# REVIEW OF THE BEST AVAILABLE TECHNIQUES (BAT) REFERENCE DOCUMENT FOR LARGE COMBUSTION PLANTS (LCP BREF)

## Assessment of split view rationales

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1 INTRODUCTION

1.1 General aspects

According to Commission Implementing Decision 2012/119/EU (Section 4.6.2.3, page 27), the following provisions apply to dissenting views expressed at final TWG meetings:

4.6.2.3. Final TWG meeting

4.6.2.3.1 General

The final TWG meeting aims at resolving outstanding issues with a view to conclude the technical discussions within the TWG.

...

In the final TWG meeting, the objective is to reach conclusions by consensus of the TWG members present. When there are well founded dissenting views, these will be recorded as indicated in Section 4.6.2.3.2 below.

4.6.2.3.2. Split views

BAT as well as environmental performance levels (see Section 3.3) associated with BAT will be drafted by the EIPPCB on the basis of information available at the time of distributing the draft to the TWG for its final meeting (see Section 4.6.2.3). Such information may include any specific proposals for BAT or associated environmental performance levels received from the TWG.

TWG members are expected to provide sound technical, cross-media and economic arguments as relevant to their case when they do not agree with the draft BAT conclusions. Such arguments should be submitted initially as comments to the formal draft BREF within the consultation period set (see Section 1.2.4).

If the TWG in the end reaches no consensus on an issue, the dissenting views and their rationale will be reported in the ‘Concluding remarks and recommendations for future work’ section of the BREF only if both the following conditions are fulfilled:

1. the dissenting view is based on information already made available to the EIPPCB at the time of drafting the conclusions on BAT for the BREF or has been provided within the commenting period corresponding to such a draft;

2. a valid rationale supporting the split view is provided by the TWG member(s) concerned. The EIPPCB will consider a rationale to be valid if it is supported by appropriate technical, cross-media or economic data or information relevant to the definition of BAT.

The Member States, environmental NGOs or industry associations that bring or support the split view will be explicitly named in the document (see Section 2.3.10).

This document lists the split views submitted in the context of the final meeting of the LCP review TWG, and assesses whether or not both conditions 1 and 2 above are met. The Concluding Remarks of the BREF shall reflect the dissenting views for which the present assessment shows that such conditions are met.
However, a positive assessment of those conditions and the reporting of a dissenting view in the BREF are not to be interpreted as an agreement of the EIPPCB with the arguments supporting that split view, or as an indication that the related BAT conclusion as agreed at the final TWG meeting may be subject to changes.

Note that, when the same TWG member made several different proposals on the same topic within a split view, only the proposal that deviates least from the conclusion was reported.

For the purposes of this document, the following acronyms are used.

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1.2 Overview of split views expressed at the final LCP TWG meeting for the review of the LCP BREF and in the subsequent consultations

Conclusions on the LCP BREF review were reached by consensus at the final TWG meeting (which took place on 1 to 5 and 8 to 9 June 2015 in Seville) and during the subsequent consultations (i.e. webinar on 1 July 2015 and written consultation from 3 July to 7 August 2015) for dealing with the final meeting leftovers. Split views were recorded on those conclusions as follows.

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### 14. Combustion of iron and steel process gases

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The detailed rationales for each of the split views provided by the TWG members concerned are reported in the following pages together with the EIPPCB’s assessment. The content of individual split views (i.e. rationale and proposal) on the same topic may differ from one to another. In this document, some split views are grouped together when the proposal and the rationale are similar and the split views are cross-referenced.

1.3 Split views not assessed in this document

Additional ‘split views’ (see table below) were submitted by TWG members after the final TWG meeting without having been raised during the meeting or during the subsequent consultations on the leftovers from the final TWG meeting. These positions are not presented or assessed in this document given that the last paragraph of Section 4.6.2.3.1 of Commission Implementing Decision 2012/119/EU (under Section ‘4.6.2.3 Final TWG meeting’) stipulates that:
"In the final TWG meeting, the objective is to reach conclusions by consensus of the TWG members present. When there are well founded dissenting views, these will be recorded as indicated in Section 4.6.2.3.2 below."

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NA=Not Applicable

(1) Version circulated on 21.10.2015.

(2) This split view is however considered in the case of some specific BAT conclusions where it was raised during the final meeting (See split views 11.13, 12.6, 12.8.1, 15.1 and 17.1).

(3) This split view was raised on the proposals for the written consultation and not on the post-consultation modified conclusion.

Some other dissenting views were announced during the final TWG meeting by the TWG members VGB Powertech and Marcogaz, relating respectively to:

- BAT-AELs for mercury emissions from coal- and/or lignite-fired plants;
• the BAT-AEL for NO\textsubscript{X} emissions and indicative levels for CO emissions from turbines for mechanical drive applications.

These split views were not supported by BUSINESSEUROPE, which is the member of the Forum established pursuant to Article 13 of Directive 2010/75/EU who nominated representatives of VGB Powertech and Marcogaz to the LCP TWG to represent BUSINESSEUROPE.

These dissenting views are therefore neither presented nor assessed in this document.
2 SCOPE

2.1 Combustion of refinery fuels

Conclusion of the meeting
Slide 8: exclude from the scope the combustion of refinery fuels in refineries.

Split view summary
CEFIC (supported by FR, PL, SK and FuelsEurope) proposes to extend the exclusion to the combustion of refinery fuels carried out:
- as a sub-activity of the refining of mineral oil and gas or,
- as an activity directly associated to the refining of mineral oil and gas which is integrated with the energy system of the refinery;
mentioning that these activities are covered by the BAT reference document for the refining of mineral oil and gas (REF BREF).

The split view is accompanied mainly by the following rationale:
- No final decision was taken by the TWG at the final meeting on the limitation of the exemption of refinery fuels from the scope of the LCP BREF to cases where refinery fuels are combusted in refineries.
- The kick-off meeting conclusions and the draft proposals before the final meeting included the exclusion of the combustion of refinery fuels from the scope.
- The text as it stands in the agreed scope of the LCP BREF would give rise to inconsistencies with the scope of the REF BREF.
- CEFIC acknowledges concerns regarding the original wording that may have opened loopholes for plants that are not physically connected to the refinery energy system. However, the rewording of the scope should allow the exclusion from the scope of the LCP BREF of combustion units firing refinery fuels outside of refineries, typically operated by the refiner itself or the operator (or operators) of petrochemicals and power generation facilities. These units should be covered by the REF BREF.

EIPPCB assessment
Availability of information on which the split view is based:
- The documents and information mentioned in the split view were available.

Validity of supporting rationale:
- The TWG addressed this topic and a decision was taken by the TWG, as reported in the final meeting conclusions slides. The only pending action was to include a definition of refinery fuels in the BAT conclusions.
- Combustion units outside refineries (whether firing refinery fuels or other fuels) are not covered by the REF BAT conclusions, which cover only "(…) certain activities specified in Section 1.2 of Annex I to the IED 'Refining of mineral oil and gas'." Therefore there is no inconsistency between the agreed scope of the LCP BREF and the scope of the REF BAT conclusions.
- The split view would expand the scope of the REF BAT conclusions, which was not discussed by the TWG that worked on the REF BREF review.
- The justification in the rationale supporting the split view is that these plants are "typically operated by the refiner itself or the operator (or operators) of petrochemicals and power generation facilities.'
EIPPCB conclusion
Taking these aspects into account, the EIPPCB considers that there are not enough appropriate technical arguments to support the split view. This split view will therefore not be reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

2.2 Waste co-incineration

2.2.1 Activity 5.2 of the Annex I to the IED

Conclusion of the meeting
Slide 5: The BAT conclusions concern the following activities specified in Annex I to Directive 2010/75/EU:
- [...]  
- 5.2: Disposal or recovery of waste in waste co-incineration plants for non-hazardous waste with a capacity exceeding 3 tonnes per hour or for hazardous waste with a capacity exceeding 10 tonnes per day, only when this activity takes place in combustion plants covered under 1.1 above.

Split view summary
RO and the UK propose to exclude from the scope of the LCP BREF Activity 5.2 of Annex I to the IED, except for the combustion of wastes that are considered biomass by the IED Article 3(31) definition.

The split view is accompanied mainly by the following rationale:
- Waste combustion may cause emission of substances which pollute air, water and soil and have harmful effects on human health.
- For this reason, operating conditions and technical requirements on waste incineration plants and waste co-incineration plants are more strictly than those imposed on LCP plants (e.g. a temperature of combustion higher than 850 °C or 1100 °C for at least two seconds).
- Technical provisions relating to combustion plants do not include the monitoring of some air-polluting substances known to have harmful effects on human health, as dioxins and furans, hydrogen chloride and hydrogen fluoride, heavy metals, gaseous and vaporous organic substances, expressed as total organic carbon (TOC); similar is the case of pollutants in waste water.
- The definition of waste and the cross-over between two BREFs is complex and open to confusion. It would be far clearer if the co-incineration of hazardous waste was dealt with by one BREF alone, any combustion AELs can be extracted from the LCP BREF.

EIPPCB assessment
Availability of information on which the split view is based:
- The data and information mentioned in the split view were available.

Validity of supporting rationale:
- The rationale justifies the split view based on arguments included in the LCP BREF on the specificities of co-incineration.
- It is noted, though, that the monitoring of the specific pollutants mentioned in the split view is included in BAT 3ter, and that it is not fully evident that moving the coverage of the waste-co-incineration from LCPs to the Waste Incineration BREF would lower the risk of confusion.
EIPPCB conclusion
Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the split view. This split view will therefore be reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scope</td>
<td>Exclude from the scope of the LCP BREF Activity 5.2 of the Annex I to the IED, except for the combustion of wastes that are biomass as defined in IED Article 3(31).</td>
<td>UK, RO</td>
<td>NA</td>
</tr>
</tbody>
</table>

2.2.2 Hazardous waste

Conclusion of the meeting
Slide 9: the BAT conclusions do not address the following:
- [...];
- disposal or recovery of waste in:
  - waste co-incineration plants where more than 40% of the resulting heat release comes from hazardous waste,
  - [...];
- this is covered by the BAT reference document for Waste Incineration.

Split view summary
SE, CAN Europe and EEB propose to exclude from the scope of the LCP BREF all co-incineration of hazardous waste (without a threshold).

SE proposes to include this activity under the scope of the waste incineration BREF (WI BREF) which is currently being reviewed.

CAN Europe proposes alternatively to define the 40% threshold as a maximum hourly average determined by the hourly heat output, the plant efficiency (determined with conventional fuels), and subtraction of average net calorific heat input of conventional fuels used during the determined operating hour.

The split view is accompanied mainly by the following rationale:
- Some activities under point 5.2 (b) of Annex I of the IED may not be covered by any BREF.
- According to the IED Article 46(2), the waste co-incineration of hazardous waste should meet emission limit levels (ELVs) set out in part 3 or 4 of the Annex VI to the IED.
- Co-incineration of hazardous waste needs adequate conditions for safe storage, handling and combustion. This is extensively and well covered by the WI BREF.
- There is a lack of clarity regarding the threshold of 40% of heat release for hazardous waste that supposedly determines whether the WI or LCP BREFs apply. In case the 40% threshold is kept, permitting authorities need clear guidance on monitoring.
EIPPCB assessment

Availability of information on which the split view is based:
- The data and information mentioned in the split view were available.

Validity of supporting rationale:
- There is no obligation for the BREFs to cover all activities listed in Annex I to the IED or to align in terms of scope with the organisation of the annexes to the IED.
- The SE rationale uses technical arguments in relation with the WI BREF on the specificities of co-incineration to justify the split view.
- The reference to ‘40% of the resulting heat release coming from hazardous waste’ is made in relation to Article 46(2) of the IED to follow the same principle as the IED: below this level, application of the IED provisions for co-incineration; above this level, application of the IED provisions for incineration. Going further in detailing in the BREF how the 40% should be understood could misalign the scope from this principle. Further, there is no clear technical justification on why the alternative proposal would be fit for purpose.
- The co-incineration of hazardous waste, which may be a common practice in some sectors (e.g. in the chemical industry), could have in principle been excluded from the LCP BREF and left to be covered in another BREF.

EIPPCB conclusion

Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the part of the split view related to the exclusion of hazardous waste from the LCP BREF scope, but not enough for other aspects of the split view. This split view will therefore only be partially reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scope</td>
<td>Exclude all co-incineration of hazardous waste from the LCP BREF scope</td>
<td>SE, CAN Europe, EEB</td>
<td>NA</td>
</tr>
</tbody>
</table>

3 DEFINITIONS

3.1 Combustion plant

Conclusion of the meeting

Slide 10:

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<th>Combustion plant</th>
<th>Combustion plant definition</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Any technical apparatus in which fuels are oxidised in order to use the heat thus generated. For the purposes of these BAT conclusions, a combination formed of:</td>
</tr>
<tr>
<td></td>
<td>- two or more separate combustion plants where the flue-gases are discharged through a common stack, or</td>
</tr>
<tr>
<td></td>
<td>- separate combustion plants which have been granted a permit for the first time on or after 1st July 1987, or for which the operators have submitted a complete application for a permit on or after that date, which are installed in such a way that, taking technical and economic factors into account, their flue-</td>
</tr>
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</table>
gases could in the judgment of the competent authority, be discharged through a common stack is considered as a single combustion plant.

For calculating the total rated thermal input of such a combination, the capacities of all individual combustion units—plants concerned, which have a rated thermal input of at least 15 MW, shall be added together.

3.1.1 Definition of combustion plant (split view from EEB)

Split view summary
EEB proposes to:

- delete: 'which have been granted a permit for the first time on or after 1st July 1987, or for which the operators have submitted a complete application for a permit on or after that date','
- delete: 'and economic',
- add: 'The public participation procedure set out in Annex IV of the IED shall apply in relation to the decision making of the competent authority',
- add: 'For the purpose of these BAT conclusions an installation on the same site which has a technical connection and which could have an effect on emissions and pollution (e.g. abatement techniques implemented at the combustion plant) shall be considered as integral part of the combustion plant'.

The split view is accompanied mainly by the following rationale:

- The aggregation rule relates to applicability questions in regards to setting minimum binding ELVs pursuant to Chapter III of the IED negotiated in co-decision whilst the BAT-AE(P)L derivation is (supposed to be) based on technical facts brought forward in the information exchange. The scope of the LCP BREF is based on Annex I.1 of the IED which refers to “combustion of fuels in installations with a total thermal input of 50MW or more”. Unlike Article 29, that provision does not exclude pre 1987 permitted installations/plants or introduce subjective conditions linked to economics or technical considerations or case by case decisions by permit writers. Consistency with a politically negotiated provision (Article 29) a) serving a different purpose and b) enabling arbitrary decision making c) and unlevel playing field for industry is therefore counter-productive to the specific purpose of the BREF.
- The questionnaires should be checked on whether there are certain cases where separate combustion plants (installations) of a lower size category (50/100/300 MWₐ) operate as a unit (higher size category) and whether the permit date (after /prior to 1987) has any technical relevance. If that is not the case than this differentiation should be removed.
- In our view it is irrelevant on when the separate combustion plants have been permitted as long as the BAT emission levels are effectively met. This would provide for consistency with Annex I.1 of the IED (the proper basis for setting the scope of the BREF) which does not differentiate between permit dates (pre / post 1987).
- Combustion plants pre-dating 1987 should be considered as “effectively closed” combustion plants as by 2021 when the revised BAT conclusions will apply, since these would by then exceed their commercial lifetime. It would be perverse to give them special (laxist) treatment on top of this through the revised BAT conclusions setting “state of the art” performance which would apply for the next decade (2021-2030).
• It should not be an economic issue to install and connect flue gas tubes to inlet of abatement techniques installed on the same site, this is a simple plumbing exercise (unlike for refineries)

• The implications of the decision by the competent authority in relation to the aggregation of separate plants is very high (leading to different ELVs). The operation of combustion plants with heat input exceeding 50 MWth are considered as having “significant effects” on the environment for which public participation is mandatory in accordance to the Aarhus Convention (Article 6). Public participation is not explicitly foreseen in Article 29 (nor Article 24 of the IED) when competent authorities need to make this judgement which can have far reaching consequences. We therefore propose this clarification to support compliance with the Aarhus Convention the Member States and the EU is bound to apply in any case.

• The explicit inclusion of “installation on the same site which has a technical connection and which could have an effect on emissions and pollution (e.g. abatement techniques implemented at the combustion plant) shall be considered as integral part of the combustion plant” is very important for the practical impact and added value of the revised BATc (see EEB split view on “new”/existing plants). The precise terms used in the definition have far reaching consequences in terms of effective environmental performance. A Large Combustion Plant is much more than a boiler/turbine/engine and environmental performance is improved by the abatement techniques or other installations at the same site with technical connection which are not themselves defined as “combustion plant” (boiler/engine/turbine). Significant emission reductions are achieved without boiler/engine/turbine change e.g. in case of replacement of abatement installations such as FGD units or systems / new dust filter types which are not themselves defined as a “combustion plant” according to the currently used definition but significantly affect environmental performance of the LCP (the whole installation). These elements should be considered since it is the uptake of the level of performance standards that is at stake here. Whilst boiler types indeed have implications on performance levels on certain parameters (e.g. NOx formation, energy efficiency) that is clearly not the case for SOx, dust and hg controls or water emissions. The abatement techniques form integral part of the combustion plant but are currently completely ignored when it comes to effective implementation requirements. (see rationale in split view on new/existing plants).

EIPPCB assessment

Availability of information on which the split view is based:
• Data and information mentioned in the split view were available.

Validity of supporting rationale:
• The reference to the date of 1 July 1987 is taken from Article 29 of the IED (and already originating from Directive 2001/80/EC). Point 1 of Annex I to the IED does not refer to the dates on which permits are granted for the first time and referring to such dates in the definition of combustion plant in the BREF/BAT conclusions has limited technical relevance, apart that it reflects long-established implementation practices.
• There may be an economic impact from merging the flue-gases of one combustion plant with those of another combustion plant, e.g. where there is a need to add reheater fans or have extensive construction works.
• The process leading to the decision of the competent authority, including public participation, is an implementation issue that goes beyond the mandate of a TWG.
• The arguments concerning the use of abatement techniques and their connections to the combustion plant are technically valid.
The definition of 'combustion plants' is given only for the purpose of this BREF (LCP).

**EIPPCB conclusion**

Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support some, but not all, of the elements of the split view. This split view will therefore only be partially reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Definition of combustion plant</td>
<td><em>Change the definition of combustion plants as follows:</em>&lt;br&gt;‘... For the purposes of these BAT conclusions, a combination formed of:*&lt;br&gt;• ...&lt;br&gt;• separate combustion plants which are installed in such a way that, taking technical and economic factors into account, their flue-gases could in the judgment of the competent authority be discharged through a common stack.&lt;br&gt;is considered as a single combustion plant.&lt;br&gt;[...] For the purpose of these BAT conclusions an installation on the same site which has a technical connection and which could have an effect on emissions and pollution (e.g. abatement techniques implemented at the combustion plant) is considered an integral part of the combustion plant.’</td>
<td>EEB</td>
<td>NA</td>
</tr>
</tbody>
</table>

### 3.1.2 Definition of combustion plant (split view from FI)

**Split view summary**

Change the definition of combustion plant so that it is identical to the Industrial Emissions Directive [IED, Article 3(25)] or add to 1.1 of the scope 'For the scope of these BAT conclusions, a combination formed by separate combustion units whose flue-gases are or could be discharged through a common stack shall be considered as a single combustion plant. For calculating the total rated thermal input of such a combination, the capacities of all combustion units concerned, which have a rated thermal input of at least 15 MW, shall be added' removing the word 'total' from the first column of all the BAT-AEL tables.

The split view is accompanied mainly by the following rationale:
The rationale for proposal of changing the definition of combustion plant to the IED definition for combustion plant is that the most important definition of the BAT conclusions should be based on IED.

The rationale for both proposals:

- IED Article 29 contains aggregation rule for the Union-wide minimum requirements of the large combustion plants of the Chapter III and Annex V. The aggregation rule is a legal instrument linked to the minimum requirements of the LCPs, resulting to minimum ELVs which cannot be exceed. Such an aggregation rule would be technically valid only in the cases where two or more plants are mixing flue gases before releasing them and sharing a common flue-gas treatment system. For any other cases the aggregation rule of the IED Article 29 would be a merely legal instrument and cannot be reasonably applied as a part of technical work. This thinking has been correctly reflected in the LCP BREF review data collection sheet and LCP BREF D1, but not in the draft conclusions released before the Final Meeting and draft Final Meeting conclusions.

- The BREF Guidance (Chapter 2.3.8. Best available techniques (BAT) conclusions) clearly states that the “The chapter of the BREF entitled ‘Best available techniques (BAT) conclusions’ will set out the conclusions on what are BAT for the sector based upon the information exchange as reflected in the previous chapters and taking account of the Article 3(10) definition of ‘best available techniques’ together with the criteria listed in Annex III to Directive 2010/75/EU.” As no information of aggregated plants has been collected or exchanged during the review, introduction of the aggregation rule at the final stages of the process, two years after the data collection would clearly against the BREF Guidance.

- The Final Meeting BP clearly states that the “Data were collected at plant level with a plant being defined in the questionnaire as ‘having only one flue-gas release point where air emissions are monitored.’ This allowed the comparison of techniques and levels of emission without the need for considering the complex cases in terms of layout of aggregated plants.” Subsequently the BAT conclusions are based on the reference plant’s data classified (typically 50–100 MW, 100–300 MW and above 300 MW) by the same rated thermal input as they were collected at unit level and not by the total rated thermal input of an aggregated plant. By adding an aggregation rule after the data has been collected, analysed and concluded at the unit level the link between BAT conclusions, the techniques and emissions of the actual plants is lost.

- The stand taken by the BP, that “The assessment performed regarding the applicability of techniques is completely valid for both standalone and aggregated plants”, is not considered valid in general: complex cases in terms of layout of aggregated plants can be only dealt properly in case-by-case implementation and not as part of the BAT conclusion. In some cases conclusions may be applied at the level of the common stack, but this is not a general case.

- This kind of change to the applicability of the BAT-AELs (i.e. applying the BAT-AELs to different combinations beyond those that the data was collected) cannot be done within the mandate of the LCP TWG. Any changes to the scope of the aggregation rule of the IED beyond Chapter III, widening of the scope of the aggregation rule to pollutants not covered by Chapter III of the IED and also the any changes to final ELVs after applying the aggregation rule for a combustion plant should be adopted by the normal legislative process of the EU, rather than the implementing acts.

- The current texts of the BAT conclusions are also far from complete as it comes to application rule. Until now it has been understood that the BAT conclusions should be a stand-alone document. To compare, the “bubble approach” of the REF BREF and related calculations are included in the conclusions. It is unclear why a different approach should be taken for the LCP BREF.
Several implementation problems arise from the current wording of the aggregation rule. The wording of the “virtual stack” is different in the IED and the draft conclusions. This creates confusion during permitting. It is not clear how the BAT-AEL ranges should be applied if aggregated, while in the IED aggregating single values is relatively straightforward. Aggregation of the plants using different fuels or units that are not similar by size would be very difficult and there would be countless different ways to do this with the current wordings. Not all fuels have BAT-AELs for all pollutants, unlike in the IED, and there seems to be no obvious way to calculate ELVs in those cases were all fuels do not have same BAT-AELs. For some cases, the IED Chapter III multi-fuel rule does not seem applicable, as all fuels would need to have ELVs defined for all three pollutants SO2, NOx and dust as in the IED. As an example, if a natural gas fired boiler is in the same stack with solid fuel fired boiler, aggregated BAT-AELs could be calculated only for NOx-emissions, as other pollutants are not covered for natural gas.

Even if no aggregation rule is applied, the conclusion would be still in line with the minimum requirements of the IED. Even if in few cases the (higher end) BAT-AELs could be higher than the aggregated minimum ELVs for that same plant based on IED Chapter III, these minimum requirements would surely be still well within the BAT-AEL range.

**EIPPCB assessment**

Availability of information on which the split view is based:

- Data and information mentioned in the split view were available.

Validity of supporting rationale:

- The rationale presented by FI includes several aspects related to the implementation of the Directive that are too broad to be addressed in detail in this assessment. However, points are raised in relation to the definition of plant at the stage of the plant-specific data collection, which provide a factual technical explanation of FI’s view that BAT-AELs should apply at the unit level rather than at aggregated plant level.

**EIPPCB conclusion**

Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the split view. This split view will therefore be reported in the ‘Concluding remarks and recommendations for future work’ section of the BREF.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
</table>


3.2  Operated hours

Conclusion of the meeting  
Slide 11:

<table>
<thead>
<tr>
<th>Operated hours</th>
<th>The time, expressed in hours, during which a combustion plant, in whole or in part, is operated and is discharging emissions to air, excluding start-up and shutdown periods</th>
</tr>
</thead>
</table>

Split view summary  
EEB proposes to delete: 'excluding start-up and shutdown periods'.

The split view is accompanied mainly by the following rationale:

- Common sense should be preserved at least in the BATc, even if political negotiations during the IED have led to a different approach for specific derogatory operation modes for Large Combustion Plants. Article 3(27) of the IED effectively excludes start-up and shut down periods in the definition of “operating hours” for combustion plants. This compromise has been retained for the purpose of calculation of hours used for the Article 33 Limited Lifetime Derogation (LLD) of the IED where the term “operating hours” is used. The European Commission can easily check this in the 4th column documents for the Trialogues;

- the practical implications are very limited since those LLD plants would have either used up their “operating hours” or would stop operation under this derogatory regime by 2024 in any case. This specific derogation is linked to derogations from the EU Safety net ELVs and in no case can be considered as combustion plants operating in accordance to BAT (in fact these plants do not even meet the LCP 2006 BREF). Further it is not clear what the purpose of inclusion of this definition in the BATc should serve;

- Chapter II of the IED, which is the only relevant provision for BAT based permitting, differentiates between “normal operating conditions” and “not normal operating conditions”. Obviously a combustion plant is discharging emissions into the air during start-up and shut down periods (as provided by the German delegation the
emissions during start-up periods are in fact much higher compared to “normal operation”). It is absurd to claim the opposite. If that is not the case the EEB we would very much welcome this, however we see not any technique or technical facts described in the revised LCP BREF which demonstrate that combustion plants manage to discharge 0 emissions into the air during those periods. EU citizens should have confidence in EU decision making, this provision is just doing the opposite and harms the credibility of the Sevilla Process especially since this definition serves no purpose.

EIPPCB assessment
Availability of information on which the split view is based:
- Data and information mentioned in the split view were available.

Validity of supporting rationale:
- The operating time of a plant is used in the LCP BREF as a criterion for identifying plants which may be subject to less strict BAT-AELs, mainly based on economic grounds.
- There is no justification provided in the split view rationale that supports including the start-up and shutdown periods within the definition of operating time.

EIPPCB conclusion
Taking these aspects into account, the EIPPCB considers that there are not enough appropriate technical arguments to support the split view. This split view will therefore not be reported in the ‘Concluding remarks and recommendations for future work’ section of the BREF.

3.3 New plant

Conclusion of the meeting
Slide 14:

| New plant | A combustion plant first permitted at the installation following the publication of these BAT conclusions or a complete replacement of a combustion plant on the existing foundations following the publication of these BAT conclusions |

Split view summary
EEB proposes to:
- Amend the definition as follow: ‘a combustion plant first operated at the installation following the publication of these BAT conclusions or a replacement of a combustion plant on the existing foundations of the installation, or replacement of an installation on the same site which has a technical connection and which could have an effect on emissions and pollution following the publication of these BAT conclusions.’
- Introduce clarifications in Chapter 10 that for 'new plants': 'The BAT conclusions apply from the date of the publication of these BAT conclusions'.

The split view is accompanied mainly by the following rationale:
- As it stands, the standards for “new plants” will only apply effectively to combustion plants that have been permitted after the publication of the BAT conclusions i.e. not likely prior to Q1 2017 or even later if further delays for publication would occur. This provision effectively promotes the status quo in environmental performance for
existing plants (in the sense of energy generation through combustion in installations above a certain threshold) which concerns roughly 98% of all coal/lignite plants for the decades to come

- the cut-off date refers to when a “combustion plant” has been permitted which are to be understood as boilers i.e. “Any technical apparatus in which fuels are oxidised in order to use the heat thus generated”. This would mean that the EIPPCB assumes that the only relevant parameter to consider in relation to differentiating the stricter BAT benchmarks (“new” plant standards) from the laxist BATc standards (“existing” plants) is the first permit date / replacement date of a boiler/turbine/engine. The precise terms used in these definitions have far reaching consequences in terms of effective environmental performance. A Large Combustion Plant is much more than a boiler and environmental performance is improved by the abatement techniques or other installations at the same site with technical connection which are not themselves defined as “combustion plant” (boiler/engine/turbine). Significant emission reductions are achieved without boiler/engine/turbine change e.g. in case of replacement of abatement installations such as FGD units or systems / new dust filter types which are not themselves defined as a “combustion plant” according to the currently used definition but significantly affect environmental performance of the LCP. These elements should be considered since it is the uptake of the level of performance standards that is at stake here. Whilst boiler types and age indeed has implications on performance levels on certain parameters (e.g. NO\textsubscript{X} formation, energy efficiency) that is clearly not the case for SO\textsubscript{X}, dust and Hg controls or water emissions. We expect that most of the boiler modifications (primary measures) already took place to meet the 2006 LCP BREF. At least that is the case for EU lignite plants

- the proposed additions are also in line with the wording used in Annex I point 1.1 which refers to “installations” which includes more than just combustion plants (boiler/engine/turbine) and are much more outcome oriented in line with the BREF aims to promote environmental performance

- all BAT-AE(P)L proposed for “new” plants are in fact met by plants that have been commissioned at latest in 2012 (HFO), 2010 (coal), 2011 (natural gas) but also much older plants (e.g. ref plant 668 already meeting the “new” standards), which are de facto “existing” plants and permitted as such. The only exception is for the non-binding energy efficiency BAT-AE(P)L where more recent plants (2014) have been put forward to derive performance benchmarks for “new” units. It is more relevant to consider the first date of operation to reflect better factual accuracy since permit procedures can take considerable time and only reflect legal obligations set by EU/national law and not what techniques can achieve

- There is no technical basis behind using the permit date as the relevant cut off to differentiate “new” plants from “existing” ones

- Further it is not explicit if that refers to “operating permit” or other type of permit which supports a situation of legal uncertainty should be prevented and not in line with the better regulation agenda. In practice this provisions invites for “cheating” by competent authorities, where plants not even in operation / in construction would be granted a (operating) permit prior to publication on paper just so they can operate in accordance to the laxist “existing” plants standards of the BATc as from 2021 up to the 2030ies (this is not fictional claim, the European Commission has been alerted on this point by Greenpeace and the EEB). A cut-off date relating to first effective operation date taking place after the publication of the BAT conclusions is therefore more straightforward. Operators of plants under construction are perfectly aware of the revised LCP BREF BATc requirements

- The trigger to apply the “new” BATc is only if a “complete replacement” (of a combustion plant) takes place. This is arbitrarily chosen and excessive and out of touch with reality since minor upgrades at boiler level or implementation / upgrades
of abatement techniques that are not at all related to the combustion plant (e.g. SOx, hg, dust abatement) can achieve the same level of performance. What would a “complete” replacement entail?

- The legal definition of the IED with a clear cut off date of 7 January 2013 pursuant to Article 30 should be used instead (option 1). One must assume that the Member States have correctly transposed the IED which specified this cut-off date for differentiating “new” from “existing” combustion plants for the purpose of implementing Chapter III of the IED. It would not be useful to introduce another different definition of what is “new” in the meaning of compliance of the BATc. We assume that any plant that went into operation after 7 January 2013 already meets the “new” LCP BATc anyways so there is no practical problem to use this approach.

- A cut-off date based on first date of operation has also been used in other BATc (e.g. Chlor-Alkali BREF) even if that definition is far from adequate (based on other points made here).

- In practical and legal terms it is not clear for “new” plants by when they need to comply with the revised BATc. Article 21(3) of the IED provides for a maximum 4 years deadline for compliance with the updated BATc. One may argue that in practice and from logical point of view the “new” plants standards would apply from publication date of the LCP BATc at the latest, but this is unfortunately not legally required (whilst it is for compliance with part 2 Annex V ELVs which however is not BAT). The EEB therefore proposes to be crystal clear that for “new” installations / combustion plants the requirements of the “new BATc” effectively apply at the latest from the publication date, to prevent perverse situations of operating permits setting out emission levels of the “existing plants” standards from 2017-2021 as an interim period to exploit the legal uncertainty created by inadequate definitions of the revised LCP BREF. This is a critical issue which deserves to be addressed at the IED Article 13 Forum level as well.

EIPPCB assessment

Availability of information on which the split view is based:

- Data and information mentioned in the split view were available.

Validity of supporting rationale:

- The applicability of each technique for existing combustion plants has been assessed in the review process, taking into account the available information and data. Applying in a general way the BAT-AELs for new plants to certain existing plants may result in the need to replace some abatement techniques, and such a possible case category has not been covered by the information exchange process.

- The criterion serves to make a distinction between new-build plants and those plants that may need to be retrofitted. This is based on technical considerations, as fewer constraints apply in the case of a newly built plant.

- The LCP BAT conclusions are developed within the context of part II of the IED and with relation to the permit conditions detailed therein. The provisions of Article 30 of the IED concern the emission limit values in Annex V to the IED and not the BAT-AELs. The date of compliance with the BAT conclusions is an issue beyond the remit of a TWG.

EIPPCB conclusion

Taking these aspects into account, the EIPPCB considers that there are not enough appropriate technical arguments to support the split view. This split view will therefore not be reported in the ‘Concluding remarks and recommendations for future work’ section of the BREF.
3.4 Aggregation rule

Conclusion of the meeting
Slide 10.
(Written consultation. Leftover 05 – Aggregation rule and definition of combustion plant)

Split view summary
EHP proposes:
- To align the aggregation rule and definition of combustion plant with the wording of IED Article 29.

The split view is accompanied by the following rationale:
- The current proposal of aggregation rules differs from the one in the IED.
- Taking into account the aggregation rules is the basic principle when considering the combustion plant definition and setting the provisions for operators in the permits. The application of BAT Conclusions should not be endangered by unnecessary ambiguities and discrepancies between BAT Conclusions and IED provisions.

- There are 3 different definitions of aggregation rules by now coming into play:
  - IED Article 29
  - LCP BREF Leftover 05 (as sent by EIPPCB by October 02, 2015)
  - LCP BREF Chapter 10 together with Final Meeting consolidated Conclusions (drafts from October 21, 2015)

EIPPCB assessment

Availability of information on which the split view is based:
- Data and information mentioned in the split view were available.

Validity of supporting rationale:
- The definition of combustion plant has been modified after the written consultation for a better alignment with IED Article 29, as explained in the explanatory document (available in BATIS) that tracks the changes made to the draft meeting conclusions slides, as updated based on the suggestions of the TWG or on the identification of other mistakes/inconsistencies.
- The rationale presented by EHP does not include substantive technical arguments explaining which are the differences in the substance of the definition of the BAT conclusions compared to that of IED Article 29, that may make the implementation of these BAT conclusions difficult.

EIPPCB conclusion
Taking these aspects into account, the EIPPCB considers that there are not enough appropriate technical arguments to support the split view. This split view will therefore not be reported in the ‘Concluding remarks and recommendations for future work’ section of the BREF.

4 INDICATIVE LEVELS FOR CO EMISSIONS TO AIR

Conclusion of the meeting
Slide 25: Set yearly average indicative emission levels for CO as a general approach, but do not exclude a priori the possibility of setting BAT-AELs when justified.

Split view summary
AT, BE and DE propose to set BAT-AELs for CO emissions to air instead of indicative levels.
DE proposes to set yearly and daily BAT-AELs for CO.

The split view is accompanied by the following rationale:
- CO is included in Annex II “List of polluting substances” to the IED.
- CO is one of the pollutants covered by Directive 2000/69/EC, setting air quality targets.
- CO was identified as a key pollutant at the KOM.
- CO is an ozone precursor.
- CO levels and corresponding techniques can be derived based on the set of well performing plants for NOX emissions (data was collected and is available).
- Indicative emission levels are not defined in IED, nor in the BREF Guidance, and thus the status of indicative emission levels is not clear.
- CO emissions are directly related to a well-controlled and complete combustion.
- In order to avoid very high short-term values, short-term monitoring based on daily average levels is necessary.
- Not providing BAT-AELs on CO poses the risk that installations will not perform in the most efficient way, resulting in higher emissions of not only CO but also PM, VOC and PAH. Higher 'CO' values could be the result of poor maintenance, but could also be the result of controlling air supply in such a way that the installation complies with the NOX emission limit values without taking structural (primary or secondary) measures. Especially when operators aim to comply with NO BAT-AEL without any NOX flue gas cleaning system CO emission may increase significantly.

**EIPPCB assessment**

Availability of information on which the split view is based:
- Data and information mentioned in the split view were available.

Validity of supporting rationale:
- CO was identified as a key pollutant at the KOM (see BP, page 17).
- Short-term and long-term CO emissions were reported in the data collection. Daily and/or yearly BAT-AELs could in principle be derived.

**EIPPCB conclusion**

Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the split view. This split view will therefore be reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 19, BAT 26, BAT 32, BAT 37, BAT 42, BAT 49, BAT 54, BAT 65, BAT 83</td>
<td>Set daily and yearly BAT-AELs for CO emissions to air instead of yearly indicative levels</td>
<td>DE</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>BE, AT</td>
<td>NA</td>
</tr>
</tbody>
</table>
5 HIGH-EFFICIENCY COGENERATION PLANTS UNDER DIRECTIVE 2012/27/EU ON ENERGY EFFICIENCY

Conclusion of the meeting
Slides 77, 200, 269, 336, 337, 377.
(Written consultation. Leftover 09 – Energy efficiency especially footnotes on CHP units/ all BAT-AEELs)

Split view summary
CZ, EL and Euroheat & Power propose for BAT 18, BAT 25, BAT 31, BAT 35, BAT 40, BAT 44, BAT 51, and BAT 64 to include the following footnote in the BAT-AEEL tables: 'CHP plants fulfilling the requirements for high-efficiency cogeneration under Directive 2012/27/EU on energy efficiency are considered as in compliance with BAT.'

The split view is accompanied by the following rationale:
- Duplicities in EU legal acts need to be avoided whenever possible.
- Hence an amendment is suggested by which the CHP plants should be considered as complying with BAT (-AEELs) if it is demonstrated that a CHP plant is fulfilling requirements for high-efficiency cogeneration within Directive 2012/27/EU on energy efficiency. This directive provides sufficiently robust scheme for calculation of effectiveness of cogeneration plants, even with periodical adjustment of harmonised reference values etc.
- In general, there are at least the environmental benefits of CHP installations in comparison to other heat or power generating facilities that should be taken into account when considering the double regulation in this respect.

EIPPCB assessment
Availability of information on which the split view is based:
- Documents and information mentioned in the split view were available.

Validity of supporting rationale:
- Directive 2012/27/EU on energy efficiency applies without prejudice to the requirements of the IED and vice versa.
- There is no clear technical rationale in the split view on how the requirements for high-efficiency cogeneration within Directive 2012/27/EU on energy efficiency are an alternative to the BAT-AEELs proposed by the BAT conclusions giving a full range of achievable performance levels.

EIPPCB conclusion
Taking these aspects into account, the EIPPCB considers that the split view is not supported by appropriate technical arguments. This split view will therefore not be reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

6 REDUCED APPLICABILITY OF BAT-AELS TO TURBINES AND ENGINES FOR EMERGENCY USE

Conclusion of the meeting
Slide 26.

Introduce in the BAT conclusions General Considerations the following text: 'The BAT-AELs set out in these BAT conclusions may not apply to liquid fuel-fired and gas-fired
turbines and engines for emergency use operated < 500 h/yr, when such emergency use is not compatible with the use of BAT.'

**Split view summary**

AT and BE propose to change the threshold agreed of < 500 h/yr to < 50 h/yr, and to remove the last part of the statement related to the compatibility with the use of BAT.

AT and BE also propose that the BAT conclusions include a definition of 'emergency use'.

The split view is accompanied by the following rationale:

- No clear consensus was achieved at the final meeting for a clear definition of the term 'emergency use' by the subgroup working on this issue. The reference to the concluding remarks that more information on these operating conditions has to be gathered is not sufficient.
- It should be clearly stated that operation of plants which are regularly contracted cannot be considered as emergency use independent of the actual operating hours.
- Real emergency situations (e.g. backup power during a grid failure) are very limited and therefore granted operation hours up to 500 h/yr are exaggerated. Operation of such plants should be limited to a maximum of yearly operating hours of 50 h/yr.

**EIPPCB assessment**

Availability of information on which the split view is based:

- There is no additional information mentioned in the split view.

Validity of supporting rationale:

- The rationale is solely based on the statement that the operation should be limited to "real" emergency situations with only one example and without any information on the reasons for applying a 50 h/yr maximum.
- The term 'emergency use' is also used in the IED without being defined in the IED. Defining the term in the LCP BREF might be seen as interpreting the IED.

**EIPPCB conclusion**

Taking these aspects into account, the EIPPCB considers that the split view is not supported by appropriate technical arguments. This split view will therefore not be reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

**7 BAT CONCLUSION ON OTNOC**

**Conclusion of the meeting**

Slide 51.

BAT 6 bis. BAT is to appropriately monitor emissions to air and/or to water during OTNOC.

**Description**

The monitoring can be carried out through direct measurement of emissions or through monitoring of surrogate parameters if this proves to be of equal or better scientific quality than the direct measurement of emissions. Emissions during start-up and shutdowns (SU/SD) may be assessed based on a detailed emission measurement carried out for a typical SU/SD procedure at least once per year, and using the results of this measurement to estimate the emissions for each and every SU/SD throughout the year.

**Split view summary**

EUROMOT proposes to change the text in the first paragraph to:
'BAT is to appropriately monitor emissions to air and/or to water during OTNOC, providing that the relevant monitoring systems are available and performing to specification during the occurrence of the OTNOC'.

The split view is accompanied by the following rationale:
- Feedback was already given on this issue, which led to a new draft BAT 6 ter/quater in Revised Draft 1 “BAT 6 ter. BAT is to monitor emissions to air and/or to water during OTNOC, providing that the relevant monitoring systems are available and performing to specification during the occurrence of the OTNOC”.
- In that feedback, EUROMOT highlighted that the emission measurements are to be based upon a validated, accurate, repeatable and cost-effective method. Some of the emissions might not be measured accurately/correctly during fast transient conditions as in a start-up situation. The measurement methods availability/suitability to provide data that is valid in respect of CEN standards, in particular in accordance with the quality assurance required must be checked. It needs to be assured that a suitable measurement method for e.g. engine start-up and shut down measurement conditions (fast analysers, calibrated for a wide concentration window and dynamic flow rates) exists when writing the environmental permit for the power plant.

**EIPPCB assessment**

Availability of information on which the split view is based:
- Documents and information mentioned in the split view were available.

Validity of supporting rationale:
- The document used for supporting the split view only says that the emission measurements are to be based upon a validated, accurate, repeatable and cost-effective method. This does not justify the rewording of the BAT conclusion as proposed in the split view.

**EIPPCB conclusion**

Taking these aspects into account, the EIPPCB considers that the split view is not supported by appropriate technical arguments. This split view will therefore not be reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

### 8 NH₃ EMISSIONS TO AIR

#### 8.1 Modify the BAT and monitoring statements / Increase the upper end of the BAT-AEL range

**Conclusion of the meeting**

Slide 39:

The BAT-associated emission level (BAT-AEL) for emissions of NH₃ to air from the use of SCR and/or SNCR is < 3–10 mg/Nm³ as a yearly average or average over the sampling period. The lower end of the range can be achieved when using SCR and the upper end of the range can be achieved when using SNCR without wet abatement techniques. In the case of combustion plants firing biomass and operating at variable load and in the case of engines firing HFO/gas oil, the higher end of the range is 15 mg/Nm³.

Slide 41:

(²) In the case of SCR, the monitoring frequency may be at least once every year, if the emissions are proven to be sufficiently stable.
**Split view summary**

EURELECTRIC proposes to change the higher end of the BAT-AEL range to 20 mg/Nm$^3$ in the case of diesel engines equipped with SCR with NO$_X$ reduction rate above 80%, with stiff load variations, frequent start-up and shutdowns, and located in small isolated systems (SIS).

EURELECTRIC proposes to change footnote (3) on the monitoring frequency as follows: 'In the case of SCR combined with the subsequent use of de-dusting and/or wet abatement techniques (e.g. Wet FGD or flue gas condenser), the monitoring frequency may be at least once every year unless the emission levels are not consistently within the BAT-AEL’s set'.

CZ proposes to change footnote (3) on the monitoring frequency as follows: 'In the case of SCR or SNC R combined with wet abatement techniques (e.g. wet/semi-Wet FGD or flue gas condenser), the monitoring frequency may be at least once every year, if the emissions are proven to be sufficiently stable or it is demonstrated that the emission levels are consistently within the BAT-AELs as set'.

EUROMOT proposes to mention the reference oxygen content in the case of engines (15% in the case of engines) along with the BAT-AEL range and to add in the statement that BAT-AEL refers to the use of SCR in the case of engines.

The split view is accompanied by the following rationale (EURELECTRIC):

- NH$_3$ emissions of diesel engines equipped with SCR may be higher than the ones observed for boilers or gas turbines equipped with SCR because of the lower temperature of the exhaust gas, the type of operation of diesel engines, the absence of wet abatement technique, etc. diesel engines equipped with SCR (and without wet abatement technique) cannot achieve NH$_3$ emission as low as 3 mg/Nm$^3$ as it is stated in text in the case of boilers or gas turbines equipped with SCR.
- The ammonia slip of a plant equipped with SCR strongly depends on the DeNOX rate of the SCR as well as on type of operation of the plants (number of start-up and shut downs, load variations...). Too little information has been collected by the TWG for diesel engines with NO$_X$ reduction rate above 80% and located in SIS.
- The solubility of NH$_3$ in water is such that, when NH$_3$-containing flue gas is brought into intensive contact with water, no relevant emission of NH$_3$ afterwards is to be expected. Wet abatement techniques such as wet FGD and flue gas condenser provide such intensive contact between flue gas and water.
- The 'stability' of the ammonia emission at the exit of a plant equipped with wet abatement technique such as Wet FGD may be difficult to be 'proven', because ammonia emission are usually so low that they cannot be satisfactorily continuously monitored. Hence in this case it is better to refer to emission 'consistently within the BAT-AEL’s set' than to emission 'sufficiently stable'.
- The need to monitor NH$_3$ with a continuous monitoring requires installing and maintaining CEMS at EN 14181 standard. In case of stable levels of NH$_3$ below CEMs detection limit or Standard Reference Method limit of quantification, such a measurement system couldn’t be duly calibrated as by QAL2 procedures.
- The text originally considered in chapter 10 of the Revised LCP draft 1 (April 2015) refers to a lowered monitoring frequency provided that 'it is demonstrated that the emission levels are consistently within the BAT-AEL’s set'. To adequately demonstrate that emission levels are consistent, frequent monitoring is provided, if not continuous monitoring. As our aim is to prevent investments that will not provide any added value (which is the case as no relevant emission is to be expected), we believe that turning the originally proposed text around is a better alternative.

The split view is accompanied by the following rationale (EUROMOT):
• There is an interconnection between NH\textsubscript{3}/NO\textsubscript{x} emissions – more NH\textsubscript{3} fed to the SCR (associated with a risk of higher NH\textsubscript{3}-slip) enables lower NO\textsubscript{x} out of a liquid fuel-fired engine equipped with SCR.

The split view is accompanied by the following rationale (CZ):
• The difference between the costs of continuous and periodical measurement of ammonia is huge. In the Czech Republic, the cost of 1 periodic measurement is about EUR 750. The continuous monitoring requires one measurement equipment per unit for cca EUR 35.000 (CAPEX) and an operational costs are cca EUR 1.800-3.500/year.
• Considering the lifetime of the continuous measurement equipment of about 15 years, the yearly costs of the continuous measurement for single unit are approximately EUR 4.000-6.000 which is about 5,3-8 times more than the costs of periodic one.
• NH\textsubscript{3} monitoring of the gases leaving the boiler (between boiler and ESP, usually) is in place as a part of direct control of NH\textsubscript{3} emissions in case where SNCR is installed. This makes the requirement of installing the continuous NH\textsubscript{3} monitoring even less useful and inefficient in terms of costs.

EIPPCB assessment

Availability of information on which the split view is based:
• Documents and information mentioned in the split view were available, with the exception of the following information submitted during or after the final meeting in June 2015 that was not considered in the assessment:
  o the following reference mentioned in the split view by EURELECTRIC that was not made available to the TWG: Wilburn, R.T. and Wright, T.L. (2004). SCR Ammonia Slip Distribution in Coal Plant Effluents and Dependence upon SO\textsubscript{3}. PowerPlant Chemistry, 2004, 6(5);
  o the reference information mentioned by CZ (EURELECTRIC on the SCR-BAT 3, Chapter 10.1.2 Monitoring) is not identified in BATIS.

Validity of supporting rationale (EURELECTRIC):
• BAT-AELs are defined for a range of < 3–10 mg/Nm\textsuperscript{3} as a yearly average or average over the sampling period, and not only as 3 mg/Nm\textsuperscript{3}. Diesel engine plants reporting NH\textsubscript{3} emissions are fitted with SCR. The emissions reported are between 4 mg/Nm\textsuperscript{3} and 9 mg/Nm\textsuperscript{3}.
• In the available information mentioned in the split view there is no technical information supporting the proposal to change the upper end of the BAT-AEL range to 20 mg/Nm\textsuperscript{3} in the case of diesel engines equipped with SCR with a NO\textsubscript{x} reduction rate above 80 %, with stiff load variations, frequent start-ups and shutdowns, and located in small isolated systems (SIS).
• The difficulty to prove the stability of the NH\textsubscript{3} emissions when additional techniques are used is an issue related to possible implementation aspects that do not justify considering the additional language on emissions within the BAT-AEL set as a substantive split view. This is rather considered an editorial issue, where –if needed– the wording of the footnote may be refined by including additional language pointing at the need to take account of the possible variations due to monitoring uncertainties.

Validity of supporting rationale (EUROMOT):
• Since information on oxygen content, for engines and for other plant types alike, is already given in the 'General considerations' section of the BAT conclusions, this repeating the oxygen level in the table would be a merely editorial change without any substantive element. For this reason, this is not considered as a split view.
• Since diesel engine plants reporting NH\textsubscript{3} emissions are all fitted with SCR (SNCR is not applied to engines), further specifying that the 15mg/Nm\textsuperscript{3} level applies to engines
with SCR would be a merely editorial change without any substantive element. For this reason, this is not considered as a split view.

Validity of supporting rationale (CZ):
- The presented rationale calculates the difference between the costs of continuous and periodic measurement of ammonia and links the cost to the added value in circumstances where wet abatement techniques are also used...

**EIPPCB conclusion**
Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the split view for most parts expressed by CZ, but that there are not enough appropriate technical arguments to support the other parts of the split view. This split view will therefore be reported for the part corresponding to the modification in footnote (3) in the case of using wet abatement techniques in the 'Concluding remarks and recommendations for future work' section of the BREF.

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 3.ter</td>
<td>Rewording of footnote (3): In the case of SCR or SNCR combined with wet abatement techniques (e.g. wet/semi-wet FGD or flue-gas condenser), the monitoring frequency may be at least once every year, if the emissions are proven to be sufficiently stable</td>
<td>CZ</td>
<td>NA</td>
</tr>
</tbody>
</table>

### 8.2 Remove the increased level for combustion plants firing biomass and operating at variable load and for engines firing HFO/gas oil

**Conclusion of the meeting**
Slide 39:
The BAT-associated emission level (BAT-AEL) for emissions of NH$_3$ to air from the use of SCR and/or SNCR is < 3–10 mg/Nm$^3$ as a yearly average or average over the sampling period. The lower end of the range can be achieved when using SCR and the upper end of the range can be achieved when using SNCR without wet abatement techniques. In the case of combustion plants firing biomass and operating at variable load and in the case of engines firing HFO/gas oil, the higher end of the range is 15 mg/Nm$^3$.

**Split view summary**
EEB, CAN Europe and NL propose to remove the text of the statement providing higher upper end of the range in some cases (biomass combustion with variable load and diesel engines).

The split view is accompanied by the following rationale:
- The increase in the upper BAT-AEL from 10 mg/Nm$^3$ to 15 mg/Nm$^3$ resulted from a number being presented without any clear technical justification and/or basis in the reference plants.
- Submitted data supplied by system supplier Yara support an upper limit of 10 mg/Nm$^3$. This accords with data provided by the Institute of Clean Air Companies.
• This also accords with data from the reference plants. The largest NH3 emission recorded for any coal plant of > 300 MW is 3.4 mg/Nm$^3$ (Plant 267), whilst most have emissions < 0.5 mg/Nm$^3$ e.g. Plants 219, 123 and 77 fitted with SCR and 376 fitted with SNCR.

• If higher levels of ammonia emissions occur, several measures exist for optimizing SNCR by a) installation of several injection points in the raw gas, b) improve mixing of injected ammonia and raw gas by the use of improved spray nozzles, c) use of ultrasonic or infrared temperature measurement for optimization of the temperature zone when injecting ammonia. All these measures lead to stoichiometric reaction of ammonia with NO$_X$ in raw gas and avoid overdosing and increase of stack emissions.

• The issue should be handled by IED Article 15(4) derogations, because the majority of the reference plants perform below 10 mg/Nm$^3$ ammonia while using comparable fuels and implementing SCR and SNCR in a comparable way.

• In the 2006 LCP BREF the BAT-AEL for ammonia is < 5 mg/Nm$^3$ (e.g. 5.5.11). Thus a wider range in the LCP BREF review must be firmly based on data. This is not the case: 15 mg/Nm$^3$ is an exception (plant 674), the majority of plants on biomass and/or peat perform below 5 mg/Nm$^3$ ammonia and all engines perform below 10 mg/Nm$^3$.

EIPPCB assessment

Availability of information on which the split view is based:
• Documents and information mentioned in the split view were available.

Validity of supporting rationale:
• Part of the information referring to NH$_3$ emissions (provided by EEB) is based on coal and/or lignite combustion.
• No clear evidence is provided supporting the assertion that there is no clear technical justification and/or basis in the reference plants for the BAT-AELs agreed in the case of biomass combustion with variable load and diesel engines. However, data provided by NL are related to biomass combustion and diesel engines and are technically analysed.

EIPPCB conclusion

Taking these aspects into account, the EIPPCB considers that the split view is supported by appropriate technical arguments. This split view will therefore be reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 4.bis</td>
<td>Remove the statement that sets the higher end of the NH$_3$ BAT-AEL range at 15 mg/Nm$^3$ in the case of combustion plants firing biomass and operating at variable load and in the case of engines firing HFO/gas oil.</td>
<td>NL, CAN Europe EEB</td>
<td>NA</td>
</tr>
</tbody>
</table>

9 BAT-AELS FOR EMISSIONS TO WATER

Conclusion of the meeting

Slides 63 to 65 on Table 10.1:
Table 10.1: BAT-AELs for direct discharges to a receiving water body from flue-gas treatment

<table>
<thead>
<tr>
<th>Substance/Parameter</th>
<th>BAT-AELs</th>
<th>Daily average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total organic carbon (TOC)</td>
<td>20–50 mg/l (*)</td>
<td></td>
</tr>
<tr>
<td>Chemical oxygen demand (COD)</td>
<td>60–150 mg/l ()</td>
<td></td>
</tr>
<tr>
<td>Total suspended solids (TSS)</td>
<td>10–30 mg/l</td>
<td></td>
</tr>
<tr>
<td>Fluoride (F⁻)</td>
<td>10–25 mg/l ()</td>
<td></td>
</tr>
<tr>
<td>Sulphate (SO₄²⁻)</td>
<td>1.3–2.0 g/l ()</td>
<td></td>
</tr>
<tr>
<td>Sulphide (S⁻), easily released</td>
<td>0.1–0.2 mg/l ()</td>
<td></td>
</tr>
<tr>
<td>Sulphite (SO₃²⁻)</td>
<td>1–20 mg/l ()</td>
<td></td>
</tr>
<tr>
<td>Metals and metalloids</td>
<td></td>
<td></td>
</tr>
<tr>
<td>As</td>
<td>10–50 µg/l</td>
<td></td>
</tr>
<tr>
<td>Cd</td>
<td>2–5 µg/l</td>
<td></td>
</tr>
<tr>
<td>Cr</td>
<td>10–50 µg/l</td>
<td></td>
</tr>
<tr>
<td>Cu</td>
<td>10–50 µg/l</td>
<td></td>
</tr>
<tr>
<td>Hg</td>
<td>0.2–3 µg/l</td>
<td></td>
</tr>
<tr>
<td>Ni</td>
<td>10–50 µg/l</td>
<td></td>
</tr>
<tr>
<td>Pb</td>
<td>10–20 µg/l</td>
<td></td>
</tr>
<tr>
<td>Zn</td>
<td>50–200 µg/l</td>
<td></td>
</tr>
</tbody>
</table>

(*) Either the BAT-AEL for TOC or the BAT-AEL for COD applies. TOC monitoring is the preferred option because it does not rely on the use of very toxic compounds.

(¹) The BAT-AEL only applies to plants using calcium compounds in flue-gas treatment.

(²) The upper end of the range may not apply in the case of high salinity of the waste water (e.g. chloride concentrations ≥ 5 g/l) due to the increased solubility of calcium sulphate.

(³) These BAT-AELs apply after subtraction of the intake load.

(⁴) These BAT-AELs only apply to wastewater from the use of Wet FGD.

(⁵) This BAT-AEL does not apply to discharges to sea- or brackish-water bodies.

The associated monitoring is in BAT 3 quater.

9.1 BAT-AEL for emissions of Hg to water (split view from EURELECTRIC, supported by EL)

Split view summary
EURELECTRIC, supported by EL, proposes to increase the lower and upper ends of the Hg BAT-AEL range for Hg emissions to water to 0.5–10 µg/l.

The split view is accompanied by the following rationale:
- The removal of mercury from water from flue gas treatment is carried out with precipitation agents (e.g. TMT, sodium sulphide, or others). Therefore, the remaining dissolved mercury concentration in the water depends on the solubility of the precipitated mercury compound. Moreover, the precipitated mercury compounds can exist as very fine particles which cannot be completely removed from the water by addition of flocculation aids and in the sedimentation system.
- The precipitation of mercury and chromium depends on the redox potential and the pH value. At low redox potentials, oxidised mercury can be reduced to elemental Hg, which cannot be precipitated. To prevent this, the redox potential has to be elevated. At a redox potential of > 800 mV, mercury is present as Hg(II) and can be precipitated (e.g. as TMT-complex). However, at elevated redox potentials, chromium can be oxidised from Cr(III) to the highly toxic Cr(VI). Therefore, the removal of mercury via precipitation has to be balanced regarding the oxidation of chromium.
The agreed BAT-AEL for mercury excludes about one third of the reference plants. These plants are proposed by respective Member States as examples of applying BAT. Thus, the BAT-AEL range has to be set in such a manner that it includes their emission levels.

**EIPPCB assessment**

**Availability of information on which the split view is based:**
- Data and information mentioned in the split view were available.

**Validity of supporting rationale:**
- The residual dissolved mercury concentration generally depends on the solubility of the precipitated compound, but also on the dosage of the reagent and on the residence time. In order to improve the removal of suspended solids, additional clarifiers or filtration can be employed.
- No information on the trade-off between Hg removal and formation of Cr(VI) was provided during the data collection. In particular, no data are presented that show that the agreed BAT-AEL range would lead to higher emissions of Cr(VI) or that the BAT-AEL proposed in the split view would not.
- Several plants in the data collection reported emission values within the agreed BAT-AEL range. The fact that a plant was proposed as a reference plant by a Member State does not necessarily imply that it uses BAT in all aspects.

**EIPPCB conclusion**

Taking these aspects into account, the EIPPCB considers that there are not enough appropriate technical arguments to support the split view. This split view will therefore not be reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

### 9.2 Table 10.1 (split view from EEB and CAN Europe)

**Split view summary**
EEB and/or CAN Europe propose to modify the following BAT-AEL ranges:

- **TOC upper end** should be < 20 mg/l (CAN Europe and EEB)
- **COD upper end** should be 60 mg/l (CAN Europe and EEB)
- **TSS upper end** should be 20 mg/l (CAN Europe and EEB)
- **Fluoride upper end** should be 10 mg/l (CAN Europe) or 12 mg/l (EEB)
- **Sulphite upper end** should be 5 mg/l (CAN Europe and EEB)
- **Arsenic upper end** should be 10 µg/l (CAN Europe) or 20 µg/l (EEB)
- **Cd upper end** should be 1.5 µg/l (CAN Europe) or 2 µg/l (EEB)
- **Cr upper end** should be 10 µg/l (CAN Europe) or 12 µg/l (EEB)
- **Cu upper end** should be 20 µg/l (CAN Europe and EEB)
- **Hg upper end** should be 0.05 µg/l (CAN Europe) or 1 µg/l (EEB)
- **Hg lower end** should be < 0.05 µg/l (EEB)
- **Ni upper end** should be 15 µg/l (CAN Europe and EEB)
- **Pb upper end** should be 7 µg/l (CAN Europe) or 16 µg/l (EEB)
- **Zn upper end** should be 64 µg/l (CAN Europe and EEB)

The split view is accompanied by the following rationale:

- **TOC upper end**
The proposed upper BAT-AEL is set by a significant rounding up of the maximum data for Plant 121 (from 42.8 to 50 mg/l).

This one plant has been used to increase the upper BAT-AEL by a factor of at least 2.5 compared with the maximum emissions recorded by the other plants in the sample.

The upper limit of the yearly TOC BAT-AEL should be based on Plant 123 with emissions of 16 mg/l. This includes all sampled types of WWT processes and single and multiple flue gas treatment streams. It also covers both coal and lignite plants, the full age range and sampled sizes and load factors.

Plants 476, 662, 464, 455, 128-1 can be used as reference for reviewing the proposed level.

COD upper end

The proposed BAT-AEL appears to have been set by a significant rounding up of the data for plant 223. However, as that plant includes other streams, it cannot set the BAT-AEL.

There are only four plants within the proposed range that have emissions deriving from flue gas treatment only, and the one with the highest emissions is Plant 122a at 75 mg/l.

However, this adds nothing in terms of fuel, age, capacity, load factor, SOx flue gas treatment and WWTP technique to a BAT-AEL set by the 2 better performing Plants – 662 and 123 (maximum emissions of 51.3 and 57 mg/l respectively).

The upper daily BAT-AEL should therefore be 60 mg/l (Plant 123).

Plants 197, 384-1, 662 can be used as reference for reviewing the proposed level.

TSS upper end

Whether the proposed upper limit is set by plant 441-2 or 384-1, these plants include other streams within the plant and therefore cannot set the BAT-AEL.

The upper BAT-AEL therefore cannot be more than 25 mg/l (Plant 567). However, this adds nothing to an upper BAT-AEL set at Plant 456, which includes all fuels, capacities, load factors, SOx flue gas treatments and WWTP techniques.

The upper BAT-AEL should therefore be 20 mg/l (Plant 456).

Plants 662, 464, 455, 128-1 can also be used as reference for reviewing the proposed level.

Fluoride upper end

The proposed upper BAT-AEL is set by Plant 121. However, this adds nothing to a BAT-AEL set at Plant 123 which covers the sampled fuel and the full range of age, capacity, load factor, SOx flue gas treatment and WWTP technique.

The upper BAT-AEL should therefore be 12 mg/l (Plant 123) (EEB).

Plants 384-1, 223, 496 can be used as reference for reviewing the proposed level (CAN Europe).

Sulphite upper end

There are no reference plants even nearly supporting an upper BAT-AEL of 20 mg/l – the nearest is Plant 121, with a maximum emission of 13 mg/l (the highest recorded). However, there is nothing distinctive about Plant 121 in terms of age, fuel, operating hours, SOx abatement, WWTP technology or single/multiple flue gas treatment streams.

The upper BAT-AEL should therefore be set by Plant 141 (5 mg/l).

Six plants, hence all plants but Plant 121, can be used as reference for reviewing the proposed level.

Arsenic upper end

There are no reference plants for an upper BAT-AEL of 50 µg/l – it lies between Plants 141 (30 µg/l) and 121 (70 µg/l). However, there is nothing distinctive
about Plant 141 that cannot better be represented by Plant 662 in terms of fuel, age, capacity, operating hours, SO\textsubscript{X} abatement and WWTP technique.

- **Cd upper end**
  - The proposed upper BAT-AEL is set by Plant 197, which includes other streams and cannot therefore be BAT.
  - It also duplicates plant and abatement characteristics that are represented in better performing plants elsewhere in the sample.
  - Setting the BAT-AEL at Plant 121 includes all fuels and fuel combinations and the full range of age, capacity, operating hours, SO\textsubscript{X} abatement and WWTP technique.
  - The upper daily BAT-AEL should therefore be 2 \( \mu \text{g/l} \) (Plant 121) (EEB).
  - Plant 476 can be used as reference for reviewing the proposed level (CAN Europe).

- **Cr upper end**
  - There is no reference plant corresponding to the proposed upper level.
  - The closest plant within that limit is Plant 233, which has maximum emissions of 40 \( \mu \text{g/l} \) but includes other waste streams and cannot therefore provide a proper basis for the BAT-AEL. Further, Plant 233 adds nothing to an upper BAT-AEL set by Plant 456, 28 MW\textsubscript{th}, commissioned in 1984 and operating 2800 hours.
  - This BAT-AEL covers all sampled fuels, the full age range, and all sizes, operating hours and SO\textsubscript{2} flue gas treatments.
  - The upper daily BAT-AEL should therefore be 12 \( \mu \text{g/l} \) (Plant 456) (EEB).
  - Plants 662, 476, 455, 473, 464, 367, 386-1 can be used as reference for reviewing the proposed level (CAN Europe).

- **Cu upper end**
  - There is no reference plant corresponding to the proposed upper level.
  - Plants 386-1 and 223 have maximum emissions of 32 \( \mu \text{g/l} \) and 37 \( \mu \text{g/l} \) respectively, but both include other streams and cannot therefore provide a proper basis for a the BAT-AEL.
  - The closest plant within that limit that does not include other streams is 141, which has maximum emissions of 20 \( \mu \text{g/l} \).
  - The upper BAT-AEL should therefore be 20 \( \mu \text{g/l} \) (Plant 141).

- **Hg upper end**
  - The proposed upper limit is nominally set by Plant 141.
  - However, Plant 141 adds nothing to an upper BAT-AEL set by plant 476 (1 \( \mu \text{g/l} \)) which covers all sampled fuels, the full range of age, size, operating hours, SO\textsubscript{2} flue gas treatments and WWTP techniques.
  - The upper BAT-AEL should therefore be 1 \( \mu \text{g/l} \) (Plant 476) (EEB).
  - Plants 662, 384-1, 479, 496 can be used as reference for reviewing the proposed level (CAN Europe).

- **Hg lower end**
  - Of the 16 plants sampled four have maximum emissions lower than the proposed lower BAT-AEL limit, with no grounds for excluding them from the BAT-AEL.
  - Plant 662 measuring only the flue gas treatment stream has emissions of 0 \( \mu \text{g/l} \), presumably below the level of detection.
  - Plant 479 has no maximum data, whilst Plant 496 has maximum emissions of 0.05 \( \mu \text{g/l} \).
  - Therefore the lower level should be < 0.05 \( \mu \text{g/l} \) (Plant 496) (EEB).

- **Ni upper end**
  - The proposed upper level is nominally set by Plant 197, but this includes streams other than just the flue gas treatment stream.
The next best performing plant is 121 with maximum emissions of 42 µg/l. However, Plant 121 adds nothing to an upper BAT-AEL set by Plants 662 and 138 (15 µg/l) which covers all sampled fuels, the full range of age, size, operating hours, SO₂ flue gas treatments and WWTP techniques.

The upper BAT-AEL should therefore be 15 µg/l (Plants 662 and 138).

- **Pb upper end**
  - The upper limit is set by Plant 141. However, Plant 141 adds nothing to an upper BAT-AEL set by Plant 456 (16 µg/l) which covers all sampled fuels, the full range of age, size, operating hours, SO₂ flue gas treatments and WWTP techniques.
  - The upper BAT-AEL should therefore be 16 µg/l (Plant 456) (EEB).
  - Plants 662, 479, 473, 455 can be used as reference for reviewing the proposed level (CAN Europe).

- **Zn upper end**
  - There is no reference plants corresponding to the proposed upper BAT-AEL. The closest is Plant 223, (150 µg/l) but that cannot form the BAT-AEL because it includes streams other than just the flue gas treatment stream.
  - In practice, the upper limit is set by Plant 138, with maximum emissions of 142 µg/l. However, Plant 138 adds nothing to an upper BAT-AEL set by plant 456 (64 µg/l) which covers all sampled fuels, the full range of age, size, operating hours, SO₂ flue gas treatments and WWTP techniques.
  - The upper BAT-AEL should therefore be 64 µg/l (Plant 456).

**EIPPCB assessment**

Availability of information on which the split view is based:

- Data and information mentioned in the split view were available.

Validity of supporting rationale (TOC/COD):

- Plants 123 and 662 burn coal and use wet FGD. The waste water is not mixed with other waste water. The maximum emission values of these plants (slightly below 20 mg/l for TOC and 60 mg/l for COD) could thus be used as a reference for defining the BAT-AEL range.
- The other cited plants do not seem to provide a good justification for defining BAT-AELs, as either no data were available (TOC: Plants 455, 464, and 476), or the emission data are from mixed waste water streams (Plant 128-1 for TOC and Plant 384-1 for COD). Also, COD levels for Plant 197, which are far below the agreed BAT-AEL, are representative of a mixed waste water stream.
- The COD/TOC ratio of the proposed alternative upper ends is 3 and corresponds to a commonly accepted ratio (e.g. in E-PRTR).

Validity of supporting rationale (TSS):

- Plants 455, 456, and 464 do not burn coal and the waste water does not originate from wet FGD. These plants may therefore not be representative for the whole sector.
- The maximum emission level of Plant 662 is much lower than the proposed alternative upper end. Plant 128-1 burns mostly coal and uses wet FGD, but the emission levels refer to a mixed waste water stream while BAT 11 refers to waste water from flue-gas treatment.

Validity of supporting rationale (fluoride):

- Plant 123 (mostly hard coal, wet FGD) with a maximum fluoride emission level of 11.8 mg/l could be taken to set an upper end of 12 mg/l.
- Plants 132 and 384-1 represent FGD waste water mixed with other waste water streams and might not be representative for the whole LCP sector. Plant 496 (mostly hard coal, wet FGD) is the only plant with pure FGD waste water that
reported a maximum emission value (6.7 mg/l) below the proposed alternative upper end of 10 mg/l. Plant 496 therefore seems to be better suited to define the lower end of the BAT-AEL range.

Validity of supporting rationale (sulphite):
- Only two plants reported maximum emission values for sulphite that are different to the reported yearly average values: Plant 141 with a maximum value of 5 mg/l and Plant 121 with a maximum value of 13 mg/l. Plant 141 burns hard coal and could be taken as the basis for setting the upper end.

Validity of supporting rationale (metals, upper end):
- The emission levels depend on the applied techniques and their performance, but also on the metal levels in the fuels and the water recycling rate of the FGD, both of which are site-specific. The agreed BAT-AELs for metals therefore need to be seen in their entirety, and not only metal by metal. The more stringent upper ends mentioned in the split view are based for different metals on different plants, not all of which can be taken as representative of the conditions prevalent for the sector as a whole e.g. in terms of the fuel combusted (in several cases the plant taken as reference combuts large shares of woody biomass and forest residues rather than representing the situation of coal plants fitted with wet FGD).

Validity of supporting rationale (mercury, lower end):
- Plant 496 mostly burns hard coal and uses wet FGD. The reported maximum emission value of 0.05 µg/l could be taken to set the lower end. There are, however, doubts about the data quality, as the plant reported exactly the same figure as minimum, average, and maximum values for a total of 52 measurements per year. The same pattern could be seen for the reported emission values of Cr, Cu, Fe, Ni, V, and Zn.

EIPPCB conclusion
Taking these aspects into account, the EIPPCB considers that there are enough technical elements to support some, but not all, of the parts of the split view. This split view will therefore be only partially reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 11</td>
<td>Decrease the upper ends of the BAT-AEL ranges for a number of parameters</td>
<td>EEB, CAN Europe</td>
<td>TOC: 20 mg/l (CAN Europe and EEB) COD: 60 mg/l (CAN Europe and EEB) Fluoride: 12 mg/l (EEB) Sulphite: 5 mg/l (CAN Europe and EEB)</td>
</tr>
</tbody>
</table>

10 BAT CONCLUSIONS FOR EMISSIONS TO AIR FROM THE COMBUSTION OF NATURAL GAS
10.1 CO emissions from gas turbines, boilers and engines

**Conclusion of the meeting**
Slide 97 and 117: 'Specify the emission levels that are expected for CO and change the following tables accordingly' (i.e. set indicative levels instead of BAT-AELs for CO).

**Split view summary**
EEB and CAN Europe propose to set CO levels as daily and yearly BAT-AELs, and not as yearly indicative levels for all combustion plants firing natural gas.

The split view is accompanied by the following rationale:
- CO emissions are an indicator of how well a plant is run – it is an indicator of corrosion risk and unburned fuel, and therefore an indicator of efficiency.
- Comprehensive data has been collected in the TWG plant survey.
- CO emissions should be kept low as possible because CO emissions are toxic and contribute to climate change as well as to ozone formation.

**EIPPCB assessment**
Availability of information on which the split view is based:
- Documents and information mentioned in the split view were available.

Validity of supporting rationale:
- CO emission data were collected and available for deriving BAT-AELs as yearly or daily averages.

**EIPPCB conclusion**
Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the split view. This split view will therefore be reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 49 Table 10.27</td>
<td>Set CO emission levels as daily and yearly BAT-AELs for gas turbines, engines and boilers combusting natural gas and not as yearly indicative levels</td>
<td>EEB, CAN Europe</td>
<td>NA</td>
</tr>
</tbody>
</table>

10.2 Gas turbine load threshold for NOX BAT-AELs

**Conclusion of the meeting**
Slide 99.

**Table 10.27:** BAT-associated emission levels (BAT-AELs) for NOX emissions to air from the combustion of natural gas in gas turbines

<table>
<thead>
<tr>
<th>Type of combustion plant</th>
<th>Combustion plant total rated thermal input (MWth)</th>
<th>BAT-AELs (mg/Nm³) (1) (2)</th>
<th>NOX</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Daily average or average over the sampling period</td>
<td>Yearly average (3) (10)</td>
<td></td>
</tr>
</tbody>
</table>

47
In the case of a gas turbine equipped with DLN burners, these BAT-AELs apply only when the plant operates with effective DLN operation.

Split view summary
EURELECTRIC, supported by EL, proposes to add a footnote: 'The BAT-AELs are only applicable above 70 % load according to ISO standards'.

The split view is accompanied by the following rationale:
- As coherence in legislation is a much needed asset in order to achieve a level playing field throughout Europe, it is necessary to make the BREF LCP AEL's applicable above 70 % nominal load. This limitation of applicability is equally set in the IED.
- Questionnaire data was not explicitly requested to cover the period between the minimum start-up load for stable generation and 70 % load, but generically only normal operating conditions. So if CCGTs have only had to report emissions above 70 % load historically and provided data on this basis, then there is a risk of inappropriate benchmark data being applied.
- Since the EIPPCB proposes BAT-AELs not consistent with IED prescription, it should provide evidence, in order to assure that there are no inconsistencies in the analysed data, that emission data collected through the questionnaire and used to set the BAT-AEL ranges are really representative of operating conditions below the 70 % Gas Turbine load. The survey on 14 plants is not enough to ensure coherence in the data used to derive BAT-AEL ranges.

EIPPCB assessment
Availability of information on which the split view is based:
- Documents and information mentioned in the split view were available.

Validity of supporting rationale:
- Some operators may have reported emissions data only above 70 % load but this was not documented in the split view.
- The survey carried out on 14 plants as part of the LCP BREF review showed that the load spectrum corresponding to the emission levels reported in the data collection was much wider than just > 70 %.

EIPPCB conclusion
Taking these aspects into account, the EIPPCB considers that there are not enough appropriate technical arguments to support the split view. This split view will therefore not be reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

10.3 NOx BAT-AELs for open-cycle gas turbines (OCGTs)

Conclusions of the meeting
Slide 101.
Table 10.27: BAT-associated emission level for NOx emissions to air from gas turbines

<table>
<thead>
<tr>
<th>Type of gas turbine</th>
<th>Combustion plant total rated thermal input</th>
<th>BAT-AELs (mg/Nm$^3$) ($^3$)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>NOx</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CO</td>
</tr>
</tbody>
</table>
### 10.3.1 Increase the lower/upper ends of the BAT-AELs for new OCGTs

**Split view summary**

EUTurbines proposes to change the daily BAT-AEL to 25–60 mg/Nm³ and the yearly BAT-AEL to 20–55 mg/Nm³ (above 70% of baseload power available on the day).

The split view is accompanied by the following rationale:

- No data exist to support the proposed yearly average of 15-35 mg/Nm³ NOₓ for new OCGTs. The best example from existing plants is Plant 16.2 with 21-55 mg/Nm³. Plants 16-1, 491 and 229 support EUTurbines’ position for daily and yearly averages.
- Footnotes (11) and (13) apply to all sections of the table and are therefore moved to the header row.
- Footnote (13) should also revert to the IED EE/ 35 not 39 as written.
- Footnote (13) is required to reflect the scientific findings from papers done by Freimark et al. and shown as figure 7.12 in D1. However, this figure needs to be extended from pressure ratio of 20 to at least 40 to represent modern aero-derivative gas turbines. Without this change aero-derivative gas turbines would need to be a separate classification outside of table 10.27.

**EIPPCB assessment**

Availability of information on which the split view is based:

- Documents and information mentioned in the split view were available.

Validity of supporting rationale:

- With regards to the lower end of the yearly BAT-AEL, no OCGT plant reported the exact yearly emission level of 15 mg/Nm³. However, the emission levels mentioned in the rationale do not appropriately support the split view as for Plant 16.2 they correspond to the 5th percentile and 95th percentile of hourly averages and not to the yearly average, which is 41 mg/Nm³ for this plant. As for the higher end of the range, there are OCGTs reporting emission levels of 35 mg/Nm³ (e.g. Plant 342 operated as mechanical drive with yearly emission levels of 34.9 mg/Nm³).
- The increase of the upper end of the yearly BAT-AEL range mentioned in this split view is supported by data from Plants 16-1 and 491. The daily emission level of Plant 16-1 is higher than the IED ELV for such plants. Plants 16-1, 491 and 229 do not report yearly emission levels which would support the split view for the lower end of the yearly BAT-AEL range.
• No information in the rationale supports the minimum 70% load threshold.
• There are further remarks in the rationales which do not lead to alternative proposals from EUTurbines.
• Footnote (11) applies also to OCGTs. Therefore (11) also needs to be inserted in the header of OCGTs. This is considered a consistency improvement to be inserted automatically in the draft BAT conclusions and not as a split view.
• No arguments are given as to why footnote (13) should apply to all sections of the table and not only to new plants.
• Table 7.12 of D1 does not give information that would support the modification of the corrective factor down to EE/35.

**EIPPCB conclusion**
Taking these aspects into account, the EIPPCB considers that there are enough technical elements to support the split view on the upper end of the yearly BAT-AEL, but not on the other parts. This split view will therefore be only partially reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 47</td>
<td>Increase the upper end of the yearly BAT-AEL for new OCGTs</td>
<td>EUTurbines</td>
<td>55 mg/Nm³</td>
</tr>
<tr>
<td>Table 10.27</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 10.3.2 Decrease the lower/upper ends of the BAT-AELs

**Split view summary**

CAN Europe proposes to set the upper end of the daily BAT-AEL to 6 mg/Nm³ and the upper end of the yearly BAT-AEL to 7 mg/Nm³.

EEB proposes to set the lower end of the daily BAT-AEL to 6 mg/Nm³ and the lower end of the yearly BAT-AEL to 7 mg/Nm³.

The split view is accompanied by the following rationale:

**On the upper end of the BAT-AELs (CAN Europe):**

- NOₓ background levels are too high in Europe, many Member States exceed national thresholds, and many cities cannot comply with local air quality standards. Therefore, BAT-AEL should be set at the lowest level technically possible and economically viable, in particular when it comes to new plants running for many years.
- The data collection shows that it is possible to achieve the above proposed levels (EIPPCB document: Natural gas combustion in gas turbines NOₓ, CO and NH₃ emissions: Table 2, OCGT Plant 332V).

**On the lower end of the BAT-AELs (EEB):**

- The yearly and daily BAT-AELs proposed by the final TWG meeting were achieved by an arbitrary averaging of the performance of Plants 330, 331 332, 333 and 102. This does not properly reflect what can be achieved, as demonstrated by the performance of Plant 332 (EEB).

**EIPPCB assessment**
Availability of information on which the split view is based:
- Documents and information mentioned in the split view were available.

Validity of supporting rationale:
- The rationales are based on data from a plant (Plant 332) implementing a technique listed in BAT 47.
- However, it is not demonstrated that an emission level lower than the level of this plant is achievable by a new OCGT. Therefore, it is not appropriate to use this plant as a reference for setting the upper end of the range.

EIPPCB conclusion
Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the part of the split view referring to the lower ends of the BAT-AEL ranges, but not enough to support the part referring to the higher ends. This split view will therefore be only partially reported in the 'Concluding remarks and recommendations for future work' section of the BREF for the part submitted by EEB.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 47 Table 10.27</td>
<td>Decrease the lower ends of the daily and yearly BAT-AEL ranges for new OCGTs</td>
<td>EEB</td>
<td>6 mg/Nm$^3$ (yearly) 7 mg/Nm$^3$ (daily)</td>
</tr>
</tbody>
</table>

10.4 NO$_X$ BAT-AELs for new combined-cycle gas turbines (CCGTs)

Conclusions of the meeting
Slide 106.
Table 10.27: BAT-associated emission level for NO$_X$ emissions to air from gas turbines

<table>
<thead>
<tr>
<th>Type of gas turbine</th>
<th>Combustion plant total rated thermal input (MW$_{th}$)</th>
<th>BAT-AELs (mg/Nm$^3$) $^{(1)}$</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>NO$_X$</td>
<td>CO</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Daily average or average over the sampling period</td>
<td>Yearly average $^{(2)}$ $^{(3)}$</td>
</tr>
<tr>
<td>New CCGT</td>
<td>$\geq$ 50</td>
<td>15–40 $^{(1)}$</td>
<td>10–30 $^{(3)}$</td>
</tr>
</tbody>
</table>

$^{(1)}$ A correction factor may be applied to the higher end of the BAT-AEL range, corresponding to [higher end] x EE / 55 where EE is the net electrical energy efficiency of the plant determined at ISO baseload conditions.

10.4.1 Increase the lower/upper ends of the BAT-AELs

Split view summary
EUTurbines proposes to change the daily BAT-AEL to 25–50 mg/Nm$^3$ and the yearly BAT-AEL to 20–45 mg/Nm$^3$ (above 70 % of baseload power available on the day).
The split view is accompanied by the following rationale:

- Smaller machines operate with greater fuel flexibility.
- DLN system costs for small machines are proportionally higher.
- Emissions variability can be shown to be typically wider on smaller machines.
- Flexible operation for peak loading is typical for smaller size machines.
- The data set used for the BREF is 2010/2011 data, the operation regime in 2014/2015 has changed to support RES with a consequence of higher emissions.
- Plants 271 and 295 (all have higher emissions and are for peak load operations).

**EIPPCB assessment**

Availability of information on which the split view is based:

- Documents and information mentioned in the split view were available.

Validity of supporting rationale:

- The rationale refers to small turbines, but makes reference to two plants of > 235 MWth (Plants 295 and 271). Furthermore, these plants are fitted with water or steam injection while new CCGTs would be fitted with DLN systems; their yearly emission levels are above the levels proposed in the split view, except for the upper end of the daily BAT-AEL range in the case of one plant.
- No information in the rationale supports the minimum 70 % load proposal.

**EIPPCB conclusion**

Taking these aspects into account, the EIPPCB considers that there are not enough appropriate technical arguments to support the split view. This split view will therefore not be reported in the ‘Concluding remarks and recommendations for future work’ section of the BREF.

### 10.5 NO\textsubscript{X} BAT-AELs for existing combined-cycle gas turbines (CCGTs) of ≥ 600 MW\textsubscript{th}

**Conclusions of the meeting**

Slide 108.

Table 10.27: BAT-associated emission level for NO\textsubscript{X} emissions to air from gas turbines

<table>
<thead>
<tr>
<th>Type of gas turbine</th>
<th>… input (MW\textsubscript{th})</th>
<th>BAT-AELs (mg/Nm\textsuperscript{3}) (^{(1)})</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>NO\textsubscript{X}</td>
</tr>
<tr>
<td></td>
<td>Daily average …</td>
<td>Yearly average …</td>
</tr>
<tr>
<td>Existing CCGT with a net total fuel utilisation &lt; 75 %</td>
<td>≥ 600</td>
<td>18–50</td>
</tr>
<tr>
<td>Existing CCGT with a net total fuel utilisation ≥ 75 %</td>
<td>≥ 600</td>
<td>18–55 (16)</td>
</tr>
</tbody>
</table>

\(^{(16)}\) For existing plants put into operation no later than 7 January 2014, the higher end of the BAT-AEL range is 65 mg/Nm\textsuperscript{3}.
10.5.1 Increase the lower/upper ends of the BAT-AELs

Split view summary
EUTurbines proposes to change the daily BAT-AELs to 35–60 mg/Nm³ for CCGTs with a net total fuel utilisation of < 75 % and to 20–75 mg/Nm³ for CCGTs with a net total fuel utilisation of ≥ 75 %.

EUTurbines proposes to change the yearly BAT-AELs to 15–50 mg/Nm³ for CCGTs with a net total fuel utilisation of < 75 % and to 15–60 mg/Nm³ for CCGTs with a net total fuel utilisation of ≥ 75 %.

The split view is accompanied by the following rationale:

- The proposed levels correspond to plants permitted under the LCP Directive on the basis of 50 mg/Nm³ (fuel utilisation < 75 %) or 75 mg/Nm³ (fuel utilisation ≥ 75 %) for NOX emissions.
- Retrofitting SCR is not possible.
- Retrofitting of combustor is unlikely in the case of plants with fuel utilisation of > 75 %.
- Plants 49, 417.1, 417.2 and 1013 support EUTurbines’ position for daily and yearly averages.

EIPPCB assessment
Availability of information on which the split view is based:

- Documents and information mentioned in the split view were available.

Validity of supporting rationale:

- LCP or IED ELVs cannot necessarily be taken to reflect the use of BAT.
- SCR/DLN system retrofit is possible with a space applicability restriction for SCR and retrofit package availability for DLN systems, according to the decisions taken by the TWG.
- Plants with a net total fuel utilisation of < 75 %: there is no rationale supporting a lower end of the yearly/daily BAT-AEL ranges at 15/35 mg/Nm³. The rationale supporting another higher end of the yearly BAT-AEL range mentions data from Plant 1013 fitted with a technique listed in BAT 47, but this does not make the link with the alternative daily BAT-AEL range at 60 mg/Nm³.
- Plants with a net total fuel utilisation of > 75 %: there is no rationale supporting a lower end of yearly/daily BAT-AEL ranges at 15/20 mg/Nm³, and no rationale supporting a higher end of yearly/daily BAT-AEL ranges at 60/75 mg/Nm³, with the only plant mentioned having a net total fuel utilisation of > 75 % being Plant 49 with emission levels different to those proposed by EUTurbines in the split view.

EIPPCB conclusion
Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the part of the split view referring to the higher end of the yearly BAT-AEL range, but not enough to support other parts of the split view. This split view will therefore only be partially reported in the ‘Concluding remarks and recommendations for future work’ section of the BREF.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
</table>

53
Increase the higher end of the yearly BAT-AEL for existing CCGTs of \( \geq 600 \text{ MW}_{\text{th}} \) with a net total fuel utilisation of < 75%.

<table>
<thead>
<tr>
<th>BAT 47</th>
<th>EUTurbines</th>
<th>50 mg/Nm³</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table 10.27</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

10.5.2 **Decrease the upper ends of the BAT-AELs for plants with a net total fuel utilisation of 75% or more**

**Split view summary**

AT proposes to decrease the upper end of the daily BAT-AEL range to 35 mg/Nm³ and the upper end of the yearly BAT-AEL range to 25 mg/Nm³.

BE proposes to decrease the upper end of the daily BAT-AEL range to 55 mg/Nm³.

CAN Europe and EEB propose to decrease the upper end of the daily BAT-AEL range to 45 mg/Nm³ and the upper end of the yearly BAT-AEL range to 30 mg/Nm³.

The split view is accompanied by the following rationale (AT):

- The majority of installations can, at all times, comply (95th percentile, half-hourly/hourly basis) with an upper daily value of the BAT-AEL range of 35 mg/Nm³ as daily average (see graph provided by the EIPPCB prior to the final meeting), taken from BATIS: up to plant 10V.
- The corresponding yearly average lies at 25 mg/Nm³ resulting in an upper BAT-AEL for the yearly averages of 25 mg/Nm³.
- Additionally AT wants to emphasise that for plants > 100 MWth SCR technology is within few constraints generally applicable which allows NO\(_X\) emissions well below 20 mg/Nm³ (daily average).

The split view is accompanied by the following rationale (BE):

- The vast majority of plants (incl. plants put into operation before 7 January 2014) can, at all times, comply with the upper value of the BAT-AEL range, i.e. 55 mg/Nm³ (daily) (see graph provided by the EIPPCB prior to the final meeting).
- Exceedance of the upper value of the BAT-AEL range are generally within the margin of error (systematic and random errors of sampling and analysis), which is 20% for NO\(_X\). Plants that do not comply after the margin of error is taken into account, are 370V, 417-1V and 241V. These plants are however not considered to be ~ BAT and/or their emission data cannot be taken into account:
  - There is a large variation between yearly average and 95 percentile data (plant 370V).
  - They do not comply with their current ELV (plant 370V, ELV: 55 mg/Nm³ (daily average)).
  - They have a rather high ELV, and plants will often go as far as needed by their permit (417-1V: 90 mg/Nm³ (averaging period not know), 241V: 150 mg/Nm³ (monthly average) and 165 mg/Nm³ (95th percentile, 48-hours average).

The split view is accompanied by the following rationale (CAN Europe and EEB):

- NO\(_X\) background levels are too high in Europe, many Member States exceed national thresholds, and many cities cannot comply with local air quality standards. Therefore, BAT-AEL should be set at the lowest level technically possible and economically viable, in particular when it comes to new plants running for many years.
- The data collection shows that it is possible to achieve the above proposed levels.
- Yearly upper BAT-AEL for existing plants \( \geq 600 \text{ MW}_{\text{th}} \) with \( \geq 75\% \) fuel utilisation.
o There is no reference plant justifying an upper BAT-AEL of 55 mg/Nm³ — all the plants in the dataset > 75% fuel utilisation have emissions < 50 mg/Nm³.

- However, 4 of the 5 plants in this category would be included in an upper BAT-AEL of 30 mg/Nm³.
- The other plant (49) is a poorer performing example of the commonly used DLN.
- The upper BAT-AEL for plants > 600 MWth with fuel utilisation > 75% should therefore be 30 mg/Nm³.

- Daily upper BAT-AEL for existing plants ≥ 600 MWth with ≥ 75% fuel utilisation
  - A well-managed plant should not have 95th percentile data excessively above its average.
  - The proposed upper BAT-AEL has been set by Plant 49, which has higher than normal difference between the yearly and daily data, and is excluded from the EEB’s proposal.
  - Better performing plants with yearly emissions of 30 mg/Nm³ would achieve daily levels within ~45mg/Nm³.
  - Therefore the upper daily BAT-AEL should be 45 mg/Nm³.

EIPPCB assessment

Availability of information on which the split view is based:
- Documents and information mentioned in the split view were available.

Validity of supporting rationale:
- The rationale is based on available data from plants fitted with techniques listed in BAT 47 and which support the alternative proposed levels (amongst the mentioned plants, two have a net total fuel utilisation > 75%, with Plant 656 having emissions very close to Plant 10), and on the fact that, further to the submitted data, SCR can also be applied providing emission levels below 20 mg/Nm³.
- Since the levels supported by AT are the most stringent among all levels mentioned in the split view by other TWG members, the rationale presented by AT is considered valid for the entire split view.

EIPPCB conclusion

Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the split view. This split view will therefore be reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 47 Table 10.27</td>
<td>Decrease the higher ends of the daily and yearly BAT-AELs for all existing CCGTs of ≥ 600 MWth with a net total fuel utilisation of ≥ 75%</td>
<td>AT</td>
<td>25 mg/Nm³ (yearly) 35 mg/Nm³ (daily)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>BE</td>
<td>55 mg/Nm³ (daily)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EEB, CAN Europe</td>
<td>30 mg/Nm³ (yearly) 45 mg/Nm³ (daily)</td>
</tr>
</tbody>
</table>

10.5.3 Decrease the upper ends of the BAT-AELs for plants with a net total fuel utilisation of less than 75% 

Split view summary
CAN Europe and EEB propose to decrease the upper end of the daily and yearly ranges respectively to 35 mg/Nm$^3$ and 25 mg/Nm$^3$ for CCGTs with a net total fuel utilisation of less than 75%.

The split view is accompanied by the following rationale:

- NO$_X$ background levels are too high in Europe, many Member States exceed national thresholds, and many cities cannot comply with local air quality standards. Therefore, BAT-AEL should be set at the lowest level technically possible and economically viable, in particular when it comes to new plants running for many years.
- The data collection shows that it is possible to achieve the above proposed levels.
- Yearly upper BAT-AEL for existing plants ≥ 600 MW$_{th}$ with < 75% fuel utilisation
  - An upper BAT-AEL of 40 mg/Nm$^3$ is set by Plants 193 and 433.
  - However, this adds nothing to setting the upper BAT-AEL at 25 mg/Nm$^3$ (Plant 10) – all sampled abatement techniques would still be covered.
  - Anything more than 25 mg/Nm$^3$ is simply duplication of plant types with less well performing ones, and this cannot be BAT.
  - Therefore the upper BAT-AEL should be 25 mg/Nm$^3$ (Plant 10).
- Daily upper BAT-AEL for existing plants ≥ 600 MW$_{th}$ with < 75% fuel utilisation
  - Nearly all the plants with yearly emissions 25–40 mg/Nm$^3$ have a difference between the yearly and 95th percentile data of < 10 mg/Nm$^3$.
  - For plants with yearly emissions 21-25 mg/Nm$^3$, all such differences are < 8 mg/Nm$^3$.
  - Therefore for a yearly average of 25 mg/Nm$^3$ the upper daily BAT-AEL should be 35 mg/Nm$^3$.

EIPPCB assessment

Availability of information on which the split view is based:

- Documents and information mentioned in the split view were available.

Validity of supporting rationale (CAN Europe):

- The rationale is based on data from all plants achieving levels below or up to the level of Plant 10, which is used as a reference for the higher end of the range. These plants encompass all the abatement techniques listed in BAT 47, and the rationale presented makes the link with the levels proposed in the split view.

EIPPCB conclusion

Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the split view. This split view will therefore be reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 47 Table 10.27</td>
<td>Decrease the higher ends of the daily and yearly BAT-AELs for existing CCGTs of ≥ 600 MW$_{th}$ with a net total fuel utilisation of &lt; 75 %</td>
<td>EEB, CAN Europe</td>
<td>25 mg/Nm$^3$ (yearly) 35 mg/Nm$^3$ (daily)</td>
</tr>
</tbody>
</table>
10.6 NO\textsubscript{X} BAT-AELs for existing combined-cycle gas turbines (CCGTs) with a rated thermal input of 50–600 MW\textsubscript{th}

Conclusions of the meeting
Slide 109.
Table 10.27: BAT-associated emission level for NO\textsubscript{X} emissions to air from gas turbines

<table>
<thead>
<tr>
<th>Type of gas turbine</th>
<th>… input (MW\textsubscript{th})</th>
<th>BAT-AELs (mg/Nm\textsuperscript{3}) \textsuperscript{(1)}</th>
<th>\begin{tabular}{c} \text{NO\textsubscript{X}} \ \text{CO} \end{tabular}</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Daily average \begin{tabular}{c} \text{…} \ \text{…} \end{tabular}</td>
<td>Yearly average \begin{tabular}{c} \text{…} \ \text{…} \end{tabular}</td>
</tr>
<tr>
<td>Existing CCGT with a net total fuel utilisation &lt; 75 %</td>
<td>50–600</td>
<td>35–55</td>
<td>10–45</td>
</tr>
<tr>
<td>Existing CCGT with a net total fuel utilisation ≥ 75 %</td>
<td>50–600</td>
<td>35–55 \textsuperscript{(17)}</td>
<td>25–50 \textsuperscript{(18)}</td>
</tr>
</tbody>
</table>

\textsuperscript{(17)} For existing plants put into operation no later than 7 January 2014, the higher end of the BAT-AEL range is 80 mg/Nm\textsuperscript{3}.
\textsuperscript{(18)} For existing plants put into operation no later than 7 January 2014, the higher end of the BAT-AEL range is 55 mg/Nm\textsuperscript{3}.

10.6.1 Increase the upper end of the yearly BAT-AEL for plants with a net total fuel utilisation of ≥ 75 %

Split view summary
EURELECTRIC, supported by EL, proposes to change the level set in footnote \textsuperscript{(18)} from 55 mg/Nm\textsuperscript{3} to 75 mg/Nm\textsuperscript{3}.

The split view is accompanied by the following rationale:
- The currently proposed maximum yearly average seems to be based on plant 1006: a 498 MW\textsubscript{th} CCGT used for district heating equipped with DLN running for 6.040 hours in the reference year with an average load of 94 \%. Commissioned in 2009.
- The maximum values of the yearly ranges for NO\textsubscript{X} should be increased to 75 mg/Nm\textsuperscript{3} in footnote \textsuperscript{(18)}, in order to include also the following plants which are all equipped with BAT technologies but were not considered without any explicit explanation:
  - Plant 153-1: yearly average of 71 mg NO\textsubscript{X}/Nm\textsuperscript{3} for a 74 MW\textsubscript{th} CCGT equipped with water injection running for 7.030 hours in the reference year with an average load factor of 89 \%. Commissioned in 1996;
  - Plant 153-3: yearly average of 73 mg NO\textsubscript{X}/Nm\textsuperscript{3} for a 74 MW\textsubscript{th} CCGT equipped with water injection running for 6.478 hours in the reference year with an average load factor of 96 \%. Commissioned in 1996;
  - Plant 154-6C: yearly average of 78 mg NO\textsubscript{X}/Nm\textsuperscript{3} for a 500 MW\textsubscript{th} CCGT equipped with DLN running for 6.940 hours in the reference year with an average load factor of 84 \%. Commissioned in 1997.
- Many existing CHPs are built in a very limited space with specific technical constraints, making the installation of secondary abatement techniques technically not feasible. This would then force the operators of both the heat receiver and the CHP to
decommission it and switch to boiler operation instead of CHP given the current market situation. Also IED foresees specific provision for CHP plants giving them higher emission limit values in case of an overall efficiency greater than 75 %, acknowledging the particularities of CHP plants.

- Some of the CHPs with gas turbines are also equipped with HRSG and supplementary firing. The supplementary firing gives rise to the emissions, but is needed to accommodate for a sufficient heat delivery, rendering the CHP-system more efficient and avoiding the use of a separate boiler. Since the BAT-AELs are applicable without any specific provision also to plants with supplementary firing, the maximum value of the NOX range should be increased to 75 mg/Nm\(^3\) also in order to take into account, specifically for CHP plants, the possible contribution of supplementary firing (as already acknowledged in background paper section 1.6.6.1.1 points 9-11).

**EIPPCB assessment**

Availability of information on which the split view is based:
- Documents and information mentioned in the split view were available.

Validity of supporting rationale:
- Plant 154-6 has emission levels higher than the level proposed in the split view and than the IED monthly ELV.
- No clear correlation between the level of NO\(_X\) emitted and the use of supplementary firing has been demonstrated, as per BP Section 1.6.6.1.1.
- The rationale mentions the lack of space preventing the implementation of SCR at CHP plants like Plants 153-1/2, which is a technical restriction mentioned in the applicability. Emission levels from Plants 153-1/2 support the split view.

**EIPPCB conclusion**

Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the split view. This split view will therefore be reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 47 Table 10.27</td>
<td>Change the level set in footnote ((^{18}))</td>
<td>EURELECTRIC, EL</td>
<td>75 mg/Nm(^3)</td>
</tr>
</tbody>
</table>

**10.6.2 Decrease the upper ends of the BAT-AELs for plants with a net total fuel utilisation of ≥ 75 %**

**Split view summary**

BE, CAN Europe and EEB propose to decrease the upper ends of the daily and yearly BAT-AEL ranges respectively to 55 mg/Nm\(^3\) and 50 mg/Nm\(^3\) in the case of existing plants, and thus to remove footnotes (\(^{17}\)) and (\(^{18}\)).

The split view is accompanied by the following rationale:
- The vast majority of plants (incl. plants put into operation before 7 January 2014) can, at all times, comply with the upper value of the BAT-AEL range, i.e. 55 mg/Nm\(^3\) (daily) (see graph provided by the EIPPCB prior to the final meeting).
- Exceedance of the upper value of the BAT-AEL range are generally within the margin of error (systematic and random errors of sampling and analysis), which is
20 % for NOx. Plants that do not comply after the margin of error is taken into account are plants 1006V, 153-1C, 153-3C, 375V, 154-6C and 1007V. These plants are however not considered to be BAT and/or their emission data cannot be taken into account:

- There is a large variation between yearly average and 95 percentile data.
- Plants 153-1C and 153-3C are the only plants applying only water injection. BAT 47 prescribes 'one or a combination of'.
- For plants 375V and 154-6C information on emission variation is lacking.
- For plants 153-1C and 153-3C information on current ELV is missing (plants will often go as far as needed by their permit).
- The questionnaire for plant 1007 is not available on BATIS (lack of transparency).
- Same accounts for the yearly average of 50 mg/Nm³. Looking at the figure, and thus the data available, there is no need to foresee a deviation for plants put into operation before 7 January 2014.

- The BAT-AELs agreed for existing plants 50-600 MWth with ≥75% fuel utilisation are derived from reference plant data collected in the period covered by the footnotes (before 7 January 2014). This shows that these plants can easily comply with the BAT-AELs.

### EIPPCB assessment

#### Availability of information on which the split view is based:
- Documents and information mentioned in the split view were available.

#### Validity of supporting rationale:
- 6 out of the 13 plants that reported 95th percentile values and that are fitted with techniques listed in BAT 47 achieve emission levels within the levels proposed in the split view, which is not 'a vast majority'.
- The difference between the higher ends of the range proposed in the split view and the BAT-AEL consists of the removal of a 'margin of error (systematic and random errors of sampling and analysis', which could correspond to the measurement uncertainty. However, it was decided at the TWG final meeting that the BAT-AELs would be derived based on raw data from the data collection and without subtracting/adding any measurement uncertainty.
- There is no further technical assessment supporting the rationale for decreasing the higher ends of the ranges in the case of plants put into operation before 7 January 2014.

### EIPPCB conclusion

Taking these aspects into account, the EIPPCB considers that there are not enough appropriate technical arguments to support the split view. This split view will therefore not be reported in the ‘Concluding remarks and recommendations for future work’ section of the BREF.

#### 10.6.3 Decrease the upper ends of the BAT-AELs for plants with a net total fuel utilisation of < 75 %

### Split view summary

CAN Europe and EEB propose to decrease the upper ends of the daily and yearly BAT-AEL ranges respectively to 40 mg/Nm³ and 30 mg/Nm³ in the case of existing CCGTs of 50–600 MWth with a net total fuel utilisation of < 75 %.
The split view is accompanied by the following rationale:

- NO\textsubscript{X} background levels are too high in Europe, many Member States exceed national thresholds, and many cities cannot comply with local air quality standards. Therefore, BAT-AELs should be set at the lowest level technically possible and economically viable, in particular when it comes to new plants running for many years.
- The data collection shows that it is possible to achieve the above proposed levels (Plant 135 justifies yearly average; plants up to Plant 171a justify daily average).
- Yearly upper BAT-AEL for existing plants of 50-600 MW\textsubscript{th} with < 75\% fuel utilisation:
  - The proposed upper BAT-AEL is set at Plant 104 (commissioned 2005) and includes 14 plants fitted with DLN alone.
  - Within these DLN plants, Plant 135 dates back to 1994 but still achieves yearly emissions of 28 mg/Nm\textsuperscript{3}.
  - Plant 104 cannot be BAT if a plant 11 years older is performing significantly better.
  - Therefore the upper yearly BAT-AEL should be 30 mg/Nm\textsuperscript{3} (Plant 135).
- Daily upper BAT-AEL for existing plants of 50-600 MW\textsubscript{th} with < 75\% fuel utilisation:
  - A yearly BAT-AEL of 30 mg/Nm\textsuperscript{3} is proposed by the EEB, which includes Plant 171a.
  - Plant 171a has 95\textsuperscript{th} percentile data of 40 mg/Nm\textsuperscript{3} which is the highest in the proposed yearly BAT-AEL range.
  - Therefore for a yearly upper BAT-AEL of 30 mg/Nm\textsuperscript{3} the upper daily BAT-AEL should be 40 mg/Nm\textsuperscript{3}.

**EIPPCB assessment**

Availability of information on which the split view is based:
- Documents and information mentioned in the split view were available.

Validity of supporting rationale:
- The rationale is based on available data from plants fitted with techniques listed in BAT 47 that support the split view. It includes technical justification, based on plant age and achieved performance, for selecting the reference plants for deriving an alternative proposal.

**EIPPCB conclusion**

Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the split view. This split view will therefore be reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 47 Table 10.27</td>
<td>Decrease the higher ends of the yearly and daily BAT-AEL ranges for existing CCGTs of between 50–600 MW\textsubscript{th} with a net total fuel utilisation of &lt; 75 %</td>
<td>EEB, CAN Europe</td>
<td>30 mg/Nm\textsuperscript{3} (yearly) 40 mg/Nm\textsuperscript{3} (daily)</td>
</tr>
</tbody>
</table>

**10.6.4 Increase the lower/higher ends of the yearly BAT-AEL range for plants with a net total fuel utilisation of < 75 \%**

**Split view summary**
EURELECTRIC proposes to change the yearly BAT-AEL range from 10–45 mg/Nm$^3$ to 15–50 mg/Nm$^3$ and to insert a new footnote stating that 'The lower end of the range can be achieved only when using SCR'.

The split view is accompanied by the following rationale:

- Emission recorded values and BAT-AELs are of different nature. Emission recorded values are achieved values whereas BAT-AELs are potential ELVs. As a minimum a margin must be set between the expected operating values and the ELV. Moreover, it is not because one plant achieved a specific value during the reference year that the same plant can do it during its entire lifetime. The yearly average variability can be easily verified by checking additional data submitted by Member States in April 2014 and then in the period September-October 2014 with the coordination of EURELECTRIC.

- The minimum yearly NO$_X$ value of the range seems to be fixed by Plant 274 (10 mg/Nm$^3$), which should be excluded considering that it has a twin plant (273) with the same DLN burners in the same installation with NO$_X$ emissions significantly higher (24 mg/Nm$^3$). So the lower end should be fixed by Plant 305 which is equipped with SCR and has a recorded yearly average of 11 mg/Nm$^3$.

- Only 3 units (Plants 274, 305 and 273) of a total of 30 CCGT reference plants with a thermal input lower than 600 MW$_{th}$ and a net total fuel utilisation of < 75% have a NO$_X$ yearly average of less than 25 mg/Nm$^3$.

- Considering the first three bullets, the lower end of the range for NO$_X$ emissions from existing CCGTs with a net total fuel utilisation of < 75% - 50–600 MW$_{th}$ should be fixed at 15 mg/Nm$^3$ @ 15% O$_2$, in order to take into due consideration the necessary margin between the expected operating values and the ELVs and it should also be stated that this value is achievable only with SCR.

- The maximum value of the yearly NO$_X$ range (45 mg/Nm$^3$) seems to be based on Plant 104: a 165 MW$_{th}$ CCGT equipped with DLN running for 6 591 hours in the reference year with an average load of 64%. Commissioned in 2005.

- The maximum value of the yearly NO$_X$ range should be increased to 50 mg/Nm$^3$ in order to also include Plants 295, 296, 292, 488, which are all equipped with BAT technologies. It is unclear why they have not been taken into account to set the AELs for this category of LCPs:
  - Plant 296: yearly average of 46 mg NO$_X$/Nm$^3$ @ 15% O$_2$ for a 235 MW$_{th}$ CCGT (aero derivative gas turbine) equipped with water injection and CO catalyst running for 1 901 hours in the reference year with an average load factor of 82%. Commissioned in 2009.
  - Plant 295: yearly average of 47 mg NO$_X$/Nm$^3$ @ 15% O$_2$ for a 235 MW$_{th}$ CCGT (aero derivative gas turbine) equipped with water injection and CO catalyst running for 1 004 hours in the reference year with an average load factor of 73%. Commissioned in 2010.
  - Plant 292: yearly average of 47 mg NO$_X$/Nm$^3$ @ 15% O$_2$ for a 112 MW$_{th}$ CCGT (aero derivative gas turbine) equipped with DLN running for 7 124 hours in the reference year with an average load factor of 90%. Commissioned in 1997.
  - Plant 488: yearly average of 51 mg NO$_X$/Nm$^3$ @ 15% O$_2$ for a 231 MW$_{th}$ CCGT equipped with steam injection running for 7 895 hours in the reference year with an average load factor of 60%. Commissioned in 1998.

- The increase of the maximum value of the yearly range to 50 mg/Nm$^3$ would better represent the emission performance of this size of CCGTs (50–600 MW$_{th}$), where are included all derivative gas turbines which are characterised by wider emission variability and flexible operation for peak or low load operation, as well represented by Plants 292, 295, 296 and 488 which should be considered while setting the maximum value of the range.
The data collected with the questionnaires are based on 2010-2011 operation, while in recent years (from 2012-2013) the plants have experienced a significant reduction of operating hours and increased request for flexibility due to the rise of intermittent renewable energy sources, which all lead to higher emissions in terms of pollutant concentrations. On the other hand, the significant reduction of operating hours in recent years has determined a substantial decrease of the absolute environmental impact of thermal installations.

EIPPCB assessment
Availability of information on which the split view is based:
- Documents and information mentioned in the split view were available.

Validity of supporting rationale:
- The split view rationale is based on available data and a valid technical reasoning (e.g. variability of plant data, limited number of plants below 25 mg/Nm³, data for twin plants, example plants between 45 mg/Nm³ and 50 mg/Nm³).
- There is no rationale supporting the request to insert a new footnote for the lower end of the range.

EIPPCB conclusion
Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the part of the split view on the BAT-AEL range, but not enough to support the part of the split view on an additional footnote. This split view will therefore be partially reported in the ‘Concluding remarks and recommendations for future work’ section of the BREF.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 47 Table 10.27</td>
<td>Increase the lower/higher ends of the BAT-AEL range for existing CCGTs of between 50 MW₁h and 600 MW₁h with a net total fuel utilisation of &lt; 75 %</td>
<td>EURELECTRIC</td>
<td>15–50 mg/Nm³</td>
</tr>
</tbody>
</table>

10.7 NOₓ BAT-AELs for CCGTs operated < 1500 h/yr - Increase the upper end of the daily range

Conclusions of the meeting
Table 10.27: BAT-associated emission level for NOₓ emissions to air from gas turbines

<table>
<thead>
<tr>
<th>Type of gas turbine</th>
<th>BAT-AELs (mg/Nm³) (³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOₓ</td>
<td>CO</td>
</tr>
<tr>
<td>Daily average …</td>
<td>Yearly average …</td>
</tr>
</tbody>
</table>
## Split view summary

The UK proposes to set the upper end of the daily BAT-AEL range at 120 mg/Nm³ for plants operated < 1500 h/yr.

The split view is accompanied by the following rationale:

- The different operating profile from base load increases the number of start-ups and shutdowns, it is recognised that the emissions immediately after start-up may be higher than during stable operation and therefore the impact of more start-ups is a net increase in concentration over shorter periods.
- The structure of the market means that these plants tend to be end of life which also means that they are technically less able to meet the BAT-AELs proposed when operating at BAT.
- The cost to apply an AEL of 50 mg/Nm³ for plants operating with < 1500 h/yr is greater than the damage costs for those emissions.
- Operating the plant with higher SU/SD number may affect the behaviour of the DLN systems and their subsequent performance.

## EIPPCB assessment

Availability of information on which the split view is based:

- Documents and information mentioned in the split view were available, with the exception of an additional cost-benefit analysis only inserted in the split view rationale submitted during or after the final meeting in June 2015 that was not considered in the assessment.

Validity of supporting rationale:

- Low operating time may affect the emission profiles on a very short-term basis but this is not quantified.
- The remaining lifetime of peak load plants is difficult to assess generally and will be site-dependent.
- The only restriction to DLN retrofit is the availability of the retrofit package. The cost-benefit analysis for plants operated < 1500 h/yr is to be done case by case, the
result being dependent on the plant configuration, the NO\textsubscript{X} concentration achieved, and the remaining plant lifetime.

- The alternative proposal for the higher end of the range at 120 mg/Nm\textsuperscript{3} is not supported in the rationale.

**EIPPCB conclusion**
Taking these aspects into account, the EIPPCB considers that there are not enough appropriate technical arguments to support the split view. This split view will therefore not be reported in the ‘Concluding remarks and recommendations for future work’ section of the BREF.

### 10.8 NO\textsubscript{X} BAT-AELs for existing gas turbines for mechanical drive (all but plants operated < 500 h/yr)

**Conclusions of the meeting**
Slide 112.

Table 10.27: BAT-associated emission level for NO\textsubscript{X} emissions to air from gas turbines

<table>
<thead>
<tr>
<th>Type of gas turbine</th>
<th>BAT-AELs (mg/Nm\textsuperscript{3}) (\textsuperscript{*})</th>
<th>NO\textsubscript{X}</th>
<th>CO</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Daily average or average over the sampling period</td>
<td>Yearly average (\textsuperscript{14})</td>
<td>Yearly average (\textsuperscript{14})</td>
</tr>
<tr>
<td>Open- and combined cycle gas turbines</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Existing gas turbine for mechanical drive applications – All but plants operated &lt; 500 h/yr</td>
<td>≥ 50</td>
<td>25–55 (\textsuperscript{19})</td>
<td>15–50 (\textsuperscript{20})</td>
</tr>
<tr>
<td></td>
<td></td>
<td>≤ 5–40 (\textsuperscript{21})</td>
<td></td>
</tr>
</tbody>
</table>

\textsuperscript{*} The higher end of the range is 50 mg/Nm\textsuperscript{3} when plants operate at low load (e.g. with an equivalent full load factor below 60 %).

\textsuperscript{19} For existing plants put into operation no later than 7 January 2014, the higher end of the BAT-AEL range is 65 mg/Nm\textsuperscript{3}.

\textsuperscript{20} For existing plants put into operation no later than 7 January 2014, the higher end of the BAT-AEL range is 60 mg/Nm\textsuperscript{3}.

**Split view summary**
BE proposes to decrease the upper ends of the daily and yearly ranges respectively to 55 mg/Nm\textsuperscript{3} and 50 mg/Nm\textsuperscript{3} in the case of existing gas turbines for mechanical drive applications, thus to remove the footnote for existing plants put into operation no later than 7 January 2014.

The split view is accompanied by the following rationale:

- The vast majority of plants (incl. plants put into operation before 7 January 2014) can comply with the upper value of the BAT-AEL range, i.e. 55 mg/Nm\textsuperscript{3} (daily) (see graph provided by the EIPPCB prior to the final meeting).
- Exceedance of the upper value of the BAT-AEL range are generally within the margin of error (systematic and random errors of sampling and analysis), which is
20 % for NO\textsubscript{X}. Plants that do not comply after the margin of error is taken into account, are 311V, 307C, 160V, 159V, 344V, 501V, 337V and 334V. These plants are however not considered to be ~ BAT and/or their emission data cannot be taken into account:

- There is a large variation between yearly average and 95 percentile data (344V and 501V).
- Plants 311V and 307V have a rather high ELV, and plants will often go as far as needed by their permit (400 mg/Nm\textsuperscript{3} (daily average)).
- For plants 160V and 159V information on techniques applied is missing.
- Plants 344V, 501V, 337V and 334V only apply (other) primary techniques and BAT 47 prescribes “one or a combination of”.
- Same accounts for the yearly average of 50 mg/Nm\textsuperscript{3}. Looking at the figure, and thus the data available, there is no need to foresee a deviation for plants put into operation before 7 January 2014.

**EIPPCB assessment**

Availability of information on which the split view is based:
- Documents and information mentioned in the split view were available.

Validity of supporting rationale:
- The rationale uses a 20 % cut for ‘margin of error’ of the reported levels which is not technically justified; the TWG, including BE, agreed to use raw data for deriving the BAT-AELs.

**EIPPCB conclusion**

Taking these aspects into account, the EIPPCB considers that there are not enough appropriate technical arguments to support the split view. This split view will therefore not be reported in the ‘Concluding remarks and recommendations for future work’ section of the BREF.

### 10.9 NO\textsubscript{X} BAT-AELs for boilers

**Conclusions of the meeting**

Slide 119.

Table 10.28: BAT-associated emission levels (BAT-AELs) for NO\textsubscript{X} emissions to air from the combustion of natural gas in boilers and engines

<table>
<thead>
<tr>
<th>Type of combustion plant</th>
<th>BAT-AELs (mg/Nm\textsuperscript{3})</th>
<th>Monitoring frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NO\textsubscript{X}</td>
<td>CO</td>
</tr>
<tr>
<td></td>
<td>Daily average or average over the sampling period</td>
<td>Yearly average ((^1))</td>
</tr>
<tr>
<td>Boilers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>New boilers(^5)</td>
<td>30–85</td>
<td>10–60</td>
</tr>
<tr>
<td>Existing boiler</td>
<td>85–110 ((^5))</td>
<td>50–100 ((^3))</td>
</tr>
</tbody>
</table>

\(^5\) These BAT-AELs do not apply when plants operate < 1500 h/yr.
\(^5\) Optimising the functioning of an existing technique to reduce further NO\textsubscript{X} emissions may lead to levels of CO emissions at the higher end of the indicative range for CO given after this table.

\(^3\) These levels are indicative for combustion plants operated < 500 h/yr.

**Split view summary**
CAN Europe proposes setting the following BAT-AELs:

- Daily upper BAT-AEL, existing boilers: 85 mg/Nm³;
- Yearly upper BAT-AEL, existing boilers: 80 mg/Nm³;
- Daily upper BAT-AEL, new boilers: 85 mg/Nm³;
- Yearly upper BAT-AEL, new boilers: 60 mg/Nm³.

The split view is accompanied by the following rationale:

- NOₓ background levels are too high in Europe, many Member States exceed national thresholds, and many cities cannot comply with local air quality standards. Therefore, BAT-AEL should be set at the lowest level technically possible and economically viable, in particular when it comes to new plants running for many years.
- The data collection shows that it is possible to achieve the above proposed levels:
  - EIPPCB document: Natural gas combustion in gas boilers and gas engines, NOₓ and CO emissions, table 1, Plants 67V, 215V, 149-2, 517, 513, 114-3, 203 justify yearly average for existing plants;
  - EIPPCB document: Natural gas combustion in gas boilers and gas engines, NOₓ and CO emissions, table 1, Plants 67V justifies daily average for existing plants;
  - EIPPCB document: Natural gas combustion in gas boilers and gas engines, NOₓ and CO emissions, table 1, Plants 67V, 215V, 149 justify yearly average for new plants;
  - EIPPCB document: Natural gas combustion in gas boilers and gas engines, NOₓ and CO emissions, table 1, Plant 67V, justifies daily average for new plants.

**EIPPCB assessment**

Availability of information on which the split view is based:

- Documents and information mentioned in the split view were available.

Validity of supporting rationale:

- The rationale is based on plants fitted with techniques listed in BAT 46 achieving emission levels corresponding to those proposed in the split view.
- However, the rationale does not explain why the existing plants mentioned are taken as a reference for proposing a higher end of the range (e.g. there are other plants with higher emission levels and fitted with the same techniques).
- As for new plants, the alternative levels proposed in the split view are the levels already agreed at the final meeting so this is not considered a split view.

**EIPPCB conclusion**

Taking these aspects into account, the EIPPCB considers that there are not enough appropriate technical arguments to support the split view. This split view will therefore not be reported in the ‘Concluding remarks and recommendations for future work’ section of the BREF.

### 10.10 NOₓ BAT-AELs for engines

**Conclusions of the meeting**

Slide 120.

Table 10.28: BAT-associated emission levels (BAT-AELs) for NOₓ emissions to air from the combustion of natural gas in boilers and engines

<table>
<thead>
<tr>
<th>Type of combustion plant</th>
<th>BAT-AELs (mg/Nm³)</th>
<th>Monitoring frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NOₓ</td>
<td>CO</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th></th>
<th>Daily average or average over the sampling period</th>
<th>Yearly average ((^{4}))</th>
<th>Yearly average ((^{4}))</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Engines ((^{1}))</td>
<td></td>
<td></td>
</tr>
<tr>
<td>New engine</td>
<td>55–85</td>
<td>20–75</td>
<td>30–100</td>
</tr>
<tr>
<td>Existing engine</td>
<td>55–110 ((^{2}))</td>
<td>20–100 ((^{3}))</td>
<td>30–100</td>
</tr>
</tbody>
</table>

\(^{1}\) These BAT-AELs only apply to SG- and DF-type engines. They do not apply to GD-type engines.

\(^{2}\) In the case of engines for emergency use operated < 500 h/yr that could not apply the lean burn concept or use an SCR system for techno-economic reasons, the higher end of the indicative range is 175 mg/Nm\(^3\).

\(^{3}\) These BAT-AELs do not apply when plants operate < 1500 h/yr.

\(^{4}\) Optimising the functioning of an existing technique to reduce further NO\(_X\) emissions may lead to levels of CO emissions at the higher end of the indicative range for CO given after this table.

\(^{5}\) These levels are indicative for combustion plants operated < 500 h/yr.

### Split view summary

EEB and CAN Europe propose to decrease the upper end of the yearly NO\(_X\) BAT-AEL for new engines firing natural gas to 30 mg/Nm\(^3\).

CAN Europe proposes to decrease the upper end of the yearly NO\(_X\) BAT-AEL for existing engines firing natural gas to 30 mg/Nm\(^3\), and to decrease the upper ends of the daily NO\(_X\) BAT-AELs for new and existing engines to 60 mg/Nm\(^3\).

The split view is accompanied by the following rationale (EEB):

- The yearly average in the revised BREF was the daily average in the 2006 BREF, with no correlation to the reference plant data.
- This was not satisfactorily explained in the final TWG meeting – reference was simply made to the difference in legal status of the two BREFs without this being related to the data.
- The reference plant data shows that 30 mg/Nm\(^3\) can be achieved with lean burn concept and SCR (Plants 354 and 353). As Plant 354 dates back to 1984, it is reasonable to expect this of new plants.

The split view is accompanied by the following rationale (CAN Europe):

- NO\(_X\) background levels are too high in Europe, many Member States exceed national thresholds, and many cities cannot comply with local air quality standards. Therefore, BAT-AEL should be set at the lowest level technically possible and economically viable, in particular when it comes to new plants running for many years.
- The data collection shows that it is possible to achieve the above proposed levels (Plants 353 and 354).

### EIPPCB assessment

Availability of information on which the split view is based:
- Documents and information mentioned in the split view were available.

Validity of supporting rationale:
- The rationale for alternative higher ends of the yearly and daily BAT-AEL ranges is based on available data from existing plants (Plants 353, 354) fitted with techniques listed in BAT 48 and on a justification based on the age of these plants in the case of new plants. It should be noted however that Plant 354 was commissioned in 2010 and not in 1984.

### EIPPCB conclusion
Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the split view. This split view will therefore be reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 48 Table 10.28</td>
<td>Decrease the higher end of the yearly NOX BAT-AEL range for new engines firing natural gas</td>
<td>EEB, CAN Europe</td>
<td>30 mg/Nm$^3$</td>
</tr>
<tr>
<td>BAT 48 Table 10.28</td>
<td>Decrease the higher ends of the daily NOX BAT-AEL range for new engines firing natural gas and of the daily and yearly NOX BAT-AEL ranges for existing engines firing natural gas</td>
<td>CAN Europe</td>
<td>30 mg/Nm$^3$ (yearly – existing engines) 60 mg/Nm$^3$ (daily – new and existing engines)</td>
</tr>
</tbody>
</table>

### 10.11 Formaldehyde and methane BAT-AELs for engines

**Conclusions of the meeting**

Slide 125.

Table 10.29: BAT-associated emission levels (BAT-AELs) for formaldehyde and CH$_4$ emissions to air from the combustion of natural gas in a spark-ignited lean-burn gas engine.

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Plants</th>
<th>BAT-AELs (mg/Nm$^3$)</th>
<th>Monitoring frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Average over the sampling period</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Formaldehyde</td>
<td>All plants</td>
<td>5–15 ($^2$)</td>
<td>Periodic measurements: 4 times/yr</td>
</tr>
<tr>
<td>CH$_4$</td>
<td>New plants</td>
<td>215–500 ($^1$)</td>
<td>Periodic measurements: 4 times/yr</td>
</tr>
<tr>
<td></td>
<td>Existing plants</td>
<td>215–560 ($^1$)$^2$</td>
<td></td>
</tr>
</tbody>
</table>

($^1$) This BAT-AEL applies only to an SG-type engine and is expressed as C at maximum continuous rating (MCR).
($^2$) These levels are indicative for existing combustion plants operated < 500 h/yr.

**Split view summary**

DK proposes to delete the BAT-AELs for formaldehyde and to keep the original NMVOC BAT-AELs as proposed in D1.

The split view is accompanied by the following rationale:

- Danish research has shown that the environmental and health cost of formaldehyde from gas engines is very low compared to other emission components from gas engines. A conclusion of a report states that 'apparently, the harmfulness of formaldehyde (HCHO) and CO are negligible compared to unburnt hydrocarbons (UHC) and NOX emissions. It was found that the costs related to damage caused by NOX are more than 10 000 times higher than the costs related to CO emissions and more than 100 000 times higher than the costs related to formaldehyde emissions at all examined cases'.
- If formaldehyde is kept in the BAT conclusions, DK suggests that the values for the BAT-AEL should be changed from the suggested values to values that the average engine can meet without making a special effort using catalyst and other possible abatement technologies.
• If engines should be allowed to operate without the excessive cost of a catalyst, most pre-chamber engines (the larger ones are pre-chamber) will be able to do so with a BAT-AEL of 40 mg/m³ at 15 % O₂ in the exhaust. This number corresponds to a BAT-AEL of 16 mg as C/m³ at 15 % O₂ in the exhaust.

**EIPPCB assessment**

Availability of information on which the split view is based:
• Documents and information mentioned in the split view were submitted during or after the final meeting in June 2015 and were not considered in the assessment: the document 'externalities for formaldehyde emissions from gas engines' and emission data from engines corresponding to the years 2001 and 2007 (via a webpage link) were only provided at the time of submitting the split view.

Validity of supporting rationale:
• The information reported does not demonstrate the non-economic viability of applying oxidation catalyst to the sector.

**EIPPCB conclusion**

Taking these aspects into account, the EIPPCB considers that there are not enough appropriate technical arguments to support the split view. This split view will therefore not be reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

10.12 BAT-AEELs for engines

**Conclusions of the meeting**

Slide 79.

The BAT-associated energy efficiency levels for the combustion of natural gas are given in Table 10.26.

<table>
<thead>
<tr>
<th>Type of combustion unit</th>
<th>BAT-AEELs (§) (%)</th>
<th>Payback period (years)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Net electrical efficiency (%)</strong></td>
<td><strong>Net total fuel utilisation (%)</strong></td>
<td><strong>Net mechanical energy efficiency (%)</strong></td>
</tr>
<tr>
<td>New unit</td>
<td>Existing unit</td>
<td>New unit</td>
</tr>
<tr>
<td>Gas engine</td>
<td>39.5–44 (§)</td>
<td>35–44 (§)</td>
</tr>
</tbody>
</table>

(§) Net total fuel utilisation BAT-AEELs may not be achievable in the case of an excessively low heat demand.
(§) These BAT-AEELs do not apply to units-operated < 1500 h/yr
(§) These BAT-AEELs apply to units used for mechanical drive applications.
(§) These levels may be difficult to achieve in the case of engines tuned in order to reach NOₓ levels lower than 190 mg/Nm³.
(§) In the case of CHP units, only one of the two BAT-AEELs 'Net electrical efficiency' or 'Net total fuel utilisation' applies, depending on the CHP unit design (i.e. either more oriented towards electricity or heat generation).

NB: NA = no BAT-AEEL

**Split view summary**

EUROMOT proposes to:
extend footnote (6) with following text: ‘… These levels may not be achievable in plants burning natural gas fuels with a methane number less than 80;’

apply the extended footnote (6) to the “Net total fuel utilization (%);”

introduce a new footnote (6) for all gas engine cases (new/existing net electrical efficiency (%) and Net total fuel utilization (%)) as ‘If plant is equipped with a high voltage transformer, efficiency might be lower’;

introduce a new footnote (6) for the Net total fuel utilisation (%) item as: ‘Innovative combined process solutions (e.g. installation of heat pumps) aiming at higher total efficiencies might decrease the electrical efficiency of the plant’.

The split view is accompanied by the following rationale:

Performance of a lean burn gas engine is highly affected by the natural gas quality. Methane Number (MN) is one of the most important parameters describing the natural gas quality suitability for a lean burn gas engine. In document /1/ it is shown that natural gas with a low MN have a detrimental impact on the lean burn gas engine performance such as on efficiency (see e.g. page 12 – e.g. efficiency drop might be high !) and emission performances and the optimal MN is > 80. EUROMOT have also noted about the MN importance (to be minimum 80 for an optimal case) in many other given documents inserted into BATIS: e.g. /2/ and /3/. IED 2010/75/EU Annex V, part I, point 6, footnote 1 text “Natural gas is naturally occurring methane with no more than 20 % (by volume) of inerts and other constituents” is not describing the Methane Number (can also be seen from document /1/ e.g. table 2).

Same prime mover is used in single or CHP (Combined Heat and Power) applications. The lean burn gas engine performance in single or combined cycle is affected by the set NOx tuning, and/or used natural gas quality (MN, etc.). This might affect the total efficiency in a detrimental way.

Definition of the net electrical efficiency has been fundamentally changed. Already in document /4/ on page 4 “Net electrical efficiency” was defined as “Ratio between the net electrical output produced at alternator terminals minus imported energy and the fuel/feedstock energy input …”. “Leftovers ..” document /5/ for commenting in July 2015 also contained wording “Ratio between the net electrical output (electricity produced at alternator terminals minus ..”. But in the document “EIPPCB feedback and way forward regarding the leftovers addressed in a written consultation (issued by EIPPCB on October 2nd 2015)”, in slide 78 (“Definitions in Revised Draft 1.” “BAT conclusions Definitions (1/2) – BP 2.11”) wording “.. at alternator terminals ..” have been changed to text “.. on the high-voltage side of the main transformer..”. This might have a big impact on the efficiency figures for certain plant types. E.g. a decentralised power plant producing electricity for a local electrical grid might not be equipped with a high voltage (HV) transformer if the voltage of the alternator is at the same voltage as of the receiving local grid but if the same plant should be connected to a high voltage grid a high voltage transformer is needed and the total efficiency will be lower in comparison with the plant not equipped with a high voltage (HV) transformer. In document /6/ (page 5) a typical (HV) transformer energy loss impact was given as “.. in the region of 0.5 % of the gross output”, EUROMOT highlighted that the Hungarian CHP plant (reference 186) was NOT equipped with a high voltage (HV) transformer and thus had an exceptional high efficiency. Actually the “4. Energy efficiency” sheets (of the “Questionnaire for collecting plant-specific data for the review of the BAT Reference Document (BREF) on Large Combustion Plants (LCP)”) available in BATIS is not containing any “fill-in box” showing if a plant is equipped or not with a high voltage transformer (transformer loss could then be assumed to be a part of the “other equipment” box), but for gas engine plants 353, 354, it is marking N/A in this box. For plant ref 40 “other equipment” box is filled in as 0.9 % (plant 40 has also a low electrical net efficiency of 39.2 %). Therefore in EUROMOT’s opinion a remark for the high voltage transformer case is to be added
to the table values when at least one of the plant (namely ref. 186) references and probably several (ref. 353, 354) of the plants (have marking “N/A” in “other consumers” box) which participated in the field plant gathering seem to have no high voltage transformer (installation of a high voltage transformer should cause additional electrical losses).

- In some Central European countries customers ask many times for extremely high total efficiencies which might be only achievable by use of innovative combined process solutions such as electrical driven heat pumps (increasing the plant parasitic “own” electrical consumption) in order to be able to utilize the low exergy energy e.g. in cooling circuits of the engine. This information should be in place in this BREF document so end customer/permitting authority is aware of the total consequences of this requirement. We asked for addition of this item already in our feedback /3/.

EIPPCB assessment

Availability of information on which the split view is based:
- Documents and information mentioned in the split view were available.

Validity of supporting rationale:
- Reduced efficiency of 15–35 % is reported when the methane number is reduced from 80 to 55 in the rationale based on available information. This information also indicates a methane number differing from the content of methane included as above 80 % in the IED.
- Footnote (6) aims at signalling the trade-off between NO\textsubscript{X} reduction and energy efficiency which primarily affects the efficiency of the prime mover and thus will also affect the net total fuel utilisation. This footnote was introduced when dealing with the leftovers in the written consultation but it was forgotten to also insert it in the case of the net total fuel utilisation. The extension to the net total fuel utilisation of footnote (6) is then to be included in the draft BAT conclusions as the result of a consistency check and not kept as a split view.
- The information on the fact that a high-voltage transformer may have a negative impact on the BAT-AEELs (of about 0.5 percentage points) is valid.
- The rationale for including a footnote on innovative combined process solutions is not based on information exchanged within the BREF review process.

EIPPCB conclusion

Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support some, but not all, parts of the split view. This split view will therefore only be partially reported in the ‘Concluding remarks and recommendations for future work’ section of the BREF.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BAT 44 Table 10.26</strong></td>
<td>Expand footnote (6) by adding: These levels may not be achievable in plants burning natural gas fuels with a methane number of less than 80’</td>
<td>EUROMOT</td>
<td>NA</td>
</tr>
<tr>
<td><strong>BAT 44 Table 10.26</strong></td>
<td>Add a footnote applicable to all BAT-AEELs for gas engines mentioning that ‘In the case of plants equipped with a high-voltage transformer, these levels may be negatively impacted’.</td>
<td>EUROMOT</td>
<td>NA</td>
</tr>
</tbody>
</table>


11 BAT CONCLUSIONS FOR EMISSIONS TO AIR FROM THE COMBUSTION OF COAL AND/OR LIGNITE

11.1 NO\textsubscript{X} – SNCR technique

Conclusions of the meeting
Slide 145.

BAT 19. In order to prevent and/or reduce NO\textsubscript{X} emissions to air while limiting CO and N\textsubscript{2}O emissions to air from the combustion of coal and/or lignite, BAT is to use one or a combination of the techniques given below.

<table>
<thead>
<tr>
<th>Technique</th>
<th>Description</th>
<th>Applicability</th>
</tr>
</thead>
<tbody>
<tr>
<td>...</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Selective non-catalytic reduction (SNCR)</td>
<td>See description in Section 10.8. Can be applied with a 'slip' SCR system</td>
<td>The applicability may be limited in the case of boilers with a high cross-sectional area preventing a homogeneous mixing of NH\textsubscript{3} and NO\textsubscript{X}. The applicability may be limited in the case of combustion plants operated &lt; 1500 h/yr with highly variable boiler loads</td>
</tr>
<tr>
<td>...</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Split view summary
EL proposes to add in the applicability column that the technique is not applicable to new and existing lignite-fired plants of > 300 MW\textsubscript{th}.

The split view is accompanied by the following rationale:

- There is no concrete evidence on the applicability of SNCR in PC lignite-fired plants of > 300 MW\textsubscript{th} for the following reasons:
  - there is not even one lignite reference plant > 300 MW\textsubscript{th} equipped with SNCR;
  - even though several example plants (and in no way reference plants) have been provided by CZ applying SNCR (Combination of primary techniques such as air and fuel staging, low-NO\textsubscript{X} burner, etc. with SNCR) in document "SNCR technology in the Czech Republic" and in “SNCR plants reference list”, all of them are < 300 MW\textsubscript{th}, while NO\textsubscript{X} emissions that are guaranteed in those cases are 200 mg/Nm\textsuperscript{3};
  - Nowhere, in any of the information material made available to the EIPPCB, has the application of SNCR in plants > 300 MW\textsubscript{th} been supported.

EIPPCB assessment

Availability of information on which the split view is based:
- Documents and information mentioned in the split view were available.

Validity of supporting rationale:
• It is correct that the collected data do not include any examples of lignite-fired plants of > 300 MW\textsubscript{th} equipped with SNCR.

**EIPPCB conclusion**

Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the split view. This split view will therefore be reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 19</td>
<td>SNCR is not applicable to new and existing lignite-fired plants of ≥ 300 MW\textsubscript{th}</td>
<td>EL</td>
<td>NA</td>
</tr>
</tbody>
</table>

**11.2 NO\textsubscript{X} – SCR technique**

**Conclusions of the meeting**

Slide 146.

BAT 19. In order to prevent and/or reduce NO\textsubscript{X} emissions to air while limiting CO and N\textsubscript{2}O emissions to air from the combustion of coal and/or lignite, BAT is to use one or a combination of the techniques given below.

<table>
<thead>
<tr>
<th>Technique</th>
<th>Description</th>
<th>Applicability</th>
</tr>
</thead>
<tbody>
<tr>
<td>d</td>
<td>Selective catalytic reduction (SCR)</td>
<td>See description in Section 10.8 Not applicable to combustion plants of &lt; 300 MW\textsubscript{th} operated &lt; 500 h/yr. Not generally applicable to combustion plants of &lt; 100 MW\textsubscript{th}. There may be technical and economic restrictions for retrofitting existing plants operated between 500 h/yr and 1500 h/yr and for existing plants of ≥ 300 MW\textsubscript{th} operated &lt; 500 h/yr</td>
</tr>
<tr>
<td>...</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Split view summary**

EL proposes to add in the applicability column that in the case of new and existing plants, there may be applicability constraints for lignite-fired plants, depending on the fuel quality characteristics.

The split view is accompanied by the following rationale:

• There is no concrete evidence on the applicability of SCR in PC lignite-fired plants for the following reasons:
• there is not even one lignite reference plant equipped with SCR;
• SCR cannot be qualified as a BAT for every single PC lignite plant based just on a case study from a restricted number of US plants (mainly Oak Grove), where SCR started operating in late December 2009. In the document provided by EEB entitled
"Research and Findings on the Applicability of Selective Catalytic Reduction (SCR) for Reduction of Nitrogen Oxides (NOx) at Lignite-Fired Coal Plants in Europe" several mechanisms for catalyst poisoning are reported, depending on the concentration of various components in the fuel, showing that SCR may have been applied successfully for Texas or North Dakota lignite, but this may not be the case for other lignites, very different in quality and ash composition, including the catalyst poisoning and deactivation components mentioned above.

- SCR applicability strongly depends on lignite quality. The fact that SCR can be applied to a specific US plant does not mean that it can be applied everywhere. Based on the analysis provided by EL concerning the assessment of application of SCR to lignite-fired plants and the comparison of Texas lignite with Greek lignite, the immediate conclusions are as follows:
  - Texas lignite LHV is 200-300 % higher than Greek lignite LHV, with considerably higher moisture, ash and S contents in the Greek lignite;
  - Assessment of pollutant concentrations in flue gases before ESP, which could have an adverse effect on SCR, shows that in case of Greek lignite flue gas concentrations of dust is 4.5 times higher, of SiO2 is 4.3 times higher, of SO2 is 2.7 times higher, of Al2O3 is 5.2 times higher, of CaO can be up to 8.8 times higher and of K2O is more than 12 times higher, while Na2O concentrations are almost 6 times higher than in Texas lignite.
  - Similarly, based on the analysis provided by PL [Reference 5] concerning the application of SCR to lignite-fired plants and the comparison of Texas lignite with Polish lignite the immediate conclusions are as follows:
    - Compared to lignite from Texas, lignite in Poland is characterized by high volatility of parameters, a lower calorific value and a much higher water content, as well as significant content of ash, sulphur, calcium. Texas lignite has calorific value around 16 000 kJ/kg, what is 50 to 100 % higher than Polish lignite. Texas lignite is more similar to poor quality Polish hard coal, which characterizes calorific value 19 000–20 000 kJ/kg (see reference plants 377, 384, 385, 387);
    - Assessment of pollutant concentrations in flue gases before ESP, which could effect on SCR, shows that in case of Polish lignite dust, SiO2, and SO2 concentrations are more than two times higher than in Texas lignite, Al2O3 concentrations are 3-4 times higher, CaO and K2O concentrations are more than 5 times higher, Na2O concentrations are almost 4 times higher.
  - None of the manufacturers of boilers and flue gas cleaning installations do have references of SCR installed in lignite-fired power plants in Germany and Central Europe.

EIPPCB assessment

Availability of information on which the split view is based:

- Documents and information mentioned in the split view were available, with the exception of the following documents submitted during or after the final meeting in June 2015 that are thus not considered in the assessment:
  - 'EL position on SCR/EEB info on Texas lignite' sent by e-mail to the TWG and uploaded on BATIS on 09.06.2015;
  - 'Polish opinion on SCR applying for new lignite-fired power plants' sent by e-mail to the TWG on 08.06.2015).

Validity of supporting rationale:

- SCR has so far not been applied to lignite-fired plants in Europe but has recently been applied to such plants in the US where technical challenges have been overcome (BP p. 46 paragraph 2.4).
- The draft revised BREF mentions the fact that the fuel quality may have an impact on the design or operation of an SCR system applied at a lignite-fired plant, e.g. a more
frequent replacement of the catalyst may be required than in the case of the same technique at a coal-fired plant.

**EIPPCB conclusion**
Taking these aspects into account, the EIPPCB considers that there are enough technical arguments to support the split view. This split view will therefore be reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 19</td>
<td>Applicability of SCR to lignite-fired plants may be constrained by the fuel characteristics</td>
<td>EL</td>
<td>NA</td>
</tr>
</tbody>
</table>

### 11.3 NOₓ BAT-AELs for existing FBC boilers of ≥ 300 MW<sub>th</sub> combusting coal and/or lignite and lignite-fired PC boilers of ≥ 300 MW<sub>th</sub>

**Conclusions of the meeting**
Slide 151.

Table 10.3: BAT-associated emission levels (BAT-AELs) for NOₓ emissions to air from the combustion of coal and/or lignite

<table>
<thead>
<tr>
<th>Combustion plant total rated thermal input (MW&lt;sub&gt;th&lt;/sub&gt;)</th>
<th>BAT-AELs (mg/Nm&lt;sup&gt;3&lt;/sup&gt;)</th>
<th>Monitoring frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NOₓ</td>
<td>CO</td>
</tr>
<tr>
<td></td>
<td>Yearly average</td>
<td>Daily average or average over the sampling period</td>
</tr>
<tr>
<td>New plants</td>
<td>Existing plants (⁴)</td>
<td>New plants</td>
</tr>
<tr>
<td>≥ 300 FBC boiler combusting coal and/or lignite and lignite-fired PC boiler</td>
<td>50–85</td>
<td>&lt; 85–175 (⁶)</td>
</tr>
</tbody>
</table>

(⁴) These BAT-AELs do not apply when plants operate in peak- or emergency-load modes.
(⁵) In the case of plants put into operation no later than 7 January 2014, the higher end of the range is 200 mg/Nm<sup>3</sup> for plants operated ≥ 1500 h/yr, and 220 mg/Nm<sup>3</sup> for plants operated < 1500 h/yr.
(⁶) In the case of plants put into operation no later than 1<sup>st</sup> July 1987, which are operated < 1500 h/yr for which SCR and/or SNCR is not applicable, the higher end of the range is 340 mg/Nm<sup>3</sup>.
(⁷) The lower end of the range is considered achievable when using SCR.
(⁸) The higher end of the range is 150 for lignite-fired FBC boilers put into operation later than 7 January 2014.
(¹⁰) The higher end of the range is 165 mg/Nm<sup>3</sup> for lignite-fired FBC boilers put into operation later than 7 January 2014.
(¹¹) These levels are indicative for combustion plants operated < 500 h/yr.

### 11.3.1 Increase the upper end of the yearly BAT-AELs

**Split view summary**
CZ and SK propose to set the upper level of the yearly BAT-AEL range for existing lignite-fired pulverized combustion plants of ≥ 300 MWth at 180 mg/Nm³ except for those for whom the newly proposed footnote (12) is relevant: ‘(12) The higher end of the range is 200 mg/Nm³ for lignite-fired boilers.’

DE, EL and EURELECTRIC propose to set the upper level of the yearly BAT-AELs range for existing lignite-fired pulverized combustion plants of ≥ 300 MWth at 190 mg/Nm³.

PL and EURACOAL, supported by EL, propose to add a footnote for the upper end of the yearly BAT-AEL range saying: ‘The higher end of the BAT-AEL range can be as high as 190 (200 in the case of EURACOAL) mg/Nm³ in the case of existing plants applying primary techniques for NOX reduction due to limitations in boiler design as well as associated trade-offs and cross-media effects.’

EE proposes to set the upper level of the yearly BAT-AEL ranges for existing lignite-fired pulverized combustion plants of ≥ 300 MWth at 200 mg/Nm³.

EURACOAL, supported by EL, proposes to delete the footnotes (8) to (10).

EURELECTRIC, supported by EL, proposes to modify the footnote (8) as follows: ‘(8) the lower end of the range is considered achievable when using most advanced design SCR’.

The split view is accompanied by the following rationale (CZ and SK):

- Most of the lignite-fired reference plants do not comply with the last proposal on 175 mg/Nm³. Actually, there are only 4 (out of 29) which do so.
- Setting the upper NOX BAT-AEL level for existing plants to 180 mg/Nm³ and for lignite PC boilers to 200 mg/Nm³ is justified by the operational data of reference plants in Schkopau (Plant 133VC), Lippendorf (Plant 117-1VC), Niederaußem (Plant 116VC), Tusimice (Plant 23V), Neu Rath (Plant 130VC), Patnów II (Plant 391V), Jänschwalde (Plant 129-1VC, 128-4VC, 128-1VC, 128-3VC) and also by the previous ones Plants 129-2VC, 128-2VC, 137VC that are even slightly above 200 mg/Nm³ level.
- CZ and SK fully agree there is a need to be progressive enough towards the better environment and therefore support to get back to the previous EIPPCB proposal of 180 mg/Nm³ value of the upper level which is considered as a fair, acceptable value for existing plants except the ones for those the newly proposed footnote (12) is relevant: ‘(12) The higher end of the range is 200 mg/Nm³ for lignite-fired boilers.’

The split view is accompanied by the following rationale (DE):

- The decision on Techniques includes the use Techniques a and/or b only (that means without any NOX-flue gas cleaning system). However an upper level of 175 mg/Nm³ does not reflect the emission performance of most of the reference plants of concern as most of them report yearly average emissions between 160 mg/Nm³ and 200 mg/Nm³. The potential to further reduce the NOX emissions based on Technique a) and/or b) is limited. The retrofit of NOX flue-gas cleaning systems tends to be very cost intensive which will be disproportionate in relation to the small emission gap to be closed.

The split view is accompanied by the following rationale (EL):

- The proposed yearly NOX BAT-AELs for existing lignite-fired power plants ≥ 300 MWth are too ambitious, due to the fact that these combustion plants apply only primary NOX reduction measures, since it not possible to be retrofitted with SCR /SNCR (see EL split views on SNCR and SCR applicability). A great number of lignite-fired reference plants have reported NOX emissions above 175 mg/Nm³.
• None of the reference plants firing lignite is applying SCR technology. Example plants operated in the US were reported without sufficient contextual information (see EL split view on SCR applicability).

• During the final TWG meeting it was argued by the EIPPC Bureau that a further reduction of the higher end of the NO\textsubscript{X} BAT-AEL down to 175 mg/Nm\textsuperscript{3} would be justified (but not proven), due to the possibility of retrofitting SNCR. However, note that according to BAT 19 the applicability of SNCR may be limited in the case of boilers with a high cross-sectional area preventing a homogeneous mixing of NH\textsubscript{3} and NO\textsubscript{X}. The latter restriction applies to large lignite-fired PC boilers significantly larger than 300 MW\textsubscript{th} (see EL split view on SNCR applicability).

The split view is accompanied by the following rationale (EURELECTRIC, supported by EL):

• The proposed yearly NO\textsubscript{X} BAT-AELs for lignite-fired power plants and both coal and lignite-fired FBC plants > 300 MW\textsubscript{th} are too ambitious because these combustion plants apply only primary NO\textsubscript{X} reduction measures and are not able to be retrofitted with SCR /SNCR. A great number of lignite-fired reference plants has reported NO\textsubscript{X} emissions above 175 mg/Nm\textsuperscript{3}.

• Since lignite-fired power plants are usually operated in base load with over 6000 h/a of operating hours and little changes in plant operation over the course of a year, the yearly averages for NO\textsubscript{x} tend to be very close to the daily averages. Therefore the upper range of the yearly BAT-AEL should be closer to the daily BAT-AEL which is 220 mg/Nm\textsuperscript{3} in the upper range.

• A retrofit of secondary abatement techniques to achieve a gradual improvement of less than 10% in the case of NO\textsubscript{x} (yearly average) is not proportionate in light of the associated excessive cost for retrofitting and operating suitable end-of-pipe technology in existing plants. Cross-media affects (optimisation of lignite use and efficiency) and trade-offs (CO emissions) of further optimization of NO\textsubscript{x} emissions have to be taken into account. The proposed marginal reduction of NO\textsubscript{x} emissions cannot justify the retrofitting of secondary NO\textsubscript{x} abatement - neither for economic (cost-benefit) nor for environmental reasons when considering cross-media effects (efficiency loss, ammonia slip etc.).

• None of the BAT reference plants firing lignite is applying SCR technology. Example plants operated in the US were reported without sufficient contextual information.

• During the final TWG meeting it was argued by the EIPPC-Bureau that a further reduction of the higher end of the NO\textsubscript{x}-BA-AEL down to 175 mg/m\textsuperscript{3} would be justified due to the possibility of retrofitting SNCR. However, note that according to BAT 19 the applicability of SNCR may be limited in the case of boilers with a high cross-sectional area preventing a homogeneous mixing of NH\textsubscript{3} and NO\textsubscript{X}. The latter restriction applies to a broad of large lignite fired PC boilers significantly larger than 300 MW\textsubscript{th}.

• Regarding the modification of footnote (8), the lower end of the BAT-AEL range is clearly achievable just for plants fitted with most efficient techniques among BAT 19 set.

The split view is accompanied by the following rationale (PL):

• Single examples of SCR technique applied for NO\textsubscript{x} removal in United States are not representative as techniques which could be commonly use to attain compliance with NO\textsubscript{X} BAT-AELs for lignite-fired combustion plants. Compared to fuel from Texas, lignite in Poland is characterized by high volatility of parameters, a lower calorific value and a much higher water content, as well as significant content of ash, sulphur, and calcium. Texas lignite has calorific value around 16 000 kJ/kg what is 50 to 100 % higher than Polish lignite. Texas lignite is more similar to poor quality Polish hard coal which characterizes calorific value 19 000 – 20 000 kJ/kg.
• There is no lignite power plant in European power sector applying the SCR and there is no possibility to build up SCR on the existing lignite-fired power units in the period of time required in BAT/BREF documents. The existing power plants cannot comply reliably with the proposed higher end of the BAT-AEL range (see reference plants n° 23, 128, 129, 130, 137, 224, 387, 389, 390 and 391) under technically and economically feasible conditions.

• The proposed marginal reduction of NOX emissions does not justify the retrofitting of secondary NOX abatement - neither for economic nor for environmental reasons when considering cross-media effects (efficiency loss, ammonia slip etc.). Every single step on the war of NOX reduction has a negative impact on existing in bed desulphurisation process efficiency (FBC boilers).

• Assessment of pollutant concentrations in flue gasses (before ESP) which could effect on SCR efficiency shows that in case of Polish lignite dust, SiO2, and SO2 concentrations are more than two times higher than in Texas lignite. Al2O3 concentrations are 3-4 times higher, CaO and K2O concentrations are more than 5 times higher, Na2O concentrations are almost 4 times higher. SCR and catalysts’ suppliers emphasize importance of these parameters on construction and operation of SCR.

• None of the manufacturers of boilers and flue gas cleaning installations have references to SCR installed in lignite-fired power plants in Central Europe.

The split view is accompanied by the following rationale (EURACOAL, supported by EL):

• The proposed yearly NOX BAT-AELs for lignite-fired power plants and both coal- and lignite-fired FBC plants > 300 MWth are too ambitious because these combustion plants use only primary NOX reduction measures and cannot be retrofitted with SCR/SNCR. Therefore, the existing power plants cannot comply reliably with the proposed higher end of the BAT-AEL range of 180 mg/Nm³ (see Plants n° 23, 128, 129, 130, 137, 224, 387, and 391) und er technically and economically feasible conditions.

• Cross-media effects (optimisation of lignite use and efficiency) and trade-offs (CO emissions) of further optimization of NOX emissions should be taken into account. The proposed marginal reduction of NOX emissions does not justify the retrofitting of secondary NOX abatement - neither for economic (cost-benefit) nor for environmental reasons when considering cross-media effects (efficiency loss, ammonia slip etc.).

• Since lignite-fired power plants are usually operated in base load with over 6000 annual operating hours and with little change in plant operation over the course of a year, the yearly averages for NOX tend to be very close to the daily averages. Therefore the upper range of the yearly BAT-AEL should be closer to the daily higher end of the BAT-AEL which is 220 mg/Nm³.

• None of the reference lignite-fired power plants was designed with SCR and none operates with SCR. At present, this technology should be considered an emerging technique for lignite-fired boilers.

• Nearly 40% of the reference power plants emit on average yearly NOX of between 175 mg/Nm³ and 200 mg/Nm³. This large group is not sufficiently considered. In fact, the NOX BAT-AEL is close to 200 mg/Nm³ (according to the evaluation of EIPPCB in File “COAL-Lignite NOX-CO-NH3 V2”, table and graph 4). The statement in footnote 9 does not consider the data of this important group of power plants.

• Most of the boilers ≥ 300 MWth are operated in base load. This is also reflected in file “COAL-Lignite NOX-CO-NH3 V2”, table and graph 4. The 1/2 hourly values are close to the yearly average. Very often they do not fluctuate more than ± 20 mg/Nm³ (see reference plants n° 128, 129, 130). It is therefore necessary to delete footnote 9: the statement in footnote 10 is also not sufficiently justified.

The split view is accompanied by the following rationale (EE):
• The oil shale high mineral content, high ash amount and high Ca-content will cause fast deactivation of the catalyst of SCR in high-dust configuration.
• The use of SCR in low-dust configuration when firing oil shale significantly reduces the overall efficiency of the whole production process and at the same time increases the emissions and fuel consumption.
• Due to this for oil shale or equal mineral rich fuels there is a need to use SNCR or some primary measures for the NOX reduction that cannot guarantee the agreed emission levels in different and variable working loads that are caused by the grid conditions, variable consumption etc..
• Therefore EE proposes to stay on the IED fixed emissions level and not to go for more ambitious targets.

EIPPCB assessment

Availability of information on which the split view is based:
• Documents and information mentioned in the split view were available with the exception of the following information submitted during or after the final meeting in June 2015 that were thus not considered in the assessment:
  o information used in the PL and EURACOAL (supported by EL) rationale that comes from a document circulated on 8.06.2015 about the characteristics of Polish lignite;
  o information used in the EE rationale about the potential use of SCR with oil shale which was not specifically assessed in D1.

Validity of supporting rationale:
• The argument that there are no plants in the data set burning European lignite and fitted with SCR or SNCR is valid. Levels proposed in the split view of up to 200 mg/Nm$^3$ are supported with available data from plants without these techniques.
• Enough yearly average data were available without the need to extrapolate from the 95th percentile of hourly averages data.
• Regarding the modification or deletion of footnote (8), the rationale is not in line with the proposal as it refers to the most efficient technique of the BAT 19 set of techniques, which may be assimilated to the SCR technique already mentioned as such in footnote (8).
• Footnotes (9) and (10) have been added to ensure consistency with the ELVs set by the IED as a 'safety net' for these plants, and thus cannot be exceeded.

EIPPCB conclusion

Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the split view for the different alternative higher ends of the range up to 200 mg/Nm$^3$, but not for the change or removal of the footnotes. This split view will therefore only be reported in the 'Concluding remarks and recommendations for future work' section of the BREF for the parts related to the alternative higher end of the BAT-AEL ranges.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
</table>
11.3.2 Decrease the upper ends of the BAT-AEL ranges

Split view summary

EEB proposes to set the upper levels of the yearly and daily BAT-AEL ranges for existing FBC boilers of ≥ 300 MWth combusting coal and/or lignite and lignite-fired PC boilers of ≥ 300 MWth respectively at 100 mg/Nm³ and 160 mg/Nm³.

CAN Europe proposes to set the yearly BAT-AEL range for existing FBC boilers of ≥ 300 MWth combusting coal and/or lignite and lignite-fired PC boilers of ≥ 300 MWth at < 50–70 mg/Nm³.

The split view is accompanied by the following rationale (EEB):

- Yearly upper BAT-AEL for existing plants:
  - The BAT-AEL of 175 mg/Nm³ is set by Plant 170.
  - However, there are better performing plants than this which are representative of the range of plants included in the BAT-AEL in terms of boiler type age, size and load factor (including mid merit) and achieve emissions of ≤ 150 mg/Nm³ without any secondary abatement.
  - Secondary abatement has not been required of lignite to date because it could meet existing standards without it.
  - However, that is not a proper basis for determining BAT and given the relatively low costs of SNCR, it is reasonable that BAT should require it for all plants.
  - SNCR achieves reductions of 30-50 %, resulting in emissions of ~100 mg/Nm³.
- Daily upper BAT-AEL for existing plants:
  - A well run plant should not have a large variation between the yearly average and 95th percentile data.
  - The daily emissions of Plants 167 and 170 are excessive compared with similar plants using primary measures – 83 and 137 mg/Nm³ above the yearly average.
  - By comparison, Plants 99, 377 and 123 have 95th percentile data of 60 mg/Nm³, 35 mg/Nm³ and 26 mg/Nm³ respectively above the yearly average.
  - For a PC yearly upper BAT-AEL of 100 mg/Nm³ the daily existing upper BAT-AEL is 160 mg/Nm³.

The split view is accompanied by the following rationale (CAN Europe):

- NOx background levels are too high in Europe, many Member States exceed national thresholds, and many cities cannot comply with local air quality standards. Therefore, BAT-AEL should be set at the lowest level technically possible and economically viable, in particular when it comes to new plants running for many years.
- The application of the proposed weak NOx levels instead of levels associated with BAT across the EU coal power plant fleet would cause a projected 18,000 premature deaths and 12.3 billion euros in economic damages over the course of a decade. The
The potential impact of the proposed limit extends even longer as the proposed lenient limit will lead to installation of a large number of SCR devices with low control efficiency, hence locking in avoidable NO\textsubscript{X} emissions for decades. The very large emissions volume sets the emission limits for coal-fired power plants apart from other sources, and this humongous human and economic cost justifies pollution control upgrades even when they cost money.

- The high upper BAT-AEL levels will allow operation of power plants with outdated pollution controls avoiding investments into emission reduction which is socioeconomically justified.
- Many power plants already achieve NO\textsubscript{X} emission levels that are well below the concluded upper BAT-AEL level. This has the negative effect that regulators intending to require lower levels achievable may find themselves discouraged and their position undermined by the failure of the BREF determining upper levels far from reflecting levels achievable with BAT.
- The basis of the data collection made by the EIPPCB is characterized by plants using SCR and operating close to emission limit values. Therefore all reported NO\textsubscript{X} levels do not show technical feasibility but only reflect economic operation of the plants according to existing legislation.
- The BAT conclusions of the BREF LCP 2006 already recognized 9 years ago that emission levels of 90 mg/Nm\textsuperscript{3} were achievable in new and existing plants with the use of SCR at that time. Now, the BAT conclusions state again that it is possible with SCR to achieve levels < 85 mg/Nm\textsuperscript{3} in new and existing plants. It follows that at least this level should have been set as upper level for all plants, existing or new.
- With primary measures only, levels of about 300 mg/Nm\textsuperscript{3} can be achieved. Assuming 80% reduction when applying SCR results in NO\textsubscript{X} levels of 60 mg/Nm\textsuperscript{3}.
- EIPPCB data collection shows several existing coal power plants achieving yearly average values below 70 mg/Nm\textsuperscript{3} (see EIPPCB document Coal and/or lignite combustion NO\textsubscript{X}, CO and NH\textsubscript{3} emissions to air, table 3, plants 367V, 34V, 253V)
- Moorburg plant in Hamburg/DE performs < 70 mg/Nm\textsuperscript{3} on a daily average basis.
- Evidence provided by CAN Europe / Greenpeace and EEB to the TWG clearly shows that emission levels below 50 mg/Nm\textsuperscript{3} are achieved in coal-fired plants (see Smoke and Mirrors report, figure 8 on page 23: Shangdu plant units 1+2+3+4+6, Guodian Beilun units 2+6, Waigaoqiao plant units 7+9).
- CAN Europe view remains that 50 mg/Nm\textsuperscript{3} is an appropriate evidence-based upper BAT-AEL, however as a compromise we propose a range including data of EIPPCB data collection, proposing a BAT-AEL of < 50-70 mg/Nm\textsuperscript{3} for new and existing plants.

**EIPPCB assessment**

Availability of information on which the split view is based:

- Documents and information mentioned in the split view were available with the exception of the data from the Moorburg plant mentioned in the CAN Europe rationale submitted during or after the final meeting in June 2015 and which thus are not considered in the assessment.

Validity of supporting rationale (EEB):

- EEB derives higher ends of the yearly and daily ranges based on the use of SNCR by applying reduction efficiency levels taken from the BREF to cases of emissions between ≤ 150 mg/Nm\textsuperscript{3} and 200 mg/Nm\textsuperscript{3}. However, 1) SNCR is not generally applicable (i.e. not in the case of a high cross-sectional area which may be the case of big lignite-fired boilers), and 2) emission levels without SNCR are reported >> 200 mg/Nm\textsuperscript{3}, up to 400 mg/Nm\textsuperscript{3} or more.

Validity of supporting rationale (CAN Europe):
The whole rationale applies to coal-fired plants and not to lignite-fired plants.

**EIPPCB conclusion**

Taking these aspects into account, the EIPPCB considers that there are not enough technical arguments to support the split view. This split view will therefore only be reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

### 11.4 NOX BAT-AELs for new FBC boilers of ≥ 300 MW<sub>th</sub> combusting coal and/or lignite and lignite-fired PC boilers of ≥ 300 MW<sub>th</sub>

#### Conclusions of the meeting

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Table 10.3: BAT-associated emission levels (BAT-AELs) for NOX emissions to air from the combustion of coal and/or lignite

<table>
<thead>
<tr>
<th>Combustion plant total rated thermal input (MW&lt;sub&gt;a&lt;/sub&gt;)</th>
<th>BAT-AELs (mg/Nm&lt;sup&gt;3&lt;/sup&gt;)</th>
<th>Monitoring frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NO&lt;sub&gt;x&lt;/sub&gt;</td>
<td>CO</td>
</tr>
<tr>
<td></td>
<td>Yearly average</td>
<td>Daily average or average over the sampling period</td>
</tr>
<tr>
<td>New plants</td>
<td>Existing plants&lt;sup&gt;(4)&lt;/sup&gt;</td>
<td>New plants&lt;sup&gt;(3)&lt;/sup&gt;</td>
</tr>
<tr>
<td>...</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥ ≥ 300 FBC boiler combusting coal and/or lignite and lignite-fired PC boiler</td>
<td>50–85</td>
<td>&lt;85–175&lt;sup&gt;(4)&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

<sup>(3)</sup> These BAT-AELs do not apply when plants operate in peak- or emergency-load modes.

<sup>(4)</sup> In the case of plants put into operation no later than 7 January 2014, the higher end of the range is 200 mg/Nm<sup>3</sup> for plants operated ≥ 1500 h/yr, and 220 mg/Nm<sup>3</sup> for plants operated < 1500 h/yr.

<sup>(3)</sup> In the case of plants put into operation no later than 1<sup>st</sup> July 1987, which are operated < 1500 h/yr for which SCR and/or SNCR is not applicable, the higher end of the range is 340 mg/Nm<sup>3</sup>.

<sup>(9)</sup> The lower end of the range is considered achievable when using SCR.

<sup>(10)</sup> The higher end of the range is 150 for lignite-fired FBC boilers put into operation later than 7 January 2014.

<sup>(11)</sup> These levels are indicative for combustion plants operated < 500 h/yr.

#### 11.4.1 Increase the upper ends of the BAT-AEL ranges

**Split view summary**

EL and EURELECTRIC propose to set the upper levels of the daily and yearly BAT-AEL ranges for new lignite-fired plants of ≥ 300 MW<sub>th</sub> respectively at 200 mg/Nm<sup>3</sup> and 190 mg/Nm<sup>3</sup>.

PL and EE propose to set the upper level of the yearly BAT-AEL ranges for new lignite-fired plants of ≥ 300 MW<sub>a</sub> at 150 mg/Nm<sup>3</sup>.

The split view is accompanied by the following rationale (EL):
• The proposed yearly NO\textsubscript{X} BAT-AELs for new lignite-fired power plants > 300 MW\textsubscript{th} are too stringent for the case where only primary NO\textsubscript{X} reduction measures are applied. Secondary abatement measures may not be applicable (see EL split views on SNCR and SCR applicability). Additionally, a great number of lignite-fired reference plants have reported yearly NO\textsubscript{X} emissions above 175 mg/Nm\textsuperscript{3} (see plants n° 23, 116, 117, 128-1, 128-2, 128-3, 128-4, 129-1, 129-2, 130, 133, 387, 391).

• For the same reasons the proposed daily NO\textsubscript{X} BAT-AELs for new lignite-fired power plants > 300 MW\textsubscript{th} are considered too stringent.

• None of the reference plants firing lignite is applying SCR technology. Example plants operated in the US were reported without sufficient contextual information (see EL split view on SCR applicability).

The split view is accompanied by the following rationale (EURELECTRIC, EL):

- None of the BAT reference plants firing lignite is applying SCR technology. Example plants operated in the US were reported without sufficient contextual information.

See Section 11.3.1 for the rationales provided by PL and EE.

EIPPCB assessment

Availability of information on which the split view is based:

- Documents and information mentioned in the split view were available with the exception of the following information submitted during or after the final meeting in June 2015 and thus not considered in the assessment:
  - the information used in the PL rationale that comes from a document circulated on 8.06.2015 about the characteristics of Polish lignite;
  - the EE rationale, which is not based on available information (almost no information has been exchanged on oil shale) and refers to oil shale while the BAT-AELs refer to lignite combustion.

Validity of supporting rationale:

- The rationale does not demonstrate that the SCR/SCNR techniques could not be applied to new European lignite-fired plants, even if the applicability restriction concerning high cross-sectional boilers regarding SNCR may apply to bigger boilers. These techniques allow the BAT-AELs to be achieved.

- The alternative levels proposed in the split view are not justified by appropriate data focusing on new plants in the rationale.

EIPPCB conclusion

Taking these aspects into account, the EIPPCB considers that there are not enough appropriate technical arguments to support the split view. This split view will therefore not be reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

11.4.2 Decrease the upper end of the BAT-AELs

Split view summary

CAN Europe proposes to set the yearly BAT-AEL range for new FBC boilers combusting coal and/or lignite and lignite-fired PC boilers of ≥ 300 MW\textsubscript{th} at < 50–70 mg/Nm\textsuperscript{3}.

The split view is accompanied by the following rationale (CAN Europe):

- See Section 11.3.2.

EIPPCB assessment
Availability of information on which the split view is based:

- Documents and information mentioned in the split view were available with the exception of data from the Moorburch plant submitted during or after the final meeting in June 2015 and thus not considered in the assessment.

Validity of supporting rationale:

- The whole rationale applies to coal-fired plants and not to lignite-fired plants.

**EIPPCB conclusion**

Taking these aspects into account, the EIPPCB considers that there are not enough appropriate technical arguments to support the split view. This split view will therefore not be reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

**11.5 NO\textsubscript{X} BAT-AELs for coal-fired PC boilers of \geq 300 MW\textsubscript{th}**

**Conclusions of the meeting**

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Table 10.3: BAT-associated emission levels (BAT-AELs) for NO\textsubscript{X} emissions to air from the combustion of coal and/or lignite

<table>
<thead>
<tr>
<th>Combustion plant total rated thermal input (MW\textsubscript{th})</th>
<th>BAT-AELs (mg/Nm\textsuperscript{3})</th>
<th>Monitoring frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NO\textsubscript{X}</td>
<td>CO</td>
</tr>
<tr>
<td></td>
<td>Yearly average</td>
<td>Daily average or average over the sampling period</td>
</tr>
<tr>
<td>New plants</td>
<td>Existing plants (\textsuperscript{1})</td>
<td>New plants</td>
</tr>
<tr>
<td>\geq 300 coal-fired PC boiler</td>
<td>65–85</td>
<td>65–150</td>
</tr>
</tbody>
</table>

(\textsuperscript{1}) These BAT-AELs do not apply when plants operate in peak- or emergency-load modes.

(\textsuperscript{6}) In the case of plants put into operation no later than 7 January 2014, the higher end of the range is 200 mg/Nm\textsuperscript{3} for plants operated \geq 1500 h/yr, and 220 mg/Nm\textsuperscript{3} for plants operated < 1500 h/yr.

(\textsuperscript{7}) In the case of plants put into operation no later than 1\textsuperscript{st} July 1987, which are operated < 1500 h/yr for which SCR and/or SNCR is not applicable, the higher end of the range is 340 mg/Nm\textsuperscript{3}.

(\textsuperscript{8}) The lower end of the range is considered achievable when using SCR.

(\textsuperscript{9}) The higher end of the range is 150 for lignite-fired FBC boilers put into operation later than 7 January 2014.

(\textsuperscript{10}) The higher end of the range is 165 mg/Nm\textsuperscript{3} for lignite-fired FBC boilers put into operation later than 7 January 2014.

(\textsuperscript{11}) These levels are indicative for combustion plants operated < 500 h/yr.

**11.5.1 Increase the upper end of the yearly BAT-AEL range for existing plants and insert footnotes**

**Split view summary**

PL, UK and EURELECTRIC propose to set the upper level of the yearly BAT-AEL range for existing coal-fired PC boilers of \geq 300 MW\textsubscript{th} at 180 mg/Nm\textsuperscript{3}.

EURELECTRIC proposes to insert a footnote for the lower ends of the BAT-AEL ranges mentioning that these values are achievable only for plants fitted with the most efficient techniques among the BAT 19 set.
EURELECTRIC proposes to consider the case of plants put into operation later than 7 January 2014 as the exemption to the general case.

EURACOAL proposes to add the following footnote: 'The higher end of the BAT-AEL range can be as high as 180 mg/Nm³ in the case of existing plants already applying secondary abatement techniques for NOX reduction in the case where limitations exist for further retrofitting for technical and economic reasons'.

The split view is accompanied by the following rationale (PL):
- Compliance with BAT-AELs of 180 mg/Nm³ for NOX is possible for pulverised bed boilers with a rated thermal input ≥ 300 MWth using combination of advanced primary techniques (ROFA combustion) and secondary technique (SNCR). With advanced and well operated primary techniques urea injection is limited and can be effectively controlled to avoid ammonia slip. Measured levels of NH3 (before ESP) is below 5 mg/Nm³.
- The BAT-AEL of 150 mg/Nm³ imposes in practice application of SCR what can be restricted due to the technical and economic reasons. Well-functioning combinations of SNCR and primary NOX abatement techniques exist and are implemented. One example is reference Plant 386.

The split view is accompanied by the following rationale (UK):
- The higher end of the BAT-AEL for existing coal plant of ≥ 300 MWth for NOX has been reduced from 180 mg/Nm³ in draft DI to 150 mg/Nm³ in the final draft. The reduced value is not achievable for primary techniques with SNCR, precluding this technology option. However, SNCR is included in BAT 10, Table entry c as an applicable technique. The range of a BAT-AEL should allow all applicable techniques to be used in practice. For some plants, it could be feasible for SNCR, in combination with other measures, to deliver 180 mg/Nm³ performance, but 150 mg/Nm³ is not feasible under any circumstances with SNCR.

The split view is accompanied by the following rationale (EURELECTRIC):
- The yearly BAT-AEL range should consider the case of existing plants already applying secondary abatement techniques for NOX reduction, that couldn’t achieve high performance in all operating conditions, considering limitations for further retrofitting due to techno-economic reasons.
- Particularly all lower BAT-AEL values could be achieved just by recent plants fitted with combination of most advanced design of BAT 19 primary (b, including specially designed burners) and secondary (d; e) techniques - design performances achievable by effective reactor volume, number and type of catalyst layers, efficient NH3 evaporators. This evidence is stated in “Coal-Lignite NOX, CO and NH3 V2” table and graphs by the few plants achieving values, as yearly average or 95th of hourly averages, lower that the higher part of the BAT-AELs range.
- In BP 1.2.2 EIPPCB indicates that values of ‘more recent existing plants - performing in these lower end of the range - are taken as reference for setting daily BAT-AELs for new plants.

The split view is accompanied by the following rationale (EURACOAL):
- Only 20% of the reference plants emit on average yearly NOX of less than 150 mg/Nm³ (see file “COAL-Lignite NOX-CO-NH3 V2”, table and graph 3). The results of the data evaluation do not justify yearly average BAT-AEL of less than 180 mg/Nm³. In fact, the emission limit of the IED is confirmed as BAT-AEL.
- Same rationale as the UK.

EIPPCB assessment
Availability of information on which the split view is based:
- Documents and information mentioned in the split view were available.
Validity of supporting rationale:
- BAT 19 lists five techniques and all should be considered for achieving the BAT-AEL, including SCR which is generally applicability for plants of ≥ 300 MW_th operated ≥ 1500 h/yr.
- Some existing plants operated with SCR have yearly emission levels above 150 mg/Nm³. However, no rationale is given as to why 180 mg/Nm³ should be used instead of 150 mg/Nm³.
- The lower end of the range is not necessarily achieved by the most recently built plants (the best performer was commissioned in 1987 and four out of the five best performers were commissioned between 1975 and 1998), but rather by an appropriate combination of the most efficient BAT listed. However the fact that the lower end of a BAT-AEL range is a general statement in principle valid for all the BAT-AELs and this is not considered a substantive and then a valid split view.
- A solely statistical assessment of an emission data set does not represent an appropriate way of deriving BAT-AELs.

EIPPCB conclusion
Taking these aspects into account, the EIPPCB considers that there are not enough appropriate technical arguments to support the split view. This split view will therefore not be reported in the ‘Concluding remarks and recommendations for future work’ section of the BREF.

11.5.2 Decrease the lower/upper ends of the BAT-AELs for new plants

Split view summary
BE proposes to set the upper levels of the yearly and daily BAT-AEL ranges for new coal-fired PC boilers of ≥ 300 MW_th respectively at 55 mg/Nm³ and 90 mg/Nm³.

EEB proposes to set the upper level of the yearly BAT-AEL range for new coal-fired PC boilers of ≥ 300 MW_th at 70 mg/Nm³.

CAN Europe proposes to set the yearly BAT-AEL range for new coal-fired PC boilers of ≥ 300 MW_th at < 50–70 mg/Nm³.

The split view is accompanied by the following rationale (BE):
- SCR is considered BAT for new coal-fired PC boiler ≥ 300 MW_th (BAT 19). The proposed values (90 mg/Nm³ as daily average and 55 mg/Nm³ as yearly average can be achieved by applying SCR (in combination with primary techniques). A new powder coal plant, which submitted an application for a permit in Belgium in 2010, could guarantee NOX concentrations of 90 mg/Nm³ as daily average and 55 mg/Nm³ as yearly average, by applying this combination.

The split view is accompanied by the following rationale (EEB):
- The Bureau notes that new plants can be expected to achieve emission levels < 85 mg/Nm³.
- However, that of itself does not justify setting the upper BAT-AEL at 85 mg/Nm³ i.e. at Plant 141.
- There are three plants performing better with primary measures and SCR: Plants 367, 34 and 253, with NOX emissions of 66 mg/Nm³, 66 mg/Nm³ and 69 mg/Nm³ respectively.
• These pre-date the normal age range for new plants, but if an older and smaller plant that is otherwise comparable can achieve a particular standard, it is reasonable to expect all new plants to do so.
• Plants 367, 34 and 253 should therefore provide the basis of the BAT-AEL i.e. 70 mg/Nm³.

The split view is accompanied by the following rationale (CAN Europe):
• See Section 11.3.2.

EIPPCB assessment
Availability of information on which the split view is based:
• Documents and information mentioned in the split view were available with the exception of the following information submitted during or after the final meeting in June 2015 and thus not considered in the assessment:
  o data from the Moorburg plant;
  o permit of a new BE coal-fired power plant.

Validity of supporting rationale (BE):
• The rationale of BE is based on information not available to the TWG in due time.

Validity of supporting rationale (CAN Europe, EEB):
• CAN Europe and EEB use available information in the assessment for coal combustion when using BAT, including plant age comparison and data from China, and there is a link between the rationale and the levels proposed in the split view.

EIPPCB conclusion
Taking these aspects into account, the EIPPCB considers that there are enough technical arguments to support the split view for the parts proposed by EEB and CAN Europe, and not for the part proposed by BE. This split view will therefore only be partially reported in the ‘Concluding remarks and recommendations for future work’ section of the BREF for the parts proposed by EEB and CAN Europe.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 19 Table 10.3</td>
<td>Decrease the upper end of the NOₓ yearly BAT-AEL range for new coal-fired PC boilers of ≥ 300 MWth</td>
<td>EEB</td>
<td>70 mg/Nm³</td>
</tr>
<tr>
<td>BAT 19 Table 10.3</td>
<td>Change the NOₓ yearly BAT-AEL range for new coal-fired PC boilers of ≥ 300 MWth</td>
<td>CAN Europe</td>
<td>&lt; 50–70 mg/Nm³</td>
</tr>
</tbody>
</table>

11.5.3 Decrease the upper ends of the BAT-AELs for existing plants

Split view summary
EEB proposes to set the upper ends of the yearly and daily BAT-AEL ranges for existing coal-fired PC boilers of ≥ 300 MWth respectively at 85 mg/Nm³ and 140 mg/Nm³.

CAN Europe proposes to set the yearly BAT-AEL range for existing coal-fired PC boilers of ≥ 300 MWth at < 50–70 mg/Nm³.

The split view is accompanied by the following rationale (EEB):
• Yearly upper BAT-AEL for existing plants
• This has been calculated on the basis of the worst possible case for both the emissions after primary measures have been applied and for the subsequent application of SCR.
• The EEB presented the following case for significant reduction, which has been checked with supply company engineers who work on fitting SCR:
• The proposed upper limit has been achieved by combining the LCPD legal requirement of <500 mg/Nm$^3$ for primary abatement with 70% removal efficiency for SCR -- the bottom end of the range identified by the Bureau in the BP (69 – 89%);
• However, plants regularly achieve below 500 mg/Nm$^3$ with just primary measures e.g. Plant 496 (343 mg/Nm$^3$); Plant 379 (299 mg/Nm$^3$); Plant 386-2 (196 mg/Nm$^3$); Plant 406 (358 mg/Nm$^3$).
• Further, the fact of 70% NO$_X$ reduction with SCR does not mean that this is what it can achieve – an operator is not going to run the plant higher than they have to.
• Assuming a modest SCR emission reduction of 75% with primary measures achieving 350 mg/Nm$^3$ gives NO$_X$ emissions of 88 mg/Nm$^3$. Similarly, 75% SCR reduction on 300 mg/Nm$^3$ achieves emissions of 75 mg/Nm$^3$.
• Existing Plant 141 achieves this, and plants 367, 34 and 253 exceed it.
• Therefore the upper BAT-AEL limit should be 85 mg/Nm$^3$ if it is to reflect what plants can achieve (Plant 141).
• Daily upper BAT-AEL for existing plants
• A well run plant should not have a large variation between the yearly average and 95$^{th}$ percentile data. There is no 95$^{th}$ percentile data for Plant 141. The closest comparable plant is for Plants 26, 17, 267 and 268, where the 95$^{th}$ percentile data exceeds the yearly average by 48 mg/Nm$^3$, 28 mg/Nm$^3$, 67 mg/Nm$^3$ and 56 mg/Nm$^3$ respectively.
• For a PC yearly upper BAT-AEL of 85 mg/Nm$^3$ the daily existing upper BAT-AEL is 140 mg/Nm$^3$.

See rationale provided by CAN Europe in Section 11.3.2.

**EIPPCB assessment**

Availability of information on which the split view is based:
• Documents and information mentioned in the split view were available, with the exception of data from the Moorburg plant submitted during or after the final meeting in June 2015 and thus not considered in the assessment.

Validity of supporting rationale (CAN Europe, EEB):
• CAN Europe and EEB use available information in the assessment for coal combustion when using BAT, and there is a link between the rationale and the proposed alternative. The rationale further justifies the split view based on the reported emission data and application of reduction factors.

**EIPPCB conclusion**

Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the split view. This split view will therefore be reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 19 Table 10.3</td>
<td>Decrease the higher ends of the NO$<em>X$ yearly and daily BAT-AEL ranges for new coal-fired PC boilers of $\geq$ 300 MW$</em>{th}$</td>
<td>EEB</td>
<td>85 mg/Nm$^3$ (yearly) 140 mg/Nm$^3$ (daily)</td>
</tr>
</tbody>
</table>
Table 10.3: Change the NOx yearly BAT-AEL range for existing coal-fired PC boilers of ≥ 300 MWth

CAN Europe | < 50–70 mg/Nm³

11.6 SO₂ BAT-AELs for existing coal- and/or lignite-fired plants of < 100 MWth and 100–300 MWth

Conclusions of the meeting
Slide 165.

Table 10.5: BAT-associated emission levels (BAT-AELs) for SO₂ SOₓ emissions to air from the combustion of coal and/or lignite

<table>
<thead>
<tr>
<th>Combustion plant total rated thermal input (MWth)</th>
<th>BAT-AELs (mg/Nm³)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yearly average</td>
</tr>
<tr>
<td></td>
<td>New plants</td>
</tr>
<tr>
<td>&lt;100</td>
<td>150–200</td>
</tr>
<tr>
<td>100–300</td>
<td>80–150</td>
</tr>
</tbody>
</table>

(') For circulating fluidised bed boilers, the lower end of the range can be achieved by using a high efficiency Wet FGD system. The higher end of the range can be achieved by using boiler in-bed sorbent injection.

(') These BAT-AELs do not apply when plants operate < 1500 h/yr.

(’) The higher end of the BAT-AEL range is 220 mg/Nm³ in the case of plants put into operation no later than 7 January 2014 and operated < 1500 h/yr. For other existing plants put into operation no later than 7 January 2014, the higher end of the BAT-AEL range is 205 mg/Nm³.

(”) In the case of plants put into operation no later than 7 January 2014, the upper end of the BAT-AEL range is 250 mg/Nm³.

(’) The lower end of the range can be achieved when using low-sulphur fuel in combination with a wet abatement system.

(”) These levels are indicative for combustion plants operated < 500 h/yr.

Split view summary
CEFIC proposes to set the upper level of the yearly BAT-AEL ranges for existing plants of < 100 MWth at 380 mg/Nm³ and for existing plants of 100–300 MWth at 240 mg/Nm³ or 220 mg/Nm³.

The split view is accompanied by the following rationale:

- Available data reflect only cases were residues/by-products generated by dry or semi-dry techniques implemented for SOx reduction are used for mine filling or landfilling. There may be difficulties throughout Europe to handle these residues in the same way.
- There will be more feedback on available techniques after the implementation of the new ELVs from the IED.

EIPPCB assessment
Availability of information on which the split view is based:

- Documents and information mentioned in the split view were available.

Validity of supporting rationale:
Dry and semi-dry techniques for SO\textsubscript{X} reduction are considered generally applicable by the TWG. There is no technical justification linking BAT and the alternative proposed BAT-AELs.

**EIPPCB conclusion**

Taking these aspects into account, the EIPPCB considers that there are not enough appropriate technical arguments to support the split view. This split view will therefore not be reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

### 11.7 SO\textsubscript{2} BAT-AELs for coal- and/or lignite-fired plants of \( \geq 300\text{ MW}\text{th} \)

**Conclusions of the meeting**

Slides 167 to 169.

**Table 10.5:** BAT-associated emission levels (BAT-AELs) for SO\textsubscript{2} SO\textsubscript{X}-emissions to air from the combustion of coal and/or lignite

<table>
<thead>
<tr>
<th>Combustion plant total rated thermal input (MW\text{th})</th>
<th>BAT-AELs (mg/Nm\textsuperscript{3})</th>
<th>Yearly average</th>
<th>Daily average</th>
<th>Daily average or average over the sampling period</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>New plants</td>
<td>Existing plants</td>
<td>New plants</td>
<td>Existing plants</td>
</tr>
<tr>
<td>≥ 300 PC boiler</td>
<td>10–75</td>
<td>10–130 (\textsuperscript{4})</td>
<td>25–110</td>
<td>25–165 (\textsuperscript{5})</td>
</tr>
<tr>
<td>≥ 300 Fluidised bed boiler (\textsuperscript{1})</td>
<td>20–75</td>
<td>20–180</td>
<td>25–110</td>
<td>50–220</td>
</tr>
</tbody>
</table>

(\textsuperscript{1}) For circulating fluidised bed boilers, the lower end of the range can be achieved by using a high efficiency wet FGD system. The higher end of the range can be achieved by using boiler in-bed sorbent injection.

(\textsuperscript{4}) These BAT-AELs do not apply when plants operate < 1500 h/yr.

(\textsuperscript{5}) The higher end of the BAT-AEL range is 220 mg/Nm\textsuperscript{3} in the case of plants put into operation no later than 7 January 2014 and operated < 1500 h/yr. For other existing plants put into operation no later than 7 January 2014, the higher end of the BAT-AEL range is 205 mg/Nm\textsuperscript{3}.

(\textsuperscript{6}) In the case of plants put into operation no later than 7 January 2014, the upper end of the BAT-AEL range is 250 mg/Nm\textsuperscript{3}.

(\textsuperscript{7}) The lower end of the range can be achieved when using low-sulphur fuel in combination with a wet abatement system.

(\textsuperscript{5}) These levels are indicative for combustion plants operated < 500 h/yr.

For a plant with a total rated thermal input of more than 300 MW\text{th}, which is specifically designed to fire indigenous lignite fuels and which can demonstrate that it cannot achieve the BAT-AELs mentioned in Table 10.5 for techno-economic reasons, the upper end of the yearly BAT-AEL range is as follows:

(i) for a new FGD system: RCG x 0.01 with a maximum of 200 mg/Nm\textsuperscript{3};

(ii) for an existing FGD system: RCG x 0.03 with a maximum of 320 mg/Nm\textsuperscript{3};

in which RCG represents the concentration of SO\textsubscript{2} in the raw flue-gas as a yearly average (under the standard conditions given under General considerations) at the inlet of the SO\textsubscript{X} abatement system, expressed at a reference oxygen content of 6 \% O\textsubscript{2}.

(iii) In case boiler sorbent injection is applied as part of the FGD system, the RCG may be adjusted by taking into account the SO\textsubscript{2} reduction efficiency of this technique (\( \eta_{BSI} \)), as follows: 

\[
\text{RCG (adjusted)} = \frac{\text{RCG (measured)}}{(1-\eta_{BSI})}.
\]
In these cases the daily BAT-AELs set out in Table 10.5 do not apply.

The associated monitoring is in BAT 3 ter.

### 11.7.1 Decrease the upper/lower ends of the yearly BAT-AELs for new and existing plants of \( \geq 300 \text{ MW}_{\text{th}} \)

#### Split view summary

CAN Europe proposes a SO\(_2\) BAT-AEL range of \(<10–75 \text{ mg/Nm}^3\) for all new and existing PC and FBC boilers of \(\geq 300 \text{ MW}_{\text{th}}\).

EEB proposes to differentiate BAT-AELs according to the sulphur content of the fuel, as follows:

- **General case for existing lignite plants:**
  - \(<130 \text{ mg/Nm}^3\) for plants burning fuels up to \(1-3.25\% \text{ S (dry wt.)}\);
  - \(<40 \text{ mg/Nm}^3\) for plants burning fuels \(<1\% \text{ S (dry wt.)}\).

- **Yearly upper SO\(_2\) BAT-AEL for existing coal plants:** \(40 \text{ mg/Nm}^3\).

- **Yearly upper SO\(_2\) BAT-AEL for new coal plants:** \(20 \text{ mg/Nm}^3\).

- **Yearly upper SO\(_2\) BAT-AEL for new lignite PC plants:**
  - \(75 \text{ mg/Nm}^3\) for plants burning fuels up to \(1-3.25\% \text{ S}\);
  - \(20 \text{ mg/Nm}^3\) for plants burning fuels \(<1\% \text{ S}\).

- **Daily upper SO\(_2\) BAT-AEL for existing coal plants:** \(75 \text{ mg/Nm}^3\).

- **Daily upper SO\(_2\) BAT-AEL for existing lignite PC plants:**
  - \(205 \text{ mg/Nm}^3\) for plants burning fuels up to \(1-3.25\% \text{ S}\);
  - \(75 \text{ mg/Nm}^3\) for plants burning fuels \(<1\% \text{ S}\).

- **Daily upper SO\(_2\) BAT-AEL for new coal plants:** \(60 \text{ mg/Nm}^3\).

- **Daily upper SO\(_2\) BAT-AEL for new lignite PC plants:**
  - \(110 \text{ mg/Nm}^3\) for plants burning fuels up to \(1-3.25\% \text{ S}\);
  - \(60 \text{ mg/Nm}^3\) for plants burning fuels \(<1\% \text{ S}\).

The split view is accompanied by the following rationale (CAN Europe):

- Evidence provided by CAN Europe and EEB to the TWG shows that emission levels below \(35 \text{ mg/Nm}^3\) and removal efficiencies above \(99.5\%\) and up to \(99.9\%\) are achievable in both coal and lignite-fired plants, corresponding to 5 times lower emission levels than the BAT conclusion for existing fluidized boiler plants.

- Data collection shows several existing coal power plants achieving yearly average values below \(75 \text{ mg/Nm}^3\).

- Moorburg hard coal PC plant in Hamburg/DE achieves levels \(<60 \text{ mg/Nm}^3\) on a daily average basis and monthly averages \(<35 \text{ mg/Nm}^3\).

- SO\(_X\) emissions contribute to acidification and to particle matters, causing \(51\,000\) premature deaths and \(12.3\) billion Euros in economic damages over the course of a decade in Europe.

The split view is accompanied by the following rationale (EEB):

- Differentiating between coal and lignite in the general case for existing plants:
  - The use of raw flue-gas content as the basis for setting different standards arises from the inclusion of both coal and lignite (with different LHV) within the indigenous and non-indigenous categories;
  - This was no part of the Domestic Fuels Initiative and no justification has been provided for the classification of individual plants between these 2 categories.
- Plants burning either indigenous or non-indigenous coals can use coal blending.

- Differentiating existing lignite plants according to fuel S-content: 1% S and 1-3.25% S (dry wt.):
  - Plant 170 burns lignite with a dry S-content of 3.22% and achieves emissions of 122 mg/Nm³. However, it would be excessive to allow this level of emissions to plants with a lower fuel S content.
  - A pro-rata reduction in emissions for plants with a fuel S content of 0.9% would result in a maximum emission of ~38 mg/Nm³. This is easily achievable in practice (Plant 137 dates from 1972, burns lignite with a fuel S content of 0.9% and achieves yearly emissions of 21 mg/Nm³ based on half hour averages).

- Yearly upper SO2 BAT-AEL for existing coal plants should be 40 mg/Nm³:
  - The proposed BAT-AEL is set by Plant 219, dating back to 1974. However, there are several existing coal-fired reference plants that currently achieve emissions considerably below this whilst being older (Plants 211 (1965) and 212 (1970) achieve emissions of 56 mg/Nm³ and 58 mg/Nm³ respectively. Plant 124b (1968) has yearly emissions of 40 mg/Nm³ based on half hourly averages).

- The yearly upper SO2 BAT-AEL for new coal plants should be 20 mg/Nm³:
  - Plant 34 has average SO2 emissions of 9 mg/Nm³, although no fuel S-content is reported.
  - However, it is known that Plant 137 (1972) achieves emissions of 21 mg/Nm³ (half hourly average) with a fuel S-content of 0.9%.

- The upper yearly SO2 BAT-AEL for new lignite PC plants should be 75 mg/Nm³ for plants burning fuels up to 1-3.25% S, and 20 mg/Nm³ for plants burning fuels < 1% S:
  - The general case BAT-AEL proposed in the BAT-AEL for new plants is based on 75 mg/Nm³ emissions. However, this would be excessive for plants burning fuels with lower S contents.
  - Plants 137, 130 and 116 date from 1972, 1975 and 2003 respectively and all burn lignite with a S-content of 0.9%. They achieve emissions of 21 mg/Nm³, 68 mg/Nm³ and 77 mg/Nm³ based on half hourly averages.
  - If a plant as old as 1972 can achieve 21 mg/Nm³ on half hourly averages, then it can be expected of the newest plants.

- Daily upper SO2 BAT-AEL for existing coal plants:
  - A well run plant should not have a large variation between the yearly average and 95th percentile data.
  - The yearly BAT-AEL was set by plant 124b, which has a difference of 34 mg/Nm³ between the yearly and 95th Percentile data; this is not excessive (Plants 26, 123 and 134 have differences of 31 mg/Nm³, 41 mg/Nm³ and 31 mg/Nm³ respectively).
  - For a yearly upper BAT-AEL of 40 mg/Nm³ the daily upper BAT-AEL should therefore be 75 mg/Nm³.

- Daily upper SO2 BAT-AEL for existing lignite PC plants:
  - A well run plant should not have a large variation between the yearly average and 95th percentile data.
  - The yearly BAT-AEL for plants with fuel S content 1-3.25% was set by Plant 139.
  - 205 mg/Nm³ (Plant 388) is the best 95th percentile data for plants in this emissions range.
  - Yearly BAT-AEL for plants with a fuel S-content < 1% was set by plant 124b, which has a difference of 34 mg/Nm³ (Plants 124b, 26, 123 and 134...
have differences between the yearly and 95th percentile data of 34 mg/Nm³, 31 mg/Nm³, 41 mg/Nm³ and 31 mg/Nm³ respectively

- Daily upper SO₂ BAT-AEL for new coal plants:
  - A well run plant should not have a large variation between the yearly average and 95th percentile data.
  - The top performing yearly average new plant does not provide 95th percentile.
  - Plants 26, 124b and 123 have difference between the daily and yearly data of 32 mg/Nm³, 34 mg/Nm³ and 41 mg/Nm³ respectively.
  - For a yearly upper BAT-AEL of 20 mg/Nm³ the daily upper BAT-AEL should therefore be 60 mg/Nm³.

- Daily SO₂ BAT-AEL for new lignite PC plants
  - A well run plant should not have a large variation between the yearly average and 95th percentile data.
  - The yearly BAT-AEL was set by Plant 137, with a difference between the daily and yearly data of 47 mg/Nm³.
  - Plant 116 has a difference between the daily and yearly data of 36 mg/Nm³.
  - The daily upper BAT-AEL should therefore be 110 mg/Nm³ for plants 1-3.25 % S content and 60 mg/Nm³ for plants < 1 % S-content.

**EIPPCB assessment**

**Availability of information on which the split view is based:**
- Most of the documents and information mentioned in the split view were available, with the exception of information on the Moorburg plant included only in the CAN Europe split view submission with a webpage link, submitted during or after the final meeting in June 2015 and thus not considered in the assessment.

**Validity of supporting rationale (CAN Europe):**
- The rationale is based on available example plants fitted with techniques listed in BAT 21 achieving the levels proposed in the split view and on the application of a SO₂ removal efficiency of 99 % or greater.

**Validity of supporting rationale (EEB):**
- The reasoning proposed by EEB is generally based on available data from the data collected in 2012 from plants fitted with BAT, making the link between the available information and the levels proposed in the split view, with justifications based on different parameters (sulphur fuel content, plant ages, etc.), except for the yearly and daily upper SO₂ levels for new coal plants, which were originally derived based on data from a lignite-fired plant.

**EIPPCB conclusion**

Taking these aspects into account, the EIPPCB considers that there are enough technical arguments to support the split view, except in the case of the yearly and daily upper SO₂ levels for new coal plants submitted by EEB. This split view will therefore be reported in the 'Concluding remarks and recommendations for future work' section of the BREF for the CAN Europe part, and be partially reported in the case of the EEB part.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 21 Table 10.5</td>
<td>Change the yearly SO₂ BAT-AELs for all new and existing combustion plants of ≥ 300 MWth</td>
<td>CAN Europe</td>
<td>&lt; 10–75 mg/Nm³</td>
</tr>
<tr>
<td>BAT 21 Table 10.5</td>
<td>Change the SO$<em>2$ BAT-AELs for new and existing combustion plants of $\geq$ 300 MW$</em>{th}$</td>
<td>EEB</td>
<td></td>
</tr>
<tr>
<td>------------------</td>
<td>-------------------------------------------------</td>
<td>-----</td>
<td></td>
</tr>
<tr>
<td><strong>Existing coal-fired plants:</strong></td>
<td></td>
<td><strong>Existing lignite-fired plants:</strong></td>
<td></td>
</tr>
<tr>
<td>$&lt;$ 40 mg/Nm$^3$ (yearly)</td>
<td>$&lt;$ 130 mg/Nm$^3$ (yearly)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$&lt;$ 75 mg/Nm$^3$ (daily)</td>
<td>$&lt;$ 205 mg/Nm$^3$ (daily)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Existing lignite-fired plants (1–3.25 % S, dry):</strong></td>
<td><strong>Existing lignite-fired plants ($&lt;$ 1 % S, dry):</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$&lt;$ 130 mg/Nm$^3$ (yearly)</td>
<td>$&lt;$ 75 mg/Nm$^3$ (yearly)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$&lt;$ 205 mg/Nm$^3$ (daily)</td>
<td>$&lt;$ 110 mg/Nm$^3$ (daily)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>New lignite-fired plants (1–3.25 % S, dry):</strong></td>
<td><strong>New lignite-fired plants ($&lt;$ 1 % S, dry):</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$&lt;$ 75 mg/Nm$^3$ (yearly)</td>
<td>$&lt;$ 20 mg/Nm$^3$ (yearly)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$&lt;$ 110 mg/Nm$^3$ (daily)</td>
<td>$&lt;$ 60 mg/Nm$^3$ (daily)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 11.7.2 Increase the upper end of the yearly BAT-AEL for existing PC boilers of $\geq$ 300 MW$_{th}$

**Split view summary**

EL proposes to set the upper level of the SO$_2$ yearly BAT-AEL range for existing coal- and/or lignite-fired PC boilers of $\geq$ 300 MW$_{th}$ at 170 mg/Nm$^3$, or at 180 mg/Nm$^3$ in the case of plants operated $<$ 1500 h/yr and put into operation no later than 7 January 2014.

The split view is accompanied by the following rationale:

- There should be a plausible and reasonable difference between daily and yearly BAT-AELs. This difference according to Table 10.5 of the Revised Draft 1 could be 35-40 mg/Nm$^3$. In view of that, for daily BAT-AEL 205 mg/Nm$^3$ the corresponding yearly BAT-AEL should be 170 mg/Nm$^3$.
- The yearly BAT-AEL range should consider the case of all existing plants already applying secondary abatement techniques for SO$_2$ reduction, that couldn’t achieve high performance in all operating conditions and taking into account limitations for further retrofitting due to techno-economic reasons.
- Many existing plants equipped with FGD have reported values well above 130 mg/Nm$^3$.

**EIPPCB assessment**

Availability of information on which the split view is based:

- Documents and information mentioned in the split view were available.

Validity of supporting rationale:

- The rationale is based on available data from plants fitted with the techniques listed in BAT 21 and makes the link with the upper end of the yearly BAT-AEL proposed in the split view in the general case (170 mg/Nm$^3$), but not in the case of plants operated $<$ 1500 h/yr (180 mg/Nm$^3$).
EIPPCB conclusion
Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the split view for the part related to existing coal- and/or lignite-fired PC boilers of ≥ 300 MWth operated ≥ 1500 h/yr, but not for the part related to the same plants operated < 1500 h/yr. This split view will therefore only be partially reported in the 'Concluding remarks and recommendations for future work' section of the BREF for the part related to plants operated ≥ 1500 h/yr.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 21 Table 10.5</td>
<td>Increase the higher end of the SO2 yearly BAT-AEL range for existing coal- and lignite-fired PC boilers</td>
<td>EL</td>
<td>170 mg/Nm³</td>
</tr>
</tbody>
</table>

11.7.3 Change the SO2 reduction efficiency and upper end of the BAT-AEL for plants of ≥ 300 MWth firing indigenous solid fuels

Split view summary
CZ, SK, EL and Euroheat & Power propose to modify the reduction rate in the formula (98 % instead of 99 %) and to have it applied to new plants and not to new FGD systems.

EE proposes to amend the statement so that the conclusion would apply to all indigenous fuels including oil shale to review the SO2 reduction rate down to 95 % for existing plants (instead of 97 %) and to set the maximum SO2 level at 420 mg/Nm³ for existing plants instead of 320 mg/Nm³.

EURACOAL proposes to replace the SO2 reduction rate by the desulphurisation rate (DSR), and to set the minimum DSR at 96 % for existing plants (instead of 97 %), or to set this minimum DSR to plants which were granted a permit before 27th November 2002 or the operators of which had submitted a complete application for a permit before that date, provided that the power plant was put into operation no later than 27th November 2003. EURACOAL proposes also to set the maximum SO2 level at 400 mg/Nm³ for existing plants instead of 320 mg/Nm³.

The split view is accompanied by the following rationale (CZ, SK, EL, Euroheat & Power):

- The level of 99 % is mainly based on expert judgment. This level represents the achievable performance and not the available performance.
- Just 3 out of 19 lignite-fired reference plants achieve reduction efficiency of above 98 %.
- European data set should prevail on data from China or the US as the techno-economic environment differs.
- Applying the BAT-AELs for new FGD in existing plants is expected to be the common case. Concerning the relation of the calculation formula to “FGD system” as proposed during the Final meeting, we need to oppose that kind of approach as the refurbishment (i.e. partial removing and upgrading the FGD plant by installing new construction and technical parts) of existing FGDs in power plants comes not into question due to big leaps in decreasing the SO2 limits and due to the construction and technological limits of the FGD.

The split view is accompanied by the following rationale (EE):
- Proposed levels are not achievable for existing pulverized indigenous fuel-fired combustion plants equipped with existing FGD system without reconstruction them to the CFBC technology.
- Costs for such changes for the existing boilers in the end of its life cycle are disproportionately high comparing to achievable environmental benefits.
- European data set should prevail on data from China or the US as the techno-economic environment differs.
- Applying the BAT-AELs for new FGD in existing plants is expected to be the common case.

The split view is accompanied by the following rationale (EURACOAL):

- For indigenous fuels the desulphurisation rate is part of the BAT-AEL. As for all other BAT-AELs, the restriction for indigenous fuels should relate to a BAT-AEL range based on reference plant data. In addition the SO2 emissions of indigenous fuels depend on the coal which is available. The operator does not have any possibility to blend with other qualities.
- The IED requires a minimum DSR of 96 % from 2016 onwards according to Article 31 in conjunction with IED Annex V Part 5. This is a lex specialis in the Directive itself and cannot be bypassed or debased by way of a technical document.
- Many potential IED Art. 31 plants are currently undergoing retrofit to achieve the stringent DSRs of 96 % required by the IED by 01st January 2016. Due to the lack of experience with the 96 % -DSR- requirement, the lower range of the factor should be 96 %.
- An upper level of 320 mg/Nm³ implies a DSR of far beyond 97 % and is not achievable at existing plants with existing FGDs firing indigenous lignite with higher sulphur contents. Even with a further upgrading of the existing FGDs a maximum emission limit value of 320 mg/Nm³ is out of reach if the indigenous fuels have higher sulphur contents. The evaluation for the revised draft 1 (1st of April) resulted in the correct upper value of 400 mg/Nm³. This value is justified with data from the reference power plants.

EIPPCB assessment

Availability of information on which the split view is based:

- Documents and information mentioned in the split view were available.

Validity of supporting rationale (CZ, SK, EL, Euroheat & Power):

- CZ, SK, EL, Euroheat & Power use information available from plants fitted with techniques listed in the BAT conclusions and there is a link between the SO2 abatement efficiency proposed in the split view (> 98 %) and the information cited.
- The part of the split view referring to the applicability to 'new/existing plants' instead of to 'new/existing FGD systems' is a general statement mentioning the difficulty of upgrading existing FGD systems without justifying why existing plants could not be retrofitted with new FGD systems.

Validity of supporting rationale (EE):

- There is no information shared within the TWG showing that achieving a 97 % SO2 reduction efficiency with an existing FGD system requires the reconstruction of the combustion plant as a CFB boiler.

Validity of supporting rationale (EURACOAL):

- The reasoning of EURACOAL on a desulphurisation rate for existing plants includes appropriate technical information from a site visit to Germany.
- The split view part on the higher end of the range of 400 mg/Nm³ instead of 320 mg/Nm³ when burning indigenous lignite with a high level of sulphur is supported with reference to the proposal given in the BP by the EIPPCB.
EIPPCB conclusion
Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the part of the split view proposed by CZ, SK, EL, EURACOAL and Euroheat & Power, and that there are not enough appropriate technical arguments to support the parts proposed by EE. This split view will therefore be partially reported in the ‘Concluding remarks and recommendations for future work’ section of the BREF.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 21 (Plants of ≥ 300 MW&lt;sub&gt;th&lt;/sub&gt; burning indigenous lignite that cannot achieve the BAT-AELs of Table 10.5)</td>
<td>Change in formula (i) the multiplier factor for new FGD systems</td>
<td>CZ, SK, EL, Euroheat &amp; Power</td>
<td>RCG x 0.02, with a maximum of 200 mg/Nm&lt;sup&gt;3&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Change in formula (ii) the multiplier factor and the higher end of the range for existing FGD systems</td>
<td>EURACOAL</td>
<td>RCG x 0.04, with a maximum of 400 mg/Nm&lt;sup&gt;3&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

11.8 HCl/HF BAT-AELs

Conclusions of the meeting
Slide 173.

The BAT-associated emission levels for HCl and HF are given in Table 10.6.

Table 10.6: BAT-associated emission levels (BAT-AELs) for HCl and HF emissions to air from the combustion of coal and/or lignite

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Combustion plant total rated thermal input (MW&lt;sub&gt;th&lt;/sub&gt;)</th>
<th>BAT-AELs (mg/Nm&lt;sup&gt;3&lt;/sup&gt;)</th>
<th>Average of samples obtained during one year</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>New plant</td>
</tr>
<tr>
<td>HCl</td>
<td>≥ 100</td>
<td>1–3</td>
<td>1–5 (&lt;2)</td>
</tr>
<tr>
<td></td>
<td>&lt; 100</td>
<td>1–6</td>
<td>2–10 (&lt;)</td>
</tr>
<tr>
<td>HF</td>
<td>≥ 100</td>
<td>&lt; 1–2</td>
<td>&lt; 1–3 (&lt;)</td>
</tr>
<tr>
<td></td>
<td>&lt; 100</td>
<td>&lt; 1–3</td>
<td>&lt; 1–6 (&lt;)</td>
</tr>
</tbody>
</table>

(<1) The lower end of these BAT-AEL ranges may be difficult to achieve in the case of plants fitted with a wet FGD system and a downstream gas-gas heater.

(<2) In the case of CFB boilers, in the case of plants combusting fuels with a chlorine content of > 1000 mg/kg (dry), or in the case of plants operated < 1500 h/yr, the higher end of the range is 20 mg/Nm<sup>3</sup>.

(<3) In the case of plants operated < 1500 h/yr and in the case of CFB boilers or of plants fitted with a Wet FGD system with a downstream gas-gas heater, the higher end of the BAT-AEL range is 7 mg/Nm<sup>3</sup>.

The associated monitoring is in BAT 3 ter.

Split view summary
PL, EURELECTRIC and EURACOAL propose to include the following additional footnote (<4) to Table 10.6: 'In the case of FBC boilers applying dry sorption technique for SO<sub>2</sub>
The split view is accompanied by the following rationale (PL):

- Emission level of HCl from coal-fired boilers is a function of chlorine content in fuel and efficiency of end-of-pipe techniques usually dedicated to abate SO2 emissions. Due to technical and economical restrictions, applicability of those techniques is very limited in case FBC boilers.
- HCl emissions from coal-fired boilers are reduced as a rule with co-benefit techniques (e.g. wet FGD) designed for the other pollutants. Reduction techniques dedicated to HCl typically are used in incineration plants with relatively small flow rates in comparison with LCPs, or as pre-scrubbers before wet absorbers.
- In case of coals with high chloride content, compliance with new BAT-AELs for HCl for FBC boilers will require secondary emission reduction methods, e.g. Wet FGD or SDS with efficiency of chlorine and fluorine removal in the range of 95 – 99 %, only because of HCl emission reduction requirement. FBC boilers equipped with primary desulphurisation (furnace (dry sorbent) injection) have efficiency of chlorine removal much lower, typically around 25 % and maximum 50 %. Chlorine content in Polish hard coal is in the range from 0.02 % to 0.6 %.
- In the case of existing FBC boilers used often in retrofitted plants, typically there is a limited space for end-of-pipe measures (FGD and bag filter with new flue gasses fans). Additionally, after coal-fired CFB outlet flue gasses temperature is around 110 – 140 °C. FBC scrubber or similar SDS end-of-pipe method will cause significant reduction of flue gasses outlet temperature. In such a case, it is absolutely necessary to protect flue gasses ducts and stack with special anticorrosion cover (it will stop plant operation for a long time) or build new stack.
- Reported data on HCl emissions are very limited. Figures 1-3 in the file “Working document - Figures Coal-Lignite HCl-HF.docx” shows HCl data only for five coal-fired fluidized bed boilers (reference plants 20, 81, 99, 377, 693).
- Proposed BAT-AELs for HCl were derived without proper consideration of technical and economical restrictions associated with operation of FBC boilers using coal with high chlorine content as an only fuel available.
- The proposed footnote takes into account techniques described as BAT (BAT 21) as well as fuel mixing and proper fuel management.

The split view is accompanied by the following rationale (EURELECTRIC, EURACOAL):

- BAT 21 states that for FBC boilers techniques such as boiler sorbent injection, duct sorbent injection, dry scrubber and spray dry absorbers are BAT. In contrast, according to BAT 21 there may be technical and economic restrictions for applying the [wet FGD] technique to combustion plants of < 300 MWth, and for retrofitting existing plants operated between 500 and 1500 hours per year'. Many, but not all FBC boilers are smaller than 300 MWth.
- BAT 21 Table 10.5 Footnote (1) states that "For circulating fluidised bed boilers, the lower end of the [SO2] range can be achieved by using a high efficiency wet FGD system. The higher end of the range can be achieved by using boiler in-bed sorbent injection.'
- For existing fluidised bed boilers, with a dry desulphurisation system, the proposed HCl BAT-AELs are not achievable. Retrofitting a wet flue gas cleaning step at existing FBC boilers for reducing HCl emission only is not proportionate. A coercive differentiation has to be made between pulverised coal and fluidised bed boilers with dry sorption techniques.
- Examples of end-of-pipe techniques applied for HCl removal shown in the Background Paper (Luminant start-up 2009, Dominion Energy start-up 2011 see file
EPPSA-01-HCl-HF.pdf) are not representative as techniques which could be commonly use to attain compliance with HCl BAT-AELs requirements for existing plants. They are appropriate only for new plants with moderate or low Cl content in fuel (HCl inlet in flue-gases 50-134 ppmv).

- Typically there is no space for additional end-of-pipe measures for reducing HCl emissions with wet abatement techniques in existing CFB plants using dry sorption techniques in combination with ESP or bag filter.

- BAT-associated emission levels for HCl and HF should be derived using Table 5.20 from the D1 proposal and complementary information taken from the BAT reference plants. HCl emissions were reported by one FBC reference plant co-incinerating waste and biomass (Plant 81), 8 FBC reference plants firing lignite and 2 FBC reference plants firing hard coal and other solid fuels.

- Plant 81 is continuously measuring HCl and reported HCl emissions of 58 mg/Nm³, significantly higher than the proposed BAT-AEL range of 1-10 mg/Nm³. The reported emission level of 58 mg/Nm³ is typical for CFBC plants with dry sorption techniques instead of wet FGD.

- Complementary data of 5 German hard-coal-fired FBC boilers commissioned in the early 90s/late 80s and recently refurbished for waste co-incineration and 2 lignite-fired FBC boilers commissioned in the early 90s/late 80s and recently refurbished for waste co-incineration was submitted to the D1 (see D1 comments n° 750 and 1007 to Table 10.49 and the corresponding attachments to the comments submitted to D1 by BDEW/VGB/EURELECTRIC), all together but one reporting HCl emissions within a range of 20-60 mg/Nm³. The background paper is not mentioning the complimentary information on FBC plants submitted by BDEW/VGB/EURELECTRIC. The information was provided for the waste co-incineration section, but is equally applicable to FBC boilers firing hard coal or lignite only. The table on HCl emissions in the waste-co-incineration section has been removed to the fuel-specific chapter.

**EIPPCB assessment**

**Availability of information on which the split view is based:**

- Documents and information mentioned in the split view were available.

**Validity of supporting rationale:**

- According to BAT 21, wet FGD may not be applicable to some CFB boilers of < 300 MWth.

- Much more data than indicated in the rationale were reported in the data collection (i.e. for fluidised bed boilers of > 100 MWth, 17 plants reported HCl emissions: 689, 25-1, 22-1, 69, 390-1 to 390-6, 224, 18-1/2, 99, 377,385 and 693, of which 11 were considered well performing plants for deriving the BAT-AELs.

- There is no specific example of CFB boiler with high Cl content retrofitted with SDS or WFGD.

- The rationale make the link between the plant-specific data and the proposed level of 60 mg/Nm³ proposed in the split view, but not with the other proposed level of 120 mg/Nm³.

- Table 5.20 refers to typical emissions as it is included in the section on emissions and consumption levels and not based on the data collected for the BREF review.

**EIPPCB conclusion**

Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the part of the split view related to a higher end of the range up to 60 mg/Nm³ for plants using a fuel with a sulphur content < 500 mg/kg, but not for the rest of the split view. This split view will therefore be partially reported in the 'Concluding remarks and recommendations for future work' section of the BREF.
A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 21 Table 10.6</td>
<td>Add the following footnote 'In the case of FBC boilers applying the dry sorption technique for SO₂ reduction, the higher end of the HCl BAT-AEL range is 60 mg/Nm³ for plants using lignite and for plants using coal with a chlorine content of 500 mg/kg or less (dry matter).’</td>
<td>PL, EURELECTRIC, EURACOAL</td>
<td>NA</td>
</tr>
</tbody>
</table>

11.9 Dust BAT-AEL ranges for plants of < 300 MWₘₜₜ

Conclusions of the meeting
Slide 181.

The BAT-associated emission levels for dust emissions to air are given in Table 10.7.

Table 10.7: BAT-associated emission levels (BAT-AELs) for dust emissions to air from the combustion of coal and/or lignite

<table>
<thead>
<tr>
<th>Combustion plant total rated thermal input (MWₘₜₜ)</th>
<th>BAT-AELs (mg/Nm³)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yearly average (₁)</td>
<td>Daily average or average over the sampling period</td>
</tr>
<tr>
<td></td>
<td>New plants</td>
<td>Existing plants</td>
</tr>
<tr>
<td>&lt; 100</td>
<td>2–5</td>
<td>2–18</td>
</tr>
<tr>
<td>100–300</td>
<td>2–5</td>
<td>2–14</td>
</tr>
</tbody>
</table>

(₁) These BAT-AELs do not apply to combustion plants operated < 1500 h/yr.
(²) The higher end of the BAT-AEL range is 28 mg/Nm³ for plants put into operation no later than 7 January 2014.
(³) The higher end of the BAT-AEL range is 25 mg/Nm³ for plants put into operation no later than 7 January 2014.
(⁴) These levels are indicative for plants operated < 500 h/yr.

The associated monitoring is in BAT 3 ter.

Split view summary
CZ, SK, and Euroheat & Power propose to increase the upper end of the yearly BAT-AEL range in the case of existing lignite-fired plants to 20 mg/Nm³ for plants of < 300 MWₘₜₜ.

EURELECTRIC, supported by EL, proposes to write in the table the values that correspond to plants put into operation no later than 7 January 2014 and as footnotes the values corresponding to plants put into operation later than 7 January 2014.

EURELECTRIC proposes to add a footnote mentioning that the lower end of the range indicates levels close to the detection limit and cannot be accurately defined.
EURACOAL, supported by EL, proposes to revise the BAT-AELs as presented below:

<table>
<thead>
<tr>
<th>Combustion plant total rated thermal input (MW_{th})</th>
<th>BAT-AELs (mg/Nm³)</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yearly average (¹)</td>
<td>Daily average or average over the sampling period</td>
<td></td>
</tr>
<tr>
<td>New plants</td>
<td>Existing plants</td>
<td>New plants</td>
<td>Existing plants (²)</td>
</tr>
<tr>
<td>&lt; 100</td>
<td>2–5</td>
<td>10–20</td>
<td>4–16</td>
</tr>
<tr>
<td>100–300</td>
<td>2–5</td>
<td>10–20</td>
<td>3–15</td>
</tr>
</tbody>
</table>

(¹) These BAT-AELs do not apply to combustion plants operated < 1500 h/yr.
(²) The higher end of the BAT-AEL range is 28 mg/Nm³ for plants put into operation no later than 7 January 2014.
(³) The higher end of the BAT-AEL range is 25 mg/Nm³ for plants put into operation no later than 7 January 2014.
(⁴) These levels are indicative for plants operated < 500 h/yr.

The split view is accompanied by the following rationale (CZ, SK, Euroheat & Power):

- Remove inequality regards the operating conditions of various fuels fired plants where high-ash-lignite-fired plants are among the most disadvantaged.
- Due to the lack of appropriate data on lignite-fired plants for categories < 100 MW_{th} and 100–300 MW_{th}, the alternative proposal is suggested on the basis of the approach chosen to the alternative proposal for plants ≥ 300 MW_{th} together with taking into account the investment and operational constraints linked to smaller plants.

The split view is accompanied by the following rationale (EURELECTRIC supported EL):

- The lower values of 2-3 mg/Nm³ are nearby the measurement uncertainty of reference gravimetric method EN 13284-1 (Standard Reference Method for the measurement of low dust concentration in gaseous stream – 8.1 SFN): “For sampling times limited to 30 min the uncertainty of measurement is in the range of 2 mg/m³. Increased sampling time to 60 min or to 90 min would naturally improve significantly the reproducibility of measurements”. The proposed footnote is necessary to explain this evidence, considering that EN 13284-1 has been validated around 5 mg/Nm³. Continuous monitoring (by EN 13284-2) is associated with an average measurement uncertainty that, nearby minimum values, should be higher than the SRM one, otherwise the comparison with reference method for CEMs calibration is not reasonable.

The split view is accompanied by the following rationale (EURACOAL, supported by EL):

- The criteria for defining the lower end of yearly and daily average BAT-AELs are not clear or sufficiently comprehensible.
- EIPPCB assessment indicates that yearly average below 2 mg/Nm³ could not generally be achieved. Only in 'some cases' and typically 'best performance' can boilers < 1000 MW_{th} achieve 12-15 mg/Nm³ as a yearly average by BAT combination.
- Values lower than 5 mg/Nm³ could be achieved as max. daily average by plants fitted with wet ESP (BAT 22 b) in tail-end position. Wet FGD indeed reduces dust emissions when applied in combustion plants. However, wet FGD is a technique that is applied in the context of SO₂ emissions reduction and not dust emissions reduction. In view of the above, in the case where other SO₂ removal techniques are applied (e.g. DSI, which may be applied for economic feasibility reasons in existing
plants), then the upper end of the range of dust BAT-AELs proposed in the revised D1 may not be achievable.

- A larger number of power plants with various exhaust gas treatment techniques is necessary for determining BAT-AEL. Such a basis allows yearly and daily average BAT-AELs to be determined and defined. This has not been done when determining dust BAT-AEL. While the revised draft 1 from 1st April still listed results based on tables and graphs, the EIPPCB explanations in the final TWG meeting were not comprehensible. The TWG decisions cannot be supported by EURACOAL because they are not verifiable by data from the reference power plants or by other documents in BATIS to a sufficient extent.

**EIPPCB assessment**

Availability of information on which the split view is based:
- Documents and information mentioned in the split view were available.

Validity of supporting rationale (CZ, SK, Euroheat & Power):
- There are no technical arguments in the rationale supporting the split view.

Validity of supporting rationale (EURELECTRIC, EL):
- There is no evidence provided in the rationale that the reported dust levels used as the basis for setting the lower end of the range are inaccurate.
- The presentation of exceptions in footnotes is an editorial matter and not a substantive one (so this is not considered to represent a split view).

Validity of supporting rationale (EURACOAL, EL):
- The BP and discussion during the final meeting considered well performing plants using de-dusting techniques possibly combined with dry desulphurisation techniques based on available data/information.
- The arguments provided seem to confirm the BAT-AELs agreed by the TWG.

**EIPPCB conclusion**

Taking these aspects into account, the EIPPCB considers that there are not enough appropriate technical arguments to support the split view. This split view will therefore not be reported in the ‘Concluding remarks and recommendations for future work’ section of the BREF.

### 11.10 Dust BAT-AELs for plants of ≥ 300 MW<sub>th</sub>

**Conclusions of the meeting**

Slide 182.

The BAT-associated emission levels for dust emissions to air are given in Table 10.7.

**Table 10.7: BAT-associated emission levels (BAT-AELs) for dust emissions to air from the combustion of coal and/or lignite**

<table>
<thead>
<tr>
<th>Combustion plant total rated thermal input (MW&lt;sub&gt;th&lt;/sub&gt;)</th>
<th>BAT-AELs (mg/Nm&lt;sup&gt;3&lt;/sup&gt;)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yearly average (1)</td>
</tr>
</tbody>
</table>

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The associated monitoring is in BAT 3 ter.

### 11.10.1 Increase the lower/upper ends of the BAT-AEL ranges

**Split view summary**

CZ, SK and Euroheat & Power, supported by EL, propose to increase the upper end of the yearly BAT-AEL range in the case of existing lignite-fired plants put into operation no later than 7 January 2014 to 15 mg/Nm$^3$ for plants of 300–1000 MW$_{th}$ and to 10 mg/Nm$^3$ for plants of ≥ 1000 MW$_{th}$.

EE proposes to increase the upper end of the yearly BAT-AEL range in the case of existing plants of ≥ 300 MW$_{th}$ put into operation no later than 7 January 2014 to 20 mg/Nm$^3$ and the upper end of the daily BAT-AEL range to 25 mg/Nm$^3$.

EURELECTRIC, supported by EL, proposes to write in the table the values that correspond to plants put into operation no later than 7 January 2014 and as footnotes the values corresponding to plants put into operation later than 7 January 2014. EURELECTRIC proposes also to add a footnote mentioning that the lower end of the range indicates levels close to the detection limit and cannot be accurately defined. EURELECTRIC proposes to increase the upper end of the BAT-AEL range in the case that Wet FGD is not applied to 22 mg/Nm$^3$ for the daily average and to 20 mg/Nm$^3$ for the yearly average.

EURACOAL, supported by EL, proposes to revise the BAT-AELs as presented below:

<table>
<thead>
<tr>
<th>Combustion plant total rated thermal input (MW$_{th}$)</th>
<th>300–1000</th>
<th>≥ 1000</th>
</tr>
</thead>
<tbody>
<tr>
<td>New plants</td>
<td>2–5</td>
<td>2–5</td>
</tr>
<tr>
<td>Existing plants</td>
<td>2–10 (*)</td>
<td>2–8</td>
</tr>
<tr>
<td>New plants</td>
<td>3–10</td>
<td>3–10</td>
</tr>
<tr>
<td>Existing plants</td>
<td>3–11 (†)</td>
<td>3–11 (†)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Combustion plant total rated thermal input (MW$_{th}$)</th>
<th>300–1000</th>
<th>≥ 1000</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT-AELs (mg/Nm$^3$)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yearly average (†)</td>
<td>2–5</td>
<td>2–5</td>
</tr>
<tr>
<td>Daily average or average over the sampling period</td>
<td>10–15 (‡)</td>
<td>5–10</td>
</tr>
<tr>
<td>New plants</td>
<td>3–10</td>
<td>3–10</td>
</tr>
<tr>
<td>Existing plants</td>
<td>15–20 (‡)</td>
<td>10–16 (‡)</td>
</tr>
</tbody>
</table>

(*) These BAT-AELs do not apply to combustion plants operated < 1500 h/yr.

(†) The higher end of the BAT-AEL range is 12 mg/Nm$^3$ for plants put into operation no later than 7 January 2014.

(‡) The higher end of the BAT-AEL range is 14 mg/Nm$^3$ for plants put into operation no later than 7 January 2014.

(†) These levels are indicative for plants operated < 500 h/yr.
These BAT-AELs do not apply to combustion plants operated < 1500 h/yr.

The higher end of the BAT-AEL range is 12 mg/Nm³ for plants put into operation no later than 7 January 2014.

The higher end of the BAT-AEL range is 20 mg/Nm³ for plants put into operation no later than 7 January 2014.

The higher end of the BAT-AEL range is 14 mg/Nm³ for plants put into operation no later than 7 January 2014.

These levels are indicative for plants operated < 500 h/yr.

The split view is accompanied by the following rationale (CZ, SK, Euroheat & Power, supported by EL):

- Remove inequality regards the operating conditions of various fuels fired plants where high-ash-lignite-fired plants are among the most disadvantaged.
- There are only 4 out of 14 lignite-fired plants that do comply with the agreed BAT-AELs for plants of 300-1000 MWth. When setting the BAT-AELs for dust, the parameters of the fuel should be reflected and weighed as operating constraints which significantly influence the availability of these BAT-AELs (by means of economy of the power plant) in comparison to the other combusting units (coal combustion or low-ash lignite combustion).
- Reference is made to emission data of reference plants of ≥ 1000 MWth in Jänschwalde (129-1VC, 128-3VC, 129-2VC, 128-1VC) that show very good consistency and they are measured on reference plants with very high number of operating hours and particularly the dust yearly-average values vary in a narrow interval between 7.2-8.6 mg/Nm³. Moreover, these 4 reference plants combust the fuel with high ash content which is a parameter that needs to be taken into account as we pointed to above.
- Based on available data fuel quality for plants of ≥ 1000 MWth (e.g. lower heat value and ash content) a synthesized parameter of ash content in relation to lower heat value “Ad/Qir [g/MJ]” was made. From sorted tabled values there is a significant uprise of this parameter from levels 11-17 (7 ref.plants) to 27 g/MJ and more (9 ref.plants). We can clearly see that the higher is the value of Ad/Qir parameter, the higher the dust yearly-average values are in general.

The split view is accompanied by the following rationale (EURELECTRIC, EL):

- Same as for plants < 300 MWth.
- The upper end of the range of dust BAT-AELs is considered too low for existing coal and/ or lignite plants 300-1000 MWth and > 1000 MWth not applying a Wet FGD system.
- Wet FGD indeed reduces dust emissions when applied in combustion plants. However, Wet FGD is a technique that is applied in the context of SO₂ emissions reduction and not dust emissions reduction. In view of the above, in the case that another SO₂ removal technic listed in BAT 21 (“Techniques to reduce SOₓ, HCl, HF emissions”) is applied (e.g. CFB process or DSI, which may be applied for economic feasibility reasons in existing plants), then the upper end of the range of dust BAT-AELs proposed by EIPPCB in may not be achievable.
- Concerning CFB process which is considered to be generally applicable for coal and or lignite plants, it is stated in D1 page 428: “ When using CFB process with hydrated lime, higher particulate matter downstream the CFB; in existing plants, ESPs may be underdesigned to handle the increased dust load”.

The split view is accompanied by the following rationale (EE):

- The criteria for defining the upper end of yearly and daily average BAT-AELs are not clear or sufficiently comprehensible.
Yearly and daily averages have not been done when determining dust BAT-AEL. EIPPCB explanations in the final TWG meeting were not comprehensible enough.

Yearly and daily averages should be maintained as in the draft dated April 2015 for existing LCP.

The split view is accompanied by the following rationale (EURACOAL, EL):

- The criteria for defining the lower end of yearly and daily average BAT-AELs are not clear or sufficiently comprehensible.
- EIPPCB assessment indicates that yearly average below 2 mg/Nm³ could not generally be achieved. Only in ‘some cases’ and typically ‘best performance’ can boilers < 1000 MWth achieve 12-15 mg/Nm³ as a yearly average by BAT combination.
- EIPPCB Assessment 1.2 takes as reference plants 141 and 415-1 for the lower end of the daily average range. Plant 415-1, according to ADC for the reference year, recorded a max daily average of 5.7 mg/Nm³. Plant 141 is the only one providing daily averages < 3 mg/Nm³ among all plants in ADC or IDC. These low daily average values might be noted as indicative but are not generally BAT-AEL.
- Values lower than 5 mg/Nm³ could be achieved as max. daily average by plants fitted with wet ESP (BAT 22 b) in tail-end position. Wet FGD indeed reduces dust emissions when applied in combustion plants. However, Wet FGD is a technique that is applied in the context of SO2 emissions reduction and not dust emissions reduction. In view of the above, in the cases where other SO2 removal techniques are applied (e.g. DSI, which may be applied for economic feasibility reasons in existing plants), then the upper end of the range of dust BAT-AELs proposed in the revised D1 may not be achievable.
- EIPPCB Assessment 2.1 gives no indication on references for lower end of the range for boilers > 1000 MWth. In accordance with the experience of the operators the lower value of the range should be increased (see proposal).
- EIPPCB Assessment 2.2 indicates that re-assessment of available daily averages (short-term as actually stated) shows that all plants having yearly averages < 10 mg/Nm³ achieve a daily average below 16. Plants 387, 24 and 193, according to ADC and IDC, recorded a max daily average over 16 mg/Nm³. Plant 141 is the only one providing daily averages < 3 mg/Nm³ among all plants in ADC or IDC. In accordance with the experience of the operators the lower value of the range should be increased (see proposal).
- EIPPCB Assessment 2.2 indicates that a re-assessment of available daily averages shows that all plants having yearly averages of < 10 mg/Nm³ achieve daily averages below 16 mg/Nm³. According to 'Table and graphs working document', more than the half of this set of plants recorded 95th percentile over 10 mg/Nm³. Values lower than 5 mg/Nm³ could be achieved as max daily average by plants fitted with wet ESP (BAT 22 b) in tail-end position. Best performances, lower than 10 mg/Nm³ on a short-term basis could be achieved by plants fitted with a combination of the most advanced secondary techniques, with preliminary filter (BAT 22 b or c) and tail-end Wet FGD system (BAT 22 f). Wet FGD indeed reduces dust emissions when applied in combustion plants. However, Wet FGD is a technique that is applied in the context of SO2 emissions reduction and not dust emissions reduction. In view of the above, in the cases where other SO2 removal techniques are applied (e.g. DSI, which may be applied for economic feasibility reasons in existing plants), then the upper end of the range of dust BAT-AELs proposed in the revised D1 may not be achievable.
- A larger number of power plants with various exhaust gas treatment techniques is necessary for determining BAT-AEL. Such a basis allows yearly and daily average BAT-AELs to be determined and defined. This has not been done when determining dust BAT-AEL. While the revised draft 1 from 1st April still listed results based on tables and graphs, the EIPPCB explanations in the final TWG meeting were not
comprehensible. The TWG decisions cannot be supported by EURACOAL because they are not verifiable by data from the reference power plants or by other documents in BATIS to a sufficient extent.

EIPPCB assessment

Availability of information on which the split view is based:
- Documents and information mentioned in the split view were available.

Validity of supporting rationale (CZ, SK, Euroheat & Power, EL):
- The study using a synthesised parameter of ash content in relation to lower heat value does not consider the technique implemented.
- The limited number of plants for setting the BAT-AELs is not per se a technical argument. There is no clear explanation on how the fuel parameters would not allow the BAT-AELs to be met in the case of plants of 300–1000 MWth.
- Reference is made in the case of plants of > 1000 MWth to data from plants (Plants 129-1VC, 128-3VC, 129-2VC, 128-1VC) fitted with techniques listed in BAT 22, making reference to the fuel ash content for the justification, with emission levels corresponding to the one proposed in the split view as higher end of the yearly BAT-AEL range.

Validity of supporting rationale (EURELECTRIC, EL):
- The assessment made for plants of < 300 MWth is also valid here.
- In the case of plants of > 300 MWth, there is no demonstration in the rationale as to why the BAT-AELs could not be achieved when not using wet techniques for desulphurisation, and no rationale justifying the levels proposed in the split view.

Validity of supporting rationale (EE):
- Time was available for discussions on these BAT-AELs at the final meeting.
- The rationale makes reference to levels mentioned in the BP that are not consistent with the ones proposed in the split view.

Validity of supporting rationale (EURACOAL):
- Criteria for defining the lower end of the ranges were presented in the BP. The BP and discussion during the final meeting considered well performing plants using dedusting techniques possibly in combination with dry desulphurisation techniques based on available data/information.
- Data collected in 2014 in the additional data collection were not processed with a view to deriving BAT-AELs.
- For plants of > 300 MWth, the rationale does not give information that allows a link with the levels proposed in the split view.

EIPPCB conclusion

Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the part of the split view proposed by CZ, SK, EL, EURACOAL and Euroheat & Power on the higher end of the yearly BAT-AEL for lignite-fired plants of ≥ 1000 MWth, but that there are not enough appropriate technical argument to support the rest of the split view. This split view will therefore only be partially reported in the 'Concluding remarks and recommendations for future work' section of the BREF for the part related to an alternative higher end of the yearly BAT-AEL range for existing lignite-fired plants of ≥ 1000 MWth proposed by CZ, SK, EL, EURACOAL and Euroheat & Power.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
</table>

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### Table 10.7

| BAT 22 | Change the higher end of the yearly BAT-AEL range for existing lignite-fired plants of ≥ 1000 MW<sub>th</sub> put into operation no later than 7 January 2014 | CZ, SK, EL, EURACOAL, Euroheat & Power | 10 mg/Nm<sup>3</sup> |

#### 11.10.2 Decrease the lower/upper ends of the BAT-AEL ranges

**Split view summary**

CAN Europe proposes a yearly BAT-AEL of < 2 mg/Nm<sup>3</sup> for all existing and new plants of ≥ 300 MW<sub>th</sub>.

EEB proposes BAT-AELs as presented below:

<table>
<thead>
<tr>
<th>Combustion plant total rated thermal input (MW&lt;sub&gt;th&lt;/sub&gt;)</th>
<th>BAT-AELs (mg/Nm&lt;sup&gt;3&lt;/sup&gt;)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yearly average (¹)</td>
<td>Daily average or average over the sampling period</td>
</tr>
<tr>
<td></td>
<td>New plants</td>
<td>Existing plants</td>
</tr>
<tr>
<td>300–1000</td>
<td>2–3.5</td>
<td>2–6 (²)</td>
</tr>
<tr>
<td>≥ 1000</td>
<td>&lt; 2</td>
<td>2–3.5</td>
</tr>
</tbody>
</table>

(¹) These BAT-AELs do not apply to combustion plants operated < 1500 h/yr.
(²) The higher end of the BAT-AEL range is 12 mg/Nm<sup>3</sup> for plants put into operation no later than 7 January 2014.
(³) The higher end of the BAT-AEL range is 20 mg/Nm<sup>3</sup> for plants put into operation no later than 7 January 2014.
(⁴) The higher end of the BAT-AEL range is 14 mg/Nm<sup>3</sup> for plants put into operation no later than 7 January 2014.
(¶) These levels are indicative for plants operated < 500 h/yr.

The split view is accompanied by the following rationale (CAN Europe):

- PM levels in many areas in Europe are far too high and have significant impact on public health. The application of the proposed dust upper BAT-AEL emission levels instead of implementation of levels achievable with BAT will cause a projected 2,600 premature deaths and 1.9 billion euros in economic damages over the course of a decade.
- There is no systematic difference in the pollutant concentration levels or treatability of flue gas stream from existing and new coal-fired power plants with respect to dust.
- Collected data show several existing coal power plants achieving yearly average values below 2 mg/Nm<sup>3</sup> (see EIPPCB document Coal and/or lignite combustion dust emissions to air V2, tables 3+4, plant 141V, 415-1V, 122aVC, 253V, 367V, 139VC).
- Moorburg hard coal PC plant in Hamburg/DE achieves levels < 2 mg/Nm<sup>3</sup> on a daily average basis and monthly averages of 0 mg/Nm<sup>3</sup> and 1 mg/Nm<sup>3</sup>.

The split view is accompanied by the following rationale (EEB):

- Yearly upper BAT-AEL range for new plants 300-1000MW<sub>th</sub>:
  - the reference plant for the proposed upper limit is 662, dating back to 1986 and using a fuel with a raw ash content of 13.37% dry wt;
  - Plant 443-1 burns a fuel with a higher raw ash content of 15.77% wt (age unknown) and is representative of the dataset and a range of abatement techniques;
therefore the upper level of the yearly dust BAT-AEL for new plants 300-1000 MW_\text{th} should be 3.5 mg/Nm³ (plant 443-1).

- **Yearly upper BAT-AEL range for existing plants 300-1000MW_\text{th}**:
  - the D1 proposal is set approximately by Plant 26 (10.5 mg/Nm³);
  - however, setting the BAT-AEL at Plant 386-3 equally includes all relevant types of FGD and dust abatement (ESP alone cannot be BAT for plants of this size, which require FGD);
  - it does not explicitly include lignite plants, but its fuel ash content (23.4 wt % raw) is the same as Plant 386-2, and greater than all the lignite plants (Plant 389 = 9.6 wt % raw; plant 137 = 5.1 wt % raw; plant 170 = 18.83 wt % raw);
  - the upper BAT-AEL should therefore be 6 mg/Nm³ (Plant 386-3).

- **Daily upper BAT-AEL range for new plants 300-1000MW_\text{th}**:
  - a well-run plant should not have a large variation between the yearly average and 95th percentile data;
  - the EEB’s proposed yearly BAT-AEL was set by Plant 443-1, which has 95th percentile data 4.6 mg/Nm³ above the yearly average;
  - very similar Plants 415-1 and 134 have 95th percentile data that is up to 3 mg/Nm³ higher than the yearly average;
  - for a EEB’s yearly upper BAT-AEL of 3.5 mg/Nm³ the daily upper BAT-AEL should therefore be 6.5 mg/Nm³.

- **Yearly upper BAT-AEL range for new plants >1000MW_\text{th}**:
  - the proposal is set at plant 77, commissioned in 1983 – not new plant age – However, Plant 253 (2008) burns fuel with a higher ash content (12.4 % compared to 12.2 % wt raw) and achieves emissions of 1.6 mg/Nm³;
  - it is also representative in terms of size and operating hours.
  - the BAT-AEL should therefore be set by Plant 253 at 2 mg/Nm³, resulting in an overall new plant yearly BAT-AEL of < 2 mg/Nm³.

- **Yearly upper BAT-AEL range for existing plants >1000MW_\text{th}**:
  - The proposed level is set by plant 384-2;
  - Plant 496 dates back to the late 1960s, burns fuel with a raw ash content of 12.2 % wt, and operates at mid merit loads. Setting the BAT-AEL at this plant includes both bag filters and ESPs with FGD, and both coal and lignite.
  - the upper BAT-AEL should therefore be 3.5 mg/Nm³ (Plant 496).

- **Daily upper BAT-AEL range for new plants >1000MW_\text{th}**:
  - a well-run plant should not have a large variation between the yearly average and 95th percentile data;
  - the EEB’s proposed yearly BAT-AEL is set by Plant 253, which does not report 95th percentile data;
  - neighbouring Plant 122a reports 95th percentile data of 1.8 mg/Nm³ above its average;
  - for a yearly upper BAT-AEL of 2 mg/Nm³ the daily upper BAT-AEL should therefore be 4 mg/Nm³.

- **Daily upper BAT-AEL range for existing plants >1000MW_\text{th}**:
  - the proposed upper daily level is set by plant 101;
  - the plants with the highest emissions within that range are Plants 128-1 and 129-2 at 8.6 mg/Nm³, both commissioned in the 1980s;
  - Plant 496 dates back to the late 1960s, burns fuel with a raw ash content of 12.2 % wt, and operates at mid merit loads. Setting the BAT-AEL at this plant includes both bag filters and ESPs with FGD, and both coal and lignite.
  - the upper daily BAT-AEL for the EEB's yearly proposal should therefore be 3.5 mg/Nm³ (Plant 496).
EIPPCB assessment

Availability of information on which the split view is based:
- Documents and information mentioned in the split view were available.

Validity of supporting rationale:
- The CAN Europe split view relies on information from plants of ≥ 300 MW_{th} fitted with techniques listed in BAT 22 (Plants 141, 415-1, 122a, 253, 367, and 139). However, it is not explained why only these plants are taken as a reference for proposing an alternative higher end of the range (i.e. there are other plants with higher emission levels and fitted with the same techniques).
- The EEB rationale relies on available information referring to plants fitted with techniques listed in BAT 22 and justifies the alternative levels proposed in the split view by assessing the plant age and the fuel ash content, linking these alternative levels with available plant-specific data, except in the following cases:
  - Daily upper end of the BAT-AEL range for new plants of 300–1000 MW_{th}: a daily variation is extrapolated from plants fitted with different techniques (variation from plants fitted with ESP/wet FGD to Plants 443-I fitted with SDA/BF).
  - Daily upper end of the BAT-AEL range for new plants of ≥ 1000 MW_{th}: a daily variation is extrapolated from a better performing plant fitted with different techniques.
  - Daily upper end of the BAT-AEL range for existing plants of ≥ 1000 MW_{th}: the rationale does not clearly link data from available plants and the alternative proposal.

EIPPCB conclusion
Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the majority, but not all, of the parts of the split view proposed by EEB, and that there are not enough appropriate technical arguments to support the part of the split view proposed by CAN Europe except in the case of new plants of ≥ 1000 MW_{th} where the split view can be supported based on the rationale presented by EEB. This split view will therefore only be partially reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 22 Table 10.7</td>
<td>Decrease the higher ends of the yearly BAT-AELs for new and existing plants of 300–1000 MW_{th}</td>
<td>EEB</td>
<td>3.5 mg/Nm^{3} (new) 6 mg/Nm^{3} (existing)</td>
</tr>
<tr>
<td>BAT 22 Table 10.7</td>
<td>Decrease the higher ends of the yearly BAT-AELs for existing plants of ≥ 1000 MW_{th}</td>
<td>EEB</td>
<td>3.5 mg/Nm^{3} (existing)</td>
</tr>
<tr>
<td>BAT 22 Table 10.7</td>
<td>Decrease the higher ends of the yearly BAT-AELs for new plants of ≥ 1000 MW_{th}</td>
<td>EEB CAN Europe</td>
<td>&lt; 2 mg/Nm^{3} (new)</td>
</tr>
</tbody>
</table>

11.11 Mercury – Carbon sorbent injection technique

Conclusions of the meeting
Slide 189.
In order to reduce mercury emissions to air from the combustion of coal and/or lignite, BAT is to use an appropriate combination of the techniques given below.

<table>
<thead>
<tr>
<th>Technique</th>
<th>Description</th>
<th>Applicability</th>
</tr>
</thead>
<tbody>
<tr>
<td>f. Carbon sorbent (e.g. activated carbon or halogenated activated carbon) injection in the flue-gas</td>
<td>See description in Section 10.8. Generally used in combination with an ESP/bag filter. The use of this technique may require additional treatment steps to further segregate the mercury-containing carbon fraction prior to further reuse of the fly ash</td>
<td>Generally applicable</td>
</tr>
</tbody>
</table>

**Split view summary**

EE proposes to remove the technique from the list of BAT and to list it among the emerging techniques

EURACOAL proposes to consider the technique 'not generally applicable'.

CZ proposes to add the following applicability restriction: 'Applicability limited due to the constraints of cross-media effects, and not generally applicable for plants using ESP or Wet FGD in combination with ESP for dust reduction.'

EURELECTRIC, supported by EL, proposes to delete the reference to ESP in the technique description, and to mention that 'the applicability may be limited in case of plants using ESP, or Wet FGD in combination with ESP, for dust reduction, and considering the constraints associated with the quality required for by-product recovery'.

The split view is accompanied by the following rationale (CZ):

- Application of the technique is not well-established across EU which is supported by the fact that also the references placed into BATIS are mostly from outside the Europe.
- The applicability has many constraints which were acknowledged by speakers across the final meeting participants.

The split view is accompanied by the following rationale (EURACOAL, EE):

- The carbon sorbent injection technique is effective in combination with bag filter (see LCP draft 1 Ch. 5.1.4.4.3.2) but can affect the operation of electrostatic precipitator and scrubber. Furthermore it can influence the quality of by-products and may require additional treatment steps. The necessary additional treatment steps lead to transfer the origin by-products in waste which has to be treated before marketing. This leads to higher environmental and economic costs. The commercial applicability with marketing of the residues is not demonstrated.

The split view is accompanied by the following rationale (EURELECTRIC, EL):

- CSI (i.e. as Activated Carbon Injection) leads potentially critical side-effects, with significant and factbased risk of environmental and operating impact, which has to be duly assessed before application.
- This technique could be effective in combination with bag filter (see LCP draft 1 Ch. 5.1.4.4.3.2) but can affect the operation of electrostatic precipitator and scrubber.
Factors that have influence mercury removal and/or the ESP’s particulate collection efficiency include fly ash composition, specific collecting area, flue gas velocity through the ESP box, flue gas temperature, sulphur trioxide concentration in the flue gas, and CSI rate, among others. The fluidisation properties of activated carbon may make it more prone to re-entrainment out of the hoppers into the ESP outlet gas stream.

The use of CSI residues, irrespective of ESP or bag filter devices, may require additional treatment steps, without confidence on aimed results.

Effects on by-products need to be deeply investigated, considering high environmental value of fly ashes and FGD gypsum recovery, with defined EU standards (e.g. EN 450).

### EIPPCB assessment

**Availability of information on which the split view is based:**
- Documents and information mentioned in the split view were available, with the exception of some papers not made available to the TWG before the final meeting (e.g. 'Impact of flue-gas characteristics and ESP operating variables on mercury removal and ESP capture on activated carbon' (Presented at Air Quality VI Conference, Arlington, VA)) from EURELECTRIC, and thus not considered in the assessment.

**Validity of supporting rationale:**
- Information on techniques should not necessarily come only from Europe (BREF Guidance 2.3.8 paragraph 3). There is no evidence that the technique would not be commercially available and applied. On the contrary, there are many examples of plants in the US using the technique.
- Constraints to the use of this technique are described in the BREF and include the need for additional treatment of residues.
- Cross-media effects related to ESPs and wet scrubbers mentioned by EURELECTRIC have not been documented.

### EIPPCB conclusion

Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the part of the split view referring to the applicability restriction linked to the by-product quality requirements, and that there are not enough appropriate technical arguments to support the rest of the split view. This split view will therefore only be partially reported, for the part related to the applicability linked to the by-product quality, in the 'Concluding remarks and recommendations for future work' section of the BREF.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 23.f</td>
<td>Change the applicability to 'Applicable within the constraints associated with the by-product quality requirements for recovery'</td>
<td>CZ, EL, EE, EURACOAL, EURLECTRIC</td>
<td>NA</td>
</tr>
</tbody>
</table>

### 11.12 Mercury – Halogenated additives technique

**Conclusions of the meeting**

Slide 190.
BAT 23  In order to reduce mercury emissions to air from the combustion of coal
and/or lignite, BAT is to use an appropriate combination of the techniques given below.

<table>
<thead>
<tr>
<th>Technique</th>
<th>Description</th>
<th>Applicability</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Specific techniques to reduce mercury emissions</td>
<td></td>
</tr>
</tbody>
</table>
| g         | Use of halogenated additives in the fuel or injected in the furnace          | Addition of halogens (e.g. brominated additives) into the
|           |                                                                              | furnace to oxidise elemental mercury into soluble or particulate
|           |                                                                              | species, thereby enhancing mercury removal in downstream
|           |                                                                              | abatement systems                                        |
|           |                                                                              | Generally applicable in the case of a low halogen content in the fuel |

**Split view summary**

EE proposes to remove the technique from the list of BAT and to list it among the emerging
techniques

EURACOAL proposes to consider the technique 'not generally applicable'.

CZ proposes to add the following applicability restriction: 'Applicability limited due to the
constraints of cross-media effects (control of halogen emissions to the environment) and
corrosion potential of equipment.'

EURELECTRIC, supported by EL, proposes to include an applicability restriction linked to
the control of halogen emissions to the environment, the quality required for by-product
recovery, and the corrosion potential of equipment.

The split view is accompanied by the following rationale (CZ):

- Application of the technique is not well-established across EU which is supported by
  the fact that also the references placed into BATIS are mostly from outside the
  Europe.
- The applicability has many constraints which were acknowledged by speakers across
  the final meeting participants.

The split view is accompanied by the following rationale (EURACOAL, EE):

- Halogen additives (esp. bromine) can affect plant operation and maintenance by
corrosion as well as accumulation of bromine compounds in the scrubber suspension
and therefore in the FGD waste water. This can pose challenges for by-product
recovery or its safe disposal and leads to higher environmental and economic costs.
The cross-media effects of bromine compounds to the environment and the
commercial applicability with marketing of the residues is not demonstrated.

The split view is accompanied by the following rationale (EURELECTRIC, EL):

- Halogens addition in combustion leads potentially critical side-effects, with
  significant and fact-based risk of environmental and operating impact, which has to
  be duly assessed before application.
- Bromide addition to the coal or lignite may increase the bromine content of the FGD
  wastewater, as toxic organo-halogens and bromate.
• Effects of bromine compounds in by-products need to be deeply investigated, considering high environmental value of fly ashes and FGD gypsum industrial recovery, with defined EU standards.
• The industrial use of residues with application of this technique isn’t tested, the disposal, as a consequence of high halogen content, could lead to huge economic and environmental costs.
• By operating point of view, the issue of most concern is the potential for bromide induced corrosion in the duct work, air heater, and in the FGD system. Halogen additives (esp. bromine) can affect plant operation and maintenance by corrosion as well as accumulation of bromine compounds in the scrubber suspension and therefore in the FGD waste water.

**EIPPCB assessment**

Availability of information on which the split view is based:
• Documents and information mentioned in the split view were available, with the exception of some papers not made available to the TWG before the final meeting (e.g. 'Impact of flue-gas characteristics and ESP operating variables on mercury removal and ESP capture on activated carbon' (Presented at Air Quality VI Conference, Arlington, VA)) from EURELECTRIC, and thus not considered in the assessment.

Validity of supporting rationale:
• Information on techniques should not necessarily come only from Europe (BREF Guidance 2.3.8 paragraph 3). There is no evidence that the technique would not be commercially available and applied. On the contrary, there are many examples of plants in the US using the technique.
• Constraints to the use of this technique are described in the BREF and include the possible long-term corrosion, impact on the quality of by-products, or increase in halogen emissions to water/air.

**EIPPCB conclusion**

Taking these aspects into account, the EIPPCB considers that the split view is partially supported by appropriate technical arguments. This split view will therefore only be partially reported, for the part related to the applicability, in the 'Concluding remarks and recommendations for future work' section of the BREF.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 23.g</td>
<td>Change the applicability to 'Applicable within the constraints associated with the by-product quality requirements for recovery, the control of halogen emissions to the environment, and the long-term corrosion potential'</td>
<td>CZ, EL, EURACOAL, EURELECTRIC</td>
<td>NA</td>
</tr>
</tbody>
</table>

**11.13 Availability of techniques to measure mercury emissions, in compliance with the relevant EN standards**
Conclusions of the meeting
Slides 194/195.

The BAT-associated emission levels for mercury are given in Tables 10.8 and 10.9.

Table 10.8: BAT-associated emission levels (BAT-AELs) for mercury emissions to air from the combustion of coal

<table>
<thead>
<tr>
<th>Combustion plant total rated thermal input (MW_{th})</th>
<th>BAT-AELs (µg/Nm³)</th>
<th>Averaging period</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>New plants</td>
<td>Existing plants</td>
</tr>
<tr>
<td>&lt; 300</td>
<td>&lt; 1–3</td>
<td>&lt; 1–9 (†)</td>
</tr>
<tr>
<td>≥ 300</td>
<td>&lt; 1–2</td>
<td>&lt; 1–4 (‡)</td>
</tr>
</tbody>
</table>

(†) The lower end of the BAT-AEL range can be achieved with specific mercury abatement techniques.

Table 10.9: BAT-associated emission levels (BAT-AELs) for mercury emissions to air from the combustion of lignite

<table>
<thead>
<tr>
<th>Combustion plant total rated thermal input (MW_{th})</th>
<th>BAT-AELs (µg/Nm³) (†)</th>
<th>Averaging period</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>New plants</td>
<td>Existing plants</td>
</tr>
<tr>
<td>&lt; 300</td>
<td>&lt; 1–5</td>
<td>&lt; 1–10 (†)</td>
</tr>
<tr>
<td>≥ 300</td>
<td>&lt; 1–4</td>
<td>&lt; 1–7 (‡)</td>
</tr>
</tbody>
</table>

(†) The lower end of the BAT-AEL range can be achieved with specific mercury abatement techniques.

Split view summary
ESWET, supported by CEFIC, CEWEP, EURELECTRIC, Euroheat & Power and EUTurbines, proposes to ask the relevant CEN Technical Committee to comment on the availability and suitability of equipment, systems and methods to measure, in compliance with the CEN standards, emissions within the range of the proposed BAT-AELs. Automated measuring systems (AMS), data acquisition and handling systems (DAHS) and standard reference methods (SRM) must be checked in order to cover continuous monitoring and periodic measurements.

The split view is accompanied by the following rationale:

- In the light of the experience gained in implementing the ELVs required by the IED for waste co-incineration and incineration installations (which are more numerous and generally more stringent than for LCP installations), it appears that the monitoring equipment and methods available today are just able (or not even able) to comply with the relevant CEN standards at the level of these ELVs.
- The BAT-AEL values proposed in the draft of the revised LCP BREF are often much lower than the ELVs of the IED and very little experience has been acquired on LCPs with the emission of some of these substances.
- The proposed BAT-AEL values need therefore to be checked to ensure that, when the BAT-AEL value is used to set an ELV, the monitoring equipment (AMS, DAHS) with the relevant SRM, the laboratory equipment (for periodic measurements), and more generally the measurement principles available today are suitable to provide data that is valid in respect of the CEN standards, in particular in accordance with the quality assurance required.
During the Final LCP meeting, the assessment of the feasibility to set ELVs at very low level has been in practice more or less only based on the checking of a ratio of 5 or 10 between the BAT-AEL values and the Limit of Quantification of the available instruments, but not on the feasibility of a compliance with all the requests of the CEN Standards and, in particular in respect of QAL2.

A BAT-AEL range of < 1–2 μg/Nm3 for continuous mercury monitoring for new coal-fired boilers of ≥ 300 MWth (yearly average) was adopted during the Final meeting on the basis that such values can be reached in the USA. However the certification method in the USA is not consistent with the European Standards method. None of the American instruments have been certified so far according to the CEN Standards and therefore they cannot be taken into account as available techniques to set BAT-AEL values.

At the moment, there are only 4 instruments available that are certified for continuous measurement of mercury according to the EN Standards and only one of them (Sick Mercem 300Z) in the range of 0–10 μg/Nm3 (the other ones being certified for higher ranges, 0–30 μg/Nm3 or 0–45 μg/Nm3 which corresponds to the current daily ELV of 30 μg/Nm3 in Germany for the incineration and co-incineration of waste. It should be noted that a yearly average ELV of 10 μg/Nm3 has been introduced in Germany by the revision of 17. BImSchV of 2/5/2013 but it will only be applicable in 2019).

According to its QAL1 certificates issued by TÜV and MCERTS, the MERCEM 300Z instrument was certified with a total expanded uncertainty of 0.7 μg/Nm3 which certainly provides an accurate value of the Hg emission but which, according to the CEN standards, is not compatible with an ELV of 2 μg/Nm3 and a fortiori of < 1 μg/Nm3.

Moreover, the dispersion identified by interlaboratory comparison studies as mentioned above shows that the resulting uncertainty (25 % or even around 50 % for mercury when the ELV is 50 μg/Nm3) will lead to higher minimum ELV values due to calibration of AMS against SRM. The same conclusion will be found for periodic measurements since they are achieved with the same instruments as the ones used to calibrate the AMS.

All the lower ends of the BAT-AELs on mercury (for continuous and periodic monitoring) have been set at < 1 μg/Nm3 and a footnote has been added below the two BAT-AEL tables on mercury stipulating that 'The lower end of the range can be achieved with specific mercury abatement techniques'. In view of what is said above, both the BAT-AELs lower end value and the footnote appear to be questionable.

EIPPCB assessment

Availability of information on which the split view is based:

- Documents and information mentioned in the split view were available, with the exception of information on the instruments available and certified according to EN standards, the level of uncertainty for the MERCEM 300Z, the results of interlaboratory comparison studies.

Validity of supporting rationale:

- The split view refers to the use of BAT-AELs for setting ELVs and to the consideration of measurement uncertainties, which are implementation and compliance issues going beyond the remit of the LCP TWG.
- BAT-AELs can be defined without referring to an EN standard.
- Quality assurance requirements as defined in EN standards cannot prescribe the setting of certain BAT-AEL ranges in BAT conclusions. BAT conclusions are secondary legislation taking precedence over EN standards.
- The lower ends of the mercury BAT-AEL ranges can be measured with a reasonable measurement uncertainty as demonstrated by continuous and sorbent trap monitoring
devices certified according to US standards and the QAL1 certificate of the MERCEM 300Z instrument.

- The BREF Guidance (Section 3.2.3) stipulates that it is acceptable to use an expression of the type ‘< X to Y’ (i.e. ‘< X’ for the lower end of the range, Y for the upper end), where the lower end of the BAT-AEL range cannot be accurately defined, e.g. when the data reported in the information exchange is close to the detection limit.
- None of the data submitted through the questionnaires has been challenged by ESWET during the period of exchange of information.

EIPPCB conclusion
Taking these aspects into account, the EIPPCB considers that the split view does not clearly refer to the BAT-AELs set. This split view will therefore not be reported in the ‘Concluding remarks and recommendations for future work’ section of the BREF.

11.14 Mercury – Minimum monitoring frequency

Conclusions of the meeting
Slides 196/197.

BAT 3 ter. BAT is to monitor emissions to air with at least the frequency given below and in accordance with EN standards. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.

<table>
<thead>
<tr>
<th>Substance/ Parameter</th>
<th>Fuel/Process</th>
<th>Combustion plant total rated thermal input</th>
<th>Standard(s)</th>
<th>Minimum monitoring frequency</th>
<th>Monitoring associated with</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hg</td>
<td>Coal and/or lignite including waste co-incineration</td>
<td>&lt; 300 MWth</td>
<td>EN 13211</td>
<td>At least once every three months ((^8)) ((^9))</td>
<td>(0)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>≥ 300 MWth</td>
<td>Generic EN standards and EN 14884</td>
<td>Continuous ((^9)) ((^{10bis}))</td>
<td>(0)</td>
</tr>
</tbody>
</table>

\(^1\) Generic EN standards for continuous measurements are EN 15267-1, EN 15267-2, EN 15267-3, and EN 14181. EN standards for periodic measurements are given in the table.

\(^{8bis}\) The monitoring frequency does not apply where plant operation would be for the sole purpose of performing an emission measurement.

\(^8\) If the emission levels are proven to be sufficiently stable, periodic measurements may be carried out each time that a change of the fuel and/or waste characteristics may have an impact on the emissions, but in any case at least once every year. For waste co-incineration in coal, lignite, solid biomass and/or peat plants, the monitoring frequency reduction is carried out pursuant to the provisions of Part 6 of Annex VI to the IED.

\(^9\) If the emission levels are proven to be sufficiently stable, periodic measurements may be carried out each time that a change of the fuel and/or waste characteristics may have an impact on the emissions, but in any case at least once every six months.

\(^{10bis}\) Continuous sampling combined with frequent analysis of time-integrated samples, e.g. by a standardised sorbent trap monitoring method, may be used as an alternative to continuous measurements.

\(^{18}\) In the case of plants operated < 1500 h/yr, the monitoring frequency may be reduced to at least once every year.

Split view summary
EEB proposes to:
- set minimum monitoring frequency to ‘continuous’ monitoring also for the < 300 MW\(_{th}\) size category considering the alternative method of sorbent traps;
- remove or amend footnote (8). Second option: footnote (8) is amended: Allow for sorbent traps method and explicitly state that ‘For waste co-incineration in coal,
lignite, solid biomass and/or peat combustion plants, the monitoring frequency shall be continuous'.

- remove footnote (9);
- remove footnote (18).

The split view is accompanied by the following rationale:

- The EIPPCB has proposed the sorbent trap monitoring method as an alternative method of continuous monitoring which is much cheaper to implement compared to CEM devices. This should at least be required for the <300 MW_{th} category as well, instead of periodic measurements every three months which are insufficient for coal/lignite combustion, representing the most important point source emitters of mercury into the air in the EU.
- Footnote (8) needs to be amended or deleted. It is not acceptable to reduce the measurement to only once every year on that basis of emissions being “sufficiently stable”. This is not defined and characterized on what this actually means. Hard coal combustion involves frequent blending of various fuels with varying mercury content which therefore may have an impact on the emissions. A procedure or protocol needs to be required which ensures that the emissions are indeed “stable” and mercury emissions did not increase after the change of fuels occurred. It may be considered that the frequency of monitoring is lowered below the minimum 4 times a year if the operator has switched to fuels with lower mercury content and the abatement levels are at least kept. However guarantees / evidence need to be provided that this is indeed the case, the BAT conclusion should provide for these criteria and conditions.
- Footnote (8): A reference to binding requirements (set by part 6 of Annex VI of the IED) is not an adequate reference for a BREF document referring to “state of the art” requirements, in fact it foresees just 2 measurements per year. Rather a link to the updated Waste incineration BREF monitoring requirements should be considered instead. In the case of co-incineration of waste, the monitoring frequency should be increased to continuous monitoring because of the variations of mercury content in specific waste types. This should be required for sewage sludge or other types of waste which may be contaminated with mercury.
- Footnote (9): the EEB objects to the lowering of the monitoring frequency for this size category. See previous bullet points in relation to the problem of characterizing the meaning of “sufficiently stable”.

**EIPPCB assessment**

Availability of information on which the split view is based:

- Documents and information mentioned in the split view were available.

Validity of supporting rationale:

- The rationale is not supported by information on plants of < 300 MW_{th} that carry out continuous or sorbent trap monitoring of mercury.
- The split view does not question per se that the monitoring frequency can be reduced if emissions are stable, but rather addresses the difficulties on how to check the emissions stability. This seems therefore to be an implementation issue.
- No examples are given.

**EIPPCB conclusion**

Taking these aspects into account, the EIPPCB considers that there are not enough appropriate technical arguments to support the split view. This split view will therefore not be reported in the 'Concluding remarks and recommendations for future work' section of the BREF.
11.15 Mercury BAT-AELs for all existing and new coal- and lignite-fired plants

Conclusions of the meeting
Slide 144.

The BAT-associated emission levels for mercury are given in Table 10.8.

Table 10.8: BAT-associated emission levels (BAT-AELs) for mercury emissions to air from the combustion of coal

<table>
<thead>
<tr>
<th>Combustion plant total rated thermal input (MWth)</th>
<th>BAT-AELs (µg/Nm³)</th>
<th>Averaging period</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>New plants</td>
<td>Existing plants</td>
</tr>
<tr>
<td>&lt; 300</td>
<td>&lt; 1–3</td>
<td>&lt; 1–9 (2)</td>
</tr>
<tr>
<td>≥ 300</td>
<td>&lt; 1–2</td>
<td>&lt; 1–4 (2)</td>
</tr>
</tbody>
</table>

(2) The lower end of the BAT-AEL range can be achieved with specific mercury abatement techniques.

The BAT-associated emission levels for mercury are given in Table 10.9.

Table 10.9: BAT-associated emission levels (BAT-AELs) for mercury emissions to air from the combustion of lignite

<table>
<thead>
<tr>
<th>Combustion plant total rated thermal input (MWth)</th>
<th>BAT-AELs (µg/Nm³) (1)</th>
<th>Averaging period</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>New plants</td>
<td>Existing plants</td>
</tr>
<tr>
<td>&lt; 300</td>
<td>&lt; 1–5</td>
<td>&lt; 1–10 (2)</td>
</tr>
<tr>
<td>≥ 300</td>
<td>&lt; 1–4</td>
<td>&lt; 1–7 (2)</td>
</tr>
</tbody>
</table>

(2) The lower end of the BAT-AEL range can be achieved with specific mercury abatement techniques.

Split view summary
CAN Europe propose a BAT-AEL of < 1 µg/Nm³ for all coal- and lignite-fired plants (existing and new).

The split view is accompanied by the following rationale:

- Because coal- and lignite-fired power plants are the main source of mercury emissions into the air in the EU, and mercury is primarily a regional and global pollutant leading to toxic methylmercury levels in worldwide predatory fish and sea animals, the aim of regulation should be a substantial reduction in total mercury emissions, in order to reduce toxic impacts on European citizens, in particularly on unborn life and children.
- Targeting only power plants with exceptionally high emission rates or relying on a few frontrunner national regulators to require emission levels well below the upper (and lower) BAT-AELs is not an effective way to address a continental-scale pollutant; yet this is what the current BAT conclusions with their incredibly wide ranges between the lower and upper BAT-AELs would do.
There is no systematic difference in the pollutant concentration levels or treatability of flue gas stream from existing and new coal-fired power plants with respect to Hg. It follows that this level is achievable at all plants with the installation of new mercury-specific control techniques where necessary.

The BAT conclusions of June 2015 state that it is possible to achieve yearly average levels < 1 µg/Nm3 in new and existing plants when using specific mercury reduction techniques. This level should have been set for all new and existing plants.

As publicly available evidence distributed to the TWG by CAN / Greenpeace shows, mercury removal efficiencies above 99 % have been demonstrated at dozens of U.S. coal-fired power plants of all sizes using either ACI or fabric filters, in very stringently controlled tests under the U.S. EPA. Removal efficiencies above 95 % have been demonstrated at lignite power plants.

The majority of EU coal-fired power plants has mercury emission levels below the upper BAT-AELs agreed on, and hence the regulation does not require mercury-specific controls at the majority of power plants and does not achieve a significant reduction in total mercury emissions.

Collected data show several existing coal and lignite power plants achieving yearly averages below 1 µg/Nm3 (see Coal and/or lignite combustion – mercury emissions document, tables 1 and 2, plants 211V, 1005V, 77V, 156V, 462V, 267V, 268V, 662V, 224V, 286V, 689, 81V, 685V, 547V, 379V, 253V, 18-2V).

Evidence provided by CAN Europe / Greenpeace and EEB to the TWG showing emission values below 1 µg/Nm3 in coal and lignite power plants in the USA (see “MATS proposal reconsideration MACT floor spreadsheet - non-low rank virgin coal Hg”, “MATS proposal reconsideration MACT floor spreadsheet - low rank virgin coal Hg” and “MACT Floor Analysis-Coal HG” and “Best performance examples for SO2, NOX, PM & Hg control in coal and lignite-fired power plants”, in particular lignite plants Oak Grove 1 and Southern Co units).

**EIPPCB assessment**

**Availability of information on which the split view is based:**
- Documents and information mentioned in the split view were available.

**Validity of supporting rationale:**
- There is no clear reference to the information which states that 'there is no systematic difference in the pollutant concentration levels or treatability of flue-gas stream from new and existing coal-fired plants' and its link with the generic achievable level of < 1 µg/Nm3.
- No information in the split view supports the statement that the majority of EU plants have mercury emissions below the upper BAT-AEL.
- CAN Europe mentions a list of plants having reported emission levels below 1 µg/Nm3 and fitted with BAT, together with information about high Hg reduction rate achievable with available techniques that could apply to plants with higher emission levels.

**EIPPCB conclusion**

Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the split view. This split view will therefore be reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
</table>

A possible formulation of this split view could be:
11.16 Mercury BAT-AELs for coal- and lignite-fired plants operated < 1500 h/yr

Conclusions of the meeting
Slides 194/195.

Deletion of footnote (1) to table 10.8 and 10.9: 'These BAT-AELs do not apply in the case of plants operated < 1500 h/yr.'

Split view summary
CZ and EURACOAL propose to reinsert footnote (1) in Tables 10.8 and 10.9: 'These BAT-AELs do not apply in the case of plants operated < 1500 h/yr.'

The split view is accompanied by the following rationale:

- To meet the low BAT-AELs in tables 10.8 and 10.9 the chemistry of mercury removal especially in the scrubber needs stable conditions because of the potential risk of re-emission. This is not secured with temporary operation of a plant (operation less than 1500 h).
- The BAT-AELs given in the tables 10.8 and 10.9 are taken from the evaluation of the data collection and based on operating hours far above 1500 h.

EIPPCB assessment

Availability of information on which the split view is based:
- Documents and information mentioned in the split view were available.

Validity of supporting rationale:
- The Hg emissions data set from plants corresponding to questionnaires collected in 2012 does not include plants operated < 1500 h/yr.

EIPPCB conclusion
Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the split view. This split view will therefore be reported in the ‘Concluding remarks and recommendations for future work’ section of the BREF.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 23 Table 10.8 and Table 10.9</td>
<td>Add a footnote mentioning that the BAT-AELs do not apply to plants of &gt; 300 MWth operated &lt; 1500 h/yr</td>
<td>CZ, EURACOAL</td>
<td>NA</td>
</tr>
</tbody>
</table>
11.17 Mercury BAT-AELs for coal-fired plants

Conclusions of the meeting
Slide 194.

The BAT-associated emission levels for mercury are given in Table 10.8.

Table 10.8: BAT-associated emission levels (BAT-AELs) for mercury emissions to air from the combustion of coal

<table>
<thead>
<tr>
<th>Combustion plant total rated thermal input (MW_{th})</th>
<th>BAT-AELs (µg/Nm³)</th>
<th>Averaging period</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>New plants</td>
<td>Existing plants</td>
</tr>
<tr>
<td>&lt; 300</td>
<td>&lt; 1–3</td>
<td>&lt; 1–9 (\textdagger)</td>
</tr>
<tr>
<td>≥ 300</td>
<td>&lt; 1–2</td>
<td>&lt; 1–4 (\textdagger)</td>
</tr>
</tbody>
</table>

(\textdagger) The lower end of the BAT-AEL range can be achieved with specific mercury abatement techniques.

11.17.1 Increase the lower/upper ends of the BAT-AEL range for existing plants of < 300 MW_{th}

Split view summary
EURACOAL proposes to change the mercury BAT-AEL range for existing coal-fired plants of < 300 MW_{th} to 4–20 µg/Nm³.

The split view is accompanied by the following rationale (EURACOAL):

- Uncertainty of measurement is not considered in table 10.8. Especially because at these low values for Hg a reasonable margin must be added (Hg is highly volatile and surface effects have to be incorporated).
- In Europe the use of gypsum and fly ash is BAT. Segregation techniques that do not consider the further use of these products or cannot guarantee the harmlessness for these products should not be considered as current BAT. Single values from the US might not be representative of European conditions. Therefore a wider range is needed.
- Plant chemistry with respect to mercury is very complex. The great variations in minimum and maximum values reported by the reference plants confirm the need for a broad BAT-AEL range for mercury that is able to reliably accommodate measurement uncertainty, naturally occurring variations of Hg and halogen in the fuel and other combustion and flue-gas cleaning related changes of process parameters occurring over the course of a typical operational year.
- Measurement equipment was used with an allowed confidence interval of up to 40 %. This high permissible uncertainty gives an indication of the risks concerning the accurate determination of actual mercury concentration. Such risks have to be considered in the derivation of BAT-AELs and require at least upper values of 20 µg/Nm³.
- This value is already well below the emission limits for waste incineration plants in the recently amended IED (requirements for waste incinerators according to Annex VI, Part 3, Directive 2010/75/EU: 50 µg/Nm³).
- BAT-AELs for mercury proposed in the present revised draft / file Draft compiled conclusions of Final Meeting were based on plant data with uncertainty subtracted. The average measurement uncertainty associated with this information depends on the equipment and was located at 1 µg/Nm³ and 3 µg/Nm³.
EIPPCB assessment

Availability of information on which the split view is based:
- Documents and information mentioned in the split view were available. However, there is no direct relation between the arguments used and the references mentioned so it is not possible to know which information the rationale is based on.

Validity of supporting rationale:
- All levels used for deriving the BAT-AEls are concentrations as measured, without subtracting/adding the uncertainty intervals, as agreed by the TWG (concluding slide 14).
- The impossibility of achieving the lower end of the BAT-AEL range is not demonstrated.
- The BREF Guidance (Section 3.2.3) stipulates that it is acceptable to use an expression of the type ‘< X to Y’ (i.e. ‘< X’ for the lower end of the range, Y for the upper end), where the lower end of the BAT-AEL range cannot be accurately defined, e.g. when the data reported in the information exchange is close to the detection limit.
- There is no correlation provided between the plant chemistry complexity and the proposed alternative range, or between an allowed confidence interval of up to 40 % and a proposed higher end of the range of 20 µg/Nm$^3$.
- IED ELVs cannot necessarily be taken to reflect the use of BAT.

EIPPCB conclusion

Taking these aspects into account, the EIPPCB considers that there are not enough appropriate technical arguments to support the split view. This split view will therefore not be reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

11.17.2 Decrease the upper ends of the BAT-AEL ranges for plants of < 300 MW$_{th}$

Split view summary

EEB proposes to decrease the upper ends of the mercury BAT-AEL ranges for coal-fired plants of < 300 MW$_{th}$ to 0.6 µg/Nm$^3$ for new plants and to 3.5 µg/Nm$^3$ for existing plants.

The split view is accompanied by the following rationale:
- Yearly upper BAT-AEL for new coal plants of < 300 MW$_{th}$:
  - The proposed upper BAT-AEL is approximately set by Plant 683 which burns sub-bituminous coal;
  - Plants burning sub-bituminous coals are of particular interest as they have higher amounts of elemental mercury that is not removed by co-benefit abatement. However, Plants 286 (retrofitted 2002) and 689 (2004) also burn sub-bituminous coal and have Hg emissions of 0.57 µ/Nm3 and 0.6 µ/Nm3 respectively.
- Yearly upper BAT-AEL for existing coal plants of < 300 MW$_{th}$:
  - The upper BAT-AEL is set by Plant 690 (2006) burning sub-bituminous coal but the inclusion of additional plants in the database justifies the revision of this upper BAT-AEL.
  - Plants burning sub-bituminous coals are of particular interest, as they have higher amounts of elemental mercury that is not removed by co-benefit abatement.
There are older plants burning 100 % sub-bituminous fuels that achieve lower emissions e.g. Plant 683 with Hg emissions of 3.1 µg/Nm³ plus several others with even lower emissions.
Further, these emissions have been achieved without the use of the Hg-specific abatement techniques that have been accepted as BAT.
Therefore the upper BAT-AEL should be 3.5 µg/Nm³ (Plant 683).

EIPPCB assessment

Availability of information on which the split view is based:
• Documents and information mentioned in the split view were available.

Validity of supporting rationale:
• The rationale is supported by data from plants equipped with BAT with a justification taking into account the fuel characteristics.

EIPPCB conclusion

Taking these aspects into account, the EIPPCB considers that there are enough technical arguments to support the split view. This split view will therefore be reported in the ‘Concluding remarks and recommendations for future work’ section of the BREF.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 23 Table 10.8</td>
<td>Decrease the higher end of the mercury BAT-AEL range for new and existing coal-fired plants of &lt; 300 MWth</td>
<td>EEB</td>
<td>0.6 µg/Nm³(new) 3.5 µg/Nm³(existing)</td>
</tr>
</tbody>
</table>

11.17.3 Increase the lower/upper ends of the BAT-AEL ranges for plants of ≥ 300 MWth

Split view summary

EURELECTRIC proposes to:
• Increase the upper end of the mercury BAT-AEL range for new and existing plants of ≥ 300 MWth to 6 µg/Nm³;
• Add in the column ‘averaging period’ the ‘average of samples obtained during one year’ for plants of ≥ 300 MWth in the case that periodic monitoring would be carried out as under BAT 3ter on monitoring - footnote (9).

EURACOAL propose to change the mercury BAT-AEL range for existing coal-fired plants of ≥ 300 MWth to 3–20 µg/Nm³.

The split view is accompanied by the following rationale (EURELECTRIC):
• Derivation of BAT-AEL ranges should primarily be based on reported European reference plant data (with extensive contextual information). Meaningful BAT-AEL range for plants of ≥ 300 MWth should be based on reference plants already fitted with continuous monitoring. Data of plants with periodical measurements can provide additional information to confirm the ranges. Considering the corrected reference plant data for plants using continuous monitoring, the higher end of the BAT-AEL range of 6 µg/Nm³ proposed in the D1 should be kept.
• Plant chemistry with respect to mercury is very complex. The great variations in minimum and maximum values reported by the reference plants confirm the need for
a broad BAT-AEL range for mercury that is able to safely accommodate measurement uncertainty, naturally occurring variations of Hg and halogen in the fuel and other combustion and flue-gas cleaning related changes of process parameters occurring over the course of a respective year in operation.

- BAT-AELs for mercury proposed in the present revised draft / file Draft compiled conclusions of Final Meeting were based on plant data with uncertainty subtracted. The average measurement uncertainty associated with this information depends from the equipment and was located between 1 μg/Nm³ and 3 μg/Nm³. BAT-AELs for new plants should be adjusted accordingly.

The split view is accompanied by the following rationale (EURACOAL):

- Uncertainty of measurement is not considered in table 10.8. Especially because at these low values for Hg a reasonable margin must be added (Hg is highly volatile and surface effects have to be incorporated).
- In Europe the use of gypsum and fly ash is BAT. Segregation techniques that do not consider the further use of these products or cannot guarantee the harmlessness for these products should not be considered as current BAT. Single values from the US might not be representative of European conditions. Therefore a wider range is needed.
- Data presented by the EIPPCB on Hg emissions from reference plants using continuous monitoring need to be used when deriving BAT conclusions, without subtraction of measurement uncertainty (as now considered in the revised List of tables and graphs, “Coal-Lignite Hg V2”).
- The BAT-AEL range for plants of ≥ 300 MWth should be based on reference plants with continuous monitoring. Data for plants with periodic measurements can provide additional information to confirm the ranges.
- The additional assessment in the BP is based upon periodically measured data that was not provided through verified MS questionnaires, was without sufficient contextual information and referred to reference years other than 2010. Inclusion of this randomly provided information resulted in a reduction of the higher end of the BAT-AEL range down to 4 µg/Nm³ (yearly average).
- The derivation of a meaningful BAT-AEL range for the yearly average should not be based on randomly picked periodic measurements. The additional data provided by EEB should not be used for deriving BAT-AEL ranges. Additional data on Hg emissions for Plants 77 and 141 (submitted by EEB and France, respectively) were based on an average of periodic samples over 3 years from 2010 to 2012. No further information on measurement uncertainty and data quality, or further contextual information on the respective plant performance in the years 2011 and 2012 was provided. The proposal to average periodically measured Hg emissions of reference Plants 77 and 141 over the years 2010 - 2012 is not in line with the data assessment and treatment applied to periodic measurements of other reference plants and pollutants in the BREF process. Plant chemistry with respect to mercury is very complex. The great variations in minimum and maximum values reported by the reference plants confirm the need for a broad BAT-AEL range for mercury that is able to reliably accommodate measurement uncertainty, naturally occurring variations of Hg and halogen in the fuel and other combustion and flue-gas cleaning related changes of process parameters occurring over the course of a typical operational year. The fact has to be acknowledged that a measurement equipment was used with an allowed confidence interval of up to 40 %. This high permissible uncertainty gives an indication of the risks concerning the accurate determination of actual mercury concentration. Such risks have to be considered in the derivation of BAT-AELs and require at least upper values of 20 µg/Nm³. This value is already well below the emission limits for waste incineration plants in the recently amended IED
(requirements for waste incinerators according to Annex VI, Part 3, Directive 2010/75/EU: 50 µg/Nm³).

- BAT-AELs for mercury proposed in the present revised draft / file Draft compiled conclusions of Final Meeting were based on plant data with uncertainty subtracted. The average measurement uncertainty associated with this information depends from the equipment and was located at 1 µg/Nm³ and 3 µg/Nm³.

**EIPPCB assessment**

**Availability of information the split view is based on:**
- Documents and information mentioned in the split view were available.

**Validity of supporting rationale (EURELECTRIC):**
- No rationale supports the split view value of 6 µg/Nm³.
- There is no correlation provided between the plant chemistry complexity and the proposed split view range.
- Levels used for deriving the BAT-AELs are concentrations as measured, without subtracting/adding the uncertainty interval (concluding slide 14).
- Data used for deriving BAT conclusions were not all corrected from 'validated' to 'raw' data before the FM. However, doing this afterwards shows that only 1 plant out of the 31 mentioned above would have an average Hg level above 4 µg/Nm³ based on the information available in the questionnaires (4.5 µg/Nm³ – Plant 122aVC).

**Validity of supporting rationale (EURACOAL):**
- See assessment of the EURELECTRIC split view.
- The impossibility of achieving the lower end of the BAT-AEL range is not demonstrated.
- The additional assessment in the BP is based upon data received via the comments, made available to the whole TWG on BATIS and further circulated along with the BP. The review of the upper end of the range down to 4 µg/Nm³ was not based only on additional data contained in the document EEB-1.
- There is no correlation provided between the plant chemistry complexity and the proposed alternative range, or between an allowed confidence interval of up to 40 % and a proposed higher end of the range of 20 µg/Nm³.
- IED ELVs cannot necessarily be taken to reflect the use of BAT.

**EIPPCB conclusion**

Taking these aspects into account, the EIPPCB considers that there are not enough appropriate technical arguments to support the split view. This split view will therefore not be reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

**11.17.4 Decrease the upper ends of the BAT-AEL ranges for plants of ≥ 300 MWₜₙ**

**Split view summary**

EEB proposes to decrease the upper ends of the mercury BAT-AEL range for plants of ≥ 300 MWₜₙ to 0.5 µg/Nm³ in the case of new plants and to 1.5 µg/Nm³ in the case of existing plants.

The split view is accompanied by the following rationale (EEB):
- Yearly upper BAT-AEL range for new plants:
The top performing plants all pre-date the usual 2008 cut-off date for new plants, but if they can achieve higher levels of abatement, then it is reasonable to use them to set the BAT-AEL.

The BAT-AEL should be set at Plants 662-268-267 which covers the full range of plant sizes and the range of abatement technique constellations; include 2 operating at mid-merit; and despite dating back to 1986 or 2004 retrofits, have lower emissions than Plant 253 which dates from 2008. They achieve emissions of 0.5 µg/Nm³ by co-benefit abatement alone, and mercury-specific abatement techniques have been accepted as BAT and are available if required.

- Yearly upper BAT-AEL range for existing plants:
  - The proposed upper limit of 4 µg/Nm³ reflects the EEB’s position at the D1 consultation.
  - However, since then 2 things have changed: confirmation of the commercial operation of related techniques -- such as concrete-friendly ACI and separation of Hg in WWTP sludge -- necessitates less of a margin being left between EU and US standards, and additional data such as age, operating hours, size etc. can inform decisions on BAT within groups of plants.
  - The proposed upper BAT-AEL is set by Plant 134 – SCR-Wet FGD-ESP – burning bituminous coal and based on half hourly averages which will overestimate the actual emissions.
  - However, this adds nothing compared to a BAT-AEL set at Plant 212, which includes all sampled combinations of SOₓ/NOₓ/dust abatement and is representative of the whole sample in terms of plant age, size and operating hours.
  - These emissions have been achieved by co-benefit abatement alone, and mercury-specific abatement techniques have been accepted as BAT if required.
  - The BAT-AEL should therefore be 1.5 µg/Nm³ (Plant 212b).

**EIPPCB assessment**

Availability of information on which the split view is based:
- Documents and information mentioned in the split view were available.

Validity of supporting rationale:
The rationale is supported by data from plants equipped with BAT with a justification taking into account different plant features.

**EIPPCB conclusion**
Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the split view. This split view will therefore be reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 23 Table 10.8</td>
<td>Decrease the higher end of the mercury BAT-AEL range for new and existing coal-fired plants of ≥300 MWth</td>
<td>EEB</td>
<td>0.5 µg/Nm³ (new) 1.5 µg/Nm³ (existing)</td>
</tr>
</tbody>
</table>
11.17.5 Remove or amend footnote (2)

Split view summary
EURACOAL proposes to delete or change footnote (2) to: 'The lower end of the BAT-AEL is an indication for operating a power plant under the very best and stable conditions. Furthermore these low values should be examined because they are close to the detection limit.'

EURELECTRIC proposes to delete or review footnote (2) as follows: 'The lower end of the BAT-AELs cannot be accurately defined and indicates values close to the detection limit. Values lower than the higher end of the range can be achieved with specific mercury abatement techniques.'

The split view is accompanied by the following rationale (EURACOAL):
- As a result of several operational factors (interacting between each other), for example load fluctuations or re-emissions, the proposed low values might not always be achievable as shown by some measurements (references in study DNV KEMA (2012) on Br-addition). In the case of re-emission the proposed mercury-specific removal techniques have no influence.

The split view is accompanied by the following rationale (EURELECTRIC):
- Values lower than < 1 µg/Nm³ are below the validated range for reference standard method EN 13211 for Hg mass concentration in exhaust gases (0,001 mg/Nm³ to 0,5 mg/Nm³ at 11% O₂) to be used as reference to calibrate CEMs. The proposed footnote amendment is necessary to explain this evidence, as stated at BP EIPPCB assessment "< X" for the lower end of the range” indicate that "the lower end of the range cannot be accurately defined, e.g. when the data reported in the information exchange is close to the detection limit".
- Footnote (2) regarding the lower end of the BAT-AEL ranges is referring to the use of specific mercury abatement measures, that couldn’t be considered generally applicable. Considering the proposed note to add for clarify measurement uncertainty and limit of quantification, the footnote is no longer needed and should be abolished or reviewed.
- As a result of operational factors, re-emissions in flue gases could occur, the proposed lower values of the range might not always be achievable despite the proposed mercury-specific removal techniques, as shown in some references in study (i.e. DNV KEMA 2012 on Br-addition).

EIPPCB assessment
Availability of information on which the split view is based:
- Documents and information mentioned in the split view were available.

Validity of supporting rationale:
- The DNV-KEMA study on bromide addition states that reaching mercury emission levels below 1 µg/Nm³ may not always be guaranteed when adding bromide to the fuel or in the flue-gas, mainly due to possible mercury re-emission from the wet FGD.
- Specific techniques for mercury reduction have been considered generally applicable by the TWG. However, split views were raised regarding some constraints associated with their use, mainly on the by-product quality requirements for recovery.
- Using ‘< X’ in the case of the mercury BAT-AEL range is consistent with the BREF Guidance as explained in the BP (p. 79 point 1.1) and in the EURELECTRIC split view: ‘< X’ for the lower end of the range indicates that ‘the lower end of the range
cannot be accurately defined, e.g. when the data reported in the information exchange is close to the detection limit’.

**EIPPCB conclusion**

Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the part of the split view related to the removal of footnote (2), and that there are not enough appropriate technical arguments to support the part related to the amendment of footnote (2). This split view will therefore be reported in the 'Concluding remarks and recommendations for future work' section of the BREF only for the part related to the removal of footnote (2).

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>BAT 23 Table 10.8</em> Remove footnote (2)</td>
<td>EURACOAL, EURELECTRIC</td>
<td>NA</td>
<td></td>
</tr>
</tbody>
</table>

**11.18 Mercury BAT-AELs for lignite-fired plants**

**Conclusions of the meeting**

Slide 195.

The BAT-associated emission levels for mercury are given in Table 10.9.

Table 10.9: BAT-associated emission levels (BAT-AELs) for mercury emissions to air from the combustion of lignite

<table>
<thead>
<tr>
<th>Combustion plant total rated thermal input (MW&lt;sub&gt;th&lt;/sub&gt;)</th>
<th>BAT-AELs (µg/Nm&lt;sup&gt;3&lt;/sup&gt;)&lt;sup&gt;(1)&lt;/sup&gt;</th>
<th>Averaging period</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>New plants</td>
<td>Existing plants</td>
</tr>
<tr>
<td>&lt; 300</td>
<td>&lt; 1–5</td>
<td>&lt; 1–10 (2)</td>
</tr>
<tr>
<td>≥ 300</td>
<td>&lt; 1–4</td>
<td>&lt; 1–7 (2)</td>
</tr>
</tbody>
</table>

<sup>(2)</sup> The lower end of the BAT-AEL range can be achieved with specific mercury abatement techniques.

**11.18.1 Increase the lower/upper ends of the BAT-AEL ranges for plants of < 300 MW<sub>th</sub>**

**Split view summary**

EURACOAL proposes to change the mercury BAT-AEL range for new and existing plants to 4–20 µg/Nm³.

EURELECTRIC and EL propose to change the mercury BAT-AEL range for existing plants to 4–20 µg/Nm³ and to 4–10 µg/Nm³ for new plants. EL joined also others in this split view but is only reported for this part as deviating the least from the conclusions.

Euroheat & Power, PL and CZ propose to increase the higher end of the mercury BAT-AEL range for existing plants to 18 µg/Nm³ (CZ) or to 20 µg/Nm³ (PL, Euroheat & Power).

EPPSA proposes to increase the lower end of the mercury BAT-AEL range for existing plants to 2 µg/Nm³.
The split view is accompanied by the following rationale (EURACOAL):

- See rationale in Section 11.17.1.

The split view is accompanied by the following rationale (EURELECTRIC, EL, CZ, Euroheat & Power):

- See rationale in Section 11.17.1.
- There is an enormous variability of the Hg in emissions due to natural conditions (Hg and halogen content in fuel) and abatement parameters within the span of the last years across the portfolio of the combustion plants in CZ and Euroheat & Power members' countries.

The split view is accompanied by the following rationale (EPPSA):

- Agreed BAT-AELs for mercury emissions to air from the combustion of lignite do not consider enough lignite particularities, measurement equipment capabilities and there was misinformation used during the Final Meeting when establishing the lower end of the BAT-AELs when using certain key characteristics of lignite fuels between Texas (US) and Rhineland (DE) and generalising the results to all EU lignites.

The split view is accompanied by the following rationale (PL):

- The economic analysis of potential investments to meet Hg BAT-AEL for coal- and lignite-fired combustion plants shows that net effect on social welfare (emissions reduction vs. modernization cost) is generally negative for.
- Application of techniques proposed as BAT for reduction of mercury emissions to air is heavily burdened by the cross-media effects related with possible mercury reemission from residues, by-products or wastes. Some of the techniques like halogen additives, PAC, and DSI sorbents can affect operation of particulate control devices and scrubbers. Therefore BAT-AELs range should reflect levels achievable by application of measures successfully tested on industrial scale in Europe.
- Recommended BAT-AELs for Hg are too ambitious because only single applications / examples are dedicated for different conditions and they are not representative standard for coal and lignite power plants.
- Specific mercury abatement techniques which jeopardise further usage/recovv try of gypsum and fly ash cannot be considered as BAT.
- Derivation of BAT-AELs should be based on reported data from continuous monitoring or properly set campaign of periodic measurements. Only in this way the long term variations of mercury content in fuel as well as measurements uncertainty and complex nature of mercury emissions can be taken into account. Results of single measurements are not reliable source of data which can be used for derivation of BAT-AELs, especially in case of as complex pollutant as mercury.
- Adapting the Hg emission standard should be preceded by recognition of the technique availability and costs / benefit analysis.
- Carbon sorbent injection could be generally applicable, but some additional examinations are needed. This technique can influence the quality of by-products (gypsum, ash) and may require additional tests.

**EIPPCB assessment**

Availability of information on which the split view is based:

- Documents and information mentioned in the split view were available, with the exception of the information mentioned in the EPPSA split view submitted during or after the final meeting in June 2015 and thus not considered in the assessment.
• There is no direct relation between the arguments used in the EURACOAL, EURELECTRIC, EL rationale and the references mentioned so it is not always possible to know which information the rationale is based on.

Validity of supporting rationale (EL, PL, CZ, EURACOAL, EURELECTRIC, Euroheat & Power):
• Levels used for deriving the BAT-AELs are raw data without subtracting/adding the uncertainty, as agreed by the TWG (concluding slide 14).
• The impossibility of achieving single values as the lower end of the BAT-AEL range is not demonstrated in the rationale.
• There is no correlation provided between the plant chemistry complexity and the levels proposed in the split view, or between an allowed confidence interval of up to 40 % and a proposed higher end of the range of 20 µg/Nm³.
• IED ELVs cannot be taken as necessarily representative of the use of BAT.
• Cross-media effects exist and are described in the BREF (e.g. possible mercury re-emission from residues, by-products or waste).
• Most of the plants which submitted data corresponding to the BAT-AELs perform periodic monitoring (1 to 12 measurements per year) while the BAT-AELs proposed are set based on an average over the sampling period for plants of < 300 MWth and on continuous monitoring for plants of ≥ 300 MWth.
• There is a link between the rationale and the proposal of 20 µg/Nm³ for existing plants in the split view, e.g. Plants 117-1/2 and 133 are mentioned as reference and have emission levels of 20–26 µg/Nm³.
• There is no supporting rationale in the case of new plants.

Validity of supporting rationale (EPPSA):
• The rationale used is not clear on which lignite particularities and which measurement equipment capabilities affect the lower end of the BAT-AEL range and how those elements would support an alternative lower end of 2 µg/Nm³.

EIPPCB conclusion
Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the split view for the part related to the higher end of the BAT-AEL range for existing plants, and that there are not enough appropriate technical argument to support the other parts of the split view. This split view will therefore be reported in the 'Concluding remarks and recommendations for future work' section of the BREF only for the part related to an alternative higher end of the yearly BAT-AEL range for existing plants supported by EL, PL, CZ, EURACOAL, EURELECTRIC and Euroheat & Power.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 23 Table 10.9</td>
<td>Increase the higher end of the mercury BAT-AEL range for existing lignite-fired plants of &lt; 300 MWth</td>
<td>EL, PL, CZ, EURACOAL, EURELECTRIC and Euroheat &amp; Power</td>
<td>20 µg/Nm³</td>
</tr>
</tbody>
</table>

11.18.2 Decrease the upper ends of the BAT-AEL ranges for plants of < 300 MWth

Split view summary
EEB proposes to decrease the upper ends of the mercury BAT-AEL range for lignite-fired plants of < 300 MWth to 1 µg/Nm³ for new plants and to 3.5 µg/Nm³ for existing plants.

The split view is accompanied by the following rationale:

- Yearly upper BAT-AEL for new lignite plants of < 300 MWth:
  - Plant 25-1 burns 100% lignite, is the oldest of the plants in this size category (1996, 1997) and is still one of the best performers. If this plant can achieve emissions of 1 µg/Nm³, then this should be the new plant standard.
  - This is especially the case when this has been achieved without using Hg-specific abatement, which is available as a BAT technique.

- Yearly upper BAT-AEL for existing lignite plants < 300 MWth:
  - There is no reference plant within this size category for an upper BAT-AEL of 10 µg/Nm³ – the nearest is plant 22-1 with Hg emissions of 6.7 µg/Nm³ but burning only 60% lignite, with 40% wood.
  - Lignite is the fuel of particular interest because it has a high level of elemental mercury which more difficult to abate by co-benefit.
  - Plant 19 is newer than Plant 22-1 but burns 100% lignite, and therefore provides a proper basis for the upper BAT-AEL.

**EIPPCB assessment**

Availability of information on which the split view is based:
- Documents and information mentioned in the split view were available.

Validity of supporting rationale:
- The rationale is supported by data from plants equipped with BAT, and includes justifications based on the age of the plants and on possible techniques that could be implemented.

**EIPPCB conclusion**

Taking these aspects into account, the EIPPCB considers that the split view is supported in the case of EEB. This split view will therefore be only partially reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 23 Table 10.9</td>
<td>Decrease the higher ends of the mercury BAT-AEL ranges for new and existing lignite-fired plants of &lt; 300 MWth</td>
<td>EEB</td>
<td>1 µg/Nm³ (new) 3.5 µg/Nm³ (existing)</td>
</tr>
</tbody>
</table>

11.18.3 Increase the lower/upper ends of the BAT-AEL ranges for plants of ≥ 300 MWth

**Split view summary**

EURACOAL proposes to change the mercury BAT-AEL range for new and existing lignite-fired plants of ≥ 300 MWth to 3–20 µg/Nm³.

EURELECTRIC and EL propose to change the mercury BAT-AEL range for lignite-fired plants of ≥ 300 MWth to 3–20 µg/Nm³ for existing plants and to 3–10 µg/Nm³ for new plants. EL joined also others in this split view but is only reported here for the proposals deviating the least from the conclusions.
Euroheat & Power, PL and CZ propose to increase the higher end of the mercury BAT-AEL range for existing lignite-fired plants of ≥ 300 MW$_{th}$ to 18 µg/Nm$^3$ (CZ) or to 20 µg/Nm$^3$ (PL, Euroheat & Power). PL proposes to increase the higher end of the mercury BAT-AEL range for new lignite-fired plants of ≥ 300 MW$_{th}$ to 10 µg/Nm$^3$.

EPPSA proposes to increase the lower end of the mercury BAT-AEL range for existing lignite-fired plants of ≥ 300 MW$_{th}$ to 2 µg/Nm$^3$.

The split view is accompanied by the following rationale (EURACOAL):
- See Section 11.17.3.

The split view is accompanied by the following rationale (EURELECTRIC, EL, CZ, Euroheat & Power):
- See Section 11.17.3.
- There were three lignite-fired reference plants reporting a continuous monitoring of mercury emissions (Plants 133, 117-1, 117-2). The reported measurement uncertainty of those lignite-fired plants was in a range of 3.1 – 4.2 µg/Nm$^3$. The reported emission levels (yearly average) of those three plants were in a range from 17.3 – 21.7 µg/Nm$^3$ (without subtraction of measurement uncertainty). BAT-AELs for existing and new plants should be adjusted accordingly at the lower and higher end of the BAT-AEL ranges (in line with data from Plants n° 133, 117-1 and 117-2 using continuous measurement).
- There is an enormous variability of the Hg in emissions due to natural conditions (Hg and halogen content in fuel) and abatement parameters within the span of the last years across the portfolio of the combustion plants in CZ and Euroheat & Power members' countries.

The split view is accompanied by the following rationale (EPPSA):
- See rationale in Section 11.18.1.

The split view is accompanied by the following rationale (PL):
- See rationale in Section 11.18.1

EIPPCB assessment

Availability of information the split view is based on:
- Documents and information mentioned in the split view were available, with the exception of the information mentioned in the EPPSA split view submitted during or after the final meeting in June 2015 and thus not considered in the assessment.

Validity of supporting rationale (PL, CZ, EL, EURELECTRIC, EURACOAL, Euroheat & Power):
- See assessment in Sections 11.7.3 and 11.8.1.
- Data used for deriving BAT conclusions were not all corrected from ‘validated’ to ‘raw’ data before the FM. However, doing this afterwards shows that only 3 plants out of the 27 which submitted data, but none of those included in the BAT-AEL range, would have a higher yearly Hg average (from 17.3–21.7 µg/Nm$^3$ to 20.4–25.9 µg/Nm$^3$). The three plants reported continuously monitored emissions. These new levels would match with the higher end of the range of 20 µg/Nm$^3$ proposed in the split view for existing plants. Also, Plants 117-1/2 and 133 are mentioned as a reference and have emission levels of 20–26 µg/Nm$^3$ (17.3–21.7 µg/Nm$^3$ before uncertainty correction).
- There is no rationale supporting the higher end of the range for new plants at 10 µg/Nm$^3$.

Validity of supporting rationale (EPPSA):
- See assessment in Section 1.18.1.
EIPPCB conclusion
Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the split view for the part related to the higher end of the BAT-AEL range for existing plants, and that there are not enough appropriate technical argument to support the other parts of the split view. This split view will therefore be reported in the 'Concluding remarks and recommendations for future work' section of the BREF only for the part related to an alternative higher end of the yearly BAT-AEL range for existing plants supported by EL, PL, CZ, EURACOAL, EURELECTRIC and Euroheat & Power.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 23 Table 10.9</td>
<td>Increase the higher end of the mercury BAT-AEL range for existing lignite-fired plants of ≥ 300 MWth</td>
<td>PL, EL, CZ, EURELECTRIC EURACOAL and Euroheat &amp; Power</td>
<td>18 µg/Nm³ (CZ) 20 µg/Nm³ (PL, EL, EURACOAL and Euroheat &amp; Power)</td>
</tr>
</tbody>
</table>

11.18.4 Decrease the upper ends of the BAT-AEL ranges for plants of ≥ 300 MWth

Split view summary
EEB proposes to decrease the upper ends of the mercury BAT-AEL range for lignite-fired plants of ≥ 300 MWth to 1 µg/Nm³ for new plants and to 3 µg/Nm³ for existing plants.

The split view is accompanied by the following rationale:

- **Yearly upper BAT-AEL for new lignite plants of ≥ 300 MWth:**
  - Plant 18-2 emits < 1 µg/Nm³, by co-benefit abatement; Plant 25-1 achieves emissions of 1 µg/Nm³ despite being only 144 MWth.
  - Mercury-specific abatement techniques have been accepted as BAT and are available if required to supplement co-benefit abatement.
  - Data submitted by the EEB on the lignite-fired US Oak Grove Units 1 and 2 show that Hg emissions are kept below 1µg/Nm³ with the use of ACI.
  - BAT can be based on plants anywhere in the world, so the BAT-AEL for lignite should be set at ≤ 1µg/Nm³.
- **Yearly upper BAT-AEL for existing lignite plants ≥ 300 MWth:**
  - The proposed BAT-AEL is set by plants 127-1 and 127-2.
  - However, the much older plants 130 and 137 have the same configuration of pollution abatement techniques and achieve emissions of 3 µg/Nm³ by co-benefit abatement alone.
  - Mercury-specific abatement techniques have been accepted as BAT and are available if required.
  - The upper yearly Hg BAT-AEL for existing lignite plants > 300 MWth should therefore be 3µg/Nm3 (Plants 130 and 137).

EIPPCB assessment
Availability of information on which the split view is based:
- Documents and information mentioned in the split view were available.

Validity of supporting rationale (EEB):

133
- The rationale of EEB is supported by data from plants equipped with BAT, and includes an assessment based on plant age and/or possible implementation of alternative techniques, which support the alternative levels proposed in the split view.

**EIPPCB conclusion**

Taking these aspects into account, the EIPPCB considers that there enough appropriate technical arguments to support the split view. This split view will therefore be reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 23 Table 10.9</td>
<td>Decrease the higher ends of the mercury BAT-AEL ranges for new and existing lignite-fired plants of ≥ 300 MWth</td>
<td>EEB</td>
<td>1 µg/Nm³(new) 3 µg/Nm³(existing)</td>
</tr>
</tbody>
</table>

**11.18.5 Remove BAT-AELs for lignite-fired plants**

**Split view summary**

EE proposes to remove the table on mercury BAT-AELs for lignite-fired plants.

The split view is accompanied by the following rationale:

- See rationale in Sections 11.11 and 11.12.
- Specific techniques to reduce mercury emissions have to be tested as emerging technique.

**EIPPCB assessment**

Availability of information on which the split view is based:

- Documents and information mentioned in the split view were available.

Validity of supporting rationale:

- The rationale focuses only on the applicability of two techniques (23.f and 23.g) while other techniques for reducing mercury emissions are also applicable (23.a to 23.e and 23.h). Data were available for plants fitted with these techniques. Thus proposing not to set BAT-AELs for mercury emissions based on the fact that two techniques out of eight are considered emerging is not justified.

**EIPPCB conclusion**

Taking these aspects into account, the EIPPCB considers that there are not enough appropriate technical arguments to support the split view. This split view will therefore not be reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

**11.18.6 Remove or amend footnote (2)**

**Split view summary**

EURACOAL, EURELECTRIC and EL propose to delete footnote (2).

The split view is accompanied by the following rationale (EURACOAL):
As a result of several operational factors (interacting between each other), for example load fluctuations or re-emissions, the proposed low values might not always be achievable as shown by some measurements (references in study DNV KEMA (2012) on Br-addition). In the case of re-emission the proposed mercury-specific removal techniques have no influence.

The split view is accompanied by the following rationale (EURELECTRIC, EL):
- Footnote (2) regarding the lower end of the BAT-AEL ranges is referring to the use of specific mercury abatement measures. The specific abatement techniques for further reducing of mercury are not sufficient examined. After adjustment for measurement uncertainty (as proposed in Section 11.4.1) the footnote is no longer needed and should be abolished.

EIPPCB assessment

Availability of information on which the split view is based:
- Documents and information mentioned in the split view were available.

Validity of supporting rationale:
- The rationale given by EURACOAL and EURELECTRIC mentioning a study on bromide addition is based on available information where it is reported that reaching mercury emission levels below 1µg/Nm$^3$ may not always be guaranteed when adding bromide to the fuel or in the flue-gas, mainly due to possible mercury re-emission from the wet FGD.
- Specific techniques for mercury reduction have been considered generally applicable by the TWG. However, split views were raised regarding some constraints associated with their use, mainly on the by-product quality requirements for recovery.

EIPPCB conclusion

Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the split view. This split view will therefore be reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 23 Table 10.9</td>
<td>Remove footnote (2)</td>
<td>EL, EURACOAL, EURELECTRIC</td>
<td>NA</td>
</tr>
</tbody>
</table>

12 BAT CONCLUSIONS FOR EMISSIONS TO AIR FROM THE COMBUSTION OF SOLID BIOMASS AND/OR PEAT

12.1 NO$_X$ – SCR technique

Conclusions of the meeting
Slide 203.
BAT 26 In order to prevent and/or reduce NO\textsubscript{X} emissions to air while limiting CO and N\textsubscript{2}O emissions to air from the combustion of solid biomass and/or peat, BAT is to use one or a combination of the techniques given below.

<table>
<thead>
<tr>
<th>Technique</th>
<th>Description</th>
<th>Applicability</th>
</tr>
</thead>
<tbody>
<tr>
<td>f. Selective catalytic reduction (SCR)</td>
<td>See description in Section 10.8. The use of high-alkali fuels (e.g. straw) may require installing SCR after the dust abatement system</td>
<td>Not applicable in the case of plants operated &lt; 500 h/yr. There may be economic restrictions for retrofitting existing plants of &lt; 300 MW\textsubscript{th}. Not generally applicable to existing plants of &lt; 100 MW\textsubscript{th}</td>
</tr>
</tbody>
</table>

Split view summary
The UK proposes to add the following applicability restriction for biomass-fired plants of $\geq$ 300 MW\textsubscript{th}: ‘There may be technical and economic restrictions for retrofitting existing plants of $\geq$ 300 MW\textsubscript{th}.’

The split view is accompanied by the following rationale:
- Economic feasibility: the life of the SCR catalyst is significantly reduced when burning the typical range of commercially available biomass fuels within boilers of $> 300$ MW\textsubscript{th}. The reduction in life of catalysts can be up to 50 % of that expected from a catalyst on a comparable coal unit. The replacement of catalysts is in the order of several million Euros per unit.
- Technical Feasibility: the proposed NO\textsubscript{X} BAT-AELs for plant of $> 300$ MW\textsubscript{th} may be achievable using a range of other NO\textsubscript{X} reduction techniques in some cases. As current biomass plant of $> 300$ MW\textsubscript{th} in the UK are coal to biomass conversions, the configuration of the plant may render the installation of SCR as technically infeasible.

EIPPCB assessment
Availability of information on which the split view is based:
- This split view is said to be based on UK TWG comments on D1 and on the document ‘UK TWG Comments and Proposals for the LCP BAT conclusions 20/5/2015’ without specifying precisely which information is related to the split view.

Validity of supporting rationale:
- The UK TWG comments on D1 did not specify applicability restrictions to the SCR technique for existing plants of $\geq$ 300 MW\textsubscript{th} (BP page 87). General exemptions for coal combustion plants converted to biomass as a different form of generation (BP page 83) and specific BAT-AELs were proposed in the UK comments to D1, which were not supported by the available information.
- In the document ‘UK TWG Comments and Proposals for the LCP BAT conclusions 20/5/2015’, higher NO\textsubscript{X} and CO BAT-AELs are proposed but no applicability restrictions are mentioned.
- Therefore, no reference information directly supports the split view. Examples of coal combustion plants converted to biomass $\geq$ 300 MW\textsubscript{th} and retrofitted with SCR (Plant 14) are available in the data collection.

EIPPCB conclusion
Taking this aspect into account, the EIPPCB considers that there are not enough appropriate technical arguments to support the split view. This split view will therefore not be reported in the ‘Concluding remarks and recommendations for future work’ section of the BREF.

12.2 NO\textsubscript{x} BAT-AELs for biomass- and/or peat-fired plants

Conclusions of the meeting
Slides 206 to 208.

The BAT-associated emission levels for NO\textsubscript{x} are given in Table 10.11. (Note that this table has been formatted differently in last version of the BAT conclusions)

Table 10.11: BAT-associated emission levels (BAT-AELs) for NO\textsubscript{x} emissions to air from the combustion of solid biomass and/or peat

| Combustion plant total rated thermal input (MW\textsubscript{th}) | BAT-AELs (mg/Nm\textsuperscript{3}) | | | | | Yearly average | Daily average or average over the sampling period | | | | | New plants | Existing plants (\textsuperscript{2}) | New plants | Existing plants (\textsuperscript{4}) | | | | | NO\textsubscript{x} | Yearly average | Daily average or average over the sampling period | | | | | New plants | Existing plants (\textsuperscript{2}) | New plants | Existing plants (\textsuperscript{4}) | | | | | 50–100 | 70–150 | 70–225 | 120–200 | 120–275 | | | | | 50–100 (high alkali fuel (\textsuperscript{3})) | 70–200 | 70–250 | 120–260 | 120–275 (\textsuperscript{4}) | | | | | 100–300 | 50–140 | 50–180 | 100–200 | 100–220 | | | | | ≥ 300 | 40–140 | 40–150 (\textsuperscript{5}) | 65–150 | 95–165 (\textsuperscript{5}) | | | | | (\textsuperscript{2}) These BAT-AELs do not apply when plants operate < 1500 h/yr.  
(\textsuperscript{3}) The higher end of the BAT-AEL range is 310 mg/Nm\textsuperscript{3} for plants put into operation no later than 7 January 2014.  
(\textsuperscript{4}) The higher end of the BAT-AEL range is 160 mg/Nm\textsuperscript{3} for plants put into operation no later than 7 January 2014.  
(\textsuperscript{5}) The higher end of the BAT-AEL range is 200 mg/Nm\textsuperscript{3} for plants put into operation no later than 7 January 2014.  
(\textsuperscript{6}) These levels are indicative for combustion plants operated < 500 h/yr.  
(\textsuperscript{7}) High alkali fuel is a fuel containing > 2000 mg/kg of K (dry) and/or > 300 mg/kg of Na (dry).

12.2.1 Increase the upper ends of the BAT-AELs for plants of < 100 MW\textsubscript{th}

Split view summary
EURELECTRIC and CEPI, supported by Euroheat & Power, propose to increase the upper ends of the NO\textsubscript{x} BAT-AEL ranges for existing plants to 250 mg/Nm\textsuperscript{3} as yearly and 310 mg/Nm\textsuperscript{3} as daily averages.

FI proposes to increase the upper end of the yearly NO\textsubscript{x} BAT-AEL range for existing plants to 250 mg/Nm\textsuperscript{3} and to add a footnote saying that for plants put into operation no later than 7 January 2014, the higher end of the daily BAT-AEL range is 310 mg/Nm\textsuperscript{3}.

The split view is accompanied by the following rationale:

- Several factors should be taken into account when setting the NO\textsubscript{x} BAT-AELs and it is argued that it was not possible to thoroughly assess all of these factors. In the BP it is stated that plants using only primary techniques may be considered for setting the BAT-AELs for plants of < 300 MW\textsubscript{th} because the retrofitting and effective operation of SNCR are restricted for existing fluidised bed plants due to the possible difficulties
to get the right temperature window in all loads. For these reasons, the BAT-AELs should be determined based on larger group of grate-fired and BFB boilers with primary techniques.

- The agreed levels are not justified based on the reference plant data and furthermore the draft conclusion is extraordinary when compared to BAT-AELs of the fossil-fuels in the same category. Typically the BAT-AELs of the fossil fuels align with the minimum ELVs of the IED.

- For existing 50-100 MW<sub>th</sub> coal-fired plants the BAT-AELs are close to IED (BAT-AELs 270/330, IED 300) and the first plant barely in compliance with the IED qualified for setting the BAT-AELs for coal plants. In the case biomass and/or peat plants 25 % of the existing plants under IED limits would not comply with the BAT-AELs and the reasons remain unclear. It is considered that the Commission should assess the impacts of these different approaches on fossil fuel versus biomass and clarify the method of setting the BAT-AELs.

- There are several plants using primary techniques having emissions above the 250 mg/Nm<sup>3</sup> including all combustion techniques (grate-fired boilers 411VC, 489-3V; BFB boilers 398NV, 1002V and CFB boilers 489-1V, 489-2V, 22-2V).

- The emission levels of grate and BFB reference plants using primary techniques together with SNCR are above 250 mg/Nm<sup>3</sup> in plants 655VC, 108-1VC, 72V and 108-2VC (252 mg/Nm<sup>3</sup>, 268 mg/Nm<sup>3</sup>, 274 mg/Nm<sup>3</sup> and 291 mg/Nm<sup>3</sup>, respectively). These values should be taken into account when setting yearly and daily BAT-AELs. The values in the BP (250 mg/Nm<sup>3</sup> yearly/310 mg/Nm<sup>3</sup> daily) are justified.

- The reasoning behind the TWG Final meeting decision to tighten the BAT-AELs for the existing plants in class < 50-100 MW<sub>th</sub> is unclear. In the BP it is stated that plants using only primary techniques may be considered for setting the BAT-AELs in this size class and for this reason the upper end of the yearly value was justifiable set to 250 mg/Nm<sup>3</sup>. The agreed levels are not qualified for setting the BAT-AELs of the fossil fuels align with the AELs for coal plants. In the case biomass and/or peat fired plants the BAT-AELs are close to IED (BAT-AELs 270/330, IED 300) and the first plant barely in compliance with the IED qualified for setting the BAT-AELs for coal plants. In the case biomass and/or peat plants 25 % of the existing plants under IED limits would not comply with the BAT-AELs and the reasons remain unclear. It is considered that the Commission should assess the impacts of these different approaches on fossil fuel versus biomass and clarify the method of setting the BAT-AELs.

The split view is accompanied, in addition, by the following rationale (CEPI):

- CEPI argues that the upper level was changed in the final meeting even if the majority supported the initial proposal, and that lowering the yearly value to 225 mg/Nm<sup>3</sup> was not thoroughly justified in the meeting by the EIPPCB.

- Analysing the pulp and paper mill BFB boilers inside the range of the conclusion of the final meeting one can realise that the initial level of 250 mg/Nm<sup>3</sup> is needed. Otherwise there are even plants with SNCR that are outside the range. CEPI analyses emissions from BFB boilers included in the data collection 2012 BAT-AEL (plants 473V, 668, 676, 671, 322VC, 424-1V, 457V, 424-2V, 378V, 423).

- Also in this category the submitted data doesn't allow setting daily values. But if these are still given, they have to take into account plants having load variation.

EIPPCB assessment

Availability of information on which the split view is based:

- Documents and information mentioned in the split view were available.

Validity of supporting rationale:

- The rationale is supported by information from plants of the 2012 data collection (i.e. a number of existing pulp and paper industry/CHP BFB/GB boilers) equipped with techniques listed in BAT 26.
EIPPCB conclusion
Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the split view. This split view will therefore be reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 26 Table 10.11</td>
<td><em>Increase the higher ends of the NO\textsubscript{X} yearly and daily BAT-AEL ranges for existing plants of (&lt;100\text{ MW}_{\text{th}})</em>&lt;br&gt; <em>Add footnote: for plants put into operation no later than 7 January 2014 the higher end of the NO\textsubscript{X} daily BAT-AEL range for existing plants (&lt;100\text{ MW}_{\text{th}}) is 310 mg/Nm\textsuperscript{3}</em></td>
<td>FI, EURELECTRIC, CEPI, Euroheat &amp; Power</td>
<td>250 mg/Nm\textsuperscript{3}(yearly) 275 mg/Nm\textsuperscript{3}(daily)</td>
</tr>
</tbody>
</table>

12.2.2 Decrease the upper ends of the BAT-AELs for plants of \(<100\text{ MW}_{\text{th}}\)

Split view summary
BE proposes to set the upper ends of the NO\textsubscript{X} BAT-AEL ranges to 150 mg/Nm\textsuperscript{3} as a yearly average for new plants and to 180 mg/Nm\textsuperscript{3} as a daily average, including for plants burning high-alkali fuel.

BE also proposes to remove footnote 3, decreasing the upper end of daily BAT-AEL range for all existing plants put into operation no later than 7 January 2014, including when burning high-alkali fuel to 275 mg/Nm\textsuperscript{3}.

The split view is accompanied by the following rationale:
- Emission data provided by Plant 668, which is actually an older plant that dates from 1979, applying primary techniques and SNCR give 175 mg/Nm\textsuperscript{3} (95\textsuperscript{th} percentile), 128 mg/Nm\textsuperscript{3} (average). A combination of primary techniques & SNCR is considered BAT for new plants.
- An exemption for high-alkali plants cannot be justified based on the dataset.
- On the other hand, plants burning (more) heavily polluting fuels, and thus having higher emissions, should be obliged to take additional measures in order to achieve similar emissions as plants burning cleaner fuels. Logically BAT will differ for the two types of plant as the environmental benefit and economic feasibility (cost-effectiveness) will differ.

EIPPCB assessment
Availability of information on which the split view is based:
- Documents and information mentioned in the split view were available.

Validity of supporting rationale:
- Beyond generic statements and the proposal itself, neither additional information nor detailed rationale has been provided to support either the lowering of the upper end of the daily BAT-AEL range for existing plants, or the deletion of the footnote for high-alkali plants put into operation prior to 2014.
• There is no analysis of the type of fuel used by the plants of the 2012 data collection or in the specific case of Plant 668, which reports the use of 95.5% bark without any information about the alkalinity of the fuel, to support the rationale expressed by BE to propose the same BAT-AELs for high-alkali plants, and to decrease the upper end of the BAT-AEL ranges for this type of plant.
• Emissions reported by Plant 668 using techniques listed in BAT 26 support the proposal to decrease the upper NO\textsubscript{X} BAT-AEL daily range for new plants.
• The yearly upper end of the BAT-AEL is already 150 mg/Nm\textsuperscript{3}.

EIPPCB conclusion
Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the part of the split view related to decreasing the upper end of the BAT-AEL daily ranges for new plants, but not for the proposal related to the high-alkali plants. This split view will therefore only be partially reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 26 Table 10.11</td>
<td>Decrease the higher end of the NO\textsubscript{X} daily BAT-AEL range for new plants of &lt;100 MW\textsubscript{th}</td>
<td>BE</td>
<td>180 mg/Nm\textsuperscript{3}</td>
</tr>
</tbody>
</table>

12.2.3 Increase the upper ends of the BAT-AELs for plants of 100–300 MW\textsubscript{th}

Split view summary
IE proposes to increase the upper ends of the NO\textsubscript{X} daily and yearly BAT-AEL ranges for existing plants to 250 mg/Nm\textsuperscript{3}.

FI proposes, for plants put into operation no later than 7 January 2014, to increase the upper ends of the NO\textsubscript{X} daily and yearly BAT-AEL ranges for BFB, grate firing and in the case of limitations of SNCR applicability due to boiler design, to 275 mg/Nm\textsuperscript{3} and 250 mg/Nm\textsuperscript{3} respectively.

EURELECTRIC proposes to increase the upper ends of the NO\textsubscript{X} daily and yearly BAT-AEL ranges for existing BFB, grate firing and PC boilers and in the case of limitations of SNCR applicability due to boiler design to 240 mg/Nm\textsuperscript{3} and 220 mg/Nm\textsuperscript{3} respectively.

CEPI, supported by Euroheat & Power, proposes to increase the upper ends of the NO\textsubscript{X} daily and yearly BAT-AEL ranges for existing BFB and grate firing boilers to 320 mg/Nm\textsuperscript{3} and 240 mg/Nm\textsuperscript{3} respectively.

The split view is accompanied by the following rationale (IE):
• The scientific rationale for the upper AEL limit of 220 mg/Nm\textsuperscript{3} is difficult to reconcile when the data from the Reference Plants are considered. Notwithstanding the broad definition of biomass, a number of plants with average NO\textsubscript{X} emissions lower than the upper BAT-AEL end of the range are cited as firing fossil fuels other than peat and/or biomass. A larger number of reference plants with average NO\textsubscript{X} emissions lower than the upper BAT-AEL end of the range are cited as using waste as a co-fuel. While waste can be biomass, there is no indication as to whether these
Plants are WID compliant – which would have a considerable bearing on the economics of operating such plants.

- The data suggest that SNCR and/or SCR is a requirement on plants to achieve BAT-AEL compliance using the ‘Compiled Conclusions’ proposed value – this does not take into account the fact that plants may be employing other techniques as listed in BAT 26 and therefore effectively excludes 44% of the referenced plants in terms of their ability to meet BAT.

- When compared to plants with a rated thermal input of greater than 300 MWth there appears to be a lack of consistency whereby the upper BAT-AEL end of the range for these larger plants extends to the IED ELV (200 mg/Nm³) – it is not unreasonable that a similar rationale (i.e. extending the upper limit of the relevant BAT-AEL to 250 mg/Nm³) would be adapted for existing plants put into operation no later than 7th January 2014.

- There is no clear scientific rationale as to why the ‘Yearly average’ for existing plants should have an upper BAT-AEL end of the range less than the IED ELV. In the absence of clear scientific data, there appears to be no objective argument for an upper BAT-AEL end of the range for the Yearly Average to be less than the BAT-ELV, i.e. 250 mg/Nm³.

The split view is accompanied by the following rationale (FI, EURELECTRIC, CEPI, Euroheat & Power):

- Several factors should be taken into account when setting the NOX BAT-AELs and it is our understanding that all of these factors have not been able to been assessed thoroughly. In the BP it is stated that plants using only primary techniques may be considered for setting the BAT-AELs for plants of < 300 MWth because the retrofitting and effective operation of SNCR are restricted for existing fluidised bed plants due to the possible difficulties to get the right temperature window in all loads. For these reasons the BAT-AELs should be determined based on larger group of grate-fired and BFB boilers with primary techniques.

- Only few BFB boilers have NOX emissions inside the proposed BAT-AEL range. But it can be noticed that Plants 669, 469 and 673 have very high CO emissions and Plant 674 has high NH₃ emissions.

- Some boilers are also running without load variation (e.g. Plant 66). These factors result to lower NOX emissions for the plants in questions. Plants 682, 678, 505, 679, 29 and 677 should also be taken into account when setting yearly and daily BAT-AELs.

The split view is accompanied, in addition, by the following rationale (CEPI):

- There are only two BFB reference boilers with primary measures inside the proposed range of which one has CO emissions of 400 mg/Nm³ and the other is running at stable load.

- There is no "one size fits all" when discussing NOx emissions of different boiler types having different operating conditions. The TWG was not given a possibility to have a discussion on the different conditions of the reference plants. CEPI gives his own analyses of the information for some plants (Plants 455V, 476V, 669, 458NV, 674, 667, 13, 666, 469, 190, 673, 46, 66, 25-2V, 678, 679, 682, 677) of the data set.

- When setting short-term values the fact that 95% hourly averages have been used as reference data must be taken into account. Using 95% hourly averages to set daily BAT-AEL short-term values is against the way forwards of the intermediate meeting of June 2014. According to CEPI, the submitted data doesn't allow setting daily values. But if these are still given, they have to take into account plants having load variation.

**EIPPCB assessment**

Availability of information on which the split view is based:
Documents and information mentioned in the split view were available.

Validity of supporting rationale (CEPI):
- A number of BFB boilers from the 2012 data collection using techniques listed in BAT 26 are referred to by CEPI to support the split view concerning the yearly average, even if some of the plants include other than normal operating conditions in the emissions reported (i.e. Plant 505), or report emissions above the IED ELVs (e.g. Plant 679, see ‘Additional data collection’). However, the alternative proposal for the daily average is above the IED ELVs.
-Grate-fired boilers report emissions above the alternative proposals and Plant 29 is a PC boiler, not a BFB boiler.
-For reasons of consistency with IED Annex V, instead of applying to all ‘existing plants’, the alternative proposal is taken into consideration for plants put into operation no later than 7 January 2014.

Validity of supporting rationale (FI, EURELECTRIC):
-See assessment made for the CEPI arguments.
-Additionally, EURELECTRIC also includes PC boilers in its proposal. The only PC boiler reporting emissions above the agreed BAT-AELs is Plant 29, which reports NOX emissions of 248 mg/Nm³ as a yearly average, while EURELECTRIC proposes 220 mg/Nm³ as a yearly average. Therefore this plant does not support the proposal made by EURELECTRIC to increase both yearly and daily BAT-AELs for this type of plant.
-Limitations of SNCR applicability due to boiler design are implicitly given in the rationale when mentioning the technical assessment given in the BP about the effective operation of SNCR in existing fluidised bed plants.
-While it is appropriate to mention that the application of a footnote is conditional to applicability restrictions for SNCR, the precise nature of those applicability restrictions should not be repeated in detail in the footnote since they are already specified in BAT 26 (g).
-For reasons of consistency with IED Annex V, instead of applying to all ‘existing plants’, the alternative proposal is reported also for EURELECTRIC with the formulation proposed by FI for plants put into operation no later than 7 January 2014.

Validity of supporting rationale (IE):
- A number of plants of the 2012 data collection with average NOX emissions lower than the upper BAT-AEL end of the range also use waste.
-For reasons of consistency with IED Annex V, instead of applying to all ‘existing plants’, the alternative proposal is taken into consideration for plants put into operation no later than 7 January 2014.

EIPPCB conclusion
Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support some, but not all, parts of the split view. This split view will therefore only be partially reported for the parts related to the yearly and daily BAT-AELs for BFB boilers (expressed by FI, IE and EURELECTRIC) and to the yearly BAT-AELs for BFB boilers (expressed by CEPI and Euroheat & Power) in the ‘Concluding remarks and recommendations for future work’ section of the BREF.

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 26 Table 10.11</td>
<td>Increase the higher ends of the NOX yearly and daily</td>
<td>CEPI, Euroheat &amp; Power</td>
<td>240 mg/Nm³ (yearly)</td>
</tr>
<tr>
<td>BAT-AEL ranges for BFB boilers of 100–300 MWth put into operation no later than 7 January 2014</td>
<td>IE</td>
<td>250 mg/Nm³ for yearly and daily</td>
<td></td>
</tr>
<tr>
<td>Increase the higher ends of the NOX yearly and daily BAT-AEL ranges for BFB boilers of 100–300 MWth put into operation no later than 7 January 2014, in case of limitations of SNCR applicability</td>
<td>EURELECTRIC</td>
<td>220 mg/Nm³ (yearly); 240 mg/Nm³ (daily)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>FI</td>
<td>250 mg/Nm³ (yearly); 275 mg/Nm³ (daily)</td>
<td></td>
</tr>
</tbody>
</table>

### 12.2.4 Decrease the upper ends of the BAT-AELs for plants of 100–300 MWth

**Split view summary**

BE proposes to decrease the upper end of the NOX daily BAT-AEL range to 165 mg/Nm³ for new plants.

EEB proposes to decrease the upper ends of the NOX daily and yearly BAT-AEL ranges for existing plants to 190 mg/Nm³ and 140 mg/Nm³ respectively.

The split view is accompanied by the following rationale (BE):

- Emission data provided by Plant 13V give 163 mg/Nm³ (95th percentile). Plant 13V only applies primary techniques, while a combination of primary techniques & SNCR / SCR is considered BAT for new plants.
- Plants applying primary techniques & SNCR / SCR all report emissions in the same range.

The split view is accompanied by the following rationale (EEB):

- Yearly upper BAT-AEL:
  - The only case made for an upper limit of 180 mg/Nm³ is the possibility that some existing FBC plants may have difficulty getting the right temperature window in all loads (BP).
  - However, CFBC plants even smaller than this size category operate SNCR e.g. Plants 466 (98 MWth) and 470 (50 MWth), both achieving emissions of ~70 mg/Nm³.
  - In this size range, CFBC plants 190 (2004) and 46 (2008) are fitted with SNCR.
  - It is these plants that should form the basis of the BAT-AEL, especially plant 190, which is slightly older and also fitted with primary NOX abatement measures.
  - Faced with this evidence, the upper BAT-AEL cannot be set higher on a possibility that might arise at some FBC plants for some loads.
  - The upper BAT-AEL for existing plants should therefore remain at 140 mg/Nm³ (Plant 190).
- Daily upper BAT-AEL:
  - A well run plant should not have a large variation between the yearly average and 95th percentile data.
o Plant 190 – the proposed reference plant with SNCR – does not have an excessive difference between the average and 95th percentile data i.e. a difference of 50 mg/Nm³. Plant 667 shows the same difference.

o For a yearly upper BAT-AEL of 140 mg/Nm³ the daily upper BAT-AEL for existing plants should therefore be 190 mg/Nm³.

EIPPCB assessment

Availability of information on which the split view is based:
• Documents and information mentioned in the split view were available.

Validity of supporting rationale:
• The rationales of BE and EEB are supported by data from a number of plants equipped with techniques listed in BAT 26 and there is a link between the rationale and the split view. They include technical justification based on plants age and the possible application of secondary abatement techniques.

EIPPCB conclusion

Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the split view. This split view will therefore be reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 26 Table 10.11</td>
<td>Decrease the higher ends of the NOₓ yearly and daily BAT-AEL ranges for existing new and existing plants of 100–300 MWₜₐ</td>
<td>BE</td>
<td>New plants: 165 mg/Nm³ (daily)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EEB</td>
<td>Existing plants: 140 mg/Nm³ (yearly); 190 mg/Nm³ (daily)</td>
</tr>
</tbody>
</table>

12.2.5 Increase the upper end of the BAT-AEL for plants of ≥ 300 MWₜₐ

Split view summary

The UK proposes to increase the upper end of the NOₓ yearly BAT-AEL range to 180 mg/Nm³ for existing plants put into operation no later than 7 January 2014.

EURELECTRIC proposes to increase the upper end of the NOₓ yearly BAT-AEL range to 190 mg/Nm³ for existing plants put into operation no later than 7 January 2014 and for plants converted from coal to biomass.

IE proposes to increase the upper end of the NOₓ yearly BAT-AEL range to 200 mg/Nm³ for existing plants put into operation no later than 7 January 2014.

The split view is accompanied by the following rationale (IE):
• The small sample size of the Reference sites for existing plants with a rated thermal input greater than 300 MWₜₐ suggests that, in equity, a conservative approach should be adapted.
- It is also worth noting, that one of the reference plants (or approximately 18% of the total) may not technically belong in the category of peat/biomass given that over one third of its fuel input is derived from traditional hydrocarbons.
- The data suggest that SNCR and/or SCR is a requirement on plants to achieve BAT-AEL compliance using the ‘Compiled Conclusions’ proposed value – this appears not to take into account plants which may be employing other techniques as listed in BAT 26 and therefore effectively excludes 20% of the referenced plants in terms of their ability to meet BAT.
- In the absence of clear scientific data, there is no objective argument to put forward an upper AEL limit for the Yearly Average to be less than the BAT-ELV, i.e. 200 mg/Nm³.

The split view is accompanied by the following rationale (UK):
- NO₆ emissions of 180 mg/Nm³ are below the guarantee level for plant currently being designed and are below the levels experienced with existing biomass conversions.
- A BAT-AEL of 180 mg/Nm³ as an annual average will be challenging for these plants to meet, and there is limited data for plants of this size which have converted from coal to biomass on which to base BAT-AELs.
- The BREF now acknowledges that SNCR may not be appropriate for retrofitting to certain boilers. However the value of 160 mg/Nm³ cannot be achieved by primary measures alone.
- The case for not fitting SCR is set out in a separate split view. Emission performance of converted coal plant will be very site specific and, therefore, the prediction of emission values where there is a lack of data represents an unacceptable commercial risk on the basis of operating experience and performance guarantees.

The split view is accompanied by the following rationale (EURELECTRIC):
- There are only 6 plants in this size class and thus no comprehensive data is available. Conversion from coal to biomass is to be more and more important when responding to climate change challenges. The upper end of the yearly average (150/160 mg/Nm³) is not achievable and not guaranteed by manufactures for older plants that have been converted from coal. Installing an SCR is economically not achievable for those plants.
- The BP states to use Plant 14 as a reference (out of a total of 6 plants). However Plant 1004 is equally in the list & sheds a different light on the achievable NOₓ-emissions: yearly 190 mg/Nm³ (consistent with IED as well). Using 190 mg/Nm³ instead of 160 mg/Nm³ also takes into consideration the fact that a large gap between the yearly and daily average may not be feasible.

**EIPPCB assessment**

Availability of information on which the split view is based:
- Documents and detailed information that is mentioned in the split view were available.

Validity of supporting rationale:
- Five out of six biomass- and/or peat-fired plants of the data collection of this size category report NOₓ emissions below the agreed BAT-AELs. There is no information about the techniques used by Plant 1004, which is the only one that is above those levels. The rest of the plants use SCR and SNCR techniques.
- Examples of coal combustion plants converted to biomass of ≥ 300 MWₑ, retrofitted with SCR, i.e. Plant 14 reporting less than 160 mg/Nm³, are available in the data collection.
EIPPCB conclusion
Taking this aspect into account, the EIPPCB considers that there are not enough appropriate technical arguments to support the split view. This split view will therefore not be reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

12.2.6 Decrease the upper ends of the BAT-AELs for plants of ≥ 300 MWth

Split view summary
BE proposes to decrease the upper ends of the NOx BAT-AEL range for new plants to 55 mg/Nm³ as a yearly average and to 85 mg/Nm³ as a daily average.

BE also proposes to decrease the upper end of the NOx BAT-AEL range for all existing plants to 150 mg/Nm³ as a yearly average and to 165 mg/Nm³ as a daily average.

A possible formulation of this split view could be:

EIPPCB conclusion

Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the split view. This split view will therefore be reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

A possible formulation of this split view could be:
BAT conclusion | Dissenting view | Expressed by | Alternative proposed level (if any) 
--- | --- | --- | ---
BAT 26 Table 10.11 | Decrease the higher ends of the NO$_x$ BAT-AEL ranges for new and all existing plants of $\geq$ 300 MW$_{in}$ | BE | New: 55 mg/Nm$^3$ (yearly); 85 mg/Nm$^3$ (daily)  
Existing: 150 mg/Nm$^3$ (yearly); 165 mg/Nm$^3$ (daily)

### 12.3 SO$_x$, HCl, HF – DSI and SDA techniques

**Conclusions of the meeting**  
Slide 215.

BAT 28 In order to prevent and/or reduce SO$_x$, HCl and HF emissions to air from the combustion of solid biomass and/or peat, BAT is to use one or a combination of the techniques given below.

<table>
<thead>
<tr>
<th>Technique</th>
<th>Description</th>
<th>Applicability</th>
</tr>
</thead>
<tbody>
<tr>
<td>…</td>
<td>…</td>
<td>…</td>
</tr>
<tr>
<td>Duct sorbent injection (DSI)</td>
<td>See description in Section 10.8. The technique is used in combination with a dust abatement technique</td>
<td>Generally applicable</td>
</tr>
<tr>
<td>Spray-dry absorber (SDA)</td>
<td>See description in Section 10.8</td>
<td>Generally applicable</td>
</tr>
<tr>
<td>…</td>
<td>…</td>
<td>…</td>
</tr>
</tbody>
</table>

**Split view summary**  
CEPI, supported by FI, proposes to change the applicability of both techniques to 'Generally applicable to new boilers. Not applicable to existing boilers equipped with ESP as dust abatement technique'.

The split view is accompanied by the following rationale:

- Almost all SO$_2$ abatement techniques were listed as generally applicable, even though sound evidence was given to prove the applicability restrictions of the different techniques.
- There are clear technical and economical restrictions on applying DSI and SDA in boilers equipped with an ESP.
- Even if there are one or two plants with a certain technique in use, this doesn't mean that the technique is generally applicable. It should also be noted, that even if a technique is in use in a plant, this doesn't necessarily mean that it works well in that plant.
- To work effectively DSI and SDA require the use of bag filter. The applicability of duct sorbent injection and spray-dry absorber is restricted in mills having the BAT technique ESP as the dust abatement technique. To use duct sorbent injection and spray-dry absorber the plant would have to install bag filter, a dry sorbent injection system and new flue gas fans. Installing the bag filter would probably mean that the ESP, even if it is effective, would have to be removed. These changes are not technically or economically justifiable.
The EIPPCB had given one example each of a plant using boiler sorbent injection and spray dry absorber (SDA). Spray-dry absorber (SDA) was not a technique listed in draft 1. SDA was added before the final meeting based on a D1 comment. In the background paper the reference plant (489-3V) given to justify the general applicability of the technique was a grate boiler burning over 50% solid waste and with a bag filter originally installed. To set a technique as generally applicable to all plant types based on this is not justifiable.

The general applicability of duct sorbent injection had been questioned in the D1 comments. Still the initial proposal was kept even though no sound assessment was given in the background document on the applicability of the technique in boilers equipped with ESP as dust abatement technique. In the final meeting no further assessment than in the background paper was given by the EIPPCB. No references of plants equipped with an ESP that had installed DSI or SDA together with a bag filter were given by the EIPPCB.

Finland supported the rationale provided by CEPI and added that, as there are no reference plants using DSI or SDA together with ESP, this restriction of applicability should be explicitly mentioned in the BAT conclusions.

EIPPCB assessment

Availability of information on which the split view is based:
- Documents and information mentioned in the split view were available.

Validity of supporting rationale:
- There is no technical justification (that would support the split view) in the proposals given in the mentioned comments on D1.
- Discussions during the FM took part between the different TWG members on the applicability of DSI and SDA techniques.
- The 2012 data collection does not include example biomass- and/or peat-fired plants using DSI or SDA together with an ESP.

EIPPCB conclusion

Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the split view. This split view will therefore be reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 28</td>
<td>Change the applicability restrictions of techniques SDA and DSI to 'Generally applicable to new boilers. Not applicable to existing boilers equipped with ESP as dust abatement technique'</td>
<td>FI, CEPI</td>
<td>NA</td>
</tr>
</tbody>
</table>

12.4 SO$_2$ BAT-AELs for biomass- and/or peat-fired plants

Conclusions of the meeting

Slides 217 to 219.

The BAT-associated emission levels for SO$_2$ are given in Table 10.12.
Table 10.12: BAT-associated emission levels (BAT-AELs) for SO₂ emissions to air from the combustion of solid biomass and/or peat

<table>
<thead>
<tr>
<th>Combustion plant total rated thermal input (MWₜₐ)</th>
<th>BAT-AELs for SO₂ (mg/Nm³)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>New plant</td>
</tr>
<tr>
<td></td>
<td>Yearly average</td>
</tr>
<tr>
<td>&lt; 100</td>
<td>15–70</td>
</tr>
<tr>
<td>100–300</td>
<td>&lt;10–50</td>
</tr>
<tr>
<td>≥ 300</td>
<td>&lt;10–35</td>
</tr>
</tbody>
</table>

(¹) For existing plants burning fuels where the average sulphur content is 0.1 % or higher, the higher end of the BAT-AEL range is 100 mg/Nm³.

(¹) These BAT-AELs do not apply when plants operate < 1500 h/yr.

(¹) For existing plants burning fuels where the average sulphur content is 0.1 % or higher, the higher end of the BAT-AEL range is 165 mg/Nm³.

(¹) For existing plants burning fuels where the average sulphur content is 0.1 % or higher, the higher end of the BAT-AEL range is 215 mg/Nm³ if those plants have been put into operation no later than 7 January 2014 and/or are FBC boilers combusting peat.

(¹) These levels are indicative for combustion plants operated < 500 h/yr.

12.4.1 Increase the upper ends of the BAT-AELs for plants burning high-sulphur fuels

Split view summary
FI proposes to increase the upper end of the SO₂ yearly BAT-AEL range for existing plants of ≥ 100 MWₜₐ burning fuels where the average sulphur content is 0.1 % or higher (covered by footnote (¹)) to 160 mg/Nm³. CEPI, supported by Euroheat & Power, proposes to increase this level to 200 mg/Nm³ and to apply it also to plants of < 100 MWₜₐ where the average sulphur content is 0.1 % or higher.

IE proposes to increase the upper ends of the SO₂ yearly BAT-AEL range for existing plants of ≥ 100 MWₜₐ burning fuels where the average sulphur content is 0.1 % or higher (covered by footnote (¹)) to 300 mg/Nm³ in the case of existing plants of 100–300 MWₜₐ and to 200 mg/Nm³ in the case of plants of ≥ 300 MWₜₐ.

IE also proposes to increase the upper ends of the SO₂ daily BAT-AEL range for existing plants of ≥ 100 MWₜₐ burning fuels where the average sulphur content is 0.1 % or higher to 300 mg/Nm³ in the case of existing plants of 100–300 MWₜₐ (covered by footnote (¹)) and to 200 mg/Nm³, or 215 mg/Nm³ for plants put into operation before 7 January 2014, in the case of plants of ≥ 300 MWₜₐ (covered by footnote (¹)). CEPI, supported by Euroheat & Power, proposes to increase the upper ends of the SO₂ daily BAT-AEL range for plants of 100–300 MWₜₐ to 330 mg/Nm³ and for plants of < 100 MWₜₐ.

EURELECTRIC proposes to increase the upper end of the SO₂ daily BAT-AEL range for existing plants of ≥ 300 MWₜₐ burning fuels where the average sulphur content is 0.1 % or higher to 220 mg/Nm³ for plants put into operation before 7 January 2014 (covered by footnote (¹))

FI and EURELECTRIC propose to increase the upper ends of the SO₂ yearly and daily BAT-AEL ranges for existing plants of < 100 MWₜₐ burning fuels where the average sulphur content is 0.1 % or higher to 300 mg/Nm³ and 330 mg/Nm³ respectively.

FI proposes alternatively to remove Table 10.12.
The split view is accompanied by the following rationale (FI):

- Plant 539V (CFB boiler) belongs to highest size category and is equipped with flue-gas condenser. At the moment the BAT-AELs of the plants using high amount of sulphur rich fuel are based on a single reference plant. FI believes that Plant 539V would be better reference plant to describe yearly average of the sulphur rich fuel, while 190VC is more representative for daily average. To the FI understanding Plant 539V was used initially in LCP BREF D1 as the reference plant for upper level of the BAT-AEL.

- The table 10.12 is related to plants burning very diverse sulphur content fuels because of the varying shares of fuels and/or the varying sulphur content of each fuel. The share of peat used by reference plants varies between 0-100 %. The biomass and especially peat have remarkable diverse sulphur content. The sulphur content of the Finnish peat varies (minimum-maximum) from 0,01 w-% to 3,0 w-% (average 0,21 w-% dry basis). The sulphur content of woody biomass varies from 0,01 w-% to 0,05 w-% (average 0,03 w.% dry basis). The BAT-AELs should take into account the varying and occasionally high sulphur content, thus BAT-AELs up to IED minimum emission limit values for sulphur rich fuels (≥ 0.1 w-% S) are justified.

- Number of reference plants burning peat in classes < 100 MWth, 100–300 MWth and > 300 MWth is very limited (6, 9 and 3 plants, respectively). Also the share of peat in these few plants varies significantly and only a couple of plants burn more that 70 % peat. Due to the lack of comprehensive and descriptive data, the proposed values are justified.

- Due to the extreme differences both in temperature (from -30 °C to + 30 °C) and amount of daylight during a year in the northern countries the demand for heat and electricity also varies heavily during the year. Increased need for energy during the winter season can cause the plants to have higher emissions during that time because of increased use of peat, while the emissions can be clearly lower during the summer months. Thus the fuel change to bigger biomass share to reduce emissions is not commonly feasible.

- The peat is domestic fuel produced typically relative close to the plant. The properties, such as sulphur content, are dependent on the peatland (location, age, depth). For these reasons the limitations for the fuel characteristics by supply contracts are often not feasible.

- The upper value of the yearly BAT-AEL for coal-fired boilers below 100 MWth is 360 mg/Nm³. For the biomass/peat plants in the same size category the upper value is 100 mg/Nm³. The upper value of the daily BAT-AEL for coal boilers is 400 mg/Nm³. For biomass/peat plants in the same size category the upper value is 215 mg/Nm³. Coals with low sulphur content (down to 0.1 % according to BAT 21, technique a), equally high than what is the sulphur content of peat, are available in the market and it would be somewhat questionable if the coal with equal sulphur content with peat would benefit from 2-4-fold higher BAT-AELs. In the 50-100 MWth category this difference is so remarkable that it would most certainly lead to fuel switching to coal, at least in the cases where peat is used as a supplementary fuel with biomass during the winter period.

- In order to balance this unequal treatment of fuels with identical sulphur content the IED minimum values should be used in the smallest category, as same approach (BAT-AELs 360/400 mg/Nm³, IED 400 mg/Nm³) was decided for coal in 50-100 MWth category by the TWG. Furthermore, we believe that this kind of unequal treatment of fuels is not justified and potential negative impacts of such differentiation should be investigated using impact assessment.

- Emissions of the biomass and/or peat firing plants are dependent on the sulphur content of the fuels used, fuel share of the sulphur rich fuel and emission reduction techniques used. The current wording of the BAT-AELs in the Table 10.12 of the
BAT 28 largely ignores (apart for 0.1% limit in the footnotes) the fuel share issue (unlike the LCP BREF D1), even if most of the peat-firing plants are using peat together with biomass. Large number of plants fire peat only during the winter months and use biomass fuels rest of the year. This kind of operation is very poorly reflected in the current BAT-AELs. Looking at the data above of the 100–300 MW plants, half of the plants are by 10-fold below the upper level without using any emission reduction technologies due to the fact that the biomass has almost no sulphur.

- Overall BAT-AELs of the BAT 28 are not very well constructed and it would not really be functional for many existing plants, if any. It is not necessary to set BAT-AELs to plants using biomass only and minimum ELVs of the IED for peat plants are already relatively low (200/300 mg/Nm³) to ensure protection of the environment. As the BAT-AEL fails to grasp to fuel share issue on the emission formation, practically all plants using peat would be candidates for the IED Article 15(4) derogations based on technical characteristics of the plant. Obviously after that it is a question of the environmental benefits. On that issue one should remember that as peat is local/regional fuel, it is used within short distance from the harvesting area, thus most peat combustion plants are situated in rural areas, industrial sites or smaller communities, thus environmental benefits can be relatively low. Number of plants using peat in Europe is also very small.

- So, as the BAT-AELs of the BAT 28 has some major applicability issues and it does not really contain any potential for emission reduction due to already low emission and high likelihood of the IED Article 15(4) derogations, it could be simply deleted. The Commission can naturally confirm these findings via impact assessment.

The split view is accompanied by the following rationale (IE):

- As presented from a number of member states at the TWG final meeting, Sulphur concentrations in plant feedstocks vary widely and can be many multiples of the threshold value detailed in the Footnotes – implying that the upper range of final BAT-AEL should be considerably higher than that currently proposed, i.e. extend the range to the respective IED ELVs.

- The background data for SO\(_X\) emissions details 26 reference plants but only 9 of these are firing peat in the respective fuel mix. This very small sample size is prima facie evidence that there is no objective/scientifically robust mandate for overly prescriptive AELs without consideration being given by Competent Authorities to local environmental conditions and their adoption of a precautionary approach.

- In addition, the reference data do not distinguish between the types of fluidised bed designs that operate across Europe today – and it would appear that the ‘Compiled Conclusion’ does not take these technical differences into account. This is relevant given that the D1 acknowledges in Chapter 5.1.1.5.2 that CFBCs (although often more susceptible to dispositions, corrosion and loss of efficiency) are inherently more efficient by up to 20% (relative to other designs) at abating SO\(_X\) emissions, albeit that other designs often have distinct advantages in terms of efficiency, resource use etc.

The split view is accompanied by the following rationale (CEPI, Euroheat & Power):

- The higher S-content of peat should be taken into account when setting BAT-AELs. The table 10.12 in the draft BAT conclusions doesn't include different BAT-AELs for existing (peat using) BFB plants, where there often are limited possibilities for secondary cleaning possibilities. The number of peat using reference BFB plants is very limited, only two inside the BAT-AEL range in the 100–300 MW\(_{th}\) category (figure 1) and two in the <100 MW\(_{th}\) category. Plants 678, 680 and 677 in the 100–300 MW\(_{th}\) category must also be taken into account. Cl-corrosion risk is restricting a more increased biomass use in these plants. Boiler sorbent injection, duct sorbent
injection, spray-dry absorber or wet scrubbing are not applicable techniques in these plants.

- CEPI proposed a yearly BAT-AEL of 300 mg/Nm$^3$ for peat using plants in the final meeting based on an interpolation of the SO$_2$ emissions of different reference plants with varying peat shares in the fuel. If real SO$_2$ emissions of the reference plants need to be used, the yearly value should be 200 mg/Nm$^3$ based on Plant 677.

- It should also be noted that the >300 MW category Plant 539, a CFB boiler that uses 70% peat and equipped with a FG condenser, has SO$_2$ emissions of 159 mg/Nm$^3$, in other words clearly higher than the conclusion of the final meeting of 100 mg/Nm$^3$. No explanation has been given by the EIPPCB why this plant hasn't been seen as a valid reference for the SO$_2$ BAT-AELs.

- Reference plant 188VC was seen as a valid reference by the EIPPCB when discussing the general applicability of boiler sorbent injection. Still, the SO$_2$ emissions of this plant are six times over the conclusion of the final meeting of 100 mg/Nm$^3$. A clearly contradictory decision. Either the emissions of plant 188VC should be valid when setting BAT-AELs for BFB plants, or the general applicability of boiler sorbent injection should be changed. Both alternatives lead to the same conclusion: higher SO$_2$ BAT-AELs should be set for existing BFB plants using peat.

- Since the number of peat using reference plants is so limited, the content of peat varies a lot in the reference plants and some of the peat plants use secondary measures and some primary measures, the SO$_2$ BAT-AEL for peat plants can't be set only by looking at the reference plants. A varying amount of peat during a year must also be taken into account.

- The SO$_2$ BAT-AELs for peat using plants in draft 1 of the BAT conclusions were tightened even if no TWG member asked for tighter BAT-AELs in the draft 1 comments. Instead there were comments that the BAT-AELs should be higher.

- In the final meeting only minor changes were made to the peat footnote. Several TWG members asked for less stringent BAT-AELs, but no changes were made to the BAT-AELs for existing plants taken into use before January 2014.

- According to CEPI, the submitted data doesn't allow setting daily values. But if these are still given, they have to take into account plants having load variation.

The split view is accompanied by the following rationale (EURELECTRIC):

- Solid biomass and peat combusted in fluidized bed boilers are the dominant fuels and combustion technology for solid fuels in Finland. There are no existing technologies for sulphur dioxide removal in many plants (equipped only with ESP). The boiler sorbent injection is appropriate only in CFB boilers, not in BFB boilers. The duct sorbent injection is not possible in the plants equipped with ESP. Technical and economic restrictions for the retrofitting existing plants with new secondary abatement measures (such as condenser, scrubber or Wet FGD or FF with sorbent) are evident.

- Even the IED values required some measures to reduce emissions when the share of peat increases. The compliance of IED values might be possible by fuel choices to same extent, but the BAT-AELs shown leave the fuel choice out of question.

**EIPPCB assessment**

Availability of information on which the split view is based:

- Documents and information mentioned in the split view were available.

Validity of supporting rationale

- The 2012 data collection includes a number of plants of different sizes reporting SO$_2$ emissions and the use of abatement techniques. Consistently with other fuels,
different BAT-AELs for new and existing plants differentiated by size are thus derived.

- The rationale of FI for increasing the yearly upper level of the BAT-AEL range for plants ≥ 100 MWth where the average sulphur content is 0.1 % or higher is supported by data collected in 2012 from plants equipped with techniques listed in BAT 28 (e.g. Plant 539V).
- In the case of plants of < 100 MWth, the widely varying sulphur concentrations in plant feed-stocks can support the alternative emission levels proposed in the split view as only plants burning a small amount of peat reported data in the data collection in 2012.
- In the case of plants of ≥ 100 MWth, the technical argument of widely varying sulphur concentrations in plant feed-stocks is not enough per se to support the alternative levels proposed in the IE, CEPI, EURELECTRIC and Euroheat & Power split view as there are a number of plants using different percentages of peat, applying the techniques listed in BAT 28 (e.g. Plant 190 burning 100 % peat with average S-content of 0.32 %) and reporting SO2 emissions within the BAT-AELs. No further plant specific data support the alternative level.
- Plants 677, 678 and 680 referenced to support an increase of the BAT-AELs for plants of ≥ 100 MWth use a mix of fuels with different sulphur contents, which may be interpreted as the use of 'fuel choice' as one of the techniques listed in BAT 28. However, fuel choice is not the only available technique to abate SOX emissions (e.g. wet scrubbing).
- There is no applicability restriction for the techniques listed in BAT 28 depending on the types of fluidised bed boiler designs.
- The proposal to increase the BAT-AELs is not considered justified by the submitted supporting rationale based on the use of sulphur to avoid corrosion problems.

**EIPPCB conclusion**

Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the split view for the part proposed by FI related to increasing the yearly upper end of the BAT-AEL range for existing plants of ≥ 100MWth where the average sulphur content is 0.1 % or higher and for the part related to increasing the yearly and daily upper ends of the BAT-AEL ranges for existing plants of < 100 MWth where the average sulphur content is 0.1 % or higher proposed by FI, Eurelectric, CEPI and Euroheat & Power. The EIPPCB considers that there are not enough appropriate technical arguments to support the remaining parts of the split view. This split view will therefore only be partially reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 28 Table 10.12</td>
<td>Increase the higher end of the yearly BAT-AEL range for existing plants of ≥ 100 MWth where the average sulphur content is 0.1 % or higher</td>
<td>FI</td>
<td>160 mg/Nm³</td>
</tr>
</tbody>
</table>

---

153
Increase the higher ends of the yearly and daily BAT-AEL ranges for existing plants of < 100 MW<sub>th</sub> where the average sulphur content is 0.1 % or higher

<table>
<thead>
<tr>
<th>FI, EURELECTRIC</th>
<th>300 mg/Nm³ (yearly) 330 mg/Nm³ (daily)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEPI, Euroheat &amp; Power</td>
<td>200 mg/Nm³ (yearly) 330 mg/Nm³ (daily)</td>
</tr>
</tbody>
</table>

### 12.4.2 Decrease the upper ends of the BAT-AELs for plants burning high-sulphur fuels

**Split view summary**

NL proposes to decrease the upper ends of the SO₂ yearly and daily BAT-AEL range for existing plants of ≥ 100 MW<sub>th</sub> burning fuels where the average sulphur content is 0.1 % or higher (covered by footnotes (1), (2), (3)) by aligning these levels with the rest of biomass/peat of < 0.1 % sulphur content and removing these footnotes.

The split view is accompanied by the following rationale:

- The issue should be handled by Article 15(4) derogations, because the majority of the reference plants perform better while using comparable peat and biomass fuels.
- The footnotes are based on plant 190VC which burns 100 % peat with sulphur content of 0.33 % and plant 539V which burns 70 % peat with sulphur content 0.18 %. Thus the rationale for applying the footnotes to biomass and sulphur content from 0.1 % is missing.
- According to the questionnaire of plant 190VC, this plant has CFB FGD installed but does not apply it and this plant does not comply with its permit. Thus plant 190VC is not a suitable reference.

**EIPPCB assessment**

Availability of information on which the split view is based:

- Documents and information mentioned in the split view were available.

Validity of supporting rationale:

- The rationale is supported by information from plants of the data set equipped with techniques listed in BAT 28 and linked with the alternative proposal. It includes technical justification, based on an assessment of the techniques implemented and of the compliance with the ELV at plant level.

**EIPPCB conclusion**

Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the split view. This split view will therefore be reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
</table>
12.4.3 **Decrease the upper ends of the BAT-AELs for plants of < 100 MW<sub>th</sub>**

**Split view summary**

EEB proposes to decrease the upper ends of the SO<sub>2</sub> BAT-AEL ranges as follows:

- yearly BAT-AEL for new plants down to 50 mg/Nm<sup>3</sup>;
- yearly BAT-AEL for existing plants down to 65 mg/Nm<sup>3</sup>;
- daily BAT-AEL for new plants down to 85 mg/Nm<sup>3</sup>;
- daily BAT-AEL for existing plants down to 180 mg/Nm<sup>3</sup>.

The split view is accompanied by the following rationale:

- **Yearly upper BAT-AEL for new plants:**
  - The proposed upper BAT-AEL for new plants is 70 mg/Nm<sup>3</sup>, on the grounds that DSI achieves emissions < 70 mg/Nm<sup>3</sup>. However, this adds nothing to an upper BAT-AEL based on the better performance of DSI at Plant 655.

- **Yearly upper BAT-AEL for existing plants:**
  - The proposed upper BAT-AEL is set by Plant 190 from the 100–300 MW<sub>th</sub> category. However, this 100 % peat plant has already been made a separate case, so it is not reasonable to use it as the reference for a BAT-AEL for wider than that special case.
  - The BP proposes using sorbent injection as the BAT technique, and plants 489-1 and 489-2 achieve emissions of 62 mg/Nm<sup>3</sup> and 46 mg/Nm<sup>3</sup> with this technique within this size category.
  - Setting the upper BAT-AEL at 65 mg/Nm<sup>3</sup> would easily cover > 69 % peat combustion (Plant 1012; 120 MW<sub>th</sub>; 2 mg/Nm<sup>3</sup>)
  - The upper BAT-AEL for existing plants should therefore be 65 mg/Nm<sup>3</sup>

- **Daily upper BAT-AEL for new plants:**
  - A well run plant should not have an excessive difference between the average and 95<sup>th</sup> percentile emissions.
  - The daily BAT-AEL for new plants is set by Plant 655, which has a difference of 33 mg/Nm<sup>3</sup> between its yearly and 95<sup>th</sup> percentile data.
  - This is not excessive, compared with the differences of Plants 108-1 and 108-2 which also operate with DSI (differences between the yearly and 95<sup>th</sup> percentile data of 61 63 mg/Nm<sup>3</sup> and 63 mg/Nm<sup>3</sup>).
  - The upper daily BAT-AEL for new plants with a yearly average of 50 mg/Nm<sup>3</sup> should therefore be 85 mg/Nm<sup>3</sup> (Plant 655).

- **Daily upper BAT-AEL for existing plants:**
  - A well run plant should not have an excessive difference between the average and 95<sup>th</sup> percentile emissions.
  - None of the plants using sorbent injection in this size category provide 95<sup>th</sup> percentile data.
  - However, Plant 46 (206 MW<sub>th</sub>) uses sorbent injection and has 95<sup>th</sup> percentile data that is 112 mg/Nm<sup>3</sup> above the yearly average.
  - The upper daily BAT-AEL for existing plants with a yearly average of 65 mg/Nm<sup>3</sup> should therefore be 180 mg/Nm<sup>3</sup>. 

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**Table 10.12**

<table>
<thead>
<tr>
<th>BAT 28 Table 10.12</th>
<th>Decrease the higher end of the SO&lt;sub&gt;2&lt;/sub&gt; yearly and daily BAT-AEL ranges for existing plants of ≥ 100 MW&lt;sub&gt;th&lt;/sub&gt; burning fuels where the average sulphur content is 0.1 % or higher</th>
<th>NL</th>
<th>Alignment with the rest of biomass/peat of &lt; 0.1 % sulphur content</th>
</tr>
</thead>
</table>
EIPPCB assessment

Availability of information on which the split view is based:
- Documents and information mentioned in the split view were available.

Validity of supporting rationale:
- The rationale is supported by information from plants of the data set equipped with techniques listed in BAT 28. It includes technical justification based on an assessment of the type of fuel combusted and of the possible techniques to be implemented for selecting the reference plants for deriving an alternative proposal.

EIPPCB conclusion
Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the split view. This split view will therefore be reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 28 Table 10.12</td>
<td>Decrease the higher ends of the SO2 yearly and daily BAT-AEL ranges for new and existing plants of &lt; 100 MWth</td>
<td>EEB</td>
<td>New plants: 50 mg/Nm^3 (yearly) 85 mg/Nm^3 (daily); Existing plants: 65 mg/Nm^3 (yearly) 180 mg/Nm^3 (daily)</td>
</tr>
</tbody>
</table>

12.4.4 Increase the upper end of the BAT-AEL for plants of ≥ 300 MWth

Split view summary
EURELECTRIC proposes to increase the upper end of the SO2 yearly BAT-AEL range for existing plants of ≥ 300 MWth to 70 mg/Nm^3.

The split view is accompanied by the following rationale:
- Especially biomass burning BFB boilers, with high steam parameters, require some sulphur in fuel to avoid chlorine corrosion. Co-firing sulphur containing peat together with low sulphur biomass helps to prevent corrosion by blocking the corroding alkali chlorides as sulphates in the existing boilers. This method is the effective way to reduce the operating and maintenance costs of these biomass burning boilers.
- For the reason described above we propose that the upper end for the class ≥ 300 MW is raised to 70 mg/Nm^3. Instead of peat, also sulphur additives or ash could be used as the sulphur source.

EIPPCB assessment

Availability of information on which the split view is based:
- Documents and information mentioned in the split view were available.

Validity of supporting rationale:
- The general comments on the varying and occasionally high sulphur content of the peat, the use of sulphur to avoid corrosion problems or the number of plants of the data collection using peat do not sufficiently justify the BAT-AEL proposed in the split view.
- There is no rationale supporting the alternative level of 70 mg/Nm^3.
EIPPCB conclusion
Taking these aspects into account, the EIPPCB considers that there are not enough appropriate technical arguments to support the split view. This split view will therefore not be reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

12.5 HCl BAT-AELs for biomass- and/or peat-fired plants

Conclusions of the meeting
Slide 223.

The BAT-associated emission levels for HCl and HF are given in Table 10.12-bis. The associated monitoring is given in BAT 3 ter.

Table 10.12-bis: BAT-associated emission levels (BAT-AELs) for HCl and HF emissions to air from the combustion of solid biomass and/or peat

<table>
<thead>
<tr>
<th>Combustion plant total thermal input (MWth)</th>
<th>BAT-AELs for HCl (mg/Nm³) (1bis)</th>
<th>BAT-AELs for HF (mg/Nm³)</th>
<th>Yearly average or average of samples obtained during one year</th>
<th>Daily average or average over the sampling period</th>
<th>Average over the sampling period</th>
</tr>
</thead>
<tbody>
<tr>
<td>New plant</td>
<td>Existing plant (2)</td>
<td>New plant</td>
<td>Existing plant (3)</td>
<td>New plant</td>
<td>Existing plant</td>
</tr>
<tr>
<td>&lt; 100</td>
<td>1–7</td>
<td>1–15</td>
<td>1–12</td>
<td>1–35</td>
<td>&lt; 1</td>
</tr>
<tr>
<td>100–300</td>
<td>1–5</td>
<td>1–9</td>
<td>1–12</td>
<td>1–12</td>
<td>&lt; 1</td>
</tr>
<tr>
<td>≥ 300</td>
<td>1–5</td>
<td>1–5</td>
<td>1–12</td>
<td>1–12</td>
<td>&lt; 1</td>
</tr>
</tbody>
</table>

(1bis) For plants burning fuels where the average Cl content is ≥ 0.1 wt-% (dry), or for existing plants co-combusting biomass with sulphur-rich fuel (e.g. peat) or using alkali chloride-converting additives (e.g. elemental sulphur), or for plants with an average Cl content in the fuel of < 0.1 wt-% (dry) operated < 1500 h/yr, the higher end of the BAT-AEL range for the yearly average for new plants is 15 mg/Nm³, the higher end of the BAT-AEL range for the yearly average for existing plants is 25 mg/Nm³. The daily BAT-AEL range does not apply to these plants.

For existing plants with an average Cl content in the fuel of ≥ 0.1 wt-% (dry) operated < 1500 h/yr, the higher end of the BAT-AEL range for the yearly average is 50 mg/Nm³.

(2) These BAT-AELs do not apply to plants operated < 1500 h/yr.

(3) The lower end of these BAT-AEL ranges may be difficult to achieve in the case of plants fitted with a Wet FGD and a downstream gas-gas heater.

(4) These levels are indicative for plants operated < 500 h/yr.

Split view summary
FI and CEPI, supported by Euroheat & Power and EURELECTRIC propose to modify footnote (1bis) as follows:

For plants burning fuels where the average Cl content is ≥ 0.1 wt-% (dry), or for existing plants co-combusting biomass with sulphur-rich fuel (e.g. peat) or using alkali chloride converting additives (e.g. elemental sulphur), or for plants with an average Cl content in the fuel of < 0.1 wt-% (dry) operated < 1500 h/yr, the higher end of the BAT-AEL range for the yearly average for new plants is 15 mg/Nm³, the higher end of the BAT-AEL range for the yearly average for existing plants is 25 mg/Nm³ or 50 mg/Nm³ in the case of existing plants operated with ESP. The daily BAT-AEL range does not apply to these plants. For existing plants with an average Cl content in the fuel of ≥ 0.1 wt-% (dry) operated < 1500 h/yr, the higher end of the BAT-AEL range for the yearly average is 50 mg/Nm³.

The split view is accompanied by the following rationale:
• HCl BAT-AEL 50 mg/Nm$^3$ for existing plants operated with ESP is reasonable due to combustion chemistry and abatements technique restrictions. Sulphur reacts more easily with alkali metals than with chlorine and due to this phenomenon sulphur is needed to avoid the formation of highly corrosive alkali chlorides simultaneously leading to the elevated concentration of HCl in flue-gases. There is no applicable HCl abatement technique for the existing plants equipped only with ESP.

• HCl BAT-AEL 50 mg/Nm$^3$ for existing plants operated with ESP only was not opposed in the written consultation and there was strong support for it.

• Currently techniques e. Duct Sorbent Injection (DSI) and f. Spray-dry absorber (SDA) are considered 'generally applicable' in BAT 28 (techniques to reduce SO$_X$, HCl and HF emissions). However Finland (later supported by CEPI) has expressed split view for these conclusions in Seville meeting and in writing afterwards. The split view proposes to define the applicability of these techniques as 'not applicable to existing boilers equipped with ESP'.

• EIPPCB’s assessment of the applicability of DSI+ESP combination is based only on one operating coal-fired plant (Plant 69). There are no known references of biomass or peat plants with DSI+ESP combination (neither in general according the Finnish boiler manufacturer nor in BREF references). The flue-gas properties (temperature, moisture content, particle resistivity) are different for coal and for biomass and peat. The applicability of DSI (or SDA) with ESP for biomass and peat plant is not confirmed by any reasonable reference plant.

• CEPI has mentioned Plants 489-1V and 489-2V as references for setting the suggested BAT-AEL (50 mg/Nm$^3$). These CFB plants fire mainly wood but also coal and are equipped with boiler sorbent injection (for SO$_2$ removal) and bag filters. The measured average HCl emissions of these plants are 42 and 53 mg/Nm$^3$ respectively. These are valid reference plants to justify the proposed BAT-AEL 50 mg/Nm$^3$ especially when taking into account that the abatement technique in these plants is somewhat better than only an ESP. Instead of these more relevant references the EIPPCB has used either coal/lignite-fired plants (Plant 69 and Plant 168) or plants with the wet abatement technique (Plant 464 and Plant 33) in the assessment. Plants with wet abatement techniques are not at all representing the case of ESP only. EIPPCB analyse is not considering the data actually reported by plants, which results to several problems in the analysis. The plant 69 has estimated data on HCl-emissions and the average value (1 mg/Nm$^3$). This value does not match with the reported emissions (59 tons per year) and is most likely not correct. Reference plant data sheet clearly indicates that DSI+ESP combination is used with an aim to reduce SO$_2$-emissions. For SO$_2$, this plant performs (SO$_2$-yearly average 300 mg/Nm$^3$) above the IED ELVs and FM BAT-AELs for its size category. It is not realistic to assume that this plant would be able perform within FM BAT-AEL (SO$_2$-yearly average 180 mg/Nm$^3$) with the current technology, so either the fuel or SO$_2$-reduction technique needs to be changed or retrofitted.

• The EIPPCB mentions several relevant factors affecting the effectiveness of an ESP. It’s indeed noticeable that DSI/SDA + ESP combination has major practical restrictions and cross media effects. The only additive applicable theoretically with ESP could be sodium bicarbonate (not used by plant 69), because of the too slow reaction time with CaOH (used by plant 69). Sodium bicarbonate requires suitable temperature window and has an impact on the reduction efficiency of ESP and on the quality of ash. The additive increases particle content of flue gases entering ESP and thus existing ESP to do not always allow DSI implementing. Looking at the overall environmental impacts, it would not make environmental sense to install this kind of technology for minor reduction of HCl-emissions only, if as a consequence the PM$_{2.5}$ emissions would be higher. It is worth considering that the reference plant sheet of the plant 69 states that: “APC has been constantly optimized for the last 10 years.”
and “SO₃ injection is used to enhance the ESP performance. In 2011, other actions have been implemented to enhance ESP performance.’

- Specificities of existing plants operated with ESP must be taken into account, because of the limited possibility to use HCl abatement techniques in these plants. The importance of the applicability of a BAT technique was neglected throughout the final TWG meeting, even though sound evidence was given to prove the applicability restrictions of the different techniques. To work effectively DSI and SDA require the use of bag filter. The applicability of duct sorbent injection and spray-dry absorber is restricted in mills having the BAT technique ESP as the dust abatement technique. To use duct sorbent injection and spray-dry absorber the plant would have to install bag filter, a dry sorbent injection system and new flue gas fans. Installing the bag filter would probably mean that the ESP, even if it is effective, would have to be removed. These changes are not technically or economically justifiable.

- Additionally, in the biomass discussions boiler sorbent injection, duct sorbent injection (DSI), spray-dry absorber (SDA) and wet scrubbing were among others listed as generally applicable. The decision on boiler sorbent injection was taken even though the several TWG members had proved that boiler sorbent injection is not a technique that can be used for a needed abatement in BFB boilers (see also SO₂ techniques for biomass/peat CEPIs split view).

- Consensus agreement to accept the 50 mg/Nm³ in the case of existing plants operated with ESP.

In the final TWG meeting it was decided that the footnote will be revisited considering the proposal of the subgroup lead by CEPI. All interested TWG members were invited to take part in the subgroup. For the written consultation the subgroup proposal was proposed by the EIPPCB. In the written consultation no TWG member proposed to change the 50 mg/Nm³ in the case of existing plants operated with ESP. EPPSA, EURELECTRIC, UK and CEPI supported the footnote as such, Denmark and Germany supported the proposal with some minor changes to other parts of the footnote. No TWG member opposed the subgroup proposal. Therefore there shouldn't have been any need to change the footnote proposal which there already was a TWG consensus on.

**EIPPCB assessment**

Availability of information on which the split view is based:

- Documents and information mentioned in the split view were available.

Validity of supporting rationale:

- As documented in the EIPPCB assessment of the responses to the written consultation, Plant 69 (coal-fired plant) fitted with DSI and an ESP and Plant 168 (lignite-fired plant) provide information on tests using DSI and an ESP. HCl emissions reported by Plant 69 were not the reference for the BAT-AELs for biomass-fired plants.
- The 2012 data collection does not include example biomass- and/or peat-fired plants using DSI or SDA together with an ESP.
- A number of plants using other techniques listed in BAT 28 and BAT 29, and the abatement efficiencies and fuels used in these plants are used to justify an increased higher end of the BAT-AEL range for the yearly average for existing plants in case of plants operated with an ESP.
**EIPPCB conclusion**

Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the split view. This split view will therefore be reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 28 Table 10.12 bis</td>
<td>Add to the footnote (^{(*)}) that the higher end of the BAT-AEL range for the yearly average for existing plants is 50 mg/Nm(^3) in the case of existing plants operated with an ESP</td>
<td>FI, CEPI, Euroheat &amp; Power, EURELECTRIC</td>
<td>NA</td>
</tr>
</tbody>
</table>

**12.6 Availability of techniques to measure mercury emissions in compliance with the relevant EN standards**

Conclusions of the meeting
Slide 232.

The BAT-associated emission levels for mercury are given in Table 10.14.

**Table 10.14: BAT-associated emission levels (BAT-AELs) for mercury emissions to air from the combustion of solid biomass and/or peat**

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Unit</th>
<th>BAT-AELs for Hg Average over the sampling period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mercury</td>
<td>µg/Nm(^3)</td>
<td>&lt; 1–5</td>
</tr>
</tbody>
</table>

The associated monitoring is in BAT 3 ter.

**Split view summary**

ESWET, supported by CEFIC, CEWEP, EURELECTRIC, Euroheat & Power and EUTurbines, proposes to ask the relevant CEN Technical Committee to comment on the availability and suitability of equipment, systems and methods able to measure, in compliance with the CEN standards, emissions within the range of the proposed BAT-AELs. Automated measuring systems (AMS), data acquisition and handling systems (DAHS) and standard reference methods (SRM) must be checked in order to cover continuous monitoring and periodic measurements.

The split view is accompanied by the following rationale:
- See rationale in Section 11.13.

**EIPPCB assessment**
- See EIPPCB assessment in Section 11.13.

**EIPPCB conclusion**

Taking these aspects into account, the EIPPCB considers that the split view does not clearly refer to the BAT-AELs set. This split view will therefore not be reported in the 'Concluding remarks and recommendations for future work' section of the BREF.
12.7  Hg BAT-AELs for biomass- and/or peat-fired plants

Conclusions of the meeting
Slide 232.

The BAT-associated emission levels for mercury are given in Table 10.14.

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Unit</th>
<th>BAT-AELs for Hg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mercury</td>
<td>µg/Nm$^3$</td>
<td>&lt; 1–5</td>
</tr>
</tbody>
</table>

The associated monitoring is in BAT 3 ter.

Split view summary
CAN Europe proposes to set a BAT-AEL at < 1 µg/Nm$^3$.

The split view is accompanied by the following rationale:

- In general, mercury emissions from solid biomass and/or peat combustion are very low. However, if fuel containing mercury occurs, emissions arising from these fuels should be reduced to levels associated with BAT. Specific reduction techniques for mercury reduction can achieve levels below 1 µg/Nm$^3$. This was acknowledged by the technical working group (see footnote 2 in tables Table 10.8 and Table 10.9). A high upper BAT-AEL level will allow operation of power plants with outdated pollution controls avoiding investments into emission reduction which is socioeconomically justified.

- There is no systematic difference in the pollutant concentration levels or treatability of flue-gas stream from existing and new coal-fired power plants with respect to Hg. It follows that this level is achievable at all plants with the installation of new mercury-specific control techniques where necessary.

- The BAT conclusions of June 2015 state that it is possible to achieve yearly average levels < 1 µg/Nm$^3$ in new and existing plants when using specific mercury reduction techniques. This level should have been set for all new and existing plants.

- EIPPCB data collection shows that fabric filter and activated carbon injection is already achieved to reduce mercury emissions to levels below 1 µg/Nm$^3$ (see graph on biomass and/or peat combustion from the 2012 data collection - Mercury (Hg) emissions to air, showing 9 plants with carbon injection). For those plants, where levels are currently above 1 µg/Nm$^3$, the use of higher dosage or activated carbon or the use of specific activated carbon (e.g. brominated ACI) leads to levels below 1 µg/Nm$^3$.

EIPPCB assessment

Availability of information on which the split view is based:
- Documents and information mentioned in the split view were available.

Validity of supporting rationale:
- The rationale is supported by information from plants of the data set equipped with techniques listed in BAT 30 and linked with the alternative proposal, together with information about high Hg reduction rate achievable with available techniques that could apply to plants with higher emission levels.
**EIPPCB conclusion**
Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the split view. This split view will therefore be reported in the ‘Concluding remarks and recommendations for future work’ section of the BREF.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 30 Table 10.14</td>
<td>Decrease the higher end of the mercury BAT-AEL range</td>
<td>CAN Europe</td>
<td>&lt; 1µg/Nm$^3$</td>
</tr>
</tbody>
</table>

**12.8 Dust BAT-AELs for biomass- and/or peat-fired plants**

**Conclusions of the meeting**
Slide 237.

The BAT-associated emission levels for dust are given in Table 10.13.

**Table 10.13:** BAT-associated emission levels (BAT-AELs) for dust emissions to air from the combustion of solid biomass and/or peat

<table>
<thead>
<tr>
<th>Combustion plant total rated thermal input (MW$_{\text{th}}$)</th>
<th>BAT-AELs for dust (mg/Nm$^3$)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>New plant</td>
</tr>
<tr>
<td></td>
<td>Yearly average</td>
</tr>
<tr>
<td>≤ 100</td>
<td>2–5</td>
</tr>
<tr>
<td>100–300</td>
<td>2–5</td>
</tr>
<tr>
<td>≥ 300</td>
<td>2–5</td>
</tr>
</tbody>
</table>

($^1$) These BAT-AELs do not apply when plants operate < 1500 h/yr.
($^2$) These levels are indicative for combustion plants operated < 500 h/yr.

The associated monitoring is in BAT 3 ter.

**12.8.1 Availability of techniques to measure dust emissions in compliance with the relevant EN standards**

**Split view summary**
ESWET, supported by CEFIC, CEWEP, EURELECTRIC, Euroheat & Power and EUTurbines, proposes to ask the relevant CEN Technical Committee to comment on the availability and suitability of equipment, systems and methods to measure, in compliance with the CEN standards, emissions within the range of the proposed BAT-AELs. Automated measuring systems (AMS), data acquisition and handling systems (DAHS) and standard reference methods (SRM) must be checked in order to cover continuous monitoring and periodic measurements.

The split view is accompanied by the following rationale:
- See rationale in Section 11.13.
EIPPCB assessment
- See EIPPCB assessment in Section 11.13.

EIPPCB conclusion
Taking these aspects into account, the EIPPCB considers that the split view does not clearly refer to the BAT-AELs set. This split view will therefore not be reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

12.8.2 Increase the lower ends of the BAT-AEL ranges

Split view summary
CEPI proposes to increase the lower ends of all BAT-AEL ranges to 5 mg/Nm$^3$.

The split view is accompanied by the following rationale:
- The standard reference method for dust has uncertainty of 2 mg/Nm$^3$ (see Orgalime working document).

EIPPCB assessment
Availability of information on which the split view is based:
- Documents and detailed information mentioned in the split view were available.

Validity of supporting rationale:
- The split view refers to the use of BAT-AELs for setting ELVs and to the consideration of measurement uncertainties, which are implementation and compliance issues going beyond the remit of the LCP TWG.

EIPPCB conclusion
Taking these aspects into account, the EIPPCB considers that there are not enough appropriate technical arguments to support the split view. This split view will therefore not be reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

12.8.3 Increase the upper ends of the BAT-AEL ranges for new and existing plants of < 100 MW$\text{th}$

Split view summary
DK proposes to increase the upper end of the daily BAT-AEL range to 25 mg/Nm$^3$ in the case of existing plants put into operation no later than 7 January 2014 and using only an ESP. SE, supported by FI, proposes to increase the upper end of the daily BAT-AEL range to 24 mg/Nm$^3$ in the case of existing plants put into operation no later than 7 January 2014.

CEPI proposes to increase the upper ends of the BAT-AEL ranges as follows:
- Daily BAT-AEL range for existing plants up to 40 mg/Nm$^3$.
- Yearly BAT-AEL range for existing plants up to 22 mg/Nm$^3$.
- Yearly BAT-AEL range for new plants up to 10 mg/Nm$^3$.

The split view is accompanied by the following rationale (DK):
- In the Background Paper (p. 109) it is stated, that the use of dust abatement techniques is linked to solutions applied to abate other pollutants like SO$_X$. This is not entirely correct. Several types of biomass, like woodchips and sawdust, only contain minor amounts of S or Cl, so that abatement of SO$_X$ and/or HCl is not necessary.
• Some of the small plants only use ESP as dust abatement, which the data collection also illustrates.
• The Background Paper refers to Plant 13, which has a nominal thermal input of 285 MWth and therefore it is not representative for plants less than 100 MWth.
• Unfortunately not many small plants equipped with ESP and using woodchips, which are part of the data collection, are reporting 95th percentile. One of them is plant 460V, which has a high dust emission. 6 plants are reporting yearly averages around 20 mg/Nm³. Five of these (Plants 668, 411VC, 453V, 660 and 447V) do not report a daily average, and one of them (470V) has a high daily average.
• A daily average is of course higher than a yearly average.
• Based on the data collection and our experience we suggest 25 mg/Nm³ as a reasonable daily value for existing plants equipped only with ESP (and therefore using fuel which does not require supplementary equipment for reducing acid gasses).

The split view is accompanied by the following rationale (SE):
• The proposal is identical with the one of the BP for the final meeting, so reference is made to the justifications of the EIPPCB.
• The footnote added in table 10.18 at the final TWG meeting in June 2015 for HFO/gas oil in boilers of < 300 MWth sets a higher end of the BAT-AEL range at 25 mg/Nm³.

The split view is accompanied by the following rationale (FI):
• The proposal is identical with the one of the BP for the final meeting, so reference is made to the justifications of the EIPPCB.
• As shown in reference data for combustion plants of < 100 MWth there are several plants equipped with ESP and even with more effective FF and they barely have average short-term value below BAT-AELs of the draft Final Meeting conclusions.
• The increasing of the upper ends is needed especially for the plants using ESP. At some bio/peat plants there is no need to abatements techniques to reduce SO₂/HCl/HF emissions and thus the fabric filter or wet measures are not necessary, but ESP is considered as BAT technology.
• Based on performance of all size categories and common knowledge the dust emissions after ESP varies due to combustion technique, fuel characteristics (such as moisture), flue-gas flow fluctuating and distribution in ESP as well as soot blow sequences. To allow ESP as the abatement technique for existing plants the daily values should not be too strict.

The split view is accompanied by the following rationale (CEPI):
• It is possible to find examples of boiler with relevant BAT (ESP or bag filters) in place, greenfield or recently retrofitted (therefore, in its early stage of investment cycle) but with levels of dust emissions not in line with the BAT-AEL range proposed by EIPPCB, including boilers from energy and other sectors.
• The observed performance variability is not consequence of lack of BAT in place but mostly due to external factors, which are not related to the BAT implementation itself, such as:
  o fuel characteristics and composition;
  o load variation;
  o design and retrofit of the boilers.
• Plant assessment shows that the combustion plants with BAT in place don’t comply with final BAT-AEL.
• The decision of the informal TWG meeting in June 2014 and the BREF Guidance document hasn’t been followed when setting daily BAT-AELs.

EIPPCB assessment
Availability of information on which the split view is based:
- Documents and information mentioned in the split view were available.

Validity of supporting rationale (SE, FI and DK):
- Split views on the alternative BAT-AELs for existing plants are supported referring to the proposal given in the BP by the EIPPCB.
- Two plants mentioned in the split view by DK are fitted with an ESP: Plant 668 and Plant 453 (ESP with FG condenser). Plant 668 reports 16 mg/Nm$^3$ as a yearly average (of two samples per month) including OTNOC, and Plant 453 reports yearly average dust emissions of 20 mg/Nm$^3$ as an estimated value in the questionnaire. These two references do not justify the part of the split view related to plants using only ESP.

Validity of supporting rationale (CEPI):
- CEPI refers to example plants applying BAT (ESP or bag filter) but having dust emissions above the BAT-AEL range: Plants 668, 660, 447, 470 and one plant in Slovakia, which is not in the data collection. However, it is not specified which reported emissions would justify the BAT-AELs mentioned in the split view. Plant 660 and Plant 447 (includes OTNOC) report yearly averages of 20 mg/Nm$^3$ and 21 mg/Nm$^3$ using a bag filter. Plant 470 reports a yearly average of 20 mg/Nm$^3$ and a short-term average of 50 mg/Nm$^3$ (includes OTNOC) using a bag filter and FG condenser. Therefore, there are no plant data justifying the proposed upper levels for the yearly average BAT-AEL for new plants (10 mg/Nm$^3$) and the daily average BAT-AEL for existing plants (40 mg/Nm$^3$). Plant 660 using a bag filter may justify the split view on the yearly average BAT-AEL for existing plants put into operation no later than 7 January 2014. IED dust emission levels for plants put into operation after that date are lower than the alternative level proposed by CEPI.

EIPPCB conclusion
Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the part of the split view proposed by DK and SE, supported by FI, related to increasing the upper end of the daily BAT-AEL range and for the part of CEPI's split view related to the yearly BAT-AEL, in the case of existing plants put into operation no later than 7 January 2014, and that there are not enough appropriate technical arguments to support the rest of the split view. This part of the split view will therefore be reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 29 Table 10.13</td>
<td><strong>Increase the higher ends of the yearly and daily dust BAT-AEL ranges for plants of &lt; 100 MW$_{th}$ put into operation no later than 7 January 2014</strong></td>
<td><strong>DK</strong></td>
<td>25 mg/Nm$^3$ (daily)</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>SE, FI</strong></td>
<td>24 mg/Nm$^3$ (daily)</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>CEPI</strong></td>
<td>22 mg/Nm$^3$ (yearly)</td>
</tr>
</tbody>
</table>

12.8.4 Decrease the upper ends of the BAT-AEL ranges for plants of < 100 MW$_{th}$

Split view summary
EEB proposes to decrease the upper ends of the BAT-AEL ranges as follows:
- Daily BAT-AEL range for existing plants down to 12 mg/Nm$^3$.
- Daily BAT-AEL range for new plants down to 6 mg/Nm$^3$. 165
• Yearly BAT-AEL range for existing plants down to 6 mg/Nm³.
• Yearly BAT-AEL range for new plants down to 3.5 mg/Nm³.

The split view is accompanied by the following rationale:
• Daily upper BAT-AEL for existing plants <100 MWth
  o A well run plant should not have a large variation between the yearly average and 95th percentile data.
  o The reference plant proposed by the EEB for this BAT-AEL does not provide 95th percentile data and neither does any other plant abated by ESP + FGD condenser.
  o However, neighbouring plants do – Plants 655, 464 and 125 have 95th percentile data that is higher than the average data by 4.95 mg/Nm³, 6.19 mg/Nm³ and 2.4 mg/Nm³ respectively.
  o The upper daily BAT-AEL for existing plants with average data of 6 mg/Nm³ should therefore be 12 mg/Nm³.
• Daily upper BAT-AEL for new plants < 100 MWth
  o A well run plant should not have a large variation between the yearly average and 95th percentile data.
  o The reference plants proposed by the EEB for this BAT-AEL do not provide 95th percentile data but neighbouring plants do – Plants 108-1, 72 and 125 have 95th percentile data that is higher than the average data by 2.68 mg/Nm³, 2.4 mg/Nm³ and 2.66 mg/Nm³ respectively.
  o The upper daily BAT-AEL for new plants with average data of 3.5 mg/Nm³ should therefore be 6 mg/Nm³.
• Yearly upper BAT-AEL for existing plants <100 MWth
  o The proposed BAT-AEL is set by Plant 676.
  o However, setting the BAT-AEL at this plant allows just 5 plants to increase the upper BAT-AEL by a factor of 2.5 from the BAT-AEL set by the other 17 plants.
  o This is allowing a few plants a disproportionate impact on the BAT-AEL that is not justified by the data – it adds nothing to a BAT-AEL set by Plant 457 in terms of plant size, age, load factor and boiler and dust abatement technologies.
  o Plant 457 (28 MWth) was commissioned in 1984 and operates for just 3200 hours.
  o The upper yearly BAT-AEL for existing plants should therefore be 6 mg/Nm³ (Plant 457).
• Yearly upper BAT-AEL for new plants <100 MWth
  o There is no reference plant according with the proposed BAT-AEL – it lies between Plant 424 and Plant 125.
  o However, a BAT-AEL set at Plants 424-2 and 489-3, provides no loss in the range of fuels combustion technologies or dust abatement techniques.
  o The upper yearly BAT-AEL for new plants should therefore be 3.5 mg/Nm³ (Plants 424-2 and 489-3).

EIPPCB assessment
Availability of information on which the split view is based:
• Documents and information mentioned in the split view were available.

Validity of supporting rationale:
• The rationale is supported by information from plants of the data set equipped with techniques listed in BAT 29 and linked with the alternative proposal. It includes
technical justification based on plant features (age, size, load, type of combustion process) and achieved performance for selecting the reference plants for deriving an alternative proposal.

**EIPPCB conclusion**
Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the split view. This split view will therefore be reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 29 Table 10.13</td>
<td>Decrease the higher ends of the yearly and daily dust BAT-AEL ranges for new and existing plants of &lt; 100 MW&lt;sub&gt;th&lt;/sub&gt;</td>
<td>EEB</td>
<td>Daily: 6 mg/Nm&lt;sup&gt;3&lt;/sup&gt; (new) 12 mg/Nm&lt;sup&gt;3&lt;/sup&gt; (existing) Yearly: 3.5 mg/Nm&lt;sup&gt;3&lt;/sup&gt; (new) 6 mg/Nm&lt;sup&gt;3&lt;/sup&gt; (existing)</td>
</tr>
</tbody>
</table>

### 12.8.5 Increase the upper ends of the BAT-AEL ranges for new and existing plants of 100–300 MW<sub>th</sub>

**Split view summary**
CEPI proposes to increase the upper ends of the BAT-AEL ranges as follows:
- Daily BAT-AEL range for existing plants up to 35 mg/Nm<sup>3</sup>.
- Yearly BAT-AEL range for existing plants up to 18 mg/Nm<sup>3</sup>.
- Yearly BAT-AEL range for new plants up to 10 mg/Nm<sup>3</sup>.

The split view is accompanied by the following rationale (CEPI):
- See rationale in Section 12.8.3.

**EIPPCB assessment**
Availability of information on which the split view is based:
- Documents and information mentioned in the split view were available.

Validity of supporting rationale:
- CEPI justify the proposal to change the upper end of the yearly BAT-AEL range for new and existing plants and the upper end of the daily BAT-AEL range for existing plants based on example plants with relevant BAT (ESP or bag filters) i.e. Plants 669, 680 and 188. Plant 669 taken as a reference by CEPI for the yearly and daily average emissions for existing plants includes OTNOC. No information about the technique implemented at Plant 680 was available before the FM.
- Plant 188 is fitted with an ESP and reports yearly dust emissions similar to those proposed by CEPI in their split view.

**EIPPCB conclusion**
Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the part of the split view proposed by CEPI to increase the yearly BAT-AEL range for existing plants up to 18 mg/Nm<sup>3</sup>, but that there are not enough appropriate technical arguments to support the rest of the split view. This part of the split view will therefore be reported in the ‘Concluding remarks and recommendations for future work’ section of the BREF.
<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 29 Table 10.13</td>
<td>Increase the higher end of the yearly dust BAT-AEL range for existing plants of 100–300 MW&lt;sub&gt;th&lt;/sub&gt;</td>
<td>CEPI</td>
<td>18 mg/Nm&lt;sup&gt;3&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

### 12.8.6 Decrease the upper ends of the BAT-AEL ranges for plants of 100–300 MW<sub>th</sub>

#### Split view summary

EEB proposes to decrease the upper ends of the BAT-AEL ranges as follows:

- **Daily BAT-AEL range for existing plants down to 12 mg/Nm<sup>3</sup>.**
- **Daily BAT-AEL range for new plants up to 16 mg/Nm<sup>3</sup>.**
- **Yearly BAT-AEL range for existing plants down to 5 mg/Nm<sup>3</sup>.**
- **Yearly BAT-AEL range for new plants down to 3.5 mg/Nm<sup>3</sup>.**

The split view is accompanied by the following rationale:

- **Daily upper BAT-AEL for existing plants 100–300 MW<sub>th</sub>**
  - A well run plant should not have a large variation between the yearly average and 95<sup>th</sup> percentile data.
  - The EEB’s yearly BAT-AEL is set by Plant 686, which does not provide 95<sup>th</sup> percentile data.
  - However, neighbouring Plant 674 with the same ESP abatement technology does – here the 95<sup>th</sup> percentile data is 7 mg/Nm<sup>3</sup> higher than the average.
  - Therefore a yearly upper BAT-AEL of 5 mg/Nm<sup>3</sup>, the upper daily BAT-AEL should be 12 mg/Nm<sup>3</sup>.

- **Daily upper BAT-AEL for new plants 100–300 MW<sub>th</sub>**
  - A well run plant should not have a large variation between the yearly average and 95<sup>th</sup> percentile data.
  - The EEB’s yearly BAT-AEL is set by Plant 190 which has 95<sup>th</sup> percentile data ~16 mg/Nm<sup>3</sup>.
  - Therefore the upper daily BAT-AEL should be 16 mg/Nm<sup>3</sup>.

- **Yearly upper BAT-AEL for existing plants 100–300 MW<sub>th</sub>**
  - The proposed BAT-AEL is set at Plant 13.
  - However, this adds nothing to an upper BAT-AEL set at Plant 686, which includes several plants burning varying proportions of the higher dust herbaceous and peat fuels.
  - It also includes the range of boiler and dust abatement technologies featured in the sample.
  - The upper BAT-AEL for existing plants 100–300 MW<sub>th</sub> should therefore be 5 mg/Nm<sup>3</sup> (Plant 686).

- **Yearly upper BAT-AEL for new plants 100–300 MW<sub>th</sub>**
  - The proposed BAT-AEL is set at Plant 686 and includes a number of existing plants.
  - However, this adds nothing to a BAT-AEL set by Plant 190, which includes plants burning 100 % peat and straw, and covers the range of boiler and abatement technologies.
  - The upper BAT-AEL for new plants 100–300 MW<sub>th</sub> should therefore be 3.5 mg/Nm<sup>3</sup> (Plant 190).
EIPPCB assessment

Availability of information on which the split view is based:
- Documents and information mentioned in the split view were available.

Validity of supporting rationale:
- The rationale is supported by information from plants of the data set equipped with techniques listed in BAT 29 and linked with the alternative proposal. It includes technical justification based on fuel types and characteristics, type of combustion process, and achieved performance for selecting the reference plants for deriving an alternative proposal.

EIPPCB conclusion

Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the split view. This split view will therefore be reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 29 Table 10.13</td>
<td>Decrease the higher ends of the yearly and daily dust BAT-AEL ranges for new and existing plants of 100–300 MW&lt;sub&gt;th&lt;/sub&gt;</td>
<td>EEB</td>
<td>Daily: 12 mg/Nm&lt;sup&gt;3&lt;/sup&gt; (new) 16 mg/Nm&lt;sup&gt;3&lt;/sup&gt; (existing)  Yearly: 3.5 mg/Nm&lt;sup&gt;3&lt;/sup&gt; (new) 5 mg/Nm&lt;sup&gt;3&lt;/sup&gt; (existing)</td>
</tr>
</tbody>
</table>

12.8.7 Increase the upper ends of the BAT-AEL ranges for new and existing plants of ≥ 300 MW<sub>th</sub>

Split view summary

FI proposes to increase the upper end of the daily BAT-AEL range to 18 mg/Nm<sup>3</sup> in the case of existing plants put into operation no later than 7 January 2014 and using only an ESP. CEPI proposes to increase the upper end of the yearly BAT-AEL range for new plants to 10 mg/Nm<sup>3</sup>.

The split view is accompanied by the following rationale (FI):
- There are only six reference plants in category ≥ 300 MW<sub>th</sub>. The 95<sup>th</sup> percentile of the short-term values is above the BAT-AELs for two plants and all the maximum values exceed BAT-AELs. The Finnish Plant 1004V should be taken as a basis for BAT-AELs setting.
- There is no practical difference of dust abatement techniques and emission levels between size categories 100–300 MW<sub>th</sub> and ≥ 300 MW<sub>th</sub> and therefore the same BAT-AEL 18 mg/Nm<sup>3</sup> is justified for all > 100 MW<sub>th</sub>.

The split view is accompanied by the following rationale (CEPI):
- It is possible to find examples of boiler with relevant BAT (ESP or bag filters) in place, greenfield or recently retrofitted (therefore, in its early stage of investment cycle) but with levels of dust emissions not in line with the BAT-AEL range proposed by EIPPCB, including boilers from energy and other sectors.

EIPPCB assessment
Availability of information on which the split view is based:
- Documents and information mentioned in the split view by FI were available. There is no detailed information supporting the proposal of CEPI.

Validity of supporting rationale:
- The rationale from FI is supported by information from plants of the 2012 data collection equipped with techniques listed in BAT 29 and makes the link with the levels proposed in the split view. It includes technical justification based on comparison with levels set for smaller plants for deriving an alternative proposal.

EIPPCB conclusion
Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the part of the split view expressed by FI, and that there are not enough appropriate technical arguments to support the part expressed by CEPI. The part of the split view expressed by FI will therefore be reported in the ‘Concluding remarks and recommendations for future work’ section of the BREF.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 29 Table 10.13</td>
<td>Increase the higher end of the daily BAT-AEL range in the case of existing plants put into operation no later than 7 January 2014 and using only an ESP</td>
<td>FI</td>
<td>18 mg/Nm³</td>
</tr>
</tbody>
</table>

12.8.8 Decrease the upper ends of the BAT-AEL ranges for plants of ≥ 300 MW<sub>th</sub>

Split view summary
EEB proposes to decrease the upper ends of the BAT-AEL ranges as follows:
- Daily BAT-AEL range for existing plants down to 10 mg/Nm³.
- Daily BAT-AEL range for new plants down to 8 mg/Nm³.
- Yearly BAT-AEL range for existing plants down to 5 mg/Nm³.
- Yearly BAT-AEL range for new plants down to 3 mg/Nm³.

The split view is accompanied by the following rationale:
- Daily upper BAT-AEL for existing plants >300 MW<sub>th</sub>
  - A well run plant should not have a large variation between the yearly average and 95<sup>th</sup> percentile data.
  - Plant 539 set the EEB’s yearly BAT-AEL and its 95<sup>th</sup> percentile data is 7.6 mg/Nm³ higher than its average – 5.6 mg/Nm³ higher.
  - However, this is high compared with the differences between average and 95<sup>th</sup> percentile data of Plants 42 and 14 of 4 mg/Nm³ and 5.66 mg/Nm³ respectively.
  - Therefore the daily upper BAT-AEL for existing plants with a yearly average of 5 mg/Nm³ should be 10 mg/Nm³.
- Daily upper BAT-AEL for new plants >300 MW<sub>th</sub>
  - A well run plant should not have a large variation between the yearly average and 95<sup>th</sup> percentile data.
  - Plant 14 set the EEB’s yearly BAT-AEL, with 95<sup>th</sup> percentile emissions 5.6 mg/Nm³ above the yearly average, this is not excessive -- Plant 42 has an equivalent figure of 95<sup>th</sup> 4 mg/Nm³.
Therefore the daily upper BAT-AEL for new plants with a yearly average of 3 mg/Nm$^3$ should be 8 mg/Nm$^3$.

- Yearly upper BAT-AEL for existing plants >300 MW$_{th}$
  - An upper BAT-AEL of 10 mg/Nm$^3$ is set by Plant 31, which is the only plant in the sample burning straw (25%).
  - Straw has an ash content about 5 times that of other biomass, but so does peat, which is represented in similar or larger amounts in better performing plants.
  - Setting the upper BAT-AEL at Plant 14 covers the age range (including retrofits), the range of fuels relevant to dust, and the boilers and dust control techniques in the sample.
  - Therefore the yearly dust upper BAT-AEL for existing plants should be 5 mg/Nm$^3$ (Plant 14).

- Yearly upper BAT-AEL for new plants >300 MW$_{th}$
  - The proposed upper BAT-AEL is set by plant 14.
  - Setting the BAT-AEL at the better performing Plant 539 (2010) would include the boiler, fuel and dust abatement options.
  - Therefore the yearly upper BAT-AEL for new plants of ≥ 300 MW$_{th}$ should be 3 mg/Nm$^3$ (Plant 539).

### EIPPCB assessment

Availability of information on which the split view is based:
- Documents and information mentioned in the split view were available.

Validity of supporting rationale:
- The rationale is supported by information from plants of the data set equipped with techniques listed in BAT 29 and linked with the alternative proposal. It includes technical justification based on fuel characteristics and achieved performance for selecting the reference plants for deriving an alternative proposal.

### EIPPCB conclusion

Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the split view. This split view will therefore be reported in the 'Concluding remarks and recommendations for future work’ section of the BREF.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
</table>
| BAT 29 Table 10.13 | *Decrease the higher end of the dust yearly and daily BAT-AEL ranges for new and existing plants of ≥ 300 MW$_{th}$* | EEB | Daily: 8 mg/Nm$^3$(new) 10 mg/Nm$^3$(existing)  
Yearly: 3 mg/Nm$^3$(new) 5 mg/Nm$^3$(existing) |

### 13 BAT CONCLUSIONS FOR EMISSIONS TO AIR FROM THE COMBUSTION OF LIQUID FUELS
13.1 NO\textsubscript{X} BAT-AELs for boilers

Conclusions of the meeting
Slide 276.

The BAT-associated emission levels for NO\textsubscript{X} emissions to air from the combustion of HFO and/or gas oil in boilers are given in Table 10.16.

Table 10.16: BAT-associated emission levels (BAT-AELs) for NO\textsubscript{X} emissions to air from the combustion of HFO and/or gas oil in boilers

<table>
<thead>
<tr>
<th>Combustion plant total rated thermal input (MW\textsubscript{th})</th>
<th>BAT-AELs (mg/Nm\textsuperscript{3})</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NO\textsubscript{X} Yearly average</td>
</tr>
<tr>
<td></td>
<td>New plants</td>
</tr>
<tr>
<td>&lt; 100</td>
<td>75–200</td>
</tr>
<tr>
<td>≥ 100</td>
<td>45–75</td>
</tr>
</tbody>
</table>

\textsuperscript{2} These BAT-AELs do not apply to combustion plants operated < 1500 h/yr.
\textsuperscript{6} These levels are indicative for combustion plants operated < 500 h/yr.
\textsuperscript{7} The higher end of the BAT-AEL range is 110 mg/Nm\textsuperscript{3} for plants of between 100 MW\textsubscript{th} and 300 MW\textsubscript{th} and plants of ≥ 300 MW\textsubscript{th} that were put into operation no later than 7 January 2014.
\textsuperscript{8} The higher end of the BAT-AEL range is 145 mg/Nm\textsuperscript{3} for plants of between 100 MW\textsubscript{th} and 300 MW\textsubscript{th} and plants of ≥ 300 MW\textsubscript{th} that were put into operation no later than 7 January 2014.
\textsuperscript{9} For industrial boilers and district heating plants put into operation no later than 27 November 2003, which are operated < 1500 h/yr and for which SCR and/or SNCR is not applicable, the higher end of the BAT-AEL range is 450 mg/Nm\textsuperscript{3}.
\textsuperscript{10} For industrial boilers and district heating plants of between 100 MW\textsubscript{th} and 500 MW\textsubscript{th} put into operation no later than 27 November 2003, which are operated < 1500 h/yr and for which SCR and/or SNCR is not applicable, the higher end of the BAT-AEL range is 365 mg/Nm\textsuperscript{3}.

Split view summary

CAN Europe proposes to decrease the upper ends of the BAT-AEL ranges as follows:

- Boilers of < 100 MW\textsubscript{th}, yearly average for new plants: 180 mg/Nm\textsuperscript{3}.
- Boilers of < 100 MW\textsubscript{th}, yearly average for existing plants: 200 mg/Nm\textsuperscript{3}.
- Boilers of ≥ 100 MW\textsubscript{th}, yearly average for new plants: 45 mg/Nm\textsuperscript{3}.
- Boilers of ≥ 100 MW\textsubscript{th}, yearly average for existing plants: 75 mg/Nm\textsuperscript{3}.

EEB proposes to delete footnotes (\textsuperscript{6} and \textsuperscript{7}) related to flexibilities in the case of plants operated < 1500 h/yr.

The split view is accompanied by the following rationale (CAN Europe):

- NO\textsubscript{X} background levels are too high in Europe, many Member States exceed national thresholds, and many cities cannot comply with local air quality standards. Therefore, BAT-AEL should be set at the lowest level technically possible and economically viable, in particular when it comes to new plants running for many years.
- The data collection shows that it is possible to achieve the above proposed levels.

The split view is accompanied by the following rationale (EEB):

- NO\textsubscript{X} background levels are too high in Europe, many Member States exceed national thresholds, and many cities cannot comply with local air quality standards. Therefore, BAT-AEL should be set at the lowest level technically possible and economically viable, in particular when it comes to new plants running for many years.
- The data collection shows that it is possible to achieve the above proposed levels.
• Start-up and shut-down operations are not considered as normal operating conditions, hence plants operating with more start-ups and shut-downs are not generally associated with higher NO\textsubscript{X} levels during their normal operating mode.
• There are many installations where SCR or SNCR is already installed, and due to economics, plant operators decide to operate the plants less than 1500 hours per year. These plants do not need exemptions for higher NO\textsubscript{X} emission values as with SCR installed plants are generally able to achieve low NO\textsubscript{X} levels. It is not justified to allow higher levels for all plants operating less than 1500 h/yr. At least plants having already installed SCR should be exempted from the footnote.
• Regarding SCR retrofit, the final TWG meeting concluded on SCR applicability: ‘There may be technical and economic restrictions for retrofitting existing plants operated between 500 and 1500 h/yr.’ Regarding SNCR retrofit, the final TWG meeting concluded on SCR applicability: ‘The applicability may be limited in the case of combustion plants operated between 500 and 1500 h/yr with highly variable boiler loads.’ There may be cases where SCR or SNCR applicability is restricted due to technical and economic reasons, however, this is a case-by-case decision by the competent authority. It depends on the plant conditions and on the local environment. A general conclusion that higher emissions are associated with BAT in case of plants operated < 1500 h/yr would be a general pre-decision on non-applicability of SCR or SNCR. It is not justified to generally allow higher levels for all plants operating less than 1500 h/yr as there are cases where SCR or SNCR retrofit is justified as technically and economically viable.

**EIPPCB assessment**

**Availability of information on which the split view is based:**
- Documents and information mentioned in the split view were available.

**Validity of supporting rationale (CAN Europe):**
- The rationale is based on available data from plants fitted with techniques listed in BAT 32 and linked with the alternative proposal. There is no clear link between the proposed alternative upper ends of the BAT-AEL ranges for new and existing plants and the plants mentioned in the split view (e.g. plants mentioned in the split view report emissions far below the alternative level for existing plants). No rationale is provided regarding the exclusion of certain plants from the alternative higher end of the range (e.g. Plant 83V fitted with LNB reports NO\textsubscript{X} emissions of 182 mg/Nm\textsuperscript{3} and seems to be one of the reference plant used by CAN Europe to propose 180 mg/Nm\textsuperscript{3} for new plants, while Plant 412-2V also fitted with LNB, reports higher emissions). The BREF Guidance (3.3) specifies that ‘the upper end of the BAT-AEPL is derived by considering the range of performance associated with the application of BAT under NOC.’

**Validity of supporting rationale (EEB):**
- Footnotes (6) and (7) related to flexibilities in the case of plants operated < 1500 h/yr are addressed to plants for which SCR and/or SNCR is not applicable. The rationale on the applicability of SNCR and/or SCR techniques seems to be more related to the implementation of specific permit conditions.
• Related to footnote (7), EEB mentions Plants 28 VC, 468V and 154-1C as plants that achieve low NO\textsubscript{X} levels even when operated < 1500 h/yr and Plant 263 achieving a low NO\textsubscript{X} level and operated 1560 h/yr. However, Plant 468V and Plant 263 VC are fitted with SCR, Plant 154-1C reports emissions above the upper end of the daily BAT-AEL range for plants of > 100 MW\textsubscript{th} and no rationale is provided regarding the exclusion of certain plants that would be covered by footnote (7) using similar techniques to Plant 28VC (e.g. Plant 192 VC). No reference plants or additional information is given related to the proposal to remove footnote (6).
Footnotes (6) and (7) do not apply to plants already fitted with SNCR or SCR.

**EIPPCB conclusion**

Taking these aspects into account, the EIPPCB considers that there are not enough appropriate technical arguments to support the split view. This split view will therefore not be reported in the ‘Concluding remarks and recommendations for future work’ section of the BREF.

### 13.2 SO₂ BAT-AELs for boilers

**Conclusions of the meeting**

Slide 284.

The BAT-associated emission levels for SO₂ from the combustion of HFO and/or gas oil in boilers are given in Table 10.17.

**Table 10.17: BAT-associated emission levels (BAT-AELs) for SO₂ emissions to air from the combustion of HFO and/or gas oil in boilers**

<table>
<thead>
<tr>
<th>Combustion plant total rated thermal input (MWₜₜ)</th>
<th>BAT-AELs for SO₂ (mg/Nm³)</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yearly average</td>
<td>Daily average or average over the sampling period</td>
<td></td>
</tr>
<tr>
<td></td>
<td>New plants</td>
<td>Existing plants (6)</td>
<td>New plants</td>
</tr>
<tr>
<td>&lt; 300</td>
<td>50–175</td>
<td>50–175</td>
<td>150–200</td>
</tr>
<tr>
<td>≥ 300</td>
<td>35–50</td>
<td>50–110</td>
<td>50–120</td>
</tr>
</tbody>
</table>

(6) These BAT-AELs do not apply to combustion plants operated < 1500 h/yr.
(5) The higher end of the BAT-AEL range is 400 mg/Nm³ for plants put into operation no later than 7 January 2014.
(7) These levels are indicative for combustion plants operated < 500 h/yr.
(5) For industrial boilers and district heating plants put into operation no later than 27 November 2003 and operated < 1500 h/yr, the higher end of the BAT-AEL range is 400 mg/Nm³.
(5) For industrial boilers and district heating plants put into operation no later than 27 November 2003, which are operated < 1500 h/yr and for which Wet FGD is not applicable, the higher end of the BAT-AEL range is 200 mg/Nm³.

**13.2.1 Increase the upper end of the BAT-AEL range for boilers of < 300 MWₜₜ operated < 1500 h/yr**

**Split view summary**

CEPI, supported by FI and Euroheat & Power, proposes to increase the upper end of the SO₂ daily BAT-AEL range for industrial HFO boilers and district heating plants of < 300 MWₜₜ put into operation no later than 27 November 2003, operated < 1500 h/yr, and for which secondary abatement techniques or fuel change from HFO to another fuel (natural gas, LFO, LNG etc.) is not applicable, to 850 mg/Nm³.

The split view is accompanied by the following rationale:

- In the HFO / gas oil engine chapter it was decided that the higher end of the BAT-AEL range is 280 mg/Nm³ if no secondary abatement techniques can be applied. This corresponds to a sulphur content of the fuel of 0.5 %. The same logic should be used for the HFO plants operated < 1500 h/yr as for the base-load engines.
- During main boiler unexpected malfunctions the operating philosophy of reserve boilers in industrial plants is similar to the operating philosophy of emergency use boilers. The main requirement is a very fast start-up to secure the heating steam during main boiler malfunctions. For that reason, fuel choice is usually fuel oil or natural gas and typical emission reduction techniques are primary techniques. Secondary abatement techniques are not applicable due low annual operating hours and short periods of continuous operation, making the costs of secondary abatement techniques compared to the environmental benefits excessive. Also secondary emission cleaning techniques are not applicable, because they require some constant operation time before taken into use.

- The applicability restrictions of the BAT techniques for plants operated < 1500 h were neglected in the background document and in the final meeting, which would be against the BREF Guidance’s statement that 'where there are restrictions on applicability for a certain technique, this will be explicitly mentioned.' One reference plant with a certain technique in use doesn't make the technique generally applicable.

- Examples of industry reserve boilers and associated emission levels and characteristics were supplied in CEPI document ENV-14-010 and in the document Reserve boilers in industrial plant (Finland).

- Boilers and fuel oil systems designed originally only for heavy fuel oil cannot be converted to gas oil without major replacements to fuel oil system because gas oil’s lower density and viscosity (technical applicability of existing systems and fire and safety requirements) which are not cost effective.

- There is no reference of conversion from HFO to gas oil in the reference plants <300 MWth. The cost versus environmental benefit should be taken into account also. There are few examples of reference plants operating with lower sulphur content HFO, but this is an issue of different fuel availability in different Member States.

**EIPPCB assessment**

**Availability of information on which the split view is based:**
- Documents and information mentioned in the split view were available.

**Validity of supporting rationale:**
- A higher end of the BAT-AEL range corresponding to a sulphur content of the fuel of 0.5% was agreed for engines if no secondary abatement techniques can be applied.
- The cost-effectiveness of reducing flue-gas emissions in existing plants operated < 1500 h/yr is discussed in the report mentioned as a reference in the split view.
- Certain applicability restrictions were agreed in the BAT conclusion for the fuel choice technique.

**EIPPCB conclusion**

Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the split view. This split view will therefore be reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
</table>
13.2.2 Decrease the upper ends of the BAT-AEL ranges for boilers of < 300 MWth

Split view summary
EEB proposes to decrease the upper end of the yearly SO₂ BAT-AEL range for new and existing boilers of < 300 MWth to 75 mg/Nm³.

CAN Europe proposes to decrease the upper end of the yearly SO₂ BAT-AEL range for new boilers of < 300 MWth to 100 mg/Nm³.

The split view is accompanied by the following rationale (EEB):
- The agreed level of 175 mg/Nm³ for existing plants is based on an assumption of 0.1 % S in the fuel. However, this overlooks the option of combining fuel choice with an abatement technique to reduce emissions.
- It also fails to accord with any reference plant:
  - An upper BAT-AEL of 175 mg/Nm³ lies between Plants 33 (72 mg/Nm³) and 290 (330 mg/Nm³) i.e. significantly detached from both.
  - Setting the upper BAT-AEL at Plant 83 would include the full ranges of sampled fuels and equivalent full load operating factor values. It also represents what can be achieved by the smallest plants within this category, and therefore what it is reasonable to expect from plants >100 MWth.
- The upper BAT-AEL for both new and existing plants should therefore be 75 mg/Nm³.

The split view is accompanied by the following rationale (CAN Europe):
- SO₇ emissions contribute to acidification and to PM when converted to secondary dust. PM levels in many areas in Europe are far too high and have significant impact on public health.
- EIPPCB document: BAT conclusions define fuel choice and Wet FGD as BAT
- The data collection shows that it is possible to achieve the above proposed levels (see plants 468V, 259V, 258V, 262V).

EIPPCB assessment
Availability of information on which the split view is based:
- Documents and information mentioned in the split view were available.

Validity of supporting rationale (EEB):
- The reasoning proposed by EEB is generally based on available data from the data collected in 2012 from plants fitted with BAT, making the link between the available information and the levels proposed in the split view, with justifications based on different parameters (sulphur fuel content and/or application of possible secondary abatement techniques).
- Since the levels supported by EEB are more stringent than those from CAN Europe, the rationale presented by CAN Europe is also considered valid.
EIPPCB conclusion
Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the split view. This split view will therefore be reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 33 Table 10.17</td>
<td>Decrease the upper end of the yearly SO$<em>2$ BAT-AEL range for new and existing boilers of &lt; 300 MW$</em>{th}$</td>
<td>EEB, CAN Europe</td>
<td>75 mg/Nm$^3$, 100 mg/Nm$^3$</td>
</tr>
</tbody>
</table>

13.3 Dust BAT-AELs for boilers of < 100 MW$_{th}$ operated < 1500 h/yr

Conclusions of the meeting
Slide 291.

The BAT-associated emission levels for dust from the combustion of HFO and/or gas oil in boilers are given in Table 10.18.

Table 10.18: BAT-associated emission levels (BAT-AELs) for dust emissions to air from the combustion of HFO and/or gas oil in boilers

<table>
<thead>
<tr>
<th>Combustion plant total rated thermal input (MW$_{th}$)</th>
<th>BAT-AELs for dust (mg/Nm$^3$)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yearly average</td>
</tr>
<tr>
<td></td>
<td>New plant</td>
</tr>
<tr>
<td>&lt; 300</td>
<td>2–10</td>
</tr>
<tr>
<td>≥ 300</td>
<td>2–5</td>
</tr>
</tbody>
</table>

(4) These BAT-AELs do not apply to combustion plants operated < 1500 h/yr.
(5) The higher end of the BAT-AEL range is 25 mg/Nm$^3$ for plants put into operation no later than 7 January 2014.
(6) The higher end of the BAT-AEL range is 15 mg/Nm$^3$ for plants put into operation no later than 7 January 2014.
(7) These levels are indicative for combustion plants operated < 500 h/yr.

Split view summary
FI proposes to increase the upper end of the daily dust BAT-AEL range for industrial boilers and district heating plants of < 100 MW$_{th}$ put into operation no later than 27 November 2003, operated < 1500 h/yr, and for which secondary abatement techniques or fuel change from HFO to another fuel (natural gas, LFO, LNG etc.) is not applicable, to 30 mg/Nm$^3$.

The split view is accompanied by the following rationale:
- Heavy fuel oil and gas oil are different fuels. Boilers and fuel oil systems designed originally only for heavy fuel oil cannot be converted to gas oil without major replacements to fuel oil system because gas oil’s lower density and viscosity (technical applicability of existing systems and fire and safety requirements).
There is no reference from conversion from HFO to gas oil in the reference plants < 300 MWth.

Dust emissions (HFO Sulphur content of 0.5%) can fluctuate between 10 mg/Nm³ and 40 mg/Nm³ depending on the boiler load. At low load (< 40%) dust emissions are higher. HFO units in district heating comply with the proposed dust BAT-AEL when operating at full load. Therefore the BAT-AEL only restricts the operating range of district heating units.

ESP and bag filter are not cost-efficient way to reduce dust emissions, if the unit is operating less than 1500 h/yr. Dust BAT-AEL of 30 mg/Nm³ allows slightly larger operating range.

Plant 68 is using combination of the two BAT-techniques, namely fuel choice (HFO S 0.5%) and multicyclone. Thus multicyclone is used together with another BAT technique. The BAT-AEL should be set based on Plant 68 (periodic measurement 36 mg/Nm³ and the BAT candidate sheet states that after low-NOx burners implementation dust emissions are 30 mg/Nm³ (3% O2, dry). In this case IED imposes cap to 30 mg/Nm³ and reference data of plant 68 supports the value 30 mg/Nm³.

Reference HFO-plants 83 and 1009 are HFO-plants equipped with multicyclone. Plant 83 uses special HFO (brand name DEWAXAT), which doesn’t exist anymore. The refinery has stopped production. Therefore, plant 83 can’t be used as a reference.

Dust emission of Plant 1009 is achievable only in certain conditions. This is mentioned in the questionnaire datasheet: 'the ash content of heavy fuel oil and other operation conditions can vary and have an unfavourable impact on dust emission level. In the 6 different measurements in our 40-50 MWth boilers with multicyclones the minimum result has been 12 mg/Nm³ (dry, 3% O2), the average has been 35 mg/Nm³ (dry, 3% O2) and the maximum has been 61 mg/Nm³ (dry, 3% O2).'

Plant 290 is using HFO with S < 0.3%. According to fuel analysis average sulphur content has been 0.23% (25 samples). The measured dust emission results (9-36 mg/Nm³) refer to same reasons, which were mentioned above (Plant 1009).

**EIPPCB assessment**

Availability of information on which the split view is based:

- Documents and information mentioned in the split view were available with the exception of information supporting the statement that ESPs and bag filters are not a cost-efficient way to reduce dust emissions if the unit is operating less than 1500 h/yr.

Validity of supporting rationale:

- The cost-effectiveness of reducing flue-gas emissions in existing plants operated < 1500 h/yr is discussed in the report mentioned as a reference in the split view.
- Certain applicability restrictions were agreed in the BAT conclusion for the fuel choice technique.
- The level proposed in the split view is supported by appropriate data.

**EIPPCB conclusion**

Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the split view. This split view will therefore be reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
</table>
13.4 NO\textsubscript{X} – SCR technique for engines

Conclusions of the meeting
Slide 298.

BAT 36. In order to prevent and/or reduce NO\textsubscript{X} emissions to air from the combustion of HFO and/or gas oil in reciprocating engines, BAT is to use one or a combination of the techniques given below.

<table>
<thead>
<tr>
<th>Technique</th>
<th>Description</th>
<th>Applicability</th>
</tr>
</thead>
<tbody>
<tr>
<td>e. Selective catalytic reduction (SCR)</td>
<td>See description in Section 10.8</td>
<td>Not applicable in the case of plants operated &lt; 500 h/yr. There may be technical and economic restrictions for retrofitting existing plants operated between 500 h/yr and 1500 h/yr. Retrofitting existing plants may be constrained by the availability of sufficient space</td>
</tr>
</tbody>
</table>

13.4.1 Add applicability restrictions

Split view summary
FR proposes to add the following applicability restriction: 'Retrofitting existing plants may be constrained by technical and logistical difficulties'.

EL, supported by IT, proposes to add that the applicability of SCR may be also constrained in the following cases:
- Plants operated with frequent load variations.
- Plants with frequent start-ups and shut-downs.
- Plants located in places with infrastructural limitations. There may be logistical restrictions in remote areas, such as islands, for supplying the reagent or managing the used catalysts.
- Plants located in places with water shortage. The applicability may be limited due to the water availability required for the urea solution preparation.
- Economical restrictions in remote areas, such as islands, where the cost of electricity production is high and air quality is fully compliant with EU directive 2008/50/EC.
- Space constraints even for new plants being part of a small or micro isolated system (SIS/MIS).
EUROMOT, supported by EL, proposes to add applicability considerations related to the possible lack of proper industrial infrastructures for the supply of reagent in some places, to the operational temperature restrictions in plants with frequent start and stops, to the possible economic constraints in remote areas such as SIS/MIS.

EURELECTRIC, supported by EL, proposes to add applicability restrictions:

- Possible logistical restrictions in remote areas for supplying the reagent or managing the used catalysts with the proper industrial infrastructure.
- Possible limitation due to the water availability required for the urea hydrolysis.
- Possible limitation for new plants on existing sites due lack of the space availability for extending the existing site like in small islands.
- Possible performances limitation in the case of plants with high number of start-up/shutdowns and fast load variations like in small isolated systems (SIS) to maintain the grid stability and balance the intermittency of renewable.
- Possible economical restriction in remote areas like islands where air quality is fully compliant with EU directive 2008/50/EC.

The split view is accompanied by the following rationale (FR):

- No existing plants retrofitted with SCR were reported in the data collection. As far as France is aware of, for the last years, France is the only Member State which has been retrofitting existing engines with SCR. Besides, such French installations are to be closed by 2023.
- France has experienced the following technical issues when it has retrofitted existing engines:
  - High energy efficiency engines are associated with lower flue-gas temperatures, which reduces SCR (NO\textsubscript{X} abatement) efficiency;
  - HFO combustion may lead to SCR poisoning agents.

The split view is accompanied by the following rationale (EL):

- During the final meeting it was recognised that there is no concrete evidence on the applicability of SCR in engines being part of a SIS/MIS. According to the Draft compiled conclusions of the Final Meeting of the Technical Working Group (TWG) for the review of the LCP BREF, it was decided to: 'Add in the BREF chapter on 'Concluding remarks and recommendations for future work' that more information on the use of the SCR technique in small isolated systems should be collected during the next BREF review'.
- In the UNECE Guidance document on control techniques for emissions of sulphur, nitrogen oxides, volatile organic compounds and particulate matter (including PM10, PM2.5 and black carbon) from stationary sources, it is noted that there is a limitation for the applicability of SCR for diesel engines with varying load operation.
- The qualification of SCR as a technique for NO\textsubscript{X} reduction in diesel engines has been based on the Delimara case study (362-365), on a large plant (515.8MW\textsubscript{th}) located at La Reunion (ref plant 691) and on commissioning information for Yara-Lampedusa plant (although the Italian authorities have questioned the credibility of these data during the Sevilla meeting) with the NO\textsubscript{X} emissions being < 1000 mg/Nm\textsuperscript{3}. However, all the other reference plants submitted and which are located in remote islands have not been taken into account. The vast majority of Greek islands have no similarities in terms of capacity, load variations due to seasonal peaks (up to 20 times higher during summer) and population of the island (most of them having less than 10,000 people compared to 800,000 population of La Reunion).
- The Delimara Station is not part of a SIS. Malta’s interconnection with Sicily has been completed. Additionally, the HFO-fired diesel engines of Delimara Station will be soon adapted to gas engines. Wärtsilä, has signed a major contract with Shanghai Electric Power for the conversion of the Maltese Delimara Power Station to operate on natural gas. The contract, signed in December 2014, is the first between Wärtsilä
and Shanghai Electric Power. The project will begin in January 2016, and the estimated completion time is in October 2016. The reasons for the adaptation are the high operating cost due to the emissions abatement techniques applied (i.e. SCR, DSI and bag filters).

- Logistical restrictions in SIS/MIS for the application of SCR are recognised both in the revised LCP BREF D1 of May 2015 and in the Gothenburg protocol. See the revised draft of LCP BREF of May 2015, page 583 (“In some places, the supply of reagent may be limited by the lack of proper industrial infrastructure”) and see Gothenburg protocol, page 45 (‘where SCR cannot currently be applied for technical and logistical reasons like on remote islands’). The relative cost for any adaptation of the infrastructure in SIS/MIS (such as expanding port facilities), in order to handle bulk materials, chemicals and residues is very high. Furthermore, in most cases it is impossible to manage the residues on these small islands and transportation is needed to faraway places adding extra costs.

- Concerning water availability restrictions in SIS/MIS, see description of the SCR in the revised draft of LCP BREF of May 2015, page 232 (‘urea is used in the form of white crystal granules, which are dissolved in water before being injected’) and in EUROMOT ’Position paper for the revision of the UNECE Gothenburg protocol’ (‘The most commonly used reagent is a 40-45 wt% urea water solution, or less commonly a 25 wt% aqueous ammonia solution or pure (100 %) ammonia’). Therefore, the restrictions already introduced for other techniques using water (such as water/steam injection) should be introduced as well for SCR and there are no solid technical and economic data that the use of sea water is a viable solution.

- Regarding the space availability restrictions in SIS/MIS, this point is already taken into consideration for existing plants in the draft D1, but this applicability constraint should be considered applicable to new plants in existing sites, where they may be no possibility to extend the site, like on small islands.

- The technical constraints affecting SCR function in SIS/MIS are recognised in the FR presentation at Intermediate LCP BREF meeting, 17-18 June 2014, (‘The French experience is that SCR still need to be optimized if used with HFO engines located in SIS and more feedback is needed to derive BAT’). In EUROMOT Presentation: ‘HFO Engine Plants - Malta Case Study’, as far as the application of SCR in diesel engines is concerned, it is highlighted that 'long term experience of SCR needed before BAT conclusions can be drawn’. See also existing LCP BREF 2006, page 406 (‘SCR is an applied technique for diesel engines, but cannot be seen as BAT for engines with frequent load variation, including frequent start-up and shut down periods due to technical constraints. A SCR unit would not function effectively when the operating conditions and the consequent catalyst temperature are fluctuating frequently outside the necessary effective temperature window’).

- In EURELECTRIC position paper on Gothenburg protocol, there is a description of the specific operation of engines on islands (‘Diesel plant on islands typically operate at highly variable load, resulting from the high variations in demand and the relatively large size of individual generators as compared to total demand. Islands typically have more fluctuating power demand over both periods than mainland location. On a 24 hour basis, the lack of industrial plants means that overnight power consumption tends to be rather low. Over a yearly period, island generation can fluctuate highly due to seasonal variation in tourism – many islands have a high dependence on the tourist economy. The variability of the load on island diesel plants is likely to increase further in future with an increased share of intermittent renewables in their power systems’). Finally, in EUROMOT position on D1, the importance of high stable exhaust gas temperature for SCR performance is highlighted.

- Regarding the economical restrictions in remote areas like islands, see the UK position on diesel engines (‘Secondary NOX abatement is therefore both
disproportionate and impractical for island diesel generators which are run for short periods to meet peak electricity demand or are operated across a continuously variable power demand cycle'). In EURELECTRIC Presentation: 'EURELECTRIC Contribution on Small Isolated Systems', in UNECE EGTEI cost report and in EUROMOT 'Position paper for the revision of the UNECE Gothenburg protocol', it is demonstrated, using the methodology described in the ECM BREF 2006, that the cost of NO\textsubscript{X} removal with the application of SCR in HFO diesel engines located in isolated islands is always significantly higher than the external cost proposed in the Economics and Cross-Media Effects BREF for NO\textsubscript{X} in the Mediterranean Sea. According to the Decision 2012/119/EC section 3.2.3, this information should be used and explicitly mentioned to restrict the applicability of the technique. The Decision 2012/119/EC section 2.3.7.2.7 clearly states that “Information on the cost-effectiveness of the technique should be reported where relevant in order to allow the assessment of the economic viability, according to Article 3(10)(b) of Directive 2010/75/EU. The ECM BREF and the MON REF should be taken into account with regard to economic aspects and monitoring costs, respectively.'

- The application of secondary emissions’ reduction techniques in a big number of SIS/MIS would have a detrimental effect on the cost of electricity. The average marginal cost of electricity in those areas is already c. 220 Euros/ MWh (> 3 times higher than in mainland), due to the fact that fuel and operating costs are increased. Furthermore, in some cases, as already stated during the final meeting in Sevilla the costs are much higher.

- It should be also highlighted, that ambient air quality in all these islands is in full compliance with the air quality legislation of EU (Directive 2008/50/EC), with the actual ambient concentrations of all pollutants being much lower than the EU standards and in most of them practically negligible. Supporting information is based on previous comments

The split view is accompanied by the following rationale (IT):

- During the TWG final meeting, data and information from the “Case Study: Effective NO\textsubscript{X} Reduction through SCR in a small isolated system”, referred to the Italian (small and isolated) island of Lampedusa (in the Mediterranean sea) were used to confirm and support the applicability of the SCR technique in engines being part of a SIS/MIS. In relation to the above, Italy would like to point out and specify the following:
  - for the purposes of the data collection process, instrumental for deriving relevant and consistent BAT conclusions for the sector concerned, the Italian reference combustion plants were carefully identified, in order to cover the main “sub-categories” believed worth to be fitting the BAT issues with reference to e.g. different combustion technologies and manufacturers, technical characteristics of the plants (new and retrofitted), plant design and layout in relation to the main use (electric and thermal generation, mechanical drive, …), type of fuel combusted (coal, natural gas, liquid fuel, waste, biomass, …), variability of the operating conditions, geographical location and non-exceptional local environmental conditions;
  - on the basis of the above, it should be well acknowledged that the plant situated in the island of Lampedusa was not included in the Italian definitive list of reference combustion plants, due to its specific exceptional local condition, which may have driven implementation of specific BAT; consequently, no site specific performance data collection was carried out through the questionnaire (e.g. covering one year of operation), in order to allow comparative analysis in a uniform and transparent way;
  - the Italian Competent Authority was not involved in the cross-checking of data and information provided within the merely descriptive document prepared by “Yara”, supplier of the SCR technique, before posting it on BATIS. Indeed, as a basic principle, Italy firmly believes that the involvement of Member State representatives
in performing the cross-checking of plant/installation data (whichever they are) is essential for ensuring high quality and reliability of the overall information to be used for drawing up and reviewing the content of the “BAT conclusions” chapter as a whole.

The split view is accompanied by the following rationale (EUROMOT):

- The rationale to add in the applicability restrictions that a reagent, urea or ammonia, is needed for SCR, and that in some places the supply of reagent may be limited by lack of proper industrial infrastructure, is based in the statement written in LCP D1, Section 3.3.3.3.11 SCR, page 229 “Technical considerations relevant to applicability”.
- The rationale for applicability restrictions for SCR related to operational temperature restrictions is based on previous EUROMOT positions.
- The rationale for economic restrictions is supported by EURELECTRIC’s “Contribution on small isolated systems”, TWG meeting LCP BREF 17 June 2014

The split view is accompanied by the following rationale (EURELECTRIC):

- Regarding the logistical restrictions, see last version of D1 2015, page 623 (“In some places, the supply of reagent may be limited by the lack of proper industrial infrastructure”) and see UNECE 2012, page 45 (“Where SCR cannot currently be applied for technical and logistical reasons like on remote islands [..]”).
- Regarding the water availability restrictions, see description of the SCR in the last version of D1, page 272 (“urea is used in the form of white crystal granules, which are dissolved in water before being injected”) and in EUROMOT 2011 (“The most commonly used reagent is a 40-45 wt% urea water solution, or less commonly a 25 wt% aqueous ammonia solution or pure (100%) ammonia”) and analogy with the restrictions already introduced for other techniques using water (like water/steam injection).
- Regarding the space availability restrictions, this point is already taken into consideration for existing plants in the draft D1, but it is considered that it also applies to new plants in existing sites, where they may be no possibility to extend the site, like on small islands.
- Regarding the performances limitations of SCR in small isolated systems, see FRANCE 2014 slide 15-17 (“The French experience is that SCR still need to be optimized if used with HFO engines located in SIS and more feedback is needed to derive BAT”), see LCP BREF 2006 page 444 (“SCR is an applied technique for diesel engines, but cannot be seen as BAT for engines with frequent load variation, including frequent start-up and shut down periods due to technical constraints. A SCR unit would not function effectively when the operating conditions and the consequent catalyst temperature are fluctuating frequently outside the necessary effective temperature window”); see also EURELECTRIC 2011 page 5 for the description of the specific operation of engines on islands (‘Diesel plant on islands typically operate at highly variable load, resulting from the high variations in demand and the relatively large size of individual generators as compared to total demand. Islands typically have more fluctuating power demand over both periods than mainland location. On a 24 hour basis, the lack of industrial plants means that overnight power consumption tends to be rather low. Over a yearly period, island generation can fluctuate highly due to seasonal variation in tourism – many islands have a high dependence on the tourist economy. The variability of the load on island diesel plants is likely to increase further in future with an increased share of intermittent renewables in their power systems’) and see EUROMOT 2013 page 3 for the description of the importance of high stable exhaust gas temperature for SCR performances.
Regarding the economical restrictions in remote areas like islands, see UK 2012 page 4 ('Secondary NOx abatement is therefore both disproportionate and impractical for island diesel generators which are run for short periods to meet peak electricity demand or are operated across a continuously variable power demand cycle'), as well as UNECE EGTEI 2011, EUROMOT 2011 and EURELECTRIC 2014 slide 21 where it is demonstrated, using the methodology prescribed in the ECM BREF 2006, that the cost of NOx removal with the application of SCR in HFO diesel engines located in isolated islands is always significantly higher than the external cost proposed in the Economics and Cross-Media Effects BREF for NOx in the Mediterranean Sea. According to the Decision 2012/119/EC section 3.2.3, this information should be used and explicitly mentioned to restrict the applicability of the technique ('The information included in the chapter of the BREF entitled 'Techniques to consider in the determination of BAT’ - see Section 2.3.7, especially information under the ‘Technical considerations relevant to applicability’, ‘Economics’ and ‘Cross-media effects’ headings - should provide the basis for indicating applicability issues in the BAT conclusions.’). The Decision 2012/119/EC section 2.3.7.2 clearly states that 'Information on the cost-effectiveness of the technique should be reported where relevant in order to allow the assessment of the economic viability, according to Article 3(10)(b) of Directive 2010/75/EU. The ECM BREF and the MON REF are to be taken into account with regard to economic aspects and monitoring costs, respectively.'

**EIPPCB assessment**

**Availability of information the split view is based on:**

- Documents and information mentioned in the split view were available.

**Validity of supporting rationale (FR):**

- FR provided information on experiences of retrofitting existing plants with SCR. Other experiences were provided in the available information, e.g. Lampedusa plant. The two examples (Vazzio and Martinique) given during FR's presentation at the intermediate meeting (June 2014) are not clearly linked to logistical difficulties, and if they presented technical difficulties, those seem to have been overcome. Furthermore, space availability is mentioned in the technical difficulties whilst this is already considered in the applicability restriction of the technique.

- The second part of the rationale is more related to the levels that can be achieved in view of the lower flue-gas temperatures in high energy efficiency engines and of SCR poisoning agents than to the applicability restriction to existing plants due to technical and logistical difficulties.

**Validity of supporting rationale (EL, EUROMOT, EURELECTRIC):**

- A recommendation for future work in the next revision of the BREF does not mean that no concrete information was available on the applicability of SCR in engines forming part of a SIS/MIS, but rather that the available information may be further improved, building on increasing experience with SCR.

- The definition of the applicability restrictions of techniques is based on the available information collected for the LCP BREF review and not only on general literature (e.g. UNECE Guidance).

- The conclusion that SCR is BAT for engines is based on available and detailed information from plants in Malta, Lampedusa and La Réunion, apart from the 50 plants already installed by FR. No information was submitted, which would prove the impossibility to implement SCR in engines in Greek islands.

- Information about the requirement for an appropriate infrastructure for implementing the SCR technique is available in the draft revised BREF, in particular for the supply and/or the use of reagent in remote areas.
The rationale of the split view on the economic restriction is based on economic information made available in the review process and in the draft revised BREF.

According to the BREF Guidance, specific technical characteristics or local circumstances of individual plants should not be considered when defining BAT at EU level, in particular those for new plants installed in existing sites.

The references to the air quality legislation of the EU (Directive 2008/50/EC) do not specifically support any of the alternative proposals.

The view that operational temperature restrictions will cause restrictions in the applicability of SCR in plants with frequent starts and stops is based on previous comments from EUROMOT that finally remit to the UNECE guidance document on identifying best abatement options, the obligations of the Gothenburg Protocol. The information related to SCR in that document refers to the following article: A promising NOx-Control Technology to Lim, K.J., C. Castaldini, and C.D. Wolbach (1982). More recent information was available for the BREF review.

The split view related to including the following applicability restriction "There may be performances limitation in the case of plants with high number of start-up/shutdowns and fast load variations like in small isolated systems (SIS) to maintain the grid stability and balance the intermittency of renewable" is supported by EURELECTRIC with reference to a statement in FR's presentation where there is not a clear link between the experience of FR and the limitations due to 'start-up/shutdowns and fast load variations' and with previous comments/documents of EUROMOT/EURELECTRIC in the context of the Gothenburg protocol documents (validity assessed in the EUROMOT rationale in the case of EUROMOT).

Validity of supporting rationale (IT):

IT confirms the use of SCR in the Lampedusa plant. Information on this plant was available. No specific information about the exceptional conditions which 'may' have led to apply SCR to this plant was given by IT, or any information which contradicts the data made available for this plant during the exchange of information.

**EIPPCB conclusion**

Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the part of the split view related to economic restrictions and/or lack of proper industrial infrastructures for the supply and/or the use of reagent in remote areas (expressed by EL, EUROMOT, EURELECTRIC and IT). The EIPPCB considers that there are not enough appropriate technical arguments to support the other parts of the split view. The split view will therefore be only partially reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 36</td>
<td>Add applicability restrictions: Possible economic restrictions and/or lack of proper industrial infrastructure for the supply and/or the use of reagent in remote areas, such as islands.</td>
<td>EL, IT,</td>
<td>EURELECTRIC, EUROMOT</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NA</td>
<td></td>
</tr>
</tbody>
</table>

### 13.4.2 Remove applicability restrictions

**Split view summary**
CAN Europe proposes to consider SCR as generally applicable.

The split view is accompanied by the following rationale:

- **NO\textsubscript{X} reduction techniques can generally be retrofitted in small and large engines. This is shown by many cases where ship engines have been retrofitted with SCR (see references).**

- **The statement implies a preliminary decision on non-applicability of SCR reduction techniques in plants operating < 500 hours. However, as technical and economical restrictions depend on plant conditions and on local environmental situation, applicability of SCR retrofit should be decided by competent authority.**

- **The statement assumes economic restrictions for retrofitting plants operated between 500 and 1500 h/yr although NO\textsubscript{x} reduction justifies investment costs which cannot be significant if many ships are retrofitted with SCR.**

**EIPPCB assessment**

Availability of information on which the split view is based:

- **References to the web page links, which are used to support the rationale that NO\textsubscript{X} reduction techniques can generally be retrofitted in small and large engines, were not provided before the FM.**

- **No information was made available to support the proposal to remove the applicability restrictions to plants operated less than 1500 hours.**

Validity of supporting rationale:

- **As the supporting information was not available in time, the rationale is not considered valid.**

**EIPPCB conclusion**

Taking these aspects into account, the EIPPCB considers that there are not enough appropriate technical arguments to support the split view. This split view will therefore not be reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

### 13.5 **NO\textsubscript{X} BAT-AELs and CO, TVOC indicative levels for engines**

**Conclusions of the meeting**

Slide 302.

The BAT-associated emission levels for NO\textsubscript{X} emissions to air from the combustion of HFO and/or gas oil in reciprocating engines are given in Table 10.20.

Table 10.20: BAT-associated emission levels (BAT-AELs) for NO\textsubscript{X}, emissions to air from the combustion of HFO and/or gas oil in reciprocating engines

<table>
<thead>
<tr>
<th>Combustion plant total rated thermal input (MW\textsubscript{th})</th>
<th>BAT-AELs (mg/Nm\textsuperscript{3})</th>
<th>NO\textsubscript{X}</th>
<th>Yearly average</th>
<th>Daily average or average over the sampling period</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>New plants</td>
<td>Existing plants (\geq 50)</td>
<td>Existing plants</td>
</tr>
<tr>
<td>\geq 50</td>
<td></td>
<td>115–225</td>
<td>125–625</td>
<td>145–225</td>
</tr>
</tbody>
</table>
These BAT-AELs do not apply to combustion plants operated < 1500 h/yr.

The BAT-AEL range for plants operated < 1500 h/yr is 1150–1900 mg/Nm$^3$.

These BAT-AELs do not apply to plants that cannot be fitted with secondary abatement techniques.

The BAT-AEL range for plants that cannot be fitted with secondary abatement techniques is 1150–1900 mg/Nm$^3$.

These levels are indicative for combustion plants operated < 500 h/yr.

As an indication, the yearly average CO levels and the average over the sampling period TVOC levels for new or existing combustion plants burning only HFO and operated ≥ 1500 h/yr will generally be 50-175 mg/Nm$^3$ and 10-40 mg/Nm$^3$ respectively.

13.5.1 Increase the upper ends of the NO$_x$ BAT-AEL ranges for some new engines

Split view summary

EURELECTRIC and EUROMOT, supported by EL, propose to:

- increase the upper ends of NO$_x$ yearly and daily BAT-AEL ranges for new plants equipped with SCR and located in remote islands and in SIS respectively to 240 mg/Nm$^3$ and 300 mg/Nm$^3$;
- apply footnotes (4) and (5) to new plants that cannot be fitted with secondary abatement techniques for techno-economic reasons. This proposal is supported by the UK.

EUROMOT proposes to add a footnote mentioning the BAT-AELs are given at 15 % O$_2$ reference level.

The split view is accompanied by the following rationale (EURELECTRIC):

- The specific operation of diesel engines in SIS (see the description in EURELECTRIC 2011 page 5) impacts the performances of SCR, including for new plants. This technical fact is well reflected in slides 15-16 of FRANCE 2014. EURELECTRIC considers that the NOx BAT-AEL for new plants in SIS should be based on the performances of a real plant, namely the plant 691 (La Réunion), for which a comprehensive emission assessment has been provided in FRANCE 2015. Please note that the reference plants database used by the TWG contains only very few diesel engines equipped with SCR and that plant 691 is the best performing of all diesel engine plants located in SIS (since Malta is not a SIS). The yearly and daily BAT-AEL suggested in this split view are the ones initially considered during the Final Meeting of the TWG, before the decision was taken to modify the BAT-AEL to conform with the Gothenburg Protocol UNECE 2012. However the Gothenburg Protocol also foresees a transition period of 10 years for plants located in “remote islands”. The footnote that is suggested, limited to plants located in SIS, will be fully consistent with the Gothenburg Protocol. It would also be fully in line with the rules set up in Decision 2012/119/EC regarding the derivation of BAT-AEL from reference plants.

- Contrary to other types of combustion plants (boilers, gas turbines), there is not emission limit value (“ELV”) set up in the annexes of the directive IED 2010/75/EU for liquid fuels-fired diesel engines. Hence the engines that will apply and obtain the derogation Art. 15.4 of IED 2010/75/EU will have no minimum requirements (“safety net”) to comply with at EU level. This is why EURELECTRIC is strongly pleading in favour of including BAT-AEL in the LCP BREF for engines that cannot implement all the BAT, including for new plants. The introduction of 'techno-economical reasons' is consistent with the footnote already agreed by the TWG in slides 82 and 119 of EIPPCB FM 2015.
The split view is accompanied by the following rationale (EUROMOT):

- BATIS measurement database has actually only 2 plant references (Malta (ref. 362, 363, 364, 365), is not a SIS/MIS) in SIS/MIS namely number 691 (La Reunion) and number 429-4 (Madeira). In ref. 691 an average NO\textsubscript{X} concentration of 241 mg/Nm\textsuperscript{3} and in Plant 429-4 1377 mg/Nm\textsuperscript{3} at 15 % O\textsubscript{2} have been measured after the SCR, i.e. much higher values than in Maltese references. In document from EURELECTRIC 2011 are the special conditions of island power generation are listed such as: "lack of economies of scale, restricted fuel choice, remoteness from continental infrastructure, the need of flexibility of generating plant to operate with high variations of duty cycle resulting from daily and seasonal variations in the island's electricity demand and increasingly fluctuating input from renewable power sources", etc. The variable power range, frequent starts and stops cause challenges for the SCR usage. Especially at lower operating loads and during starts/stops the exhaust gas temperatures is often too low for effective operation of the SCR and it becomes ineffective. Supply of needed reagents for the SCR might also imply logistical difficulties and significant costs on islands. E.g. island locations require a different trade-off between restrictions on remoteness and immissions compared to the European mainland. SIS/MIS are in compliance with EU Directive 2008/50/EC.

- In light of above constraints (frequent load variations, etc.) higher NO\textsubscript{X} levels are needed also for new remote plants and following footnote is to be added for new plants e.g. on islands (SIS/MIS) (strictest NO\textsubscript{X} level of ref. 691 or 429-4 chosen): (New) footnote (7) for the new plant in SIS/MIS with SCR: NO\textsubscript{X} limit to be in line with measured average value in Plant 691 to reflect the real conditions: yearly average: 240 mg/Nm\textsuperscript{3} and based on this a daily value of 300 mg/Nm\textsuperscript{3} (15 % O\textsubscript{2}).

- According to the BAT definition, the technique is to be available (to allow implementation under technical and economic conditions), thus following option is to be included: existing footnotes (4) and (5) to be extended also to new plants where SCR cannot be used due to technical constraints or/and it can be demonstrated that benefits associated with the use of SCR on a diesel engine in e.g. a SIS/MIS island are lower than associated costs (method based on the BREF ECM 2006) then modified footnotes (4) (yearly average) and (5) (daily average). There is no ELV set for diesel engines in IED 2010/75/EU – for situations where the Directive Article 15(4) derogation possibility is applied then by above approach a “safety” net is established for this special category of plants.

The split view is accompanied by the following rationale (EL):

- Based on the applicability constraints of SCR that should apply to both new and existing diesel engines being part of a SIS/MIS (see relevant EL split view), the BAT-AELs should be adapted to reflect diesel engines’ operation with primary measures only for NO\textsubscript{x} emissions reduction.

The split view is accompanied by the following rationale (UK):

- Technical feasibility: the size and profile of island demand means that plant on remote islands need to be very flexible to accommodate rapidly changing loads. The loads on an island have a large seasonal variation as well as a frequently varying daily fluctuations. They are also commonly used to balance the variable generation from new renewable sources which adds further variability of the system. They also have to react quickly in Start-up and Shut Down situations. An optimised SCR system would be designed for the maximum output of the plant and would work best in a narrow temperature and flow window which would only be experienced in stable base load operation conditions which would very infrequently be experienced on these systems – therefore compromising the effectiveness of the SCR system.

- Water and space availability: the availability of water of sufficient quality may require the installation of an additional water treatment plant to meet the demand of
these systems. Space is usually limited on remote islands and small isolated systems, and is likely to be an issue for existing systems, but could also be a constraint for new systems constructed on existing sites.

- Logistical and transportation difficulties: as well as the cost of installation of the SCR, the additional cost of transportation, installation, management, replacement and disposal of catalyst would be significant. There will also be a requirement to supply, transport, store and handle additional hazardous chemicals e.g. ammonia for emission abatement. The additional costs incurred on these remote islands would be disproportionate to the potential environmental impact of emissions.
- Cost benefit – HFO/gas oil engines operating on a remote island or in a small isolated system have a relatively small environmental impact due to their small scale, running on low sulphur fuel and good air dispersal. Opting for liquid fuels, which are habitually more expensive than other alternatives already implies that resource availability and efficient connections and transport links are constrained for these island systems. The cost of emission abatement for such plant would be disproportionate to the small reduction in emissions that would be realised.

**EIPPCB assessment**

**Availability of information on which the split view is based:**
- Documents and information mentioned in the split view were available.

**Validity of supporting rationale:**
- It is not the aim of the BREF to set 'safety net' levels in case of derogation of new plants according to IED Article 15(4).
- The supporting rationale for the part of the split view about applying footnotes (4) and (5) to new plants that cannot be fitted with secondary abatement techniques for techno-economic reasons is based on the split view on SCR applicability restrictions. The economic restrictions refer to remote areas such as islands, not to SIS.
- The rationale to increase the higher ends of the yearly and daily NO\textsubscript{X} BAT-AELs ranges for new plants is supported by information from plants of the data set equipped with techniques listed in BAT 36 and linked with the alternative proposal.
- The 'General considerations' section of the BAT conclusions already reports that BAT-AELs are given at 15 % O\textsubscript{2} reference level for liquid fuels combusted in engines. Repeating this information in the table would not make any substantive difference.

**EIPPCB conclusion**

Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the split view for the parts related to increasing the upper ends of the yearly and daily NO\textsubscript{X} BAT-AEL ranges for new plants equipped with SCR and located in remote islands and to the application of footnotes (4) and (5) to new plants that cannot be fitted with secondary abatement techniques for techno-economic reasons. The EIPPCB considers that there are not enough appropriate technical arguments to support the remaining part of the split view. This split view will therefore be only partially reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
</table>

189
| BAT 36 Table 10.20 | Increase the higher ends of the yearly and daily NOX BAT-AEL ranges for new plants equipped with SCR and located in remote islands | EURELECTRIC, EUROMOT, EL | 240 mg/Nm³(yearly)
300 mg/Nm³(daily) |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Apply footnotes (4) and (5) to new plants that cannot be fitted with secondary abatement techniques for techno-economic reasons</td>
<td>EURELECTRIC, EUROMOT, EL, UK</td>
<td>NA</td>
<td></td>
</tr>
</tbody>
</table>

13.5.2 Decrease the upper end of the NOX BAT-AEL range for existing engines

Split view summary
CAN Europe proposes to decrease the upper end of the NOX BAT-AEL range for existing plants to 250 mg/Nm³.

The split view is accompanied by the following rationale:
- NOX background levels are too high in Europe, many Member States exceed national thresholds, and many cities cannot comply with local air quality standards. Therefore, BAT-AEL should be set at the lowest level technically possible and economically viable, in particular when it comes to new plants running for many years.
- The data collection shows (Plants 364V, 362V, 365V, 363V, 691) that it is possible to achieve the above proposed levels.

EIPPCB assessment
Availability of information on which the split view is based:
- Documents and information mentioned in the split view were available.

Validity of supporting rationale:
- The rationale is supported by information from plants of the data set equipped with techniques listed in BAT 36 and linked with the alternative proposal.

EIPPCB conclusion
Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the split view. This split view will therefore be reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 36 Table 10.20</td>
<td>Decrease the higher end of the NOX BAT-AEL range for existing plants</td>
<td>CAN Europe</td>
<td>250 mg/Nm³</td>
</tr>
</tbody>
</table>

13.5.3 Remove footnotes (4) and (5) in Table 10.20 giving information in case of non-applicability of SCR

Split view summary
EEB proposes to remove footnotes (4) and (5).
The split view is accompanied by the following rationale:

- No such equivalent provision is available for other fuels – where there is an issue over whether the BAT-AEL can be met due to available space, this is the subject of an IED Art 15.4 derogation.
- The trigger for the application of the footnote is the inability to fit secondary abatement. However, this is an artificial qualification in that it overlooks the reality of partial ability to fit secondary abatement in the face of space requirements.
- The justification required for an IED Article 15.4 derogation allows the potential for secondary abatement to be fully explored.

**EIPPCB assessment**

Availability of information on which the split view is based:
- Documents and information mentioned in the split view were available.

Validity of supporting rationale:
- ‘Retrofitting existing plants may be constrained by the availability of sufficient space’ was agreed as an applicability restriction for SCR by the TWG.

**EIPPCB conclusion**

Taking these aspects into account, the EIPPCB considers that there are not enough appropriate technical arguments to support the split view. This split view will therefore not be reported in the ‘Concluding remarks and recommendations for future work’ section of the BREF.

### 13.5.4 CO and TVOC from indicative levels to BAT-AELS

**Split view summary**

DE and CAN Europe propose to have the levels for TVOC as yearly and daily BAT-AELs and not as indicative levels (see Section 4 for the split view related to CO indicative levels).

The split view is accompanied by the following rationale (DE, CAN Europe):
- There is a need to control TVOC emissions as parameter which represents the state of incomplete combustion which may be associated with a great many of substances. In order to avoid very high short-term values short-term monitoring based on daily average levels is necessary. Especially when operators aim to comply with NO\textsubscript{X} BAT-AEL without any NO\textsubscript{X} flue-gas cleaning system CO emission and/or TVOC emission may increase significantly.

**EIPPCB assessment**

Availability of information on which the split view is based:
- Documents and information mentioned in the split view were available with the exception of the document ‘Research subproject 05 Determination of the state-of-the-art of emission control techniques for stationary internal combustion engines; UBA report 3708 44 300/05, April 2010’, submitted during or after the final meeting in June 2015 and thus not considered in the assessment.

Validity of supporting rationale:
- Only long-term TVOC emissions were reported in the data collection.

**EIPPCB conclusion**
Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the split view for the part related to yearly levels, but not for the part related to daily levels. This split view will therefore be only partially reported in the ‘Concluding remarks and recommendations for future work’ section of the BREF.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BAT 36</strong></td>
<td>Express TVOC emissions as yearly BAT-AELs and not as indicative levels</td>
<td>DE, CAN Europe</td>
<td>NA</td>
</tr>
<tr>
<td><strong>Table 10.20</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 13.5.5 Increase the CO and TVOC upper indicative levels

**Split view summary**

EURELECTRIC, supported by EL, proposes to increase the upper indicative levels to 190 mg/Nm³ for CO and to 70 mg/Nm³ for TVOC.

EUROMOT proposes to add the following contextual information along with the CO/TVOC indicative levels: ‘at high engine loads (> 90 %)’ and/or to increase the levels to 74 mg/Nm³ (15 % O₂) for TVOC and to 192 mg/Nm³ (15 % O₂) for CO.

EUROMOT proposes to add a footnote mentioning the indicative levels are given at 15 % O₂ reference level.

The split view is accompanied by the following rationale (EURELECTRIC):

- For the CO BAT-AEL, EURELECTRIC recommends to consider as reference the plant 691, which is equipped with SCR and that reported CO emission of 192 mg/Nm³ (15 % O₂). The additional data provided by France confirm the fact that these plants may experience significant CO emission, for instance because of sharp load variations. For one of the diesel engines considered, the 95th percentile of the daily CO averages is even higher, at 199 mg/Nm³.

- It has been acknowledged by the TWG that the applicability of oxidation catalyst is restricted by the sulphur content of the fuel (BAT 37) and hence may not be adapted to HFO.

- For the TVOC indicative level, we recommend to consider as reference the plant 427-7 which reported TVOC emission of 74 mg/Nm³ (15 % O₂). We consider that the 40 mg/Nm³ proposed by the EIPPCB is too low considering the low number of periodic measurement results available (15), the high variations between measurements (for instance the emissions of plant 427-7 are 7 times higher than the emissions of plant 427-6 although there are supposed to have the same technical characteristics, which highlights the uncertainty associated with these measurements) and the fact the most of these measurements are based on the USEPA Method 25 and not on the European standard EN12619 which may lead to discrepancies according to EUROMOT.

The split view is accompanied by the following rationale (EUROMOT):

- EUROMOT pointed out in May 2015 that the CO and TVOC data in the “LCP-BREF review – Data collection carried out in 2011 – 2012 at European Plant levels” BATIS database seem to be emissions measured at high engine loads and at lower engine loads emission values are higher.
On page 23 of Compiled Conclusions document /2/ is stated “Set yearly average indicative emissions .. but do not exclude a priori the possibility of setting BAT-AELs when justified”.

There are actually only in totally 15 TVOC measurement results (manual measurement average result in most cases of one or 2 samples each) measured with US EPA Method 25 A not the proposed EN 12619 method (methods have different sampling line temperatures with influence on the TVOC-measurement results) in the BATIS data collection database. Due to the very narrow BATIS TVOC database also the measured TVOC value (in plant 427-7) of 74 mg/Nm$^3$ (15 % O$_2$) calc. as C should be included in the informed span and not excluded.

Plants with SCR seemed to have amongst highest CO emissions in the BATIS database. BAT 37 states “applicability may be limited by the sulphur content of the fuel” for the oxidation catalyst. Thus for CO the value in the range to be increased to 192 mg/Nm$^3$ (15 % O$_2$) (measured in Plant 691 equipped with SCR).

In June 2015, EUROMOT made a note about the missing reference O$_2$ % for the given emission concentration. This should be given to avoid misinterpretation.

**EIPPCB assessment**

Availability of information on which the split view is based:
- Documents and information mentioned in the split view were available.

Validity of supporting rationale:
- There is no plant in the data collection using techniques listed in BAT 37 to prevent and/or reduce emissions of CO and volatile organic compounds. The higher CO levels mentioned in the split view are supported by information from plants of the data set equipped with SCR (e.g. Plant 691).
- The data collection does not provide a clear proof that that CO and TVOC emissions are lower at high engine loads and that at lower engine loads emission values are higher.
- A number of engine plants of the 2012 data collection report TVOC emissions based on the US EPA method. The possible differences depending on the different methods used are not clearly demonstrated.
- The split view supports the proposed TVOC levels with Plant 427-7, reporting 74 mg/Nm$^3$ TVOC. However, this plant does not meet its permit conditions, as the questionnaire reports an emission limit value of 50 mg/Nm$^3$).
- Oxygen reference levels are given in the 'General considerations' section of the BAT conclusions. Repeating the same statement would not make any substantive difference.

**EIPPCB conclusion**

Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the split view for the part related to increasing the higher indicative level, but not for the remaining parts of the split view. This split view will therefore be partially reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 37</td>
<td>Increase the higher indicative level for CO</td>
<td>EURELECTRIC, EL</td>
<td>190 mg/Nm$^3$</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EUROMOT</td>
<td>192 mg/Nm$^3$</td>
</tr>
</tbody>
</table>
13.6 **SO₂ BAT-AELs for engines – Increase the upper ends of the BAT-AEL ranges**

Conclusions of the meeting
Slide 310.

The BAT-associated emission levels for SO₂ from the combustion of HFO and/or gas oil in reciprocating engines are given in Table 10.21.

**Table 10.21:** BAT-associated emission levels (BAT-AELs) for SO₂ emissions to air from the combustion of HFO and/or gas oil in reciprocating engines

<table>
<thead>
<tr>
<th>Combustion plant total rated thermal input (MW\text{th})</th>
<th>BAT-AELs for SO₂ (mg/Nm\text{³})</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yearly average</td>
<td>Daily average or average over the sampling period</td>
<td></td>
</tr>
<tr>
<td></td>
<td>New plants</td>
<td>Existing plants</td>
<td>New plants</td>
</tr>
<tr>
<td>All sizes</td>
<td>≤45–100</td>
<td>100–200 (₃)</td>
<td>≤60–110</td>
</tr>
</tbody>
</table>

(₃) These BAT-AELs do not apply to combustion plants operated < 1500 h/yr.

(₄) The higher end of the BAT-AEL range is 280 mg/Nm\text{³} if no secondary abatement technique can be applied. This corresponds to a sulphur content of 0.5%.

(₅) These levels are indicative for combustion plants operated < 500 h/yr.

**Split view summary**

The UK and EURELECTRIC, supported by EL, propose to increase the upper ends of the SO₂ daily and yearly BAT-AEL ranges to 590 mg/Nm\text{³} corresponding to a maximum of 1 wt%S fuel oil, in the case of new and existing plants located in remote islands and isolated systems where 0.5 wt%S fuel oil is not readily available (footnote (₃)).

CY proposes to modify footnote (₃) in case no secondary technique would be applicable and where fuel with S content ≤ 0.5 wt% would not be available by setting alternative upper end of the daily/yearly emissions at 550/500 mg/Nm\text{³}.

EL, EURELECTRIC and EUROMOT, propose to apply footnote (₃) to new plants, and modify it as follows: The higher ends of the yearly and daily BAT-AEL ranges are respectively 280 and 300 mg/Nm\text{³} or the maximum sulphur content of the fuel is 0.5 wt-% if no secondary abatement techniques can be applied for techno-economical reasons'.

EL proposes to include in the above proposal for footnote (₃) that 'In case that fuel with S content ≤ 0.5% is not available the upper end of BAT-AEL range should be 590 mg/Nm\text{³}, corresponding to a sulphur content of <1%'.

The UK, EL, EURELECTRIC, EUROMOT propose to extend to new plants (yearly average) the application of footnote (₃).

EURELECTRIC, supported by EL, propose to add a footnote for new and existing plants (yearly and daily averages) to explain that 'These BAT-AEL do not apply to engines for emergency use operated less than 500 operating hours per year'.

EUROMOT, supported by EL, propose to extend footnote (₄) to also apply for the new plant daily average changing the wording to 'The BAT-AEL do not apply to engines for emergency
use operated less than 500 operating hours per year when such emergency use is not compatible with the use of BAT.

EUROMOT, supported by EL, proposes to add a footnote mentioning the BAT-AELs are given at 15 % O₂ reference level.

The split view is accompanied by the following rationale (UK):

- Implementation of Directive 2012/33/EU: the justification for inclusion of this footnote was given as the implementation of Directive 2012/33/EU of the European Parliament and of the council of 21 Nov 2012 amends Council Directive 1999/32/EC as regards the sulphur content of marine fuels. The directive does not limit the sulphur content of HFO to 0.5 %, rather it limits the sulphur content to 1 %. Further, it is unlikely that this grade of fuel will be freely available for engines operating on remote islands and isolated systems when this directive is implemented.
- Consistency with MCPD: introduction of a BAT-AEL of 590 mg/Nm³ for plants on remote islands is consistent with the provision of the MCPD for existing and new plants until 2025.

The split view is accompanied by the following rationale (EL):

- Based on the applicability constraints of secondary abatement techniques for SO₂ emissions reduction (DSI and Wet FGD) for diesel engines being part of SIS/MIS, which should apply to both new and existing diesel engines being part of a SIS/MIS (see relevant EL split view), the BAT-AELs should be adapted to reflect diesel engines’ operation with only low S fuel for SO₂ emissions reduction.
- HFO with S content 0.5 %, is not available in the Greek market. Only HFO with <1% S content is available now and there is no guarantee that it will be available at that time.
- According to BAT 38 the applicability constraints of “fuel choice” BAT, associated with the availability of different types of fuel are recognised.
- Furthermore, current EU legislation for liquid fuels quality (Directive 1999/32/EC amended) sets only requirements for the production and use of HFO with a sulphur content lower than 1 wt-% in Europe. Additionally, the introduction of a BAT-AEL of 590 mg/Nm³ for plants in SIS is consistent with the provision of the new MCP Directive for existing and new plants in SIS until 2025.

The split view is accompanied by the following rationale (CY):

- It was recognized during the discussion at the final TWG meeting that took place in Seville between 1-9/6/2015 that there are technical constraints to apply secondary abatement techniques for SO₂ reduction in existing reciprocating engines and especially in combustion plants less than 300 MWₑ. For this reason, the aforementioned technical constraints were included in all secondary abatement techniques for SO₂ reduction included in the list of BAT 38 (Best Available Techniques for the reduction of SO₂ emissions to air from the combustion of HFO and/or gas oil in reciprocating engines).
- Therefore, the only remaining BAT that can be applied in existing HFO-fired engines, that have technical constraints to apply the secondary abatement techniques included in the BAT 38 list, is fuel choice and specifically the use of an HFO-fuel with sulphur content of 0.5 %. However, as it is mentioned in the list of BAT 38, fuel choice is applicable within the constraints associated with the availability of different types of fuel which may be impacted by the energy policy of the Member State. Therefore the implementation of the specific decision to introduce the use of an HFO-fuel with sulphur content of 0.5 %, will depend on the availability of such a fuel.
- The vast majority of reference plants (engines), that are considered as existing, which submitted questionnaires and are included in the graph presented in BP-Section 1.5.2.3.2 BATc, use fuel with sulphur content between 0.85-1 %. In the updated graph presented in the afore mentioned BP Section, only two existing plants (430,
428-6V) reported SO2 emissions between 200 – 300 mg/Nm$^3$. However, from the questionnaires submitted, it seems that both plants use HFO with sulphur content between 0.9-0.95 % and they report no abatement technology. Most other reference plants reported average SO2 emissions in the range of 400-600 mg/Nm$^3$.

The split view is accompanied by the following rationale (EURELECTRIC):

- Contrary to other types of combustion plants (boilers, gas turbines), there is not emission limit value (“ELV”) set up in the annexes of the directive IED 2010/75/EU for liquid fuels-fired diesel engines. Hence the engines that will apply and obtain the derogation Art. 15.4 of IED 2010/75/EU will have no minimum requirements (“safety net”) to comply with at EU level. This is why EURELECTRIC is strongly pleading in favour of including SO2 BAT-AEL in the LCP BREF for new engines that cannot implement neither DSI nor FGD, nor switch to gasoil. The introduction of ‘techno-economic reasons’ is consistent with the footnote already agreed by the TWG in slides 82 and 119 of EIPPCB FM 2015. The increase of the daily BAT-AEL from 280 to 300 mg/Nm$^3$ is requested to deal with measurement uncertainty and with fuel quality variations corresponding to the specification of 0.5 wt % sulphur content liquid fuels.

- HFO with sulphur content of 0.5 wt% may not be available in remote areas and the disadvantages associated with its importation (environmental impact induced by fuel transportation from faraway areas, socio-economic impact on local refineries) may be higher than the advantages. See for instance FRANCE 2014 slide 18 (‘fuel supply is a complex issue in remote areas’). This could be the case in particular for small isolated systems which are significantly far from mainland Europe like Caribbean Sea and Indian Ocean according to FRANCE 2013. In such remote areas, BAT should be to use low sulphur fuels (typically 0.9 % S in the Caribbean Sea and the Indian Ocean) supplied by local refineries and not to import it from faraway areas. Furthermore EU legislation concerning liquid fuel quality (Directive 1999/32/EC amended) do not set requirement for the production and use of HFO with a sulphur content lower than 1 wt-% for plants in Europe (but only for marine fuels with regards to shipping). The use of diesel engines in islands impose restrictions to access in fuels, especially in winter time, which are more important if special grade of fuel is required (see EURELECTRIC 2013). The introduction of a BAT-AEL of 590 mg/Nm$^3$ for plants in SIS is consistent with the provision of the Draft directive MCP for existing and new plants in SIS until 2025.

The split view is accompanied by the following rationale (EUROMOT):

- Existing plants: slide 248 / footnote 11 gives an alternative to the continuous SO$_2$ measurement for combustion plants firing oil with known sulphur content without waste gas desulphurisation equipment. In order to strengthen this alternative (which is also allowed in current IED 2010/75/EU (Annex V Part 3) for SO$_2$) a slight change of footnote (1) is needed such as: ‘The upper end of the BAT-AEL range is 280 mg/Nm$^3$ if no secondary abatement techniques can be applied or the maximum sulphur content of the fuel is 0.5 wt- %.’. In the daily average SO$_2$ BAT-AEL for existing plants a footnote as the above one for the yearly average was missing in document. Footnote (1) has been inserted also to apply in context with the daily average for the existing plant. There was no clear agreement on setting footnote (1) to apply (same level of 280 mg/Nm$^3$) also for the daily average BAT-AEL value in the Seville meeting. The daily average level for SO$_2$ we propose to be set to 300 mg/Nm$^3$ (in line with procedures used for other techniques for difference between daily and yearly emission values seen in for other BAT).

- New plants: BATIS measurement database has actually no plant reference in SIS/MIS equipped with FGD (Flue gas Desulphurization), Malta (ref. 362 .. 365) is not a SIS/MIS. In document 1/ are the special conditions of island power generation listed such as: “lack of economies of scale, restricted fuel choice .., remoteness from continental infrastructure, the need of flexibility of generating plant to operate with high variations of duty cycle resulting from daily and seasonal variations in the
island’s electricity demand and increasingly fluctuating input from renewable power sources”, etc. Infrastructural limitations might exist for the supply of needed process reagents, spare parts, unavailability of water in big quantities (need depending on chosen FGD process), etc. Management of the produced FGD waste/end-product disposal is also a severe handicap for SIS. Air quality is not an issue for islands, SIS/MIS are in compliance with EU Directive 2008/50/EC. In light of above constraints, footnote 3 needs to extend also to new plants due to techno-economic reasons.

- EUROMOT made in June 2015 a note about the missing reference O₂-% for the given emission concentration. This should be given to avoid misinterpretation.

**EIPPCB assessment**

Availability of information on which the split view is based:

- Documents and Information mentioned in the split view were available.

Validity of supporting rationale to modify footnote (3) (by EL, EURELECTRIC, EUROMOT):

- Modification of footnote (3) to also include ‘for techno-economic reasons’ would be redundant as this is indeed one of the possible reasons why it may not be possible to apply secondary abatement techniques.
- Raw data without uncertainty subtraction have been used for deriving BAT-AELs as different approaches for validating data are used throughout Europe. The BAT-AEL in footnote (3) corresponds to a S content in the fuel agreed in the FM, which already considers the fuel variability.
- There is no clear justification in the rationale for the view to include ‘the maximum sulphur content of the fuel is 0.5 wt-%’ in footnote (3) as an alternative to the BAT-AEL. Furthermore, the flexibilities already introduced for the monitoring seem to make this statement redundant.
- Information about the requirement for an appropriate infrastructure for implementing the DSI is available in the revised draft BREF, in particular for the supply and/or the use of reagent in remote areas.
- Although the yearly/daily variability is expected to be less pronounced in cases where a specific emission level is solely determined by the chemical composition of a fuel conforming with standards, there are cases where BAT-AELs with different yearly and daily values were agreed by the TWG, even if the only technique considered was fuel choice (e.g. BAT-AEL for SOX emissions in GT combusting gas oil).

Validity of supporting rationale to add a footnote for SIS (by EURELECTRIC, UK):

- Regarding the argument made by the UK on the reflections made at the Final Meeting in relation to the Implementation of Directive 2012/33/EU, it is recalled that according to this Directive ‘Member States shall take all necessary measures to ensure that marine fuels are not used in the areas of their territorial seas, exclusive economic zones and pollution control zones if the sulphur content of those fuels by mass exceeds 0.5 % as of 1 January 2020’, which links to the general requirement to ensure availability of this type of fuel.
- According to the BREF Guidance, specific technical characteristics or local circumstances of individual plants should not be considered when defining BAT at EU level. The possible fuel availability restrictions mentioned may be covered as such local circumstances.

Validity of supporting rationale to extend footnote (4) to also apply for the new plant daily average (by EURELECTRIC, EUROMOT, EL):

- The link between fuel availability in remote areas and the proposal to include new plants in footnote (4) is considered local circumstances. As set out in the BREF
Guidance, such specific cases should not be considered when defining BAT at EU level.

Validity of supporting rationale to extend footnote (²) for new plants (by the UK, EURELECTRIC, EUROMOT, EL):
- The link between fuel availability in remote areas and the proposal to include new plants in footnote (²) is considered local circumstances. As set out in the BREF Guidance, such specific cases should not be considered when defining BAT at EU level.

Validity of supporting rationale to add a footnote for SIS (by CY):
- The fact that the fuel choice technique in general has applicability restrictions related to the energy policy of the MS does not have a specific bearing on the availability of 0.5 % sulphur fuel in the MS. The fact that plants from the data collection report the use of fuel with more than 0.85 % S content does not mean that they could not use the type of HFO agreed in the FM.

Validity of supporting rationale to add a footnote mentioning the indicative levels are given at 15 % O₂ reference level. (by EUROMOT):
- Oxygen reference levels for the BAT-AELs are given in the 'General considerations' section of the BAT conclusions. Adding redundant statements does not provide any added value.

EIPPCB conclusion
Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the split view for the part related to the modification of footnote (³) corresponding to the daily BAT-AEL ranges for new and existing plants if no secondary abatement techniques can be applied proposed by EL, EURELECTRIC and EUROMOT. The EIPPCB considers that there are not enough appropriate technical arguments to support the remaining parts of the split view. This split view will therefore only partially be reported in the 'Concluding remarks and recommendations for future work' section of the BREF

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 38</td>
<td>Modify footnote (³) applying to new and existing plants: The higher end of the yearly BAT-AEL range is 280 mg/Nm³ and the higher end of the daily BAT-AEL range is 300 mg/Nm³ if no secondary abatement technique can be applied.</td>
<td>EURELECTRIC, EUROMOT, EL</td>
<td>NA</td>
</tr>
</tbody>
</table>

| 13.7 Dust BAT-AELs for engines |

Conclusions of the meeting
Slide 317.

The BAT-associated emission levels for dust from the combustion of HFO and/or gas oil in reciprocating engines are given in Table 10.22.
Table 10.22: BAT-associated emission levels (BAT-AELs) for dust emissions to air from the combustion of HFO and/or gas oil in reciprocating engines

<table>
<thead>
<tr>
<th>Combustion plant total rated thermal input (MWth)</th>
<th>BAT-AELs for dust (mg/Nm$^3$)</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yearly average</td>
<td>Daily average or average over the sampling period</td>
<td></td>
</tr>
<tr>
<td></td>
<td>New plants</td>
<td>Existing plant ($^1$)</td>
<td>New plant</td>
</tr>
<tr>
<td>≥ 50</td>
<td>5–10</td>
<td>5–35</td>
<td>10–20</td>
</tr>
</tbody>
</table>

($^1$) These BAT-AELs do not apply to combustion plants operated < 1500 h/yr.

($^2$) These levels are indicative for combustion plants operated < 500 h/yr.

13.7.1 Increase the upper ends of the BAT-AEL ranges

Split view summary

The UK, EL, EURELECTRIC and EUROMOT propose to increase the upper ends of the daily and yearly dust BAT-AEL ranges respectively to 45 mg/Nm$^3$ and 35 mg/Nm$^3$ in the case of new plants located in remote islands/SIS where no secondary abatement techniques can be applied.

EL and EURELECTRIC propose to increase the upper ends of the daily and yearly dust BAT-AEL ranges for new plants respectively to 30 mg/Nm$^3$ and 20 mg/Nm$^3$, and to increase the upper ends of the daily and yearly dust BAT-AEL ranges for existing plants located in SIS to 50 mg/Nm$^3$.

EUROMOT proposes to increase the upper ends of the daily and yearly dust BAT-AEL ranges for new plants respectively to 30 mg/Nm$^3$ and 20 mg/Nm$^3$. Add a new time derogated footnote ($^3$) ‘For new plants situated in MIS/SIS the particulate limit is the same as for the existing plant’.

EL and FI support EUROMOT’s split view.

The split view is accompanied by the following rationale (UK):
- Technical characteristics: the size and profile of island demand means that plant on remote islands need to be very flexible to accommodate rapidly changing loads. This severely restricts stable ‘base load’ operation, which will limit the effectiveness of secondary abatement techniques. In order to meet the proposed BAT-AELs it is likely that plants will have to install electrostatic precipitators and/or bag filters. Electrostatic precipitators are designed for systems which operate under stable loads, this is not considered appropriate for remote island demand where loads rapidly change and are often operated in emergency mode. Due to technical restrictions on the fabrics used, bag filters normally require the flue gas to be cooled; this would require additional investment in heat recovery equipment and in some cases may lead to plume grounding issues with a less buoyant plume.
- Cost benefit – HFO/gas oil engines operating on a remote island or in a small isolated system will be required to meet the relevant air quality standards implementing Directive 2008/50/EC protecting ambient air quality. Many plants in these circumstances will have a relatively small environmental impact due to their small scale, running on low sulphur fuel and good air dispersal. The cost of emission abatement for such plant would be disproportionate to the small reduction in emissions that would be realised.

The split view is accompanied by the following rationale (EL):
None of the reference plants that have been submitted to EIPPCB is equipped with bag filters or electrostatic precipitators. The BAT-AELs proposed in the conclusions of the FM for new engines are derived from only one single plant which is only a case study (DELIMARA plant, references 362 to 365), using bag filters for dust emission abatement. This installation can be considered as a “single of its kind” installation in the world. It should be noted that the MALTESE authorities sent this plant to the EIPPCB as a “case study” and not as a reference plant and that the local dust ELV was 50 mg/Nm$^3$ (and not 20 or 10 mg/Nm$^3$, allowing for more flexibility). The plant is operating in quite stable conditions (Malta is not a SIS) while no long time feedback will be available since the plant is currently dismantled to shift to gas after only a few months of operation, due to the increased operating costs of the abatement system.

New MCP Directive fully recognises for medium combustion plants the specificity of SIS/MIS, as well as the need for more time to develop and test dust removal techniques for HFO engines (the draft directive sets a dust ELV of 75 mg/Nm$^3$ for new medium combustion plants located in SIS until 2025. To this end, in the draft MCP directive, there is a review clause to assess the need to review the provisions as regards plants being part of SIS/MIS.

BAT-AELs in the revised LCP BREF for existing engines should be in line with the existing LCP BREF 2006 requirements (50 mg/Nm$^3$ for dust emission monitored at steady state above 85% of the nominal load). It should be noted that the introduction of a specific BAT-AEL for existing plants in SIS/MIS is fully in line with the provision of the Draft directive MCP that foresees derogation until 2030 for all existing medium combustion plants located in SIS.

The split view is accompanied by the following additional rationale (EURELECTRIC):

The BAT-AEL proposed in the conclusions of the FM for new engines are derived from only one single plant (DELIMARA plant, references 362 to 365), using a specific technology for dust emission abatement (DSI + bag filters). This installation can be considered as a “single of its kind” installation in the world. It should be noted that the MALTESE Authorities sent this plant to the EIPPCB as a “case study” and not as a reference plant, that the local dust ELV was 50 mg/Nm$^3$ (and not 20 nor 10 mg/Nm$^3$, which allow more flexibility), that the plant is operating in quite stable conditions (Malta is not a SIS) and that no long time feedback will be available since the plant is currently dismantled to shift to gas after only a few years of operation.

See EUROMOT 2013, EUROMOT 2014 and EUROMOT 2015 for a comprehensive analysis of the DELIMARA case and limitations. According to art. 2.3.8 of Decision 2012/119/EU, a “thorough assessment of the applicability” of the technique by the TWG is required, which in our opinion has still to be carried out. This is why EURELECTRIC pleads for increasing the higher end of the dust BAT-AEL ranges in order to allow the use of other techniques, such as ESP (which is also considered as BAT for engines), combined or not with FGD.

Contrary to other types of combustion plants (boilers, gas turbines), there is no emission limit value (“ELV”) set up in the annexes of the directive IED 2010/75/EU for liquid fuels-fired diesel engines. Hence the engines that will apply and obtain the derogation Art. 15.4 of IED 2010/75/EU will have no minimum requirements (“safety net”) to comply with at EU level. This is why EURELECTRIC is strongly pleading in favour of including BAT-AEL in the LCP BREF for new engines that cannot implement ESP nor bag filters, in particular when located in SIS. Please note that Draft directive MCP fully recognizes for medium combustion plants the specificity of SIS as well as the need for more time to develop and test dust removal techniques for HFO engines (the draft directive fixes a dust ELV of 75 mg/Nm$^3$ for new medium combustion plants located in SIS until 2025).
Contrary to other types of combustion plants (boilers, gas turbines), there is not emission limit value ('ELV') set up in the annexes of the directive IED 2010/75/EU for liquid fuels-fired diesel engines. Hence the engines that will apply and obtain the derogation Art. 15.4 of IED 2010/75/EU will have no minimum requirements ('safety net') to comply with at EU level. This is why EURELECTRIC is strongly pleading in favour of including BAT-AEL in the LCP BREF for existing engines that cannot go beyond the existing LCP BREF 2006 requirements (50 mg/Nm$^3$ for dust emission monitored at steady state above 85 % of the nominal load). It should be noted that the introduction of a specific BAT-AEL for existing plants in SIS is fully in line with the provision of the Draft directive MCP that foresees a time derogation until 2030 for all existing medium combustion plants located in SIS.

The split view is accompanied by the following additional rationale (EUROMOT):

- Shared information shows that chosen secondary abatement technique candidate has big issues that cannot thus be deemed as a general BAT for the whole (new) engine sector. An alternative BAT approach is needed in order to cover the whole (new) engine sector such as a combination of dry ESP and wet limestone FGD (in order to fulfil both particulate and SO2 limits). A combination of e.g. a dry ESP and a Wet FGD needs thorough testing before any BAT particulate conclusion might be drawn. If the mist eliminator of the wet scrubber is not working properly small water droplets including fly ash may remain in the flue gases /5/ (section 3.3.3.1.4). Thus particulate emission might increase. Particulate removal rate of a wet limestone scrubber is depending on particulate size, EUROMOT informed that in the few diesel power plants equipped with wet limestone scrubbers, impact of the scrubber has in practice been “nil” on particulate reduction.

- EUROMOT document May 2015 (similar feedback also submitted May 2013) showed that 11 plants (namely references: 428-5, 428-8 …-10, 492-2, 492-4, 430, 177, 178, 179, 180) in the database had too low (erroneous) dust emission data reported. Emissions of 4 references in Greece present in above list (namely ref. 177, 178, 179, 180) had not been updated despite Greece submitted corrected data in autumn 2013. Techniques for dust reduction (BAT 39) for a reciprocating plant are given in table of slides pages 249 - 250 as fuel choice, bag filter and ESP. A check with data collection in BATIS showed: the EIPPCB conclusion for the dust limit is based on the bag filter technique, i.e. based solely on the Maltese (362, 363, 364 and 365) plant: consisting in total of 8 similar engines, four exhaust gas trains (each with 2 engines connected to a novel NaHCO3-type FGD) and a common steam turbine in the plant. Thus this should be considered as one new reference plant (whole plant taken into operation autumn 2012). Thus this should be considered as one new reference plant (whole plant taken into operation autumn 2012). I.e. paragraph 2.3.8 of the BREF Guidance should be applied. In EUROMOT opinion this has not been the case in the TWG work.

- Techniques used in Malta cannot be deemed to be a general BAT for the whole liquid-fired engine sector. In the Seville TWG meeting (June 5th 2015) when the dust emission limits were discussed EIPPCB referred also to ongoing the Medium Combustion Plant Directive (MCPD) process as a reference for setting the dust emission limit to 10 mg/Nm$^3$ (15 % $O_2$). We want to inform that in the final decided emission values for dust a derogation for the areas where HFO is mostly used until year 2025 has been set for new plants and until then the dust limit for new plants in SIS/MIS using e.g. HFO is set to 75 mg/Nm$^3$ (15 % $O_2$). This is thus a strong indication for what EUROMOT expressed in the Seville meeting June 2015 that there are no proven available secondary abatement technique to reach the proposed dust limits in Table 10.22 for the new plant. Time is needed for the development of alternative dust removal techniques besides bag filter and also for more long term testing on bag filters in diesel plants. In meantime it should be logical (for technical
& economic reasons) to set a dust limit similar as for the existing plant for these special SIS/MIS areas until techniques mature enough are available on the market. In order to spur development of new secondary techniques dust limits shall be set to be reasonable.

**EIPPCB assessment**

Availability of information on which the split view is based:
- Data and information mentioned in the split view were available.

Validity of supporting rationale to increase the higher ends of the daily and yearly dust BAT-AEL ranges for new plants (EL, EURELECTRIC, EUROMOT):
- The rationale includes technical arguments related to the possible configurations for both SO\textsubscript{X} and dust reduction (e.g. dry ESP and wet FGD) which could lead to higher levels of dust emissions than those of the Maltese plant, which supports the levels proposed in the split view.

Validity of supporting rationale to increase the upper ends of the daily and yearly dust BAT-AEL ranges for new and existing plants located in SIS (EL, UK, EURELECTRIC, EUROMOT):
- BAT-AELs agreed in the 2006 BREF for existing plants do not support the BAT-AELs in the BREF review because they do not take into account updated information collected in the course of this review.
- The rationale includes technical arguments related to the resistance of the bag filter or to the efficiency of de-dusting devices in the possible cases of engines operating with variable loads in remote areas that support the split view for new plants.
- The levels proposed in the split view for new plants are supported by data from the 2012 data collection, referring to plants achieving levels agreed for existing plants and not implementing secondary abatement techniques.

Validity of supporting rationale to add new footnote (\textsuperscript{4}) in Table 10.22 for the existing plant yearly and average dust limits: (\textsuperscript{4}) 'at > 85 % of engine MCR load, steady state conditions' (by EUROMOT):
- Technical information mentioned by EUROMOT supporting the proposal analyses in detail the 'technical availability' of secondary abatement techniques for dust and SO\textsubscript{2} used by Plants 362, 363, 364 and 365 in the context of reaction to the proposals given in the BP for the dust BAT-AEL daily average for new plants. There is neither clear justification for the correlation of the emissions and the engine load, nor for the percentage of engine load that could affect the efficiency of the techniques listed in BAT 39.

**EIPPCB conclusion**

Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support part of the split view. This split view will therefore be reported for the part about increasing the upper ends of the ranges for new plants in the 'Concluding remarks and recommendations for future work' section of the BREF.

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
</table>

202
<table>
<thead>
<tr>
<th>BAT 39 Table 10.22</th>
<th>Increase the higher ends of the daily and yearly dust BAT-AEL ranges for new plants</th>
<th>EL, EURELECTRIC, EUROMOT, FI</th>
<th>30mg/Nm$^3$(daily) 20mg/Nm$^3$(yearly)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Increase the higher ends of the daily and yearly dust BAT-AEL ranges for new plants located in remote islands/SIS/MIS</td>
<td>UK, EL, EURELECTRIC, EUROMOT, FI</td>
<td>45mg/Nm$^3$(daily) 35mg/Nm$^3$(yearly)</td>
</tr>
</tbody>
</table>

### 13.7.2 Decrease the upper ends of BAT-AEL ranges

#### Split view summary

CAN Europe proposes to decrease the upper end of the dust yearly BAT-AEL range to 10 mg/Nm$^3$ for existing plants.

EEB proposes to decrease the upper ends of the dust BAT-AEL ranges as follows:

- Yearly upper level for new plants: 7 mg/Nm$^3$.
- Daily upper level for new plants: 15 mg/Nm$^3$.
- Yearly upper level for existing plants: 20 mg/Nm$^3$.
- Daily upper level for existing plants: 40 mg/Nm$^3$.

The split view is accompanied by the following rationale (CAN Europe):

- PM levels in many areas in Europe are far too high and have significant impact on public health. Therefore it is justified to apply techniques that achieve lowest emission levels, in particular fabric filters.
- The data collection shows that it is possible to achieve the above proposed levels (plants 364V, 362V, 365V, 363V).

The split view is accompanied by the following rationale (EEB):

- Yearly upper limit for new plants
  - Plants 362, 363, 364 and 365 achieve average dust emissions of 5-7 mg/Nm$^3$ with bag filters.
  - Bag filters are more effective than ESPs at removing the fine particles that are most damaging to human health.
  - The upper BAT-AEL for new plants should therefore be 7 mg/Nm$^3$.
- Daily upper limit for new plants
  - Plants 362, 363, 364 and 365 achieve 95th percentile dust emissions of 12-15 mg/Nm$^3$.
  - As these plants form the basis of the EEB’s proposed yearly average, the upper daily average should be 15 mg/Nm$^3$.
- Yearly upper limit for existing plants
  - The TWG proposed upper limit is set by plant 428-5, which uses fuel choice without any secondary abatement.
  - However, plant 428-10 also uses fuel choice without secondary abatement, but performs much better.
  - The upper BAT-AEL should therefore be 20 mg/Nm$^3$ (plant 428-10).
- Daily upper limit for existing plants
  - A well-run plant should not have an excessive difference between its average and 95th percentile emissions.
There is no 95th percentile or maximum data reported for the reference plant 428-10, used by the EEB to propose a split view for the yearly upper limit for existing plants.

However, plants 429-2, 429-4 and 430 have differences of 1-5 mg/Nm$^3$ between its average and maximum data.

Therefore, for a yearly average of 20 mg/Nm$^3$, the daily average should be 25 mg/Nm$^3$.

**EIPPCB assessment**

Availability of information on which the split view is based:
- Documents and information mentioned in the split view were available.

Validity of supporting rationale:
- The rationale is supported by information from plants of the data set equipped with techniques listed in BAT 39.

**EIPPCB conclusion**

Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the split view. This split view will therefore be reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
</table>
| BAT 39 Table 10.22 | *Decrease the higher ends of the yearly and daily dust BAT-AEL ranges for new and existing plants* | EEB | *Yearly:* 7 mg/Nm$^3$ (new) 20 mg/Nm$^3$ (existing)  
*Daily:* 15 mg/Nm$^3$ (new) 40 mg/Nm$^3$ (existing)  
*Can Europe* | *Yearly:* 10 mg/Nm$^3$ (existing) |

**13.7.3 Limit the applicability of BAT-AELs to HFO engines**

**Split view summary**

FR proposes not to make reference to gas oil engines in the Table 10.22 title.

The split view is accompanied by the following rationale (FR):
- In the graphs, there is no data reported for engines using gasoil only. Hence, it does not seem clear which BAT is required to reach the proposed BAT-AELs for new engines. Namely, it does not seem clear whether BAT 39a alone could achieve such BAT-AELs or whether BAT 39c or BAT 39d are required in all circumstances. This situation leads to high uncertainties in terms of techno-economic balance.
- French authorities believe that emissions of dust from new gasoil-fired engines are low by implementing BAT 39a alone. However, French authorities strongly question the possibility to reach the proposed dust BAT-AELs for new engines by implementing BAT 39 alone.
- French Authorities consider that more information on gasoil-fired engines must be collected for the next review of the LCP BREF.
EIPPCB assessment

Availability of information on which the split view is based:

- Documents and Information mentioned in the split view was available.

Validity of supporting rationale:

- The number of gas oil-fired-plants is limited. Plants reporting the use up to 76% gas oil during a year are available in the data collection. BAT 39 is to use one or a combination of the given techniques, including an ESP and bag filter, both of which were agreed in the FM to be applicable to gasoil-fired engines.

EIPPCB conclusion

Taking these aspects into account, the EIPPCB considers that there are not enough appropriate technical arguments to support the split view. This split view will therefore not be reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

13.7.4 Include reference conditions

Split view summary

EUROMOT proposes to add a footnote mentioning that levels set for existing plants apply 'at > 85% of engine MCR load, steady state conditions' and that the oxygen reference level is 15%.

The split view is accompanied by the following rationale:

- In May 2015, EUROMOT highlighted that the engine load information for the gathered dust data in BATIS is not given and that dust emission increase at part loads. EUROMOT commented also in the TWG meeting the need to specify the engine load when setting dust limits and obtained values indicate high load operation of the engines. FM conclusions state actually “Assess cases by cases, for each plant category, the need to address the influence of load modes in fuel specific BAT conclusions, e.g. via footnotes “. I.e. a new footnote “4” needs to be added for the existing plant yearly and average limits such as “at > 85% of engine MCR load, steady state conditions.”
- In June 2015, EUROMOT made a note about the missing reference O2-% for the given emission concentration. This should be given to avoid misinterpretation.

EIPPCB assessment

Availability of information on which the split view is based:

- Documents and information mentioned in the split view were available.

Validity of supporting rationale:

- EUROMOT says in the split view that the engine load for the gathered dust data is not given and that dust emissions increase at part loads. A number of plants of the data collection using only fuel choice for dust abatement reported the average of single dust measurements without a clear connection to the engine load. Reference is made to the 2006 LCP BREF which gives expected dust emissions from engines using fuel choice and dust BAT-AELs applying only above a minimum load threshold.
- Oxygen reference levels for the BAT-AELs are given in the 'General considerations' section of the BAT conclusions. Adding redundant statements does not provide any added value.
EIPPCB conclusion
Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support part of the split view. This split view will therefore be reported for the part related to adding a footnote mentioning that yearly BAT-AELs for existing plants using only fuel choice apply at engine MCR loads of > 85 %, in steady state conditions in the 'Concluding remarks and recommendations for future work' section of the BREF.

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 39 Table 10.22</td>
<td>Add a footnote mentioning that yearly BAT-AELs for existing plants using only fuel choice apply at engine MCR loads of &gt; 85 %, in steady state conditions</td>
<td>EUROMOT</td>
<td>NA</td>
</tr>
</tbody>
</table>

13.8 BAT-AEELs for engines

Conclusions of the meeting
Slide 295.

The BAT-associated energy efficiency levels for the combustion of HFO and/or gas oil in reciprocating engines are given in Table 10.19.

<table>
<thead>
<tr>
<th>Type of combustion unit</th>
<th>BAT-AEELs (1)</th>
<th>Net electrical efficiency (%) (2)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>New unit</td>
<td>Existing unit</td>
</tr>
<tr>
<td>HFO- and/or gas oil-fired reciprocating engine – single cycle</td>
<td>41.5–44.5 (3)</td>
<td>38.3–44.5 (3)</td>
</tr>
<tr>
<td>HFO- and/or gas oil-fired reciprocating engine – combined cycle</td>
<td>&gt; 48 (4)</td>
<td>N.A.</td>
</tr>
</tbody>
</table>

(1) These BAT-AEELs do not apply to units operated < 1500 h/yr.
(2) Net electrical efficiency BAT-AEELs apply to CHP units whose design is oriented towards power generation, and to units-generating only power.
(3) These levels may be difficult to achieve in the case of engines fitted with sophisticated secondary abatement techniques.
(4) This level may be difficult to achieve in the case of engines using a radiator as a cooling system in dry, hot geographical locations.

Split view summary
EUROMOT proposes to:
- lower range of the Net electrical efficiency % for a new HFO- and gas oil-fired reciprocating engine single cycle unit is to be decreased to 40 %. I.e. Net electrical efficiency (%) for a new unit lower threshold is to be 40 %;
- change the net electrical efficiency % of the new HFO-and gas oil-fired reciprocating engine – combined cycle to be reduced to > 46.9 %.

The split view is accompanied by the following rationale:
Reference 176 is a 2-stroke engine (2-stroke engines are more efficient than 4-stroke engines and units 427-5, 427-8 are (460 mm) big bore 43.7 MWth four stroke 18 cylinder diesel engine units. Reference 428-9 is a big (480 mm) bore 4-stroke with a heat input of an about 32 MWth (12 cylinder unit). Engine 429-4 is a (500 mm) big bore 39.5 MWth, DF 4-stroke unit. References 178 and 179 are 27.5 MWth (12 cylinder unit). Engine 427-4 is a (500 mm) big bore 39.5 MWth DF 4-stroke unit. All above referred references are much bigger than the > 15 MWth minimum unit threshold set for units included and thus the lower efficiency threshold for a new diesel engine is to be lowered to 40 % in order not restrict usage of engines with smaller bore sizes such as e.g. 320 mm. Task force report 1/1, see Table 7.2b actually also set the lower threshold to 40 % for the reciprocating engine case (see also 3/1).

Note also that no information has been given for references 178/179 if plants are equipped with a high voltage transformer or not (in reference 2/ page 5 EUROMOT is not equipped with a high voltage transformer in order of 0.5 % of the gross output! If the engine alternator voltage is at a similar level as of the receiving local electrical grid then a high voltage transformer is not needed, this might be the case in especially medium sized power producing plants. See also EUROMOT split view on gas engine efficiency (“Table 10.29 in revised draft 1” slide 65 “Energy Efficiency: Techniques BAT-AEELs (6/7) –BP 1.6.1” for more information about high voltage transformer impact).

Combined cycle efficiency is based on only one plant equipped with big bore (460 mm) efficient 4-stroke engines. As shown in the case for the single cycle engines smaller (bore) engine units have a lower electrical efficiency. Addition of a steam turbine will make the total efficiency higher compared to the single cycle case. But it is widely known that a steam cycle (especially low/medium pressure ones used in smaller unit case compared to bigger engine unit case) will lead to a lower total efficiency of the combined cycle plant. Thus in order not to lock out combined cycle plants equipped with smaller engine units down to 15 MWth the total efficiency given shall at least be set down to > 46.9 % which is actually also a part of the real overall performance of the Maltese plant during its total short operation period (more long term data from this plant should be needed in order to see long term impact degradation). Before drawing BAT conclusions - not only best figures of the plant should be used).

EIPPCB assessment

Availability of information on which the split view is based:

- Documents and information mentioned in the split view were available.

Validity of supporting rationale:

- EUROMOT supports the alternative design BAT-AEELs with the performance levels reported by plants from the data collection and technical arguments.

EIPPCB conclusion
Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the split view. This split view will therefore be reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 35 Table 10.19</td>
<td>Change the lower end of the of the net electrical efficiency range for a new HFO- and gas-oil-fired reciprocating engine – single cycle</td>
<td>EUROMOT</td>
<td>40 %</td>
</tr>
<tr>
<td></td>
<td>Change the net electrical efficiency of the new HFO- and gas-oil-fired reciprocating engine – combined cycle</td>
<td></td>
<td>&gt; 46.9 %</td>
</tr>
</tbody>
</table>

14 BAT CONCLUSIONS FOR EMISSIONS TO AIR FROM THE COMBUSTION OF IRON AND STEEL PROCESS GASES

14.1 NO\textsubscript{X} BAT conclusions for boilers – SCR and SNCR

Conclusions of the meeting
Slides 341/342.

BAT 52 In order to prevent and/or reduce NO\textsubscript{X} emissions to air from the combustion of iron and steel process gases in boilers, BAT is to use one or a combination of the techniques given below.

<table>
<thead>
<tr>
<th>Technique</th>
<th>Description</th>
<th>Applicability</th>
</tr>
</thead>
<tbody>
<tr>
<td>e. Selective catalytic reduction</td>
<td>See description in Section 10.8</td>
<td>Not applicable to combustion plants operated &lt; 500 h/yr. Not generally applicable to plants of &lt; 100 MW\textsubscript{th}. Retrofitting existing plants may be constrained by the availability of sufficient space and by the combustion plant configuration.</td>
</tr>
<tr>
<td>f. Selective non-catalytic reduction (SNCR)</td>
<td>See description in Section 10.8</td>
<td>Not applicable to combustion plants operated &lt; 500 h/yr.</td>
</tr>
<tr>
<td>…</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Split view summary
Eurofer is of the view that SCR is only applicable to new plants and to existing plants in specific situations where local conditions require further NO\textsubscript{X} reduction (e.g. environmental standards are not likely to be met).
Eurofer also is of the view that SNCR should not be considered BAT.

The split view is accompanied by the following rationale:
- In relation to SCR:
There are a limited number of plants in the EU utilising iron and steel process gases that are equipped with SCR.

The technology requires very high investments as the installation of SCR involves both high investment costs and loss of capacity since the boiler in which it is fitted has to be taken out of operation for a long period of time.

The efficiency of operation has to be curtailed to minimise the risk of NH₃ slip.

Consistency with the applicability of SCR technique for Sinter Plants (BAT 23 Iron and Steel BREF) should be sought: 'This technique might be an option where environmental quality standards are unlikely to be met through the application of other techniques'. LCP BAT conclusions must not be in conflict with conclusions of other vertical BREFs as for example I&S BREF (BAT Iron and Steel production - Commission Implementing Decision 2012/135/EU), according to the section 1.1.2 of the BREF Guidance (Commission Implementing Decision 2012/119/EU).

The proposal is aligned with Article 18 of the IED in relation to environmental quality standards.

In the last draft LCP BREF (available from 27th May 2015 for TWG) this technique is not specifically referenced for the determination of BAT for I&S process gas LCPs (not aligned to Section 3.1 of the BREF Guidance: the technique should have been mentioned in the chapter of the BREF entitled 'Techniques to consider in the determination of BAT').

In relation to SNCR:

The BREF document has not demonstrated a case for this process to be considered a BAT for this sector.

In the last draft LCP BREF (available from 27th May 2015 for TWG): The applicability may be limited in case of boilers with load variations or with variable fuel quality. These are the operating conditions for iron and steel process gas-fired boilers and therefore SNCR should be considered not applicable.

There are no reference plants in the EU where SNCR is used on LCPs utilising iron and steel process gas (see the official validated questionnaire data collected by the EIPPCB). SNCR is not applicable to LCPs in the sector because the fluctuation in the process gases is too high.

No operational information has been collected and subsequently used to propose this BAT for I&S LCPs (Section 2.3.7.2.9 of the BREF Guidance). As such, no evidence or assessment of its applicability (Section 2.3.8 of the BREF Guidance) have been advanced to support the selection of this technique as being a BAT within the sector.

The SNCR technique is not in the BAT 52 list for boilers plants because there are no reference plants with installed SNCR in the EU.

In the last draft LCP BREF (available from 27th May for TWG) SNCR is not included as technique to reference for the determination of BAT for LCP I&S.

No alignment with point 3.1 of the BREF Guidance: “The technique should have been mentioned in the chapter of the BREF entitled ‘Techniques to consider in the determination of BAT’.

EIPPCB assessment

Availability of information on which the split view is based:

- Documents and information mentioned in the split view were available.

Validity of supporting rationale (SCR):

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• The information used by Eurofer in its rationale is included in Section 7.3.4.2.1 which describes the SCR technique (limited number of plants, costs, and operational aspects including the need to control NH\textsubscript{3} slip). However, it does not refer to the proposal about ‘specific situations where local conditions require further NO\textsubscript{X} reduction’. These local conditions are to be dealt with within the provisions of Article 15(4) of the IED.

• In any case the TWG agreed to have certain applicability restrictions for the use of SCR in the case of existing plants, related to the number of operated hours, to the plant size, to the space availability and to the combustion plant configuration.

• The applicability of SCR to a combustion plant and to a sinter plant may differ as they are different types of plants. Thus there is no perceived contradiction between the LCP BAT conclusion and the Iron and Steel BAT conclusions.

Validity of supporting rationale (SNCR):
• No example of a combustion plant firing iron and steel process gases and fitted with SNCR has been reported through the data collection performed at European plants in 2012, except one plant where SNCR was being tested in 2012. No additional information on iron and steel plants fitted with such a technique elsewhere in the world was made available in the review process either.

**EIPPCB conclusion**
Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the split view in the case of SNCR, but not in the case of SCR. This split view will therefore only be partially reported, for the part related to SNCR, in the ‘Concluding remarks and recommendations for future work’ section of the BREF.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 52</td>
<td>Remove ‘Selective non-catalytic reduction (SNCR)’ from the techniques listed in BAT 52</td>
<td>Eurofer</td>
<td>NA</td>
</tr>
</tbody>
</table>

**14.2 NO\textsubscript{X} BAT conclusions for CCGTs – SCR**

**Conclusions of the meeting**
Slide 347.

BAT 53 In order to prevent and/or reduce NO\textsubscript{X} emissions to air from the combustion of iron and steel process gases in CCGTs, BAT is to use one or a combination of the techniques given below.

<table>
<thead>
<tr>
<th>Technique</th>
<th>Description</th>
<th>Applicability</th>
</tr>
</thead>
<tbody>
<tr>
<td>…</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Selective catalytic reduction (SCR)</td>
<td>See description in Section 10.8</td>
<td>Retrofitting existing plants may be constrained by the availability of sufficient space.</td>
</tr>
<tr>
<td>…</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Split view summary**
Eurofer does not consider SCR a general BAT for plants utilising iron and steel process gases, and proposes that SCR may be applicable to new plants and to existing plants in specific
situations where local conditions require further NO\textsubscript{X} reduction (e.g. environmental standards are not likely to be met).

The split view is accompanied by the following rationale:

- There are a limited number of plants in the EU utilising iron and steel process gases that are equipped with SCR.
- The technology requires very high investments as the installation of SCR involves both high investment costs and loss of capacity since the boiler in which it is fitted has to be taken out of operation for a long period of time.
- The efficiency of operation has to be curtailed to minimise the risk of NH\textsubscript{3} slip.
- Consistency with the applicability of SCR technique for Sinter Plants (BAT 23 Iron and Steel BREF) should be sought: 'This technique might be an option where environmental quality standards are unlikely to be met through the application of other techniques'. LCP BAT conclusions must not be in conflict with conclusions of other vertical BREFs as for example I&S BREF (BAT Iron and Steel production - Commission Implementing Decision 2012/135/EU), according to the section 1.1.2 of the BREF Guidance (Commission Implementing Decision 2012/119/EU).
- The proposal is aligned with Art 18 of the IED in relation to environmental quality standards.
- In the last draft LCP BREF (available from 27th May 2015 for TWG) this technique is not specifically referenced for the determination of BAT for I&S process gas LCPs (not aligned to Section 3.1 of the BREF Guidance: the technique should have been mentioned in the chapter of the BREF entitled 'Techniques to consider in the determination of BAT').

**EIPPCB assessment**

*Availability of information on which the split view is based:*

- Documents and information mentioned in the split view were available.

**Validity of supporting rationale:**

- The information used by Eurofer in its rationale is included in Section 7.3.4.2.1 which describes the SCR technique (limited number of plants, costs, and operational aspects including the need to control NH\textsubscript{3} slip). However, it does not refer to the proposal about 'specific situations where local conditions require further NO\textsubscript{X} reduction'. Specific aspects are not supposed to be dealt with in the BREF context, which takes a sectoral approach.
- The TWG agreed to have applicability restrictions for the use of SCR in the case of lack of space.
- The applicability of SCR to a combustion plant and to a sinter plant may differ as they are different types of plants. Thus there is no contradiction between the LCP BAT conclusion and the Iron and Steel BAT conclusions.

**EIPPCB conclusion**

Taking these aspects into account, the EIPPCB considers that there are not enough appropriate technical arguments to support the split view. This split view will therefore not be reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

14.3 CO BAT conclusions for CCGTs – Oxidation catalyst

*Conclusions of the meeting*

Slide 351.
BAT 54  In order to prevent and/or reduce CO emissions to air from the combustion of iron and steel process gases, BAT is to use one or a combination of the techniques given below.

<table>
<thead>
<tr>
<th>Technique</th>
<th>Description</th>
<th>Applicability</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Combustion optimisation</td>
<td>See description in Section 10.8</td>
<td>Generally applicable</td>
</tr>
<tr>
<td>e. Oxidation catalysts</td>
<td>See description in Section 10.8</td>
<td>Only applicable to CCGTs. The applicability may be limited by lack of space, the load requirements and the sulphur content of the fuel</td>
</tr>
</tbody>
</table>

**Split view summary**

Eurofer proposes that ‘Oxidation catalysts’ be removed from the list of BAT.

The split view is accompanied by the following rationale:

- The process is not properly described in D1 (June 2013) of the draft revised LCP BREF dated 27.05.2015:
- There is a brief outline of the chemistry of the process on Page 263 but there are no specific details on its application to CCGTs in the sector.
- The Table 7.12 ‘Environmental performance and operational data’ indicates ‘High operational experience’.
- The cross-media effects are noted as ‘SO₂ and NO generation’ and the economics as ‘high CAPEX low OPEX’.
- In the revised LCP Draft1 Chapter 10 the technique is mentioned on page 109, but again there are no practical details.
- The technique is discussed in Chapter 11 (Draft D1 of the LCP BREF review) page 827, under the general heading of “Emerging Techniques” where its use has been limited to very small scale operations in the US.
- There are no reference plants in the EU using this Emerging Technique. No operational information has been collected and subsequently used to propose this BAT for I&S LCPs (Section 2.3.7.2.9 of the BREF Guidance). As such no evidence or assessment of its applicability (Section 2.3.8 of the BREF Guidance) have been advanced to support the selection of this technique as being a BAT within the sector. According to the IED where there is no reference plant a BAT cannot be derived and defined.
- In the draft revised LCP BREF 27.05.2015, it is considered as an emerging technique (Section 11.6.1.2.1). The technique is not explained in chapter 3 or chapter 7 or as a technique in the determination of BAT.
- No alignment with Section 3.1 of the BREF Guidance: ‘The technique should have been mentioned in the chapter of the BREF entitled 'Techniques to consider in the determination of BAT'.
- As it is stated in the Section 2.3.9 of the BREF Guidance, this technique should be considered in the Chapter of the BREF entitled “Emerging techniques”.

**EIPPCB assessment**

Availability of information on which the split view is based:

- Documents and information mentioned in the split view were available.

Validity of supporting rationale:
• CO catalysts were mentioned in D1 in several places but not as a technique. In the draft revised LCP BREF of 27.05.2015, CO catalyst is identified and described as a technique in Section 3.3.3.7.2. The example plants quoted are either gas turbines or CCGTs.
• There is no example plant firing iron and steel process gases fitted with this technique in Europe.
• The information used by Eurofer in its rationale is included in Table 7.12 of the draft revised LCP BREF of 27.05.2015 which lists the techniques applicable to the combustion of natural gas according to the 10-heading structure of the BREF Guidance, with information on cross-media effects and costs. Some elements of this description were agreed as applicability restrictions by the TWG (space availability, load, fuel sulphur content) during the final meeting.
• The oxidation catalyst description reported in the 'Emerging techniques' section in D1 and the draft revised LCP BREF refer to mercury and CH₄ oxidation.

EIPPCB conclusion
Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the split view. This split view will therefore be reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 54</td>
<td>Remove ‘oxidation catalyst’ from the techniques listed in BAT 52</td>
<td>Eurofer</td>
<td>NA</td>
</tr>
</tbody>
</table>

### 14.4 NOₓ BAT-AELs

**Conclusions of the meeting**
Slides 353 to 358.

The BAT-associated emission levels for NOₓ from the combustion of iron and steel process gases are given in Table 10.32.

**Table 10.32: BAT-associated emission levels (BAT-AELs) for NOₓ emissions to air from the combustion of 100% iron and steel process gases**

<table>
<thead>
<tr>
<th>Combustion plant type</th>
<th>O₂ reference level (%)</th>
<th>BAT-AELs (mg/Nm³) (¹)</th>
<th>NOₓ</th>
<th>Yearly average</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Daily average or average over the sampling period</td>
<td></td>
<td></td>
</tr>
<tr>
<td>New boilers</td>
<td>3</td>
<td>22–100</td>
<td>15–65</td>
<td></td>
</tr>
<tr>
<td>Existing boiler</td>
<td>3</td>
<td>22–110 (²)</td>
<td>20–100 (³)</td>
<td></td>
</tr>
<tr>
<td>New CCGT</td>
<td>15</td>
<td>30–50</td>
<td>20–35</td>
<td></td>
</tr>
<tr>
<td>Existing CCGT</td>
<td>15</td>
<td>30–55 (⁴)</td>
<td>20–50 (⁴)</td>
<td></td>
</tr>
</tbody>
</table>

(¹) Plants combusting a mixture of gases with an equivalent LHV of > 20 MJ/Nm³ are expected to emit at the higher end of the BAT-AEL ranges.

(²) In the case of plants put into operation no later than 7 January 2014, the higher end of the BAT-AEL range is 160 mg/Nm³. Further, the higher end of the BAT-AEL range may be exceeded when SCR cannot be used and when using a high share of COG (e.g. > 50 %) and/or when combusting COG with a relatively high level of H₂. In this case the higher end of the BAT-AEL range is 220 mg/Nm³.

(³) The lower end of the BAT-AEL range can be achieved when using SCR.

(⁴) In the case of plants put into operation no later than 7 January 2014, the higher end of the BAT-AEL range is 70 mg/Nm³.
14.4.1 Change the reference percentage of process gases

Split view summary
Eurofer proposes not to refer to '100 % process gases' in the table title but to a 'minimum of 90 % of process gases for boilers and minimum of 55 % of process gases for CCGTs'. EURELECTRIC proposes not to refer to '100 % process gases' in the table title but to a 'minimum thermal input from iron and steel process gases of 90 % for boilers and 60 % for CCGTs'.

The split view is accompanied by the following rationale (Eurofer):
- Not to use auxiliary fuels is only a theoretical approach which is not described in the LCP BREF and has not been cited in the relevant chapters of the BREF. Its derivation from the BREF chapters is not traceable and not transparent. The general utilisation of process gases is not possible without the provision of auxiliary fuels. In the last draft LCP BREF released on 27th May, the use of auxiliary fuels is described (page 673, Section 7.3.1.1) as a normal practice for plants using iron and steel process gases. As stated in Section 3.2.3 of the BREF Guidance the information to assess the applicability of the techniques has to be considered (as for example type of fuel) for the BAT definition. The reference conditions should be clearly included in the proposal of BAT conclusion (Section 3.3.1 of the BREF Guidance) and aligned with the data collection.
- The use of 5-10% auxiliary fuels in boilers under normal operating conditions is the practice and reality as documented in the LCP BREF and I&S BREF. The original validated emission values in the 1st and 2nd data collection for the derivation of the BAT-AELs include the use of auxiliary fuels. The average of the total auxiliary fuels of the plants considered in in the data collection carried out in 2011-2012 at European levels for the revision of the LCP BREF (BP 1.7.4 – BATc Table 10.32) is 9.94 % in the case of 53 boilers and 44.75 % for 8 CCGTs.
- Blast furnace gas has the highest volume and the lowest caloric value of the produced process gases: alone it cannot be ignited and does not combust without the support of an auxiliary fuel. Flaring of I&S process gases in emergency cases happens only with support of auxiliary fuels.
- During maintenance of the blast furnace, the basic oxygen furnace, and/or the coke oven plant the percentage thermal input from the auxiliary fuels in boilers can be higher than 10 % on an annual basis.
- The non-use of auxiliary fuels for the utilization of process gases in the LCPs of the I&S industry is equivalent to “other than normal operational conditions” which are outside the scope of the IED, the BREF and the BAT conclusions.
- On an annual average basis there are no I&S LCP reference plants in the EU which are not using any auxiliary fuels. According to the IED where there is no reference plant a BAT cannot be derived and defined.
- The operators utilising the iron and steel process gases cannot influence at all the quantity and quality of the process gases received at the LCP and therefore the amount of the auxiliary fuel which is needed to maintain normal operations cannot be exactly specified.

The split view is accompanied by the following rationale (EURELECTRIC):
- The use of 5-10 % auxiliary fuels (Natural gas, LFO) in boilers and up to 40-50 % of natural gas in CCGTs under normal operating conditions is the practice and reality as documented in the LCP BREF and reported in the working document issued by the EIPPCB “Combustion of iron and steel process gases – NOx, CO, NH3, SOX, dust emissions and energy efficiency”. The validated emission values in the data collection for the derivation of the BAT-AELs always include the use of auxiliary fuels.
As stated in Section 3.2.3 of the BREF Guidance, the information to assess the applicability of the techniques has to be considered (as for example type of fuel) for the BAT definition. The reference conditions should be clearly included in the proposal of BAT conclusion (Section 3.3.1 of the BREF Guidance) and aligned with the data collection. All BAT-AELs for I&S LCPs gases has been assessed by EIPPCB considering the emissions resulting by the combustion of process gases with the combination of auxiliary fuels. It’s not technically justified and it’s not in accordance with the BREF Guidance to affirm that the BAT-AELs refer to 100 % of process gases.

EURELECTRIC proposal is to clearly state in a footnote that all BAT-AELs for I&S LCPs refer to a minimum thermal input from I&S process gases of 90 % for boilers and 60 % for CCGTs. These percentages are directly derived from data collection (see for example plants 005, 596 C, 615, 621, 623, for boilers and plants 358 A-B-C for CCGTs). Outside these minimum percentages of I&S process gases, IED mixing rule should apply.

Same conclusions should be considered for Table 10.34 (BAT 56) and Table 10.36 (BAT 58).

EIPPCB assessment
Availability of information on which the split view is based:
- Documents and information mentioned in the split view were available.

Validity of supporting rationale:
- Auxiliary fuels are usually used along with process gases in the iron and steel sector, as mentioned in the section on iron and steel process gas combustion of the BREF.
- Reported emission data include the use of auxiliary fuels along with process gases. The minimum percentages of auxiliary fuel used mentioned by Eurofer correspond to the average of the submitted percentages of process gas used by all the plants. The percentage mentioned by EURELECTRIC is similar to the one proposed by Eurofer in the case of boilers, whilst the percentage it mentions in the case of CCGTs is slightly different as it is based on only three of the eight submitted percentages, thus not encompassing all the available data.

EIPPCB conclusion
Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the split view, except for the reference percentage of process gas proposed by EURELECTRIC in the case of CCGTs. This split view will therefore be reported in the 'Concluding remarks and recommendations for future work' section of the BREF, except for the reference percentage of process gas proposed by EURELECTRIC in the case of CCGTs.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 52 and 53</td>
<td>Change the table title as follows: 'BAT-associated emission levels (BAT-AELs) for NOx (respectively SO2 and dust) emissions to air from the combustion of a minimum of 90 % of iron and steel process gases for boilers and a minimum of 55 % of iron and steel process gases for CCGTs'</td>
<td>Eurofer, EURELECTRIC</td>
<td>NA</td>
</tr>
<tr>
<td>Table 10.32</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BAT 56</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Table 10.34</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BAT 58</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Table 10.36</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
14.4.2 Oxygen reference level for boilers using hot air exhausted from sinter plant coolers

Split view summary
Eurofer proposes to add a footnote to Tables 10.32 and 10.34 mentioning that ‘for boilers utilising hot air exhausted from sinter plant coolers the emission value is given at the oxygen level of the measurement, according to BAT 32 – Iron and Steel BREF’.

The split view is accompanied by the following rationale:

- Coherence is needed with the BAT 32 of the I&S BREF: BAT is to reduce thermal energy consumption within sinter plants by using one or a combination of the following techniques: I. recovering sensible heat from the sinter cooler waste gas, etc. For example Plant 615 utilises hot air form the sinter plant cooler. In this boiler the sensible heat from the sinter cooler waste gas is recovered during its passage through the plant; the hot air is not involved in the combustion process. In the point 2 and 3 of the data collection of this plant it is included the following information: ‘K41 (boiler 41) is fired on hot air from the Sinter-plant (by-product), premixed BFG (BFG + small amount of BOF-gas and a small amount of natural gas for flame stabilization. The hot air from the sinter plant is filtered through a ESP in order to reduce the PM10 (dust). K41 (Boiler 41) is fed with hot air (300°C) from the Sinter Plant. Blast furnace gas and natural gas (auxiliary fuel) are used to increase the hot air temperature. Approximately 50-70% of the energy input comes from hot air.’

- LCP BAT conclusions must not be in conflict with conclusions of other vertical BREFs as for example I&S BREF (BAT Iron and Steel production - Commission Implementing Decision 2012/135/EU), according to the section 1.1.2 of the BREF Guidance (Commission Implementing Decision 2012/119/EU).

EIPPCB assessment
Availability of information on which the split view is based:

- Documents and information mentioned in the split view were available.

Validity of supporting rationale:

- BAT 32 of the IS BREF does not make any reference to the oxygen content linked to the recovery in, for example, steam generation of the sensible heat from the sinter cooler waste gas.
- Plant 615 recovers energy from the sinter plant hot air and reports air emission levels at a reference oxygen level of 3 %, like the other plants of the sector.

EIPPCB conclusion
Taking these aspects into account, the EIPPCB considers that there are not enough appropriate technical arguments to support the split view. This split view will therefore not be reported in the ‘Concluding remarks and recommendations for future work’ section of the BREF.

14.4.3 Footnote (1) on process gases with a LHV of > 20 MJ/Nm³

Split view summary
Eurofer proposes to remove footnote (1) which gives contextual information related to the higher end of the BAT-AEL range.

The split view is accompanied by the following rationale:
• LHV in COG is up to 19 MJ/Nm³ (reference I&S BREF(2012)), lower than the LHV of > 20 MJ/Nm³ included in the footnote.
• As it was acknowledge during the Final TWG, there is a relationship between the % thermal input from the COG in the fuel mix and the NOx emissions. The current proposal of footnote has not sense when the technical approach has to be oriented to have a correlation between the % input of COG and the related BAT-AEL as it is explained in the following split-views and in line to the discussion in the final TWG meeting.
• NOx emissions from COG is a consequence of the organic nitrogen in the gas, i.e. fuel NOX as opposed to thermal NOX as it is included in the Table 2.6 I&S BREF (2012).
• The BAT-AELs need to be reconsidered within the context of the use of I&S process gases, founded on the data provide in the questionnaires and using an argued, transparent methodology.

EIPPCB assessment
Availability of information on which the split view is based:
• Documents and information mentioned in the split view were available.

Validity of supporting rationale:
• The LHV of iron and steel process gases is lower than 20 MJ/Nm³.

EIPPCB conclusion
Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the split view. This split view will therefore be reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 52 and 53 Table 10.32</td>
<td>Remove footnote (¹)</td>
<td>Eurofer</td>
<td>NA</td>
</tr>
</tbody>
</table>

14.4.4 BAT-AELs for boilers – Increase the lower/upper ends of the ranges for some existing plants and change the footnotes

Split view summary
Eurofer proposes to:
• increase the upper ends of the yearly BAT-AEL range to 140 mg/Nm³ in the case of plants equipped only with primary techniques put into operation no later than 7 January 2014, and to 250 mg/Nm³ for plants firing up to 100 % COG put into operation no later than 27 November 2003;
• change footnote (¹) which gives contextual information related to the lower ends of the daily and yearly BAT-AEL ranges to:
o yearly BAT-AEL: ‘the range of 20–100 mg/Nm$^3$ can be achieved with the implementation of SCR. The higher end of the range is associated with up to 32% COG in the fuel mix’;
o ‘the lower end of the BAT-AEL range can be achieved under the condition using SCR when COG is not combusted. The range 22-100 mg/Nm$^3$ is achieved with SCR when COG is combusted in the mix.’ in the case of the daily BAT-AEL.

- modify footnote (6), which applies to the NO$_X$ daily BAT-AELs, by replacing:
o ‘…when SCR cannot be used…’ by ‘…when primary techniques are applied…’;
o ‘…when using a high share of COG (e.g. > 50 %)…’ by ‘…when using a high proportion of COG (e.g. > 32 %)…’;
o the alternative higher end of the range of 220 mg/Nm$^3$ by two alternative levels of 325 mg/Nm$^3$ for plants put in operation no later than 27th November 2003 and 220 mg/Nm$^3$ for plants put in operation after 27th November 2003.

EURELECTRIC proposes to:
- increase the lower end of the daily BAT-AEL range to 45 mg/Nm$^3$;
- add ‘… when COG is not combusted’ at the end of footnote (6);
- add a footnote mentioning that the higher end of the yearly BAT-AEL range corresponds with up to 32% COG in the fuel mix.

EURELECTRIC proposes to change the wording of footnote (6) applying to the daily BAT-AEL, so as to:
- remove the reference to the non-use of SCR;
- change the example reference percentage of COG used to 32%;
- add a higher end of the range of 330 mg/Nm$^3$ in the case of plants of ≤ 500 MW$_{in}$ put into operation no later than 27th November 2003.

The split view is accompanied by the following rationale (Eurofer):
- Related to the change for yearly BAT-AELs:
  o Eurofer submitted and posted in BATIS on 17th November, 2014 a traceable technical approach to handling the annual average data collected in which a broad separation of the BAT into primary or in-process measures and end-of-pipe techniques is made. The alternative BAT-AELs proposed can be explained using this figure.
  o The proposed BAT-AEL derivation methodology makes a differentiation in two groups, first including the application of SCR (20-100 mg/Nm$^3$) and other group applying LNB plus other systems, with an upper range of BAT-AEL of 140 mg/Nm$^3$. The proposed BAT-AELs cover, contrary to the EIPPCB one, the different mixes of iron and steel gases that can be used in normal operation conditions in the I&S LCPs (0-100 % COG in the short or long term) and quality under I&S BREF.
  o In an earlier submission posted in BATIS in 1st October, 2013, Eurofer made a 4 way division, allowing a coherent and traceable determination of the BAT-AEL for annual NO$_X$ emission for boilers in the sector following the VITO methodology with the same result. Plants utilising I&S process gases were sub-divided into 4 key groups dependent upon the BAT. As a conclusion, following the VITO methodology the analysis the NO$_X$ BAT-AEL proposed are in line with the Eurofer request.
  o The reference plants chosen by EIPPCB have yearly average levels of COG > 27 % but < 32% (plants 601-1,606 and 601-5). As it was acknowledged during the Final TWG, there is a relationship between the % thermal input from the COG in the fuel mix and the NO$_X$ emissions. For these reference
plants the higher end of the range corresponds with 32% COG in the fuel mix according to the data collection. The higher level as proposed by the EIPPCB of 50% is not technically justified. Information to assess the applicability and reference conditions (in accordance to section 3.3.1 of the BREF Guidance) must be unambiguously defined (type of fuel).

- The proposal of BAT-AELs should cover all the normal operation conditions (Art 3(13) IED) and then including the situation of utilising 100% COG. The table should include that for plant firing up to 100% COG the BAT-AEL is 250 mg NOx/Nm³ (reference plant 395 with LNB). It is important to remark that the IED acknowledge the different composition of iron and steel process gases with different ELVs for coke oven gas or blast furnace gas for some pollutants and acknowledge that for plants before 27th Nov 2003 the ELV is 300 mg/Nm³, higher than the proposed BAT-AEL. This flexibility should be considered in the footnote as presented above in the Eurofer proposal. In this point again, information to assess the applicability and reference conditions (in accordance to section 3.3.1 of the BREF Guidance) must be unambiguously defined (type of fuel).

- The statement that the lower end of BAT-AEL range can be achieved when using SCR (20 mg/Nm³) is unreal, since this value was achieved on only one plant in one year mainly utilising BFG and is thus not representative (Plant 007 without firing COG: 78.8% BFG, 13.7% BOFG and 7.5% NG). The proposal of BAT-AEL should cover all the possibilities and different situations of firing I&S process gases in normal operation conditions. Eurofer requests that the range that can be achieved with the implementation of SCR is 20 to 100 mg/Nm³ (Example plants 145VC and 005 (Firing 14% COG and 27% COG respectively)). The reference conditions must be unambiguously defined, and information should be added to explain under what conditions the lower end of BAT-AELs can be achieved (in accordance to section 3.3.1 of the BREF Guidance) under normal operating conditions (section 3.3 BREF Guidance). In addition the performance of this technique should be put into context and supported in particular by the relevant operational data (section 5.2.1 BREF Guidance).

- The EIPPCB applied criteria for the derivation of the BAT-AELs to set-up the higher end of ranges is not considered traceable and no methodology has been presented during the exchange within the TWG discussions (with standardized and objective parameters and criteria). With an objective of a fair level playing field (which also means the avoidance of the risk of not treating different situations in the same way) it is considered that to ensure an effective and active exchange of information in high-quality BAT reference documents, the process should be done in a transparent manner (in line with the recital 14 of the IED). As such the Eurofer proposal takes into consideration the particularities of the iron and steel process gases and explains the proposal with robust technical arguments. It is important to remark that no evidence in relation to methods and procedures has been presented by EIPPCB to the TWG in relation to this issue for a guarantee of the quality assurance of the reviewing of the BREF in accordance to chapter 6 of the BREF Guidance.

- It does not appear that the economic viability under the definition of BAT (art 3.10 IED) has been evaluated in the proposal of BAT-AEL by the EIPPCB. It is important to remark that the available technique means that it has been developed on a scale which allows implementation in the relevant industrial sector, under economically and technically viable conditions. In addition Eurofer would like to stress that the costs (investments and operating costs) of a utility I&S LCP within the sector producing electricity from iron and...
Steel process gases are significantly higher than the electricity produced in a LCP fired with natural gas (see Annex 3).

- Related to the proposals on daily BAT-AELs:
  - EIPPCB submitted a request for additional information (RAI) to the TWG in order to collect any important missing information to understand the emission pattern (section 4.6.4 BREF Guidance). Eurofer compiled an extensive data collection of short-term average based on a large amount of information fully representative of the situation within the sector including the reference conditions (linking the fuel input, mainly COG input, to study the influence in the emission pattern (section 5.4.7.3 BREF Guidance). The data collection and technical assessment was aligned to point A of the Appendix 1 of Data Quality Rating System of the BREF Guidance.
  - Eurofer posted in BATIS on 17th November 2014 a traceable technical approach considering the particularities of the iron and steel gases including an analysis of the data collection. A bilateral videoconference Eurofer EIPPCB took place on 14th January 2015 to explain the main outcome and discuss the technical approach. This analysis showed a clear link between the emissions and the relative amounts of the different iron and steel process gases in the mix. The variability of the thermal input in the Iron and Steel LCPs has to be taken into account for the derivation of BAT-AELs under all the normal operation conditions (from 0 to 100 % COG).
  - The reference plants chosen by EIPPCB have yearly average levels of COG > 27 % but < 32 % (plants 601-1, 606 and 601-5 applying primary techniques). As it was acknowledged during the Final TWG, there is a relationship between the % thermal input from the COG in the fuel mix and the NO\textsubscript{X} emissions. For these reference plants the higher end of the range corresponds with up to 32 % COG in the fuel mix according to the data collection. The higher level as proposed by the EIPPCB of 50 % is not technically justified. It is important to remark that the Information to assess the applicability and reference conditions (in accordance to section 3.3.1 of the BREF Guidance) must be unambiguously defined (type of fuel).
  - The proposal of BAT-AELs should cover all the normal operation conditions including the situation of utilising 100 % COG according to the particularities of the sector. In the technical approach elaborated by Eurofer the data clearly show a relationship between the daily NO\textsubscript{X} emission and the level of COG in the gas mixture where > 95 % of the thermal input to the boiler is from process gases (BATIS 17th November 2014 and p.201 FM BP April 2015). This is to be expected as the flame temperature increases in moving from a gas with low LHV to one that is higher. The holistic analysis of all the daily data (Eurofer second data collection) shows that the higher end of the emissions range at 100 % COG is up to 325 mg/Nm\textsuperscript{3}. It is important to remark that the IED acknowledge the different composition of iron and steel process gases with different ELVs for coke oven gas or blast furnace gas for some pollutants and acknowledge that for plants before 27th November 2003 the daily NOx maximum BAT is 330 mg/Nm\textsuperscript{3}, higher than the one proposed. This flexibility should be considered in the footnote as presented above in the Eurofer proposal.
  - The statement that the lower end of BAT-AEL range can be achieved when using SCR (22 mg/Nm\textsuperscript{3}) is unreal, since this value was achieved on only one plant in one year mainly utilising BFG input and this is not representative (Plant 007 without firing COG: 78.8% BFG, 13.7% BOFG and 7.5% NG). The proposal of BAT-AEL should cover all the possibilities and different situations of firing I&S process gases in normal operation conditions. Eurofer requests that it is recognised that the lower end of the range can only be achieved without COG in the process gas mix. In other cases the range that
can be achieved with the implementation of SCR is 20 to 100 mg/Nm³ (Example plants 145VC and 005 (Firing 14 % COG and 27 % COG respectively)). The reference conditions must be unambiguously defined, and information should be added to explain under what conditions the lower end of BAT-AELs can be achieved (in accordance to section 3.3.1 of the BREF Guidance) under normal operating conditions (section 3.3 BREF Guidance). In addition the performance of this technique should be put into context and supported in particular by the relevant operational data (section 5.2.1 BREF Guidance).

- The EIPPCB applied criteria for the derivation of the BAT-AELs to set-up the higher end of ranges is not considered traceable and no methodology has been presented during the exchange within the TWG discussions (with standardized and objective parameters and criteria). With an objective of a fair level playing field (which also means the avoidance of risk of not treating different situations in the same way) it is considered that to ensure an effective and active exchange of information in high-quality BAT reference documents, the process should be done in a transparent manner (in line with the recital 14 of the IED). As such the Eurofer proposal takes into consideration the particularities of the iron and steel process gases and explains the proposal with robust technical arguments. It is important to remark that no evidence in relation to methods and procedures has been presented by EIPPCB to the TWG in relation to this issue for a guarantee of the quality assurance of the reviewing of the BREF in accordance to chapter 6 of the BREF Guidance.

- It does not appear that the economic viability under the definition of BAT (art 3.10 IED) has been evaluated in the proposal of BAT-AEL by the EIPPCB. It is important to remark that ‘available technique’ means that it has been developed on a scale which allows implementation in the relevant industrial sector, under economically and technically viable conditions. In addition Eurofer would like to stress that the costs (investments and operating costs) of a utility I&S LCP within the sector producing electricity from iron and steel process gases are significantly higher than the electricity produced in a LCP fired with natural gas (see Annex 3).

The split view is accompanied by the following rationale (EURELECTRIC):

- The proposed BAT-AEL should take into account that under normal operation conditions, the Coke Oven Gas (COG) availability can vary from 0 % to 100 % in the short or long term, and BAT-AELs for NOX emissions must reflect all the possible situations, taking into account the quality composition of the gas.

- The reference plants inside the NOX emission range chosen by EIPPCB have yearly average levels of COG not higher than 32 % (plants 601-1 to 601-5 all applying primary techniques). As it was discussed during the Final TWG and acknowledged in the background paper, there is a strict relationship between the % of thermal input from the COG in the fuel mix and the NOX emissions, so this has to be clearly represented in Table 10.32, both for daily and yearly BAT-AEL ranges. This is especially important for older plants which cannot implement secondary abatement techniques. The level of thermal input coming from COG (> 50 %) proposed by the EIPPCB in order to increase the NOX higher end of the range is not supported by the data collected with the questionnaires.

- The IED acknowledges that for plants with a thermal input not exceeding 500 MWth which were put in operation before 27th November 2003, the daily NOX maximum ELV is 330 mg/Nm³. This flexibility is considered in the footnote as presented above in EURELECTRIC proposal.
The daily lower end proposed by the EIPPC (22 mg/Nm³) is not technically justified. The value seems to be derived considering plant 629-3 (thermal input of 39 MWth), but does not take in consideration the three twin combustion plants (629-1, 629-2, 629-4) which discharge in the same stack and are equipped with the same primary techniques and which have recorded significant different 95th percentile NOX emissions. If we refer to the average 95th percentile of the four combustion plants we obtain a value of 47 mg/Nm³, which is lower than all other 95th percentiles of the reference plants. So EURELECTRIC proposal is to increase the minimum value of the daily NOX emission range from 20 to 45 mg/Nm³.

The statement that the lower end of BAT-AEL yearly range (20 mg/Nm³) can be achieved when using SCR is not technically justified, since this value was achieved on only one plant in one year mainly utilising BFG input and this is not representative (Plant 007 with no utilization of COG: 78.8% BFG, 13.7% BOFG and 7.5% NG). The proposal of BAT-AEL should cover all the possibilities and different situations of firing I&S process gases in normal operation conditions. EURELECTRIC requests that it is recognised that the lower end of the range can only be achieved without COG in the process gas mix. In other cases the range that can be achieved with the implementation of SCR varies from 20 to 100 mg/Nm³ (see for example plants 145VC and 005, firing 14% COG and 27%COG respectively).

The reference conditions must be unambiguously defined, and information should be added to explain under what conditions the lower end of BAT-AELs can be achieved (in accordance to section 3.3.1 of the BREF Guidance) under normal operating conditions (section 3.3 BREF Guidance). In addition the performance of this technique should be put into context and supported in particular by the relevant operational data (section 5.2.1 BREF Guidance). This information is completely missing for the case of SCR utilisation with high share of COG.

EIPPCB assessment

Availability of information on which the split view is based:

- The documents and information mentioned in the split view were available with the exception of a general paper on the additional cost for electricity production in the iron and steel sector.

Validity of supporting rationale (Eurofer/yearly BAT-AEL):

- The documents Eurofer uses for proposing alternative BAT-AELs are based on available data from the data collection and include technically based rationales for proposing alternative levels. The alternative proposal is consistent with the assessment performed.
- Apart from the impact the fuel composition (e.g. share of COG) may have on the NOX emissions generated, one should also consider that additional primary or secondary techniques (e.g. SCR) may be used for plants emitting more NOX such as those burning a high share of COG, taking into consideration the applicability of the techniques to prevent and/or reduce those NOX emissions. Plant 395 burning almost exclusively COG is not fitted with such additional primary techniques or SCR which are considered applicable by the TWG.
- Plants using SCR can be found in the full 20–100 mg/Nm³ range in the data collected in 2012.
- In the data collection, plants within the BAT-AEL range have yearly average COG levels of up to 32%.
- Plants using SCR can be found in the full 20–100 mg/Nm³ range in the data collected in 2012.
- There is no reference level (> 50 %) proposed in the table regarding the share of COG in the case of yearly BAT-AELs.
- The EIPPCB followed the steps included in the BREF Guidance.
• The information mentioned by Eurofer on cost assessment was not provided in the course of the information exchange process. It is not related to a particular technique or pollutant, and thus does not support the submitted dissenting view.

Validity of supporting rationale (Eurofer/daily BAT-AEL):
• The documents Eurofer uses for proposing alternative BAT-AELs are based on available data from the additional data collection on short-term averages, and include technically based rationales for proposing alternative levels. The levels proposed in the split view are consistent with the assessment performed.
• The higher end of the daily BAT-AEL range was not set for a COG share of 32 %, but using, among others, available information, e.g. a plant with a yearly average share of COG of 32 % having on a daily basis higher levels of COG share up to 100 % (see BP p. 201, 202 Section 2.2).
• The > 50% COG share in footnote (6) is given as an example, and as such is preceded by 'e.g.', and has been extrapolated based on data available in the review process.
• Apart from the impact the fuel composition (e.g. share of COG) may have on the NOX emissions generated, one should also that additional primary or secondary techniques (e.g. SCR) may be used for plants emitting more NOX such as those burning a high share of COG, taking into consideration the applicability of the techniques to prevent and/or reduce those NOX emissions.
• The IED ELVs cannot necessarily be taken to reflect the use of BAT.
• Plants using SCR can be found in the full 22–110 mg/Nm³ range in the data collected in 2012.
• The EIPPCB followed the steps included in the BREF Guidance.
• The information mentioned by Eurofer on cost assessment was not provided in the course of the information exchange process. It is not related to a particular technique or pollutant, and thus does not support the submitted dissenting view.
• There is no rationale supporting the replacement of '…when SCR cannot be used…' with '…when primary techniques are applied…'.

Validity of supporting rationale (EURELECTRIC):
• Much of the rationale was the same as from Eurofer (see the assessment of these comments in the above paragraph).
• The IED ELVs cannot necessarily be taken to reflect the use of BAT.
• The view that the lower end for the daily average should be 45 mg/Nm³ has been supported by available data from the data collection.
• There is no reason for plants combusting COG not to be able to achieve the lower end of the BAT-AEL range when fitted and operating with SCR.
• SCR is described in the BREF and considered applicable by the TWG. Examples of plants combusting COG and fitted with SCR are included in the data set.

EIPPCB conclusion
Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the part of the split view submitted by Eurofer related to:
• the higher end of the yearly BAT-AEL range in the case of plants fitted only with primary techniques put into operation no later than 7 January 2014,
• part of the changes in footnotes (6) and (7).

The EIPPCB considers that there are enough appropriate technical arguments to support the part of the split view submitted by EURELECTRIC related to:
• the lower end of the daily BAT-AEL range,
• part of the changes in footnotes (6) and (7).

The EIPPCB considers that there are not enough appropriate technical arguments to support the other parts of the split view.
This split view will therefore be only partially reported in the 'Concluding remarks and recommendations for future work' section of the BREF for these parts.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 52 Table 10.32</td>
<td>Change footnote (‘) to: 'The yearly range of 20–100 mg/Nm(^3) and daily range of 22–110 mg/Nm(^3) can be achieved with the implementation of SCR. The higher end of the range is associated with up to 32 % COG in the fuel mix.'</td>
<td>Eurofer, EURELECTRIC</td>
<td>NA</td>
</tr>
<tr>
<td>BAT 52 Table 10.32</td>
<td>Increase the higher end of the yearly NO(_x) BAT-AEL for plants put into operation no later than 7 January 2014 and fitted only with primary techniques</td>
<td>Eurofer</td>
<td>140 mg/Nm(^3)</td>
</tr>
<tr>
<td>BAT 52 Table 10.32</td>
<td>Change footnote (&quot;) to: 'In the case of plants put into operation no later than 7 January 2014, the higher end of the range is 160 mg/Nm(^3) corresponding to up to 32 % COG in the fuel mix. Furthermore, the higher end of the BAT-AEL range may be exceeded when SCR cannot be used and when using a high share of COG (e.g. &gt; 32 %) and/or when combusting COG with a relatively high level of H(_2). In this case, the higher end of the range is 325 mg/Nm(^3) for plants put into operation no later than 27 November 2003 or 220 mg/Nm(^3) for plants put into operation after this date.'</td>
<td>Eurofer, EURELECTRIC</td>
<td>See dissenting view</td>
</tr>
<tr>
<td>BAT 52 Table 10.32</td>
<td>Increase the lower end of the daily BAT-AEL range for existing boilers</td>
<td>EURELECTRIC</td>
<td>45 mg/Nm(^3)</td>
</tr>
</tbody>
</table>

14.4.5 BAT-AELs for CCGTs – Increase the upper ends of the ranges for existing plants

**Split view summary**

Eurofer proposes to increase the upper ends of the yearly and daily BAT-AEL ranges respectively to 65 mg/Nm\(^3\) and 80 mg/Nm\(^3\) in the case of plants put into operation no later than 7 January 2014.

The split view is accompanied by the following rationale (Eurofer):

- Related to the change for yearly BAT-AELs:
According to the graphs and in the draft 1 of the BAT conclusions the proposed BAT-AEL was 100 mg/Nm³ derived from the 95th percentile of the 1st validated data collection. The MS Austria and Eurofer proposed a lower BAT-AEL of 66 mg NOx/Nm³ which is more realistic.

In the revised draft BAT conclusions the EIPPCB have proposed 20-50 mg/Nm³. There is no justification for this change; it is outside the agreement of all involved parties in the TWG during the Informal intermediate meeting on LCP 17-18 June 2014 and fails to take into account the maximum of the yearly measured data provided by Eurofer.

The IED acknowledge that for plants put in operation before 7th January 2014 the ELV is 120 mg/Nm³, higher than the proposed one. This flexibility should be considered in the footnote as presented above in the Eurofer proposal.

Plant 008 provided a measured maximum value of 65.6 mg NOx/Nm³ in 2012 and should be considered as reference. The relative amounts of process gas in any one year is dependent upon the level of hot metal production in the BF and steel in the BOF in the integrated I&S works.

EIPPCB submitted a request for additional information (RAI) to the TWG in order to collect any important missing information to understand the emission pattern (section 4.6.4 BREF Guidance). Eurofer compiled an extensive data collection of short-term average based on a large amount of information fully representative of the situation within the sector including the reference conditions (linking the fuel input, mainly COG input, to study the influence in the emission pattern (section 5.4.7.3 BREF Guidance). The data collection and technical assessment was aligned to point A of the Appendix 1 of Data Quality Rating System of the BREF Guidance. The EIPPCB should take into consideration the 2nd data collection by Eurofer with yearly data from 2003 to 2012 for the adequate derivation of the yearly BAT-AEL.

The EIPPCB applied criteria for the derivation of the BAT-AELs to set-up the higher end of ranges is not considered traceable and no methodology has been presented during the exchange within the TWG discussions (with standardized and objective parameters and criteria). With an objective of a fair level playing field (which also means the avoidance of risk of not treating different situations in the same way) it is considered that to ensure an effective and active exchange of information in high-quality BAT reference documents, the process should be done in a transparent manner (in line with the recital 14 of the IED). As such the Eurofer proposal takes into consideration the particularities of the iron and steel process gases and explains the proposal with robust technical arguments. It is important to remark that no evidence in relation to methods and procedures has been presented by EIPPCB to the TWG in relation to this issue for a guarantee of the quality assurance of the reviewing of the BREF in accordance to chapter 6 of the BREF Guidance.

It does not appear that the economic viability under the definition of BAT (art 3.10 IED) has been evaluated in the proposal of BAT-AEL by the EIPPCB. It is important to remark that “available technique” means that it has been developed on a scale which allows implementation in the relevant industrial sector, under economically and technically viable conditions. In addition Eurofer would like to stress that the costs (investments and operating costs) of a utility I&S LCP within the sector producing electricity from iron and steel process gases are significantly higher than the electricity produced in a LCP fired with natural gas (see Annex 3).

- Related to the proposals on daily BAT-AELs:
  - For Plant 008 the short time ELV as half hour average is defined as 160 mg/Nm³ and the daily average as 80 mg NOx/Nm³. These are very low
levels. In draft 1 the daily BAT-AEL for NOx has been derived and defined as 120 mg/Nm³ and the yearly as 100 mg/Nm³. The new derived BAT-AELs in draft 2 are about 100 % lower in spite of the results of the 2nd data collection (by Eurofer) on daily and yearly averages. For a daily BAT-AEL of 70 mg/Nm³ the corresponding half hour average BAT-AEL will be defined by MS Austria as 140 mg/Nm³. In the past measured half hour values of 150 mg NOx/Nm³ have been recorded (see validated questionnaire for plant 008). Under these conditions in MS Austria the newly defined short time BAT-AEL of 140 mg/Nm³ will often be exceeded. In such cases the local authorities and the operator cannot apply any further measures because the NOx concentration in the waste gas depends mainly on the present mix and amounts of utilised process gases.

- Eurofer compiled an extensive data collection of short-term average based on a large amount of information fully representative of the situation within the sector including the reference conditions (linking the fuel input, mainly COG input, to study the influence in the emission pattern (section 5.4.7.3 BREF Guidance). The data collection and technical assessment was aligned to point A of the Appendix 1 of Data Quality Rating System of the BREF Guidance. The EIPPCB have a duty to take into consideration the 2nd data collection (by Eurofer) with yearly data from 2003 to 2012 for the adequate derivation of BAT-AEL.

- The IED acknowledge that for plants put in operation before 7th January 2014 the daily NOx maximum BAT is 132 mg/Nm³, higher than the proposed one. This flexibility should be considered in the footnote as presented above in the Eurofer proposal.

- The EIPPCB applied criteria for the derivation of the BAT-AELs to set-up the higher end of ranges is not considered traceable and no methodology has been presented during the exchange within the TWG discussions (with standardized and objective parameters and criteria). With an objective of a fair level playing surface (which also means the avoidance of risk of not treating different situations in the same way) it is considered that to ensure an effective and active exchange of information in high-quality BAT reference documents, the process should be done in a transparent manner (in line with the recital 14 of the IED). As such the Eurofer proposal takes into consideration the particularities of the iron and steel process gases and explains the proposal with robust technical arguments. It is important to remark that no evidence in relation to methods and procedures has been presented by EIPPCB to the TWG in relation to this issue for a guarantee of the quality assurance of the reviewing of the BREF in accordance to chapter 6 of the BREF Guidance.

- It does not appear that the economic viability under the definition of BAT (art 3.10 IED) has been evaluated in the proposal of BAT-AEL by the EIPPCB. It is important to remark that “available technique” means that it has been developed on a scale which allows implementation in the relevant industrial sector, under economically and technically viable conditions. In addition Eurofer would like to stress that the costs (investments and operating costs) of a utility I&S LCP within the sector producing electricity from iron and steel process gases are significantly higher than the electricity produced in a LCP fired with natural gas (see Annex 3).

**EIPPCB assessment**

Availability of information on which the split view is based:

- Documents and information mentioned in the split view were available.
Validity of supporting rationale (yearly averages):

- The proposed BAT-AEL range was justified in the BP (p. 202 paragraph 2.4). No agreement was reached at the intermediate TWG meeting on any of the BAT-AELs.
- BAT-AELs are different from IED ELVs. There is no link between the 120 mg/Nm$^3$ mentioned and the alternative proposed levels.
- Data from Plant 008 was not considered as the plant was operated < 1500 h/yr and a footnote proposed to exclude these plants from the yearly BAT-AEL range. However, this footnote was removed during the TWG final meeting.
- Data to be considered are those of the submitted questionnaires, when available. In the case of Plant 008, the yearly average submitted in the questionnaire is 55 mg/Nm$^3$. The aim of the additional data collection was not to expand the data set over more than one year for deriving BAT conclusions and BAT-AELs but to improve the knowledge on averaging periods. Thus other emission levels provided through this exercise were generally not included in the BREF. As a consequence the alternative proposal is not linked to available data considered in the assessment.

Validity of supporting rationale (daily averages):

- For short-term BAT-AELs, data from Plant 008 were taken on board as no other data were available in the submitted questionnaires, in order to introduce specific BAT-AELs for plants operated < 1500h/yr. However, the corresponding footnote was removed during the TWG final meeting.
- The alternative proposal fits with the data reported by Eurofer.

**EIPPCB conclusion**

Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the part of the split view related to the higher end of the daily NO$_X$ BAT-AEL range, but not for the yearly range. This split view will therefore only be partially reported in the 'Concluding remarks and recommendations for future work' section of the BREF for this part.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 53 Table 10.32</td>
<td>Increase the higher end of the daily NO$_X$ BAT-AEL range for CCGTs combusting iron and steel process gases in the case of plants put into operation no later than 7 January 2014</td>
<td>Eurofer</td>
<td>80 mg/Nm$^3$</td>
</tr>
</tbody>
</table>

**14.5 SO$_X$ BAT conclusions – Process gas management system and auxiliary fuel choice**

**Conclusions of the meeting**

Slide 361.

BAT 56 In order to prevent and/or reduce SO$_X$ emissions to air from the combustion of iron and steel process gases, BAT is to use a combination of the techniques given below.
| b. Process gas management system and auxiliary fuel choice | See description in Section 10.8. Use, as much as the iron- and steel-works allow it, of:
- a majority of blast furnace gas with low sulphur content in the fuel diet;
- a combination of fuels with averaged low sulphur content, e.g. individual process fuels with very low S content such as:
  - BFG with sulphur content < 10 mg/Nm³;
  - coke oven gas with sulphur content < 300 mg/Nm³, and auxiliary fuels such as:
    - natural gas;
    - liquid fuels with sulphur content of ≤ 0.4 % (in boilers).
Use of a limited amount of fuels with higher sulphur content | Generally applicable, within the constraints associated with the availability of different types of fuel |

**Split view summary**

Eurofer proposes to remove from technique b the part related to iron and steel process gases.

The split view is accompanied by the following rationale:

- It has been recognised by the EIPPCB (for example in the background paper, Page 204) that the S content of the COG utilised in the LCPs and CCGTs is regulated through the I&S BREF, BAT 48. These processes are effective in reducing the residual hydrogen sulphide (H2S) concentrations to daily mean averages of <300 – 1000 mg/Nm³ in the case of using BAT I (350 – 780 mg H2S/Nm³ from the data collected in the 2012 questionnaires) and <10 mg/Nm³ in the case of using BAT II. These processes are not very effective at removing organic sulphur from the gas so up to a further 300 mg S/Nm³ can be present in COG. Indeed the maximum SO2 emissions utilising 100% COG (as per I&S BREF (2012)) is 425 mg/Nm³ (calculation sent to EIPPCB on 31st January 2015 as one of the outcomes of the bilateral videoconference Eurofer – EIPPCB held on 14th January 2015). The concerns raised over the second technique in BAT 56 to prevent and/or reduce SO2 emissions to air using process gas management system and auxiliary fuel choice is not aligned with the real operation and the particularities of the sector. It must be remembered that the process gases are produced as a consequence of making coke, hot metal and steel and are not engineered as fuels.
- LCP BAT conclusions must not be in conflict with conclusions of other vertical BREFs as for example I&S BREF (BAT Iron and Steel production - Commission Implementing Decision 2012/135/EU), according to the section 1.1.2 of the BREF Guidance (Commission Implementing Decision 2012/119/EU).
- The thermal input from the iron and steel process gases is not at the discretion of the operators of the LCPs. The LCP has to consume what is delivered – the composition and relative proportions of the process gases utilised are not and cannot be selected or changed.
- Process gases with exceptionally low S contents cannot be engineered to enable this technique to work.
• There are no LCP reference plants in the I&S industry in which these techniques are used or applied. No operational information has been collected and subsequently used to propose this BAT for I&S LCPs (section 2.3.7.2.9 BREF Guidance). As such no evidence or assessment of its applicability (section 2.3.8 BREF Guidance) have been advanced to support the selection of this technique as being a BAT within the sector.

• The application of this technique for I&S process gases is not demonstrated in Chapters 3 or 7 of the latest draft LCP BREF (available from 27th May). In addition there is a reference in the point 3.1.1.5 that “fuel switch or choice depends strongly on the type of fuel and the equipment used, and therefore will be discussed later on Chapter 5 to Chapter 7”. No such discussion of the application of this technique to I&S process gases has been presented in chapter 7 and no evidence has been provided that the technique has been applied or is potentially applicable and can be considered as a BAT.

• No alignment with point 3.1 of the BREF Guidance: “The technique should have been mentioned in the chapter of the BREF entitled “Techniques to consider in the determination of BAT””.

**EIPPCB assessment**

Availability of information on which the split view is based:

• Documents and information mentioned in the split view were available.

Validity of supporting rationale:

• There is no contradiction between the I&S BAT conclusions and the technique description, as already assessed in the BP (p. 204 paragraph 2.3). The levels of sulphur mentioned are given as examples in the description, based on available data.

• The technique description is not about fuel engineering, selection or change but about process gas management as described in the BREF Section 7.3.4.1.2 where the technique is said to be widely used.

**EIPPCB conclusion**

Taking these aspects into account, the EIPPCB considers that there are not enough appropriate technical arguments to support the split view. This split view will therefore not be reported in the ‘Concluding remarks and recommendations for future work’ section of the BREF.

### 14.6 SO₂ BAT-AELs

**Conclusions of the meeting**

Slide 365.

The BAT-associated emission levels (BAT-AELs) for SO₂ emissions to air from the combustion of iron and steel process gases are given in Table 10.34. The associated monitoring is in BAT 3 ter.

**Table 10.34: BAT-associated emission levels (BAT-AELs) for SO₂ emissions from the combustion of 100 % iron and steel process gases**

<table>
<thead>
<tr>
<th>Type of combustion plant</th>
<th>O₂ reference level (%)</th>
<th>BAT-AELs for SO₂ (mg/Nm³)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Daily average or average over the sampling period</td>
</tr>
<tr>
<td>New or existing boiler</td>
<td>3</td>
<td>50–200 (⁵)</td>
</tr>
<tr>
<td>New or existing CCGT</td>
<td>15</td>
<td>20–70</td>
</tr>
</tbody>
</table>

(⁵) The higher end of the BAT-AEL range may be exceeded when using a high share of COG (e.g. > 50 %). In this case, the higher end of the BAT-AEL range is 300 mg/Nm³.
14.6.1 Increase the upper ends of the ranges for some boilers

Split view summary
Eurofer proposes to add contextual information related to the current upper ends of the yearly and daily BAT-AEL ranges for new and existing boilers that would refer to a 23 % thermal input from COG, and to increase:

- the higher end of the yearly BAT-AEL range to 400 mg/Nm\(^3\) in the case of 100 % COG combustion;
- the higher end of the daily BAT-AEL range to 425 mg/Nm\(^3\) in the case of 100 % COG combustion.

EURELECTRIC proposes to:

- add a footnote mentioning that the higher ends of the yearly and daily BAT-AEL ranges correspond to up to 32 % COG in the fuel mix;
- increase the higher end of the daily BAT-AEL range to 440 mg/Nm\(^3\) when a share of 100 % COG is combusted;
- change in footnote (1) the example reference level of COG in the fuel mix for having higher daily emission levels, from 50 % to 32 %.

The split view is accompanied by the following rationale regarding the yearly BAT-AEL (Eurofer):

- The relationship between the proportion of COG in the mix and the SO\(_2\) emission is well recognized. The H\(_2\)S level in the COG is defined under BAT 48 in the I&S BREF. In addition the IED takes into consideration different ELVs of SO\(_2\) for COG and BFG. Eurofer requests that a footnote be added that refers to the proportion of COG at which the BAT-AEL has been set, i.e. plants 144-1 and 004. For the upper end of the range for existing or new boilers, the proportion of COG is 23 % (plant 144-1: 22.36 % COG and plant 004: 19.8 % COG). The reference proportion of COG should be the same as that included in the reference plants used by EIPPCB and directly linked to the table. Information to assess the applicability and reference conditions (in accordance to Section 3.3.1 of the BREF Guidance) must be unambiguously defined (type of fuel).

- The proposal of BAT-AELs should cover all the normal operation conditions (Art. 3(13) of the IED) plus the situation of firing 100% COG. It is important to remark that the IED acknowledges the different composition of iron and steel process gases with different ELVs for coke oven gas or blast furnace gas. In Annex V Part 1 (plants put in operation no later than 7th January 2014) and Part II (plants put in operation after 7th January 2014) the emission limit value are the same (400 mg/Nm\(^3\) COG and 200 mg/Nm\(^3\) BFG) due to the particularities of the composition of the process gases under the I&S BREF (BAT composition). This acknowledgement should be incorporated in the table as no representative reference plants are available in the LCP BREF revision process. The table should include that for plant firing up to 100% COG the BAT-AEL is 400 mg SO\(_2\)/Nm\(^3\). Information to assess the applicability and reference conditions (in accordance to Section 3.3.1 of the BREF Guidance) must be unambiguously defined (type of fuel).

- The EIPPCB applied criteria for the derivation of the BAT-AELs to set-up the higher end of ranges is not considered traceable and no methodology has been presented during the exchange within the TWG discussions (with standardized and objective parameters and criteria). With an objective of a fair level playing field (which also means the avoidance of risk of not treating different situations in the same way), it is considered that to ensure an effective and active exchange of information in high-quality BAT reference documents, the process should be done in a transparent
manner (in line with the recital 14 of the IED). As such, the Eurofer proposal takes into consideration the particularities of the iron and steel process gases and explains the proposal with robust technical arguments. It is important to remark that no evidence in relation to methods and procedures has been presented by EIPPCB to the TWG in relation to this issue for a guarantee of the quality assurance of the reviewing of the BREF in accordance to Chapter 6 of the BREF Guidance.

- It does not appear that the economic viability under the definition of BAT (Art. 3(10) of the IED) has been evaluated in the proposal of BAT-AEL by the EIPPCB. It is important to remark that “available technique” means that it has been developed on a scale which allows implementation in the relevant industrial sector, under economically and technically viable conditions. In addition, Eurofer would like to stress that the costs (investments and operating costs) of a utility I&S LCP within the sector producing electricity from iron and steel process gases are significantly higher than the electricity produced in a LCP fired with natural gas.

The split view is accompanied by the following rationale regarding the daily BAT-AEL (Eurofer):

- The relationship between the proportion of COG in the mix and the SO\textsubscript{2} emission is well recognized. The H\textsubscript{2}S level in the COG is defined under BAT 48 in the I&S BREF. In addition the IED takes into consideration different ELVs of SO\textsubscript{2} for COG and BFG. In addition the IED takes into consideration different ELVs of SO\textsubscript{2} for COG or BFG due to same reason (daily BAT of 440 mg/Nm\textsuperscript{3} and 220 mg/Nm\textsuperscript{3} for existing/new boilers respectively). Eurofer requests modification of the footnote that references the proportion of COG at which the BAT-AEL has been set, according to the plants used by the derivation of BAT-AELs (plants 144-1 and 004). Information to assess the applicability and reference conditions (in accordance to Section 3.3.1 of the BREF Guidance) must be unambiguously defined (type of fuel). For these plants the upper end of the range for existing or new boilers is for a COG proportion of 23%. The higher proportion of 50% proposed by the EIPPCB is not technically justified.

- The maximum SO\textsubscript{2} limit value firing 100% COG according to the Iron and Steel BREF is 425 mg/Nm\textsuperscript{3} (see Eurofer technical explanation sent to EIPPCB on 31st January 2015), in line with the IED. The reference proposed by EIPPCB of 300 mg/Nm\textsuperscript{3} it is not aligned and consistent with the Iron and Steel BREF and BAT conclusions (BAT 48), and the Annex V, Part 1 and 2 of the IED. In Annex V Part 1 (plants put in operation no later than 7th January 2014) and Part II (plants put in operation after 7th January 2014), the monthly SO\textsubscript{2} BAT-AELs are the same (400 mg/Nm\textsuperscript{3} COG and 200 mg/Nm\textsuperscript{3} BFG) due to the particularities of the composition of the process gases under the I&S BREF (BAT composition). In daily basis 110% of the ELV, up to 440 mg/Nm\textsuperscript{3} when COG is combusted. LCP BAT conclusions must not be in conflict with conclusions of other vertical BREFs as for example the I&S BREF (BAT Iron and Steel production - Commission Implementing Decision 2012/135/EU), according to Section 1.1.2 of the BREF Guidance (Commission Implementing Decision 2012/119/EU).

- The EIPPCB applied criteria for the derivation of the BAT-AELs to set-up the higher end of ranges is not considered traceable and no methodology has been presented during the exchange within the TWG discussions (with standardized and objective parameters and criteria). With an objective of a fair level playing field (which also means the avoidance of risk of not treating different situations in the same way) it is considered that to ensure an effective and active exchange of information in high-quality BAT reference documents, the process should be done in a transparent manner (in line with the recital 14 of the IED). As such the Eurofer proposal takes into consideration the particularities of the iron and steel process gases and explains the proposal with robust technical arguments. It is important to remark that no
evidence in relation to methods and procedures has been presented by EIPPCB to the TWG in relation to this issue for a guarantee of the quality assurance of the reviewing of the BREF in accordance to chapter 6 of the BREF Guidance. It does not appear that the economic viability under the definition of BAT (Art. 3(10) of the IED) has been evaluated in the proposal of BAT-AEL by the EIPPCB. It is important to remark that “available technique” means that it has been developed on a scale which allows implementation in the relevant industrial sector, under economically and technically viable conditions. In addition Eurofer would like to stress that the costs (investments and operating costs) of a utility I&S LCP within the sector producing electricity from iron and steel process gases are significantly higher than the electricity produced in a LCP fired with natural gas.

The split view is accompanied by the following rationale (EURELECTRIC):

- The proposed BAT-AEL should take into account that under normal operation conditions, the Coke Oven Gas (COG) availability can vary from 0% to 100% in the short or long term, and BAT-AELs for SO\textsubscript{x} emissions must reflect all the possible situations, taking into account the quality composition of the gas.
- The reference plants inside the SO\textsubscript{x} emission range chosen by EIPPCB have yearly average levels of COG not higher than 32% (plants 601-2 to 601-5 all applying primary techniques). As it was discussed during the Final TWG and acknowledged in the background paper, there is a strict relationship between the % of thermal input from the COG in the fuel mix and the SO\textsubscript{x} emissions due to the H\textsubscript{2}S content in the COG, so this has to be clearly represented in Table 10.34 especially for older plants which cannot implement secondary abatement techniques or fuel pretreatments. The level of thermal input coming from COG (>50%) proposed by the EIPPCB in order to increase the SO\textsubscript{x} higher end of the range is not supported by the data collected with the questionnaires. Information to assess the applicability and reference conditions (in accordance to Section 3.3.1 of the BREF Guidance) must be unambiguously defined (type of fuel).
- The IED acknowledges that the daily SO\textsubscript{x} maximum ELV is 440 mg/Nm\textsuperscript{3} when using only COG. This flexibility is considered in the footnote as presented above in EURELECTRIC proposal.

EIPPCB assessment

Availability of information on which the split view is based:
- Documents and information mentioned in the split view were available.

Validity of supporting rationale (Eurofer – yearly BAT-AEL):
- The yearly SO\textsubscript{2} BAT-AEL has not been set based on data from Plants 144-1 and 004 with a maximum share of COG of 23 %. Other plants with higher levels of COG are included in the range (e.g. Plants 005, 601, 605, 611) with up to 38 % of COG as a yearly average in the fuel mix.
- The IED ELVs cannot necessarily be taken to reflect the use of BAT. Contrary to the Eurofer statement, there is an example plant burning almost 100 % COG whose emissions are within the yearly BAT-AEL range (Plant 395 once corrected for the monitoring problem that led to the higher emissions reported in the submitted questionnaire - see short-term additional data reported by Eurofer).
- The EIPPCB followed the steps included in the BREF Guidance.
- The rationale does not demonstrate how the economics would prevent the implementation of the proposed BAT conclusions and BAT-AELs which are based
on well performing plants whose performances were presented and discussed in a transparent way within the TWG.

Validity of supporting rationale (Eurofer – daily BAT-AEL):
- Data from Plants 144-1 and 004 with a COG share in the yearly average fuel mix of 23% have been used in the assessment for deriving a proposed daily SO₂ BAT-AEL.
- The > 50% COG share in footnote (') is given as an example, as such it is preceded by ‘e.g.’, and has been extrapolated based on data available in the review process.
- A purely theoretical SO₂ emission level calculated based on levels of sulphur contents in process gases mentioned in the I&S BREF gives a result of about 425 mg/Nm³. There is a link between this calculated value and the alternative Eurofer proposal.
- The EIPPCB followed the steps included in the BREF Guidance.
- The rationale does not demonstrate how the economics would prevent the implementation of the proposed BAT conclusions and BAT-AELs which are based on well performing plant whose performances were presented and discussed in a transparent way within the TWG.

Validity of supporting rationale (EURELECTRIC):
- Much of the rationale was the same as from Eurofer (see the assessment of these comments in the above paragraph).
- Plants 611 and 612 reported COG yearly shares in the fuel mix higher than 32% (respectively 34% and 38%). Plant 395, combusting > 95% COG, once corrected for the mistakes due to the monitoring system, is also within the BAT-AEL ranges.
- Reference is only made to the ELV of the IED for setting the higher end of the daily SOₓ BAT-AEL.

EIPPCB conclusion
Taking these aspects into account, the EIPPCB considers that there are enough appropriate arguments to support the part of the split view submitted by Eurofer related to the percentage of COG in the fuel mix and to the higher end of the daily BAT-AEL range, but not to support the part of the split view related to the higher end of the yearly BAT-AEL range.
Taking these aspects into account, the EIPPCB considers that there are enough appropriate arguments to support the part of the split view submitted by EURELECTRIC related to the percentages of COG in the fuel mix, but not to support the part of the split view related to the higher end of the daily BAT-AEL range.
This split view will therefore only be partially reported in the ‘Concluding remarks and recommendations for future work’ section of the BREF for these parts.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 56 Table 10.34</td>
<td>Change the reference levels in footnote ('')</td>
<td>Eurofer</td>
<td>Higher end of the daily range of 425 mg/Nm³ in the case of a high share of COG (e.g. &gt; 23%)</td>
</tr>
<tr>
<td>BAT 56 Table 10.34</td>
<td>Add a footnote related to the higher end of the BAT-AELs mentioning that they correspond to a COG share of up to 23% in the case of the daily BAT-AEL, and of up to 38% in the case of the yearly BAT-AEL</td>
<td>Eurofer, EURELECTRIC</td>
<td>NA</td>
</tr>
</tbody>
</table>
14.6.2 Increase the upper end of the range for some CCGTs

Split view summary
Eurofer proposes to increase the upper end of the yearly BAT-AEL range for new and existing CCGTs to 50 mg/Nm³ and to add contextual information related to this new upper end that it would refer to a 27 % COG share in the fuel mix.

The split view is accompanied by the following rationale:

- The relationship between the proportion of COG in the mix and the SO2 emission is well recognized. The H2S level in the COG is defined under BAT 48 in the I&S BREF. In addition the IED takes into consideration different ELVs of SO2 for COG and BFG.

- In the case of the higher end of BAT-AEL for existing/new CCGTs a value of 50 mg/Nm³ is requested to cover different COG input in the CCGTs under normal operation conditions (values depend mainly on the annual utilization of COG and the sulphur content under I&S BREF). The representativeness is more realistic with an upper range of 50 mg/Nm³ (to cover situations firing more COG than reference plant 001 over different years), as it was explained in the technical dossier posted in BATIS on 17th November 2014 including a traceable technical approach to the particularities of the iron and steel process gases and an analysis of the data collection).

- Eurofer requests a footnote is added that refers to the proportion of COG at which the BAT-AEL has been set. For the upper end of the range for existing or new CCGTs the proportion of COG is 23% for CCGTs (EIPPCB reference plant 001 27.2% COG). The reference proportion of COG should be the same as that included in the reference plants and directly linked to the table. Information to assess the applicability and reference conditions (in accordance to section 3.3.1 of the BREF Guidance) must be unambiguously defined (type of fuel).

- The EIPPCB applied criteria for the derivation of the BAT-AELs to set-up the higher end of ranges is not considered traceable and no methodology has been presented during the exchange within the TWG discussions (with standardized and objective parameters and criteria). With an objective of a fair level playing surface (which also means the avoidance of risk of not treating different situations in the same way) it is considered that to ensure an effective and active exchange of information in high-quality BAT reference documents, the process should be done in a transparent manner (in line with the recital 14 of the IED). As such the Eurofer proposal takes into consideration the particularities of the iron and steel process gases and explains the proposal with robust technical arguments. It is important to remark that no evidence in relation to methods and procedures has been presented by EIPPCB to the TWG in relation to this issue for a guarantee of the quality assurance of the reviewing of the BREF in accordance to chapter 6 of the BREF Guidance.

- It does not appear that the economic viability under the definition of BAT (art 3.10 IED) has been evaluated in the proposal of BAT-AEL by the EIPPCB. It is important to remark that “available technique” means that it has been developed on a scale which allows implementation in the relevant industrial sector, under economically and technically viable conditions. In addition Eurofer would like to stress that the costs (investments and operating costs) of a utility I&S LCP within the sector producing electricity from iron and steel process gases are significantly higher than the electricity produced in a LCP fired with natural gas (see Annex 3).

EIPPCB assessment
Availability of information on which the split view is based:
- Documents and information mentioned in the split view were available.
Validity of supporting rationale:
- Additional data for Plant 001 provided through an additional data collection exercise give a maximum yearly value of 43 mg/Nm$^3$. The rationale for going to 50 mg/Nm$^3$ instead of 45 mg/Nm$^3$ is the flexibility to accommodate a fuel variation of 10%. This 10% is not further justified and its consideration would give a yearly average of 47 mg/Nm$^3$.
- The 27% COG share in the fuel mix for Plant 001 corresponds to the emission level of 34 mg/Nm$^3$ reported in the data collection in 2012. Further emission values from this plant provided by Eurofer have been considered for deriving the higher end of the range at 45 mg/Nm$^3$. However, no information on the COG share was provided along with the emission value by Eurofer.
- The rationale does not demonstrate how the economic issue could prevent the implementation of the proposed BAT conclusions and BAT-AELs which are based on well performing plants whose performances were presented and discussed in a transparent way within the TWG.

EIPPCB conclusion
Taking these aspects into account, the EIPPCB considers that there are not enough appropriate technical arguments to support the split view. This split view will therefore not be reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

14.7 Dust BAT-AELs

Conclusions of the meeting
Slide 372.

The BAT-associated emission levels (BAT-AELs) for dust emissions to air from the combustion of iron and steel process gases are given in Table 10.36. The associated monitoring is in BAT 3 ter.

<table>
<thead>
<tr>
<th>Combustion plant type</th>
<th>BAT-AELs for dust (mg/Nm$^3$)</th>
<th>Daily average or average over the sampling period</th>
<th>Yearly average</th>
<th>Yearly average</th>
<th>Yearly average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boiler</td>
<td></td>
<td>2–10</td>
<td>2–7</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>CCGT</td>
<td></td>
<td>2–5</td>
<td>2–5</td>
<td>15</td>
<td></td>
</tr>
</tbody>
</table>

14.7.1 Increase the upper end of the daily range for boilers

Split view summary
Eurofer and EURELECTRIC propose to increase the upper end of the daily BAT-AEL range to 15 mg/Nm$^3$ for boilers.

The split view is accompanied by the following rationale:
- The IED Annex V sets dust limits of 10 mg/Nm$^3$ for BFG and 30 mg/Nm$^3$ for COG and BOF gas for new and existing plants. In this way the IED acknowledge the different characteristics of the iron and steel process gases. The EIPPCB makes no
In the I&S BREF and BAT conclusions for cleaned BFG, the residual dust concentration associated with BAT is < 10 mg/Nm³, determined as the average over the sampling period (discontinuous measurement, spot samples for at least half an hour). There is no reference for COG dust.

Eurofer posted in BATIS on 17th November, 2014 a traceable technical approach outlining the particularities of the iron and steel gases and analysis of the data collected. When plants using oils as auxiliary fuels, higher dust emissions are evident and this particularity has to be taken into account in the derivation of the BAT-AEL. Eurofer requests 15 mg/Nm³ as higher end of the range of the daily BAT-AEL due to the following reason: In the second data collection only a few plants recorded dust emissions on a continuous basis and provided their data. A significant portion of these plants used oil as their auxiliary fuel. The 97.5 percentile of the plants using more than 95% Iron and Steel process gases is 15.9 m³/Nm³ slightly in excess of the requested BAT-AEL (analysis of 2373 data). This proposal is considered acceptable under the process gas selection criteria and is deliberately set to encourage improvements in the level of particulate emission without requiring application of excessive secondary measures.

The EIPPCB applied criteria for the derivation of the BAT-AELs to set-up the higher end of ranges is not considered traceable and no methodology has been presented during the exchange within the TWG discussions (with standardized and objective parameters and criteria). With an objective of a fair level playing surface (which also means the avoidance of risk of not treating different situations in the same way) it is considered that to ensure an effective and active exchange of information in high-quality BAT reference documents, the process should be done in a transparent manner (in line with the recital 14 of the IED). As such the Eurofer proposal takes into consideration the particularities of the iron and steel process gases and explains the proposal with robust technical arguments. It is important to remark that no evidence in relation to methods and procedures has been presented by EIPPCB to the TWG in relation to this issue for a guarantee of the quality assurance of the reviewing of the BREF in accordance to chapter 6 of the BREF Guidance.

It does not appear that the economic viability under the definition of BAT (art 3.10 IED) has been evaluated in the proposal of BAT-AEL by the EIPPCB. It is important to remark that “available technique” means that it has been developed on a scale which allows implementation in the relevant industrial sector, under economically and technically viable conditions. In addition Eurofer would like to stress that the costs (investments and operating costs) of a utility I&S LCP within the sector producing electricity from iron and steel process gases are significantly higher than the electricity produced in a LCP fired with natural gas (see Annex 3).

The IED Annex V sets monthly dust ELVs of 10 mg/Nm³ for BFG and 30 mg/Nm³ for COG and BOF gas, both for new and existing plants, considering the different characteristics of the I&S process gases. The EIPPCB makes no reference to the COG proportion nor is there any consideration of auxiliary fuels in the mix, as for example oil.

EURELECTRIC proposal of 15 mg/Nm³ as higher end of the range of the daily BAT-AEL for boilers is motivated by the analysis of emission data collected through the questionnaires. In particular the level of 15 mg/Nm³ derives from reference plant 623, which has a level of dust in BF gas within the range given by the I&S BAT conclusions, an yearly average of 5 mg/Nm³, well inside the range proposed by the EIPPCB, but a 95th percentile of 14.1 mg/Nm³. This plant should have been taken in consideration and not excluded while determining the daily dust range for boilers (as also represented in background paper section 1.7.8).
EIPPCB assessment

Availability of information on which the split view is based:
- Documents and information mentioned in the split view were available.

Validity of supporting rationale:
- BAT-AELs are not derived based on IED ELVs.
- BAT-AELs are given only for process gases.
- The rationale does not demonstrate how the economic issue could prevent the implementation of the proposed BAT conclusions and BAT-AELs which are based on well performing plants whose performances were presented and discussed in a transparent way within the TWG.
- The rationale uses data from one plant (Plant 623) fitted with a technique listed in BAT 58 and links these data to the level proposed in the split view.

EIPPCB conclusion

Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the split view. This split view will therefore be reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 58 Table 10.36</td>
<td><em>Increase the upper end of the daily dust BAT-AEL range for boilers combusting iron and steel process gases</em></td>
<td>Eurofer, EURELECTRIC</td>
<td>15 mg/Nm³</td>
</tr>
</tbody>
</table>

14.7.2 Remove the (daily/yearly) BAT-AELs for CCGTs

Split view summary

Eurofer proposes to remove the yearly BAT-AEL for CCGTs.

EURELECTRIC propose to remove the daily BAT-AEL for CCGTs.

The split view is accompanied by the following rationale (Eurofer):
- No reference plant to support a yearly average BAT-AEL has been proposed. In the LCP BREF Draft 1 no yearly BAT-AEL was defined; in the Revised LCP Draft 1 it was defined as “NA” i.e. Not Applicable but during the Final Meeting a BAT-AEL of 2-5 mg/Nm³ was postulated. This begs the question, on what basis has the BAT-AEL been proposed since initially it was “NA” and now it has to be 2-5 mg/Nm³?
- The EIPPCB applied criteria for the derivation of the BAT-AELs to set-up the higher end of ranges is not considered traceable and no methodology has been presented during the exchange within the TWG discussions (with standardized and objective parameters and criteria). With an objective of a fair level playing field (which also means the avoidance of risk of not treating different situations in the same way) it is considered that to ensure an effective and active exchange of information in high-quality BAT reference documents, the process should be done in a transparent...
manner (in line with the recital 14 of the IED). As such the Eurofer proposal takes into consideration the particularities of the iron and steel process gases and explains the proposal with robust technical arguments. It is important to remark that no evidence in relation to methods and procedures has been presented by EIPPCB to the TWG in relation to this issue for a guarantee of the quality assurance of the reviewing of the BREF in accordance to chapter 6 of the BREF Guidance.

- It does not appear that the economic viability under the definition of BAT (art 3.10 IED) has been evaluated in the proposal of BAT-AEL by the EIPPCB. It is important to remark that “available technique” means that it has been developed on a scale which allows implementation in the relevant industrial sector, under economically and technically viable conditions. In addition Eurofer would like to stress that the costs (investments and operating costs) of a utility I&S LCP within the sector producing electricity from iron and steel process gases are significantly higher than the electricity produced in a LCP fired with natural gas (see Annex 3).

The split view is accompanied by the following rationale (EURELECTRIC):

- No reference plant to support the daily and yearly average BAT-AEL for CCGTs has been proposed in the Working document – Combustion of iron and steel process gases – NOx, CO, NH3, SOx, dust emissions and energy efficiency. In the LCP BREF Draft 1 no daily and yearly BAT-AELs were defined. In the Updated draft BAT conclusions dated April 2015, the yearly was defined as “NA” and the daily as <2 – 5, without giving a clear evidence on how these values were derived. During the Final Meeting a BAT-AEL of 2-5 mg/Nm³ for yearly averages was also proposed for CCGTs.

- Since there is no technical reason to have identical daily and yearly BAT-AELs, EURELECTRIC proposal is to leave the yearly average for dust for CCGTs as defined during the final TWG meeting but to remove the daily averages, which do not take properly into account the very high fluctuations in quality and quantity of process gases (COG and BOF have typically an higher content of dust) which could lead an increase of dust emissions on particular days. Regarding daily ELVs, IED safety net is always applicable so EURELECTRIC proposal, while maintaining a very high standard (the proposed yearly values are very near the limits of detection of the monitoring devices as acknowledged also in the Background paper section 1.7.8) aims to give the necessary flexibility for I&S LCP plants which may experience very high fluctuations in quality and quantity of process gases.

**EIPPCB assessment**

Availability of information on which the split view is based:

- Documents and information mentioned in the split view were available.

Validity of supporting rationale (Eurofer):

- There is no plant with reported yearly average dust emissions within the BAT-AEL ranges.

- The rationale does not demonstrate how the economic issue could prevent the implementation of the proposed BAT conclusions and BAT-AELs which are based on well performing plants whose performances were presented and discussed in a transparent way within the TWG.

Validity of supporting rationale (EURELECTRIC):

- There is no plant with reported yearly average dust emissions within the BAT-AEL ranges but there are plants with reported daily average dust emissions within the BAT-AEL ranges (e.g. Plants 359 and 360).

- The rationale does not demonstrate how the fuel quality variation can lead a plant to exceed the BAT-AELs on some days.

**EIPPCB conclusion**
Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the part of the split view submitted by Eurofer, and that there are not enough appropriate technical arguments to support the part of the split view submitted by EURELECTRIC. This split view will therefore only be partially reported in the 'Concluding remarks and recommendations for future work' section of the BREF, for the part submitted by Eurofer.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 58 Table 10.36</td>
<td>Remove the yearly dust BAT-AEL for CCGTs combusting iron and steel process gases</td>
<td>Eurofer</td>
<td>NA</td>
</tr>
</tbody>
</table>

**14.8 Remove the references to iron and steel process gases from BAT 5**

**Conclusions of the meeting**
Slide 47.

BAT 5. In order to improve the general environmental performance of combustion and/or gasification plants and to reduce emissions to air, BAT is to include the following elements in the QA/QC programmes for all the fuels used, as part of the environmental management system (see BAT 1):

i. Initial full characterisation including at least the parameters listed below and in accordance with EN standards. ISO, national or other international standards may be used provided they ensure the provision of data of an equivalent scientific quality.

ii. Regular testing of the fuel quality to check it is within the criteria of the characterisation and the plant design. The frequency of testing and the parameters chosen from the table below are based on the variability of the fuel and an assessment of the relevance of pollutant releases (e.g. concentration in fuel, flue-gas treatment employed).

iii. Subsequent adjustment of the plant settings as and when needed and practicable (e.g. integration of the fuel characterisation and control in the advanced control system (see description in Section 10.8)).

<table>
<thead>
<tr>
<th>Fuel(s)</th>
<th>Substances/Parameters subject to characterisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>...</td>
<td>* ...</td>
</tr>
<tr>
<td>Iron and steel process gases</td>
<td>* LHV, CH₄ (for COG), C₃H₈ (for COG), CO₂, H₂, N₂, total sulphur, dust, Wobbe index</td>
</tr>
<tr>
<td>...</td>
<td>* ...</td>
</tr>
</tbody>
</table>

**Split view summary**
Eurofer proposes to remove the references to iron and steel process gases from BAT 5.

The split view is accompanied by the following rationale:

- According to the IED and Annex 3, for categories of activities referred to in Article 10, point 2.2 for the production, composition, characterisation and chemical analysis
of the I&S process gases as by-products the I&S BREF and its BAT conclusions are relevant, competent and responsible and not the LCP BREF. There are no existing EN standards, ISO, national or international standard methods for the characterisation of COG, BFG and BOF gas compositions, see I&S BREF. Only non-standardised continuous and periodic measurement methods are used.

- According to the I&S BAT conclusions for the characterisation of iron and steel process gases the environmental parameters for COG is BAT 48, for BFG it is BAT 64 and for BOFG they are BAT 75 and BAT 76. These conclusions recognise the peculiarities of the iron and steel process gases and, as such, are applied by the regulating authorities. Inconsistencies between the BAT conclusions of the I&S BREF and those of the LCP BREF must be avoided otherwise there will be unnecessary problems for the authorities and operators. LCP BAT conclusions must not be in conflict with conclusions of other vertical BREFs as for example I&S BREF (BAT Iron and Steel production - Commission Implementing Decision 2012/135/EU), according to the Section 1.1.2 of the BREF Guidance (Commission Implementing Decision 2012/119/EU).
- The other species such as C₂H₆, C₃, C₄, CH₄ and so on in the gas do not have any environmental relevance in the emissions because they combust to form H₂O and CO₂.
- There are no LCP reference plants in the I&S industry in which these techniques are used or applied. According to the IED, where there is no reference plant a BAT cannot be derived and defined. No operational information has been collected and subsequently used to propose this BAT for I&S LCPs (section 2.3.7.2.9 BREF Guidance). As such no evidence or assessment of its applicability (Section 2.3.8 BREF Guidance) has been advanced to support the selection of this technique as being a BAT within the sector.
- In the last draft LCP BREF (available from 27th May) this potential technique is not included in the techniques to consider BAT (7.3.4) only a description of different fuels in 7.3.1.1 has been included.
- No alignment with point 3.1 of the BREF Guidance: “The technique should have been mentioned in the chapter of the BREF entitled ‘Techniques to consider in the determination of BAT’”.

**EIPPCB assessment**

Availability of information on which the split view is based:

- Documents and information mentioned in the split view were available.

Validity of supporting rationale:

- This BAT conclusion applies to LCPs and is therefore within the scope of the BAT conclusions.
- This BAT conclusion and the BAT conclusions of the IS BREF mentioned in the comments have different purposes and do not contradict each other.
- Monitoring of the characteristics of the fuel is performed in the sector in Europe as shown by the reported data in Section 7.3.1.1 of the draft BREF.

**EIPPCB conclusion**

Taking these aspects into account, the EIPPCB considers that there are not enough appropriate technical arguments to support the split view. This split view will therefore not be reported in the ‘Concluding remarks and recommendations for future work’ section of the BREF.
15 BAT CONCLUSIONS FOR EMISSIONS TO AIR FROM THE
COMBUSTION OF PROCESS FUELS FROM THE
CHEMICAL INDUSTRY

15.1 Availability of techniques to measure HCl, dust and
PCDD/F emissions in compliance with the relevant EN
standards

Conclusions of the meeting
Slides 400/406/412.

The BAT-associated emission levels for HCl and HF from the combustion of process fuels from the chemical industry in boilers are given in Table 10.41.

Table 10.41: BAT-associated emission levels (BAT-AELs) for HCl and HF emissions to air from the combustion of process fuels from the chemical industry in a boiler

<table>
<thead>
<tr>
<th>Combustion plant total rated thermal input (MW\textsubscript{th})</th>
<th>BAT-AELs (mg/Nm\textsuperscript{3})</th>
<th>HCl</th>
<th>HF</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Average of samples obtained during one year</td>
<td>New plant</td>
<td>Existing plant</td>
</tr>
<tr>
<td>&lt; 100</td>
<td></td>
<td>1–7</td>
<td>2–15 (\textsuperscript{)}</td>
</tr>
<tr>
<td>≥ 100</td>
<td></td>
<td>1–5</td>
<td>&lt; 1–9 (\textsuperscript{)}</td>
</tr>
</tbody>
</table>

\textsuperscript{)} In the case of plants operated < 1500 h/yr, the higher end of the BAT-AEL range is 20 mg/Nm\textsuperscript{3}.

\textsuperscript{2)} In the case of plants operated < 1500 h/yr, the higher end of the BAT-AEL range is 7 mg/Nm\textsuperscript{3}.

The BAT-associated emission levels of dust from the combustion of process fuels from the chemical industry in boilers are given in Table 10.42.

Table 10.42: BAT-associated emission levels (BAT-AELs) for dust emission to air from the combustion of mixtures of gases and liquids composed of 100% process fuels from the chemical industry in a boiler

<table>
<thead>
<tr>
<th>Combustion plant total rated thermal input (MW\textsubscript{th})</th>
<th>BAT-AELs for dust (mg/Nm\textsuperscript{3})</th>
<th>Yearly average</th>
<th>Daily average or average over the sampling period</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>New plant</td>
<td>Existing plant</td>
<td>New plant</td>
</tr>
<tr>
<td>&lt; 300</td>
<td></td>
<td>2–5</td>
<td>2–15</td>
</tr>
<tr>
<td>≥ 300</td>
<td></td>
<td>2–5</td>
<td>2–10 (\textsuperscript{)}</td>
</tr>
</tbody>
</table>

\textsuperscript{)} For combustion plants put into operation no later than 7 January 2014, the higher end of the BAT-AEL range is 15 mg/Nm\textsuperscript{3}.

\textsuperscript{2)} For combustion plants put into operation no later than 7 January 2014, the higher end of the BAT-AEL range is 25 mg/Nm\textsuperscript{3}.

The BAT-associated emission levels for PCDD/F and TVOC from the combustion of process fuels from the chemical industry in boilers are given in Table 10.45.
Table 10.45: BAT-associated emission levels (BAT-AELs) for PCDD/F and TVOC emissions to air from the combustion of 100% process fuels from the chemical industry in a boiler

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Unit</th>
<th>BAT-AELs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Average over the sampling period</td>
</tr>
<tr>
<td>PCDD/F (1)</td>
<td>ng I-TEQ/Nm³</td>
<td>&lt; 0.012–0.036</td>
</tr>
<tr>
<td>TVOC</td>
<td>mg/Nm³</td>
<td>0.6–12</td>
</tr>
</tbody>
</table>

(1) These BAT-AELs only apply to combustion plants using fuels derived from chemical processes involving chlorinated substances.

Split view summary
ESWET, supported by CEFIC, CEWEP, EURELECTRIC, Euroheat & Power and EUTurbines, proposes to ask the relevant CEN Technical Committee to comment on the availability and suitability of equipment, systems and methods to measure, in compliance with the CEN standards, emissions within the range of the proposed BAT-AELs. Automated measuring systems (AMS), data acquisition and handling systems (DAHS) and standard reference methods (SRM) must be checked in order to cover continuous monitoring and periodic measurements.

The split view is accompanied by the following rationale:
- See rationale in Section 11.13.
- EN 1911 describes the SRM for the determination of the mass concentration of gaseous chlorides, expressed as HCl, from stationary sources. It requires a maximum uncertainty of 30% for the 95% confidence interval of 40% at daily ELV (10 mg/Nm³) which is given in the IED for incineration and co-incineration installations. However, the accuracy of the SRM, including sampling and analysis methods, which is used for periodic measurements and as reference method for calibration of AMS (QAL2) is limited. Indeed, as shown by the repeatability and reproducibility tests made within the frame of Interlaboratory Comparisons (ILCs) / Interlaboratory Proficiency testing (ILPT), the dispersion between accredited laboratory analysis results can be quite high in respect of the current ELVs and is even more important for lower ELVs. An assessment of the resulting levels of uncertainty is given in the relevant EN standards. These assessments are regularly updated when accredited laboratories pass the reaccreditation test. The report of the latest study by INERIS on real flue gas published by AFNOR in September 2013 shows for instance a Total expanded uncertainty of 80% on HCl with a concentration of 10 mg/Nm³ and probably above 50% for PCDD/F when the ELV is 0.1 ng/Nm³.

EIPPCB assessment
Availability of information on which the split view is based:
- The rationale is not based on information made available to the TWG in due time (AFNOR 2013 publication on the implementation of standardized reference methods, results of inter-laboratory comparison studies). In addition, none of the data submitted through the questionnaires was challenged by ESWET during the period of exchange of information.
- Two documents available to the TWG are mentioned as a reference (Appendix 2: report ‘LCP BAT and measurement uncertainties’ by VTT Technical Research Centre of Finland Ltd dated 13/5/2015 posted on BATIS on 20.05.2015, and Appendix 3: report 'Mercury emissions from coal-fired combustion plants for BREF-LCP discussion' prepared by the Working Group on mercury of VGB PowerTech e.v., dated March 2012 and posted on BATIS in 2012).

Validity of supporting rationale:
- See EIPPCB assessment in Section 11.13.
EN 1911 for the measurement of gaseous chlorides stipulates that the method applies to concentrations from 1 mg/Nm\(^3\) to 5000 mg/Nm\(^3\).

**EIPPCB conclusion**

Taking these aspects into account, the EIPPCB considers that the split view does not clearly refer to the BAT-AELs set. This split view will therefore not be reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

### 15.2 NO\(_X\) BAT-AELs – Increase the upper ends of the ranges for fuels with a high level of hydrogen

**Conclusions of the meeting**

Slide 386.

The BAT-associated emission levels for NO\(_X\) from the combustion of process fuels from the chemical industry in boilers are given in Table 10.39.

The associated monitoring is in BAT 3 ter.

**Table 10.39:** BAT-associated emission levels (BAT-AELs) for NO\(_X\) emissions to air from the combustion of 100 % process fuels from the chemical industry in a boiler

<table>
<thead>
<tr>
<th>Fuel phase</th>
<th>BAT-AELs (mg/Nm(^3))</th>
<th>NO(_X)</th>
<th>Yearly average</th>
<th>Daily average or average over the sampling period</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>New plant</td>
<td>Existing plant</td>
</tr>
<tr>
<td>Mixture of gases and liquids</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>New plant</td>
<td>Existing plant</td>
</tr>
<tr>
<td>Gases only</td>
<td>20–80</td>
<td>70–100</td>
<td>30–100</td>
<td>85–110 ((^1))</td>
</tr>
</tbody>
</table>

\(^1\) For existing plants of ≤ 500 MW\(_{th}\) put into operation no later than 27 November 2003 using liquid fuels with a nitrogen content higher than 0.6 % (w/w), the higher end of the BAT-AEL range is 380 mg/Nm\(^3\).

\(^2\) For existing plants put into operation no later than 7 January 2014, the higher end of the BAT-AEL range is 180 mg/Nm\(^3\).

\(^3\) For existing plants put into operation no later than 7 January 2014, the higher end of the BAT-AEL range is 210 mg/Nm\(^3\).

**Split view summary**

CEFIC proposes to add the following footnote to the yearly and daily average BAT-AELs for gaseous fuels and mixtures of gaseous/liquid fuels in existing plants: 'The higher end of the BAT-AEL range applies to gaseous fuels with a hydrogen content lower than 30% Vol. For higher hydrogen contents, the upper limit may be increased by 25 mg/Nm\(^3\) per 10% Vol increase in hydrogen content.'

The split view is accompanied by the following rationale:

- Low-NO\(_X\) burner manufacturers link their emission value guarantees to the composition of the gaseous fuel when it is significantly different from the composition of natural gas. Many technical reference documents exist that show the need of referring the NO\(_X\) emission values to the composition of the gaseous fuel. Especially a high hydrogen content significantly increases the adiabatic flame temperature with the consequence of higher NO\(_X\) emissions. This is very much the case for many gaseous process fuels from chemical industry that have a variable...
composition depending on plant utilisation; thus those fuels may have a very different composition than natural gas.

**EIPPCB assessment**

Availability of information on which the split view is based:
- Documents and information mentioned in the split view were available, with the exception of the mentioned handbooks of two burner manufacturers, which were not available.

Validity of supporting rationale:
- The information and data quoted by CEFI in the rationale for the upper end of the BAT-AEL range are related to the implementation of BAT and to emissions from some submitted questionnaires, which include additional graphs plotting short-term emission levels along with the H₂ contents in the fuel. However, these data do not provide clear correlation evidence, and reference is made only to the performance of one of the techniques of BAT 65. Furthermore, no clear link with the proposed alternative BAT-AELs is provided, considering that a justification for the proposed increase of 25 mg per 10% H₂ content both for daily and yearly averages is not given. It is also noted that the available example plants (157-1 and 157-2) for a high (75%) share of H₂ in the fuel mix for only gaseous fuels have both short-term and long-term performances well within the BAT-AEL ranges of Table 10.39.

**EIPPCB conclusion**

Taking these aspects into account, the EIPPCB considers that there are not enough appropriate technical arguments to support the split view. This split view will therefore not be reported in the ‘Concluding remarks and recommendations for future work’ section of the BREF.

### 15.3 SO₂ BAT-AELs – Change the reference percentage of process fuels and increase the upper end of the yearly range

**Conclusions of the meeting**

Slides 396/397.

The BAT-associated emission levels for SO₂, HCl and HF from the combustion of process fuels from the chemical industry in boilers are given in Table 10.40.

**Table 10.40: BAT-associated emission levels (BAT-AELs) for SO₂ emissions to air from the combustion of 100% process fuels from the chemical industry in a boiler**

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>BAT-AELs (mg/Nm³)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yearly average</td>
</tr>
<tr>
<td>SO₂</td>
<td>10–110</td>
</tr>
</tbody>
</table>

**Split view summary**

CEFIC proposes to:
- remove the reference to 100% process fuels in the table title;
- restore footnote (2) making reference to other upper ends of the daily BAT-AEL ranges for days where auxiliary fuels were used;
• increase the upper end of the yearly BAT-AEL range in the case where end-of-pipe techniques would not be applicable.

The split view is accompanied by the following rationale:

• The scope of Techniques and BAT-AEL for process fuels from chemical industry appears to be very confusing in the Final Meeting conclusions. Some Techniques and BAT-AEL now only refer to pure process fuels while others continue to refer to combustion of process fuels, individually, in combination, or simultaneously with other gaseous and/or liquid fuels.

• The data provided by chemical industry covered mostly multi-fuel firing combustion plants with process fuels from chemical industry being only a part of the fuel mix used. Regarding SO2 emissions, only plants 61, 73 and 374 are using 100% process fuels. These plants represent only 27 % of the plants used as a reference for setting the BAT-AEL range. For plants 425-1 and 425-2, the SO2 emissions are related to firing HFO which cannot be considered as representative for setting BAT-AEL ranges for 100% process fuels. Additionally, for plants 535-2, 297 and 298 the reduction of SO2 emissions was related to replacing HFO by process fuels from chemical industry.

• Restricting Techniques and BAT-AEL ranges to pure process fuels would cause significant difficulties for operators and permitting authorities alike. Operators would be facing problems when burning mainly commercial fuels as they would have to comply with BAT-AEL ranges that are very close to those derived for commercial fuels. However, compliance with those BAT-AEL ranges may not be achievable as plants were designed to accommodate process fuels from chemical industry and were not optimised for the occasional combustion of a high percentage of commercial fuels in the fuel mix. Permitting authorities on the other hand would have to derive emission limit values that foresee all potential fuel mixes; this will neither be practical nor does it do justice to the primary objective of making best use of process fuels.

• The restriction of Techniques and BAT-AEL ranges to pure process fuels would also cause inconsistencies for load modes < 1500 h/yr. Although CEFIC believes that no such decision was taken at the Final Meeting (see separate split view from CEFIC on this topic), EIPPCB has decided to exempt process fuels from the general approach that applies to all other fuels for low load modes. Thus, BAT-AEL would apply to process fuels from chemical industry even if plants are operated < 500 h/yr or < 1500 h/yr. This is not consistent with other fuels. For HFO (to only give one example) the daily averaged levels are indicative for combustion plants operated < 500 h/yr while the yearly averaged BAT-AEL do not apply to combustion plants operated < 1500 h/yr. If mixes of process fuels and HFO are combusted it would be completely unclear if any BAT-AEL apply to plants operating < 500 h/yr or < 1500 h/yr.

• CEFIC is therefore convinced that Techniques and BAT-AEL for SO2 (as for all pollutants) should not only apply to 100% process fuels and that the original text on slides 312 and 319 should be restored. In accordance with that rationale, the original footnote (2) on slide 320 should be kept to allow for the use of auxiliary fuels.

• The data basis on process fuels from chemical industry is rather limited, which makes it difficult to derive generally applicable BAT-AEL for SO2. However, BAT-AEL can be set if information from all plants is taken into account, for instance by covering specific cases via footnotes.

• CEFIC believes that such a footnote is required based on plant 152 which has yearly averaged SO2 emissions of 227 mg/Nm³. This plant reflects the situation where end-of-pipe treatment is not possible. This is due to possible technical and economic restrictions for applying Wet FGD or constraints associated with duct configuration, space availability, and/or potential safety restrictions imposed for other end-of-pipe techniques as mentioned in BAT 66. Fuel switch is not an option if there is no
alternative use of the process fuel. The use of by-products and residues of (petro)-
chemical processes is a preferable use compared to flaring or incineration. Thus, the
BAT-AEL range on slide 320 should be modified accordingly.

**EIPPCB assessment**

Availability of information on which the split view is based:
- Documents and information mentioned in the split view were available.

Validity of supporting rationale:
- Excluding some plants that were not taken into consideration for setting BAT-AELs
  because of high emission levels that do not comply with IED Annex 5, the majority
  of the plants considered combust a very high share of process fuels from the chemical
  industry. However, in certain cases a substantial share of SO₂ emissions may be
  associated with small amounts of high-sulphur support fuels; this element is
  considered sufficient to support the dissenting view on the reference percentage of the
  process fuels and, as an associated consequence, on the restoration of footnote
  (\(^2\)).
- CEFIC puts forward a number of arguments related to implementation, which should
  be considered as part of the broader context of the IED in general as they are also
  related to the IED ELVs' implementation.
- Regarding CEFIC’s position to increase of the yearly average BAT-AEL, the
  technical arguments for setting a level of 230 mg/Nm\(^3\) are based on the performance
  of a single plant, which is taken as an example of a plant where no control techniques
  are viable. However, the demonstration of such non-viability seems purely
  hypothetical and the proposed level related to a specific local situation rather than
  being of general validity.

**EIPPCB conclusion**

Taking these aspects into account, the EIPPCB considers that there are enough appropriate
technical arguments to support the split view for the part related to the reference percentage
of process fuels and for the associated inclusion of a footnote addressing the case of days of use
of auxiliary liquid fuels. For the part related to the increase of the yearly BAT-AEL in the
case where end-of-pipe controls are not applicable, the EIPPCB considers that there are not
enough appropriate technical arguments to support the split view. This split view will
therefore only be partially reported, for the part related to the reference percentage of process
fuels and inclusion of a footnote addressing the case of days of use of auxiliary liquid fuels, in
the 'Concluding remarks and recommendations for future work' section of the BREF.
A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 66 Table 10.40</td>
<td>Change the title of Table 10.40 as follows: ‘BAT-associated emission levels (BAT-AELs) for SO\textsubscript{2} emissions to air from the combustion of process fuels from the chemical industry in boilers’, and include a footnote associated with the ‘daily average or average over the sampling period’ stating that ‘the higher end of the BAT-AEL range may be different on days when auxiliary liquid fuels are used. In this case, the higher end of the BAT-AEL range may correspond to the higher end of the BAT-AEL range applicable to the corresponding auxiliary fuel for the case of plants operated &lt;1500h/yr’</td>
<td>CEFIC</td>
<td>NA</td>
</tr>
</tbody>
</table>

15.4 Dust BAT-AELs – Decrease the upper ends of the ranges

Conclusions of the meeting
Slide 406.

The BAT-associated emission levels of dust from the combustion of process fuels from the chemical industry in boilers are given in Table 10.42.

Table 10.42: BAT-associated emission levels (BAT-AELs) for dust emission to air from the combustion of mixtures of gases and liquids composed of 100 % process fuels from the chemical industry in a boiler

<table>
<thead>
<tr>
<th>Combustion plant total rated thermal input (MW\textsubscript{th})</th>
<th>BAT-AELs for dust (mg/Nm\textsuperscript{3})</th>
<th>Yearly average</th>
<th>Daily average or average over the sampling period</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>New plant</td>
<td>Existing plant</td>
<td>New plant</td>
</tr>
<tr>
<td>&lt; 300</td>
<td>2−5</td>
<td>2–15</td>
<td>2–10</td>
</tr>
<tr>
<td>≥ 300</td>
<td>2–5</td>
<td>2–10 (\textsuperscript{\textcircled{1}})</td>
<td>2–10</td>
</tr>
</tbody>
</table>

(\textsuperscript{\textcircled{1}}) For combustion plants put into operation no later than 7 January 2014, the higher end of the BAT-AEL range is 15 mg/Nm\textsuperscript{3}.

(\textsuperscript{\textcircled{2}}) For combustion plants put into operation no later than 7 January 2014, the higher end of the BAT-AEL range is 25 mg/Nm\textsuperscript{3}.

Split view summary
EEB proposes to decrease the upper end of the yearly dust BAT-AEL range for existing plants to 10 mg/Nm\textsuperscript{3}.
CAN Europe proposes to decrease the upper end of the daily dust BAT-AEL range for existing plants to 16 mg/Nm\(^3\).

The split view is accompanied by the following rationale (EEB):

- A proposed upper limit of 10 mg/Nm\(^3\) was rejected by the TWG on the grounds that 15 mg/Nm\(^3\) was necessary to cover the use of 100% process gases.
- However, an upper limit of 10 mg/Nm\(^3\) would still cover this through other plants i.e. 61, 527 and 374.
- It would also include a wide range of fuels as well as fully representing the sample of plants in terms of capacity, operating hours and equivalent full load operating factor values.
- The upper BAT-AEL for existing plants should therefore be 10 mg/Nm\(^3\) (Plants 298 and 75-2).

The split view is accompanied by the following rationale (CAN Europe):

- PM levels in many areas in Europe are far too high and have significant impact on public health. Therefore it is justified to apply techniques that achieve lowest emission levels, in particular fabric filters.
- The data collection shows that it is possible to achieve the above proposed levels (all plants from 374V to 535V having emission levels of dust below 10 mg/Nm\(^3\)).

**EIPPCB assessment**

Availability of information on which the split view is based:

- Documents and information mentioned in the split view were available.

Validity of supporting rationale:

- EEB: Information and data used in the rationale for the upper end of the BAT-AEL range are related to the implementation of BAT and to emissions from submitted questionnaires, and make the link with the alternative proposal for BAT-AELs for the range of performances associated with the application of BAT.
- CAN Europe: Information and data used in the rationale for the upper end of the BAT-AEL range are related to the implementation of BAT and to emissions from submitted questionnaires, but no rationale is provided regarding the exclusion of certain plants from the BAT-AEL range. The BREF Guidance (3.3) specifies that 'the upper end of the BAT-AEPL is derived by considering the range of performance associated with the application of BAT under NOC'.

**EIPPCB conclusion**

Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the split view in the case of EEB but not in the case of CAN Europe. This split view will therefore be reported only for EEB in the 'Concluding remarks and recommendations for future work' section of the BREF.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 67 Table 10.42</td>
<td>Decrease the higher end of the yearly dust BAT-AEL range for existing plants</td>
<td>EEB</td>
<td>10 mg/Nm(^3)</td>
</tr>
</tbody>
</table>
### 15.5 Dust monitoring

**Conclusions of the meeting**

Slide 407.

BAT 3 ter. BAT is to monitor emissions to air with at least the frequency given below and in accordance with EN standards. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.

<table>
<thead>
<tr>
<th>Substance/Parameter</th>
<th>Fuel/Process</th>
<th>Combustion plant total rated thermal input</th>
<th>Standard(s)</th>
<th>Minimum monitoring frequency</th>
<th>Monitoring associated with</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dust</td>
<td>Process fuels from the chemical industry in boilers</td>
<td>All sizes</td>
<td>Generic EN standards and EN 13284-1/2</td>
<td>Continuous ((^2))((^16))</td>
<td>BAT 67</td>
</tr>
</tbody>
</table>

\(^2\) In the case of plants with a rated thermal input of < 100 MW\(_{th}\) operated < 1500 h/yr, the monitoring frequency may be reduced to at least once every six months. For gas turbines, periodic monitoring is carried out with a combustion plant load of > 70%.

\(^16\) In the case of combustion plants firing iron and steel process gases, the monitoring frequency may be at least once every six months if the emissions are proven to be sufficiently stable.

**Split view summary**

CEFIC proposes to add the following footnotes to the minimum frequency:

- Monitoring is only required if non-gaseous fuels are used.
- If the emission levels are proven to be sufficiently stable, periodic measurements may be carried out each time that a change of the fuel characteristics may have an impact of the emissions, but in case at least once every year.

The split view is accompanied by the following rationale:

- Gaseous fuels are generally clean and do not contain particles or dust. Also, combustion of gaseous fuels does usually not generate particles or dust. Monitoring obligations for gaseous process fuels from chemical industry should be consistent with those for natural gas; therefore no monitoring of dust should be required if solely gaseous process fuels are used.
- In accordance with the current draft of the Reference Report on Monitoring any choice between periodic and continuous monitoring needs to be based on the requirements of the individual industrial sector and on the information provided. This includes the significance of the emissions and specific local conditions which can only be assessed by the local permitting authority. Depending on this assessment the local permitting authority should be given the choice to adjust monitoring obligations. Thus, CEFIC believes that footnote (8) of slide 325 should also apply to slide 330 as continuous monitoring for process fuels from chemical industry should only be required in specific cases.

**EIPPCB assessment**

Availability of information on which the split view is based:

- Documents and information mentioned in the split view were available.

Validity of supporting rationale:
• The reference quoted by CEFIC in the rationale for not requiring the monitoring of dust for the combustion of gaseous fuels shows the comparison of dust emissions from example plants combusting process fuels from the chemical industry, showing the correlation between dust emissions and the percentage of liquid fuels combusted. However, clear correlation evidence is lacking, taking into consideration for instance the performance of Plant 73, which combests 100 % gaseous fuels and has not only yearly average emissions that are higher than several plants burning mixtures of liquid and gaseous fuels, but also the highest short-term peaks of the entire sample of plants shown.

• The alternative proposal does not appear consistent with the minimum requirements set in IED Annex V, which in the case of plants above 100 MWth allows periodic instead of continuous monitoring only for plants firing natural gas.

• The alternative proposal to allow for periodic monitoring at each relevant change of fuel characteristics is not supported by any specific rationale that would make the case for process fuels from the chemical industry decisively different from other fuels for which continuous monitoring applies.

EIPPCB conclusion
Taking these aspects into account, the EIPPCB considers that there are not enough appropriate technical arguments to support the split view. This split view will therefore not be reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

15.6 PCDD/F monitoring

Conclusions of the meeting
Slide 413.

BAT 3 ter. BAT is to monitor emissions to air with at least the frequency given below and in accordance with EN standards. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.

<table>
<thead>
<tr>
<th>Substance/Parameter</th>
<th>Fuel/Process</th>
<th>Combustion plant total rated thermal input</th>
<th>Standard(s)</th>
<th>Minimum monitoring frequency</th>
<th>Monitoring associated with</th>
</tr>
</thead>
<tbody>
<tr>
<td>...</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PCDD/F</td>
<td>• Process fuels from the chemical industry in boilers • Waste co-incineration in coal, lignite, solid biomass and/or peat combustion plants</td>
<td>All sizes</td>
<td>EN 1948-1, EN 1948-2, EN 1948-3</td>
<td>At least once every six months (8)</td>
<td>BAT 69</td>
</tr>
<tr>
<td>...</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(8) If the emission levels are proven to be sufficiently stable, periodic measurements may be carried out each time that a change of the fuel and/or waste characteristics may have an impact on the emissions, but in any case at least once every year.

(8) In the case of process fuels from the chemical industry, monitoring is only applicable when the fuels contain chlorinated substances.

Split view summary
EEB and CAN Europe propose to remove footnote (8).

The split view is accompanied by the following rationale:

- The industry itself emphasises that the fuels from chemical processing are of a variable composition, to the extent that emissions of pollutants may vary by a factor of 2 for short periods of time. It is therefore unrealistic to use fuel quality as a basis for determining monitoring frequency.

**EIPPCB assessment**

Availability of information on which the split view is based:

- The split view submitted by CAN Europe makes generic reference to the varying composition of fuels reported by the chemical industry. No specific supporting information is mentioned by CAN Europe.
- Documents and information mentioned by EEB in the split view were available.

Validity of supporting rationale:

- The rationale does not make the link with specific elements of information to support the alternative proposal for the monitoring of PCCD/F. The study referenced by EEB reports composition variability in relation to hydrogen and nitrogen content rather than to halogens or other substances that may have a clearer link with PCCD/F emission levels.
- The rationale does not demonstrate that keeping the minimum six-monthly frequency would allow short-term emission fluctuations to be captured significantly better than by applying the conditions of footnote (8).

**EIPPCB conclusion**

Taking these aspects into account, the EIPPCB considers that there are not enough appropriate technical arguments to support the split view. This split view will therefore not be reported in the 'Concluding remarks and recommendations for future work' section of the BREF.
16 BAT CONCLUSIONS FOR EMISSIONS TO AIR FROM THE COMBUSTION OF GASEOUS AND/OR LIQUID FUELS ON OFFSHORE PLATFORMS

Conclusions of the meeting
Slide 130.

The BAT–associated emission levels for NO\textsubscript{X} given in Table 10.37.

Table 10.37: BAT-associated emission levels (BAT-AELs) for NO\textsubscript{X} emissions to air from the combustion of gaseous and/or liquid fuels in open-cycle gas turbines on offshore platforms

<table>
<thead>
<tr>
<th>Plant type</th>
<th>BAT-AELs (mg/Nm\textsuperscript{3}) (\textsuperscript{1})</th>
<th>NO\textsubscript{X} Average over the sampling period</th>
</tr>
</thead>
<tbody>
<tr>
<td>New gas turbines combusting gaseous fuels (\textsuperscript{3})</td>
<td>15–50 (\textsuperscript{4})</td>
<td></td>
</tr>
<tr>
<td>Existing gas turbines combusting gaseous fuels (\textsuperscript{3})</td>
<td>&lt; 50–350 (\textsuperscript{4})</td>
<td></td>
</tr>
</tbody>
</table>

(\textsuperscript{1}) The lower end of the BAT-AEL range can be achieved with DLN burners.
(\textsuperscript{2}) These BAT-AELs are based on > 70 % of baseload power available on the day.
(\textsuperscript{3}) This includes single fuel and dual fuel gas turbines.
(\textsuperscript{4}) The higher end of the BAT-AEL range is 250 mg/Nm\textsuperscript{3} if DLN burners are not applicable.

Split view summary
EEB and CAN Europe propose to remove footnote (\textsuperscript{2}).

The split view is accompanied by the following rationale:
- EEB: no evidence was provided in support of the threshold of > 70 % of base load power being the basis of the BAT-AELs, either in the meeting or in the Background Paper.
- CAN Europe: the data collection does not show that it is only possible to achieve the BAT-AEL levels when > 70 % of base load power is achieved on the day.

EIPPCB assessment

Availability of information on which the split view is based:
- Documents and information mentioned in the split view were available.

Validity of supporting rationale:
- Data collection shows plants achieving the agreed BAT-AELs with loads below 70 %.

EIPPCB conclusion

Taking these aspects into account, the EIPPCB considers that the split view is supported by appropriate technical arguments. This split view will therefore be reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 61 Table 10.37</td>
<td>Remove footnote (\textsuperscript{2})</td>
<td>EEB, CAN Europe</td>
<td>NA</td>
</tr>
</tbody>
</table>
17 BAT CONCLUSIONS FOR EMISSIONS TO AIR FROM THE CO-INCINERATION OF WASTE

17.1 Availability of techniques to measure metals when co-incinerating waste with biomass and/or peat, and PCDD/F emissions, in compliance with the relevant EN standards

Conclusions of the meeting
Slides 255/261.

The BAT-associated emission levels for metals are given in Table 10.52. The associated monitoring is given in BAT 3 ter.

Table 10.52: BAT-associated emission levels (BAT-AELs) for metal emissions to air from the co-incineration of waste with biomass and/or peat

<table>
<thead>
<tr>
<th>BAT-AELs (average of samples obtained during one year)</th>
<th>Sb+As+Pb+Cr+Co+Cu+Mn+Ni+V (mg/Nm³)</th>
<th>Cd+Tl (µg/Nm³)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.075–0.3</td>
<td>&lt; 5</td>
</tr>
</tbody>
</table>

The BAT-associated emission levels for PCDD/F and TVOC are given in Table 10.54. The associated monitoring is given in BAT 3 ter.

Table 10.54: BAT-associated emission levels (BAT-AELs) for PCDD/F and TVOC emissions to air from the co-incineration of waste with biomass, peat, coal and/or lignite

<table>
<thead>
<tr>
<th>Type of combustion plant</th>
<th>Pollutant</th>
<th>Unit</th>
<th>BAT-AELs</th>
<th>Averaging period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biomass-, peat-, coal- and/or lignite-fired combustion plant</td>
<td>PCDD/F</td>
<td>ng I-TEQ/Nm³</td>
<td>&lt; 0.01–0.03</td>
<td>Average over the sampling period</td>
</tr>
<tr>
<td>Biomass-, peat-, coal- and/or lignite-fired combustion plant</td>
<td>TVOC</td>
<td>mg/Nm³</td>
<td>&lt; 0.1–5</td>
<td>Yearly average</td>
</tr>
</tbody>
</table>

Split view summary
ESWET, supported by CEFIC, CEWEP, EURELECTRIC, Euroheat & Power and EUTurbines, proposes to ask the relevant CEN Technical Committee to comment on the availability and suitability of equipment, systems and methods to measure, in compliance with the CEN standards, emissions within the range of the proposed BAT-AELs. Automated measuring systems (AMS), data acquisition and handling systems (DAHS) and standard reference methods (SRM) must be checked in order to cover continuous monitoring and periodic measurements.

The split view is accompanied by the following rationale:
- See rationale in Section 11.13.

EIPPCB assessment
- See EIPPCB assessment in Section 11.13.
EIPPCB conclusion
Taking these aspects into account, the EIPPCB considers that the split view does not clearly refer to the BAT-AELs set. This split view will therefore not be reported in the 'Concluding remarks and recommendations for future work' section of the BREF.

17.2 Metals BAT-AELs for waste co-incineration with coal and/or lignite – Decrease the upper ends of the ranges

Conclusions of the meeting
Slide 250.

The BAT-associated emission levels for metals are given in Table 10.51.

Table 10.51: BAT-associated emission levels (BAT-AELs) for metals emissions to air from the co-incineration of waste with coal and/or lignite

<table>
<thead>
<tr>
<th>Combustion plant total rated thermal input (MW&lt;sub&gt;th&lt;/sub&gt;)</th>
<th>BAT-AELs (µg/Nm&lt;sup&gt;3&lt;/sup&gt;)</th>
<th>Averaging period</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sb+As+Pb+Cr+Co+Cu+Mn+Ni+V</td>
<td></td>
</tr>
<tr>
<td>&lt; 300</td>
<td>0.005–0.5</td>
<td>5–12</td>
</tr>
<tr>
<td>≥ 300</td>
<td>0.005–0.2</td>
<td>5–6</td>
</tr>
</tbody>
</table>

Split view summary
EEB proposes to decrease the upper ends of the BAT-AEL ranges to:
- 0.25 mg/Nm<sup>3</sup> for Sb+As+Pb+Cr+Co+Cu+Mn+Ni+V for plants of < 300 MW<sub>th</sub>;
- 0.04 mg/Nm<sup>3</sup> for Sb+As+Pb+Cr+Co+Cu+Mn+Ni+V for plants of ≥ 300 MW<sub>th</sub>;
- 6 µg/Nm<sup>3</sup> for Cd + Tl for plants of < 300 MW<sub>th</sub>;
- 3 µg/Nm<sup>3</sup> for Cd + Tl for plants of ≥ 300 MW<sub>th</sub>.

The split view is accompanied by the following rationale:
- Upper BAT-AEL for Sb+As+Pb+Cr+Co+Cu+Mn+Ni+V for plants of < 300 MW<sub>th</sub>
  - There is no reference plant that accords with the proposed upper BAT-AEL of 0.5 mg/Nm<sup>3</sup> – plant 684 has emissions of 0.54 mg/Nm<sup>3</sup>, whilst plant 689 has emissions of 0.2462 mg/Nm<sup>3</sup>.
  - Setting the upper BAT-AEL at plant 689 would include 4 out of the 5 samples and cover all fuels and plant sizes.
  - Therefore, the upper BAT-AEL should be 0.25 mg/Nm<sup>3</sup>.
- Upper BAT-AEL for Sb+As+Pb+Cr+Co+Cu+Mn+Ni+V for plants of ≥ 300 MW<sub>th</sub>
  - No plant in the sample emits the proposed upper limit 0.2 mg/Nm<sup>3</sup> – the largest average emission is 0.156 mg/Nm<sup>3</sup> by Plant 117-2 burning 97% lignite and 3% waste.
  - However, plants 128-1, -2, -3 and -4 also burn 97% lignite and 3% waste, but still achieve average emissions of at most 0.04 mg/Nm<sup>3</sup>.
  - Therefore the upper BAT-AEL should be 0.04 mg/Nm<sup>3</sup>.
- Upper BAT-AEL for Cd + Tl for plants of < 300 MW<sub>th</sub>
  - The proposed upper limit appears to be based on the only maximum emission recorded (Plant 81, the plant with the highest average emission) and not on the averages.
  - Based on averages, the BAT-AEL should be no greater than 6 ug/Nm<sup>3</sup> i.e. plant 81
- Upper BAT-AEL for Cd + Tl for plants of > 300 MW<sub>th</sub>
It is not possible to justify an upper BAT-AEL of 8 ug/Nm\(^3\) because no reference plant achieved emissions this high.

The largest emission sampled is 6 ug/Nm\(^3\) (Plant 146).

However, just 3 plants – 146, 198 and 197 – increase the upper BAT-AEL by 50% compared to that set by the other 14 plants in the sample.

It should therefore be set at 3 ug/Nm\(^3\) by Plant 124f (0.0028 ug/Nm\(^3\)), which covers a wide range of fuels and the full capacity range.

**EIPPCB assessment**

Availability of information on which the split view is based:

- Documents and information mentioned in the split view were available.

Validity of supporting rationale:

- Information and data used in the rationale for the upper ends of the BAT-AEL range are related to the implementation of techniques listed in BAT 78 and to emissions from submitted questionnaires, make the link with the proposed alternative BAT-AELs and justify with a comparison of plant sizes and types of fuels combusted the alternative proposals for plants ≥ 300 MW\(_{th}\).

- However, the justification for alternative Cd + Tl BAT-AELs for plants of < 300 MW\(_{th}\) does not present valid technical arguments when arguing that only yearly average values should be used as a basis to set BAT-AELs, considering that in this case the BAT-AELs are defined not as yearly averages but as averages over the sampling period. Furthermore, the technical justification for alternative Sb+As+Pb+Cr+Co+Cu+Mn+Ni+V BAT-AELs for plants of < 300 MW\(_{th}\) does not build on a sample of plants representative of the co-incineration of waste.

**EIPPCB conclusion**

Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the split view for the part related to plants of ≥ 300 MW\(_{th}\), but not for the part related to plants of < 300 MW\(_{th}\). This split view will therefore only be partially reported (for the part related to plants of ≥ 300 MW\(_{th}\)) in the ‘Concluding remarks and recommendations for future work’ section of the BREF.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
</table>
| BAT 78 Table 10.51 | Decrease the higher ends of the BAT-AEL ranges for plants of > 300 MW\(_{th}\) | EEB | Cd+Tl: 3 μg/Nm\(^3\)  
Sb+As+Pb+Cr+Co+Cu+Mn+Ni+V: 0.4 mg/Nm\(^3\) |
17.3 Metals BAT-AELs for waste co-incineration with biomass and/or peat – Decrease the upper end of the range

Conclusions of the meeting
Slide 255.

The BAT-associated emission levels for metals are given in Table 10.52.

Table 10.52: BAT-associated emission levels (BAT-AELs) for metal emissions to air from the co-incineration of waste with biomass and/or peat

<table>
<thead>
<tr>
<th>BAT-AELs (average of samples obtained during one year)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Sb+As+Pb+Cr+Co+Cu+Mn+Ni+V (mg/Nm³)</td>
<td>Cd+Tl (µg/Nm³)</td>
</tr>
<tr>
<td>0.075–0.3</td>
<td>&lt; 5</td>
</tr>
</tbody>
</table>

Split view summary
EEB and CAN Europe propose to decrease the upper end of the BAT-AEL range for Cd+Tl to 2 µg/Nm³.

The split view is accompanied by the following rationale (EEB):
- Plant 72 is rightly excluded from the BAT-AEL because rather than co-incinerate waste, it predominantly burns it (93.4% of total fuel).
- 2 µg/Nm³ is the highest average emission of plants that would qualify as 'biomass- and/or peat-fired boilers including waste co-incineration plants'.
- Therefore the upper BAT-AEL should be no higher than 2 µg/Nm³.

The split view is accompanied by the following rationale (CAN Europe):
- The BAT-AEL should not be derived from emission limit values of the Waste Incineration Directive respectively Industrial Emissions Directive but from best performers of the data collection.
- The data collection shows that it is possible to achieve the above proposed levels (all plants except 489-1V, 66VC, 489-3V, 72V are reported with Cd+Tl emission levels (averages as well as maxima) ≤ 2 µg/Nm³).

EIPPCB assessment

Availability of information on which the split view is based:
- Documents and information mentioned in the split view were available

Validity of supporting rationale:
- Information and data used in the rationale presented by EEB and CAN Europe for the upper end of the BAT-AEL range are related to the implementation of techniques listed in BAT 78 and to emissions from submitted questionnaires, make the link with the proposed alternative BAT-AEL and justify the alternative proposal based on the composition of fuels combusted.

EIPPCB conclusion
Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the split view. This split view will therefore be reported in the 'Concluding remarks and recommendations for future work' section of the BREF.
A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 79 Table 10.52</td>
<td>Decrease the higher end of the Cd+TI BAT-AEL range</td>
<td>EEB, CAN Europe</td>
<td>&lt; 2 µg/Nm$^3$</td>
</tr>
</tbody>
</table>

### 17.4 TVOC and PCDD/F BAT-AEL ranges – Decrease the upper end of the range

#### Conclusions of the meeting
Slide 261.

The BAT-associated emission levels for PCDD/F and TVOC are given in Table 10.54.

#### Table 10.54: BAT-associated emission levels (BAT-AELs) for PCDD/F and TVOC emissions to air from the co-incineration of waste with biomass, peat, coal and/or lignite

<table>
<thead>
<tr>
<th>Type of combustion plant</th>
<th>Pollutant</th>
<th>Unit</th>
<th>BAT-AELs</th>
<th>Averaging period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biomass-, peat-, coal- and/or lignite-fired combustion plant</td>
<td>PCDD/F</td>
<td>ng I-TEQ/Nm$^3$</td>
<td>&lt; 0.01–0.03</td>
<td>Average over the sampling period</td>
</tr>
<tr>
<td>Biomass-, peat-, coal- and/or lignite-fired combustion plant</td>
<td>TVOC</td>
<td>mg/Nm$^3$</td>
<td>&lt; 0.1–5</td>
<td>Yearly average</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.5–10</td>
<td>Daily average</td>
</tr>
</tbody>
</table>

#### Split view summary
CAN Europe proposes to decrease the upper end of the BAT-AEL range for PCDD/F to ≤ 0.01 ng/Nm$^3$.

EEB proposes to separate the BAT-AELs for coal and/or lignite and for biomass and/or peat.

The split view is accompanied by the following rationale (CAN Europe):
- The data collection shows that it is possible to achieve the above proposed levels (many plants are reported with PCDD/F emission levels ≤ 0.01 ng/Nm$^3$).

The split view is accompanied by the following rationale (EEB):
- The reference plant data shows that combining coal/lignite and biomass/peat in one BAT-AEL means that they are too high for coal/lignite by a factor of about 10.

#### EIPPCB assessment
Availability of information on which the split view is based:
- Documents and information mentioned in the split view were available.

Validity of supporting rationale:
- Information and data used by CAN Europe in the rationale for the upper end of the BAT-AEL range are related to the emissions reported in the 2012 data collection. However, the link of the proposed alternative BAT-AEL with the implementation of techniques listed in BAT 78, or with other characteristics of the plants that would provide a rationale for the alternative proposal of the 0.01 ng/Nm$^3$ level as the upper end of the BAT-AEL range, and for disregarding any of the plants above this level, is missing.
• Information and data used in EEB’s rationale for the upper end of the BAT-AEL range are related to emissions reported in the 2012 data collection. Although no specific link is made between the implementation of techniques listed in BAT 78 and the alternative proposal to develop separate BAT-AELs for coal/lignite and for biomass/peat, or with any proposed specific alternative BAT-AEL ranges for coal/lignite and for biomass/peat, the proposed justification considers the entire sample of plants of the data collection and can thus be deemed valid.

EIPPCB conclusion
Taking these aspects into account, the EIPPCB considers that there are enough appropriate technical arguments to support the split view in the case of EEB, but not in the case of CAN Europe. The split view will therefore be reported only for the part related to EEB in the ‘Concluding remarks and recommendations for future work’ section of the BREF.

A possible formulation of this split view could be:

<table>
<thead>
<tr>
<th>BAT conclusion</th>
<th>Dissenting view</th>
<th>Expressed by</th>
<th>Alternative proposed level (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 81 Table 10.54</td>
<td>Separate BAT-AELs should be established for coal and/or lignite and for biomass and/or peat</td>
<td>EEB</td>
<td>NA</td>
</tr>
</tbody>
</table>

17.5 PCDD/F monitoring

Conclusions of the meeting
Slide 262.

BAT 3 ter. BAT is to monitor emissions to air with at least the frequency given below and in accordance with EN standards. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.

<table>
<thead>
<tr>
<th>Substance/Parameter</th>
<th>Fuel/Process</th>
<th>Combustion plant total rated thermal input</th>
<th>Standard(s)</th>
<th>Minimum monitoring frequency</th>
<th>Monitoring associated with</th>
</tr>
</thead>
<tbody>
<tr>
<td>...</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| PCDD/F              | • Process fuels from the chemical industry in boilers  
                       • Waste co-incineration in coal, lignite, solid biomass and/or peat combustion plants | All sizes | EN 1948-1, EN 1948-2, EN 1948-3 | At least once every six months (\(^{(*)}\))  
                       (\(^{12}\)) | BAT 81 |

\(^{(1)}\) If the emission levels are proven to be sufficiently stable, periodic measurements may be carried out each time that a change of the fuel and/or waste characteristics may have an impact on the emissions, but in any case at least once every year. For waste co-incineration… the monitoring frequency reduction is carried out pursuant to the provisions of Part 6 of Annex VI of the IED.

\(^{(12)}\) In the case of process fuels from the chemical industry, monitoring is only applicable when the fuels contain chlorinated substances.
Split view summary
EEB and CAN Europe propose to remove footnote (8).

The split view is accompanied by the following rationale:
- Waste is inherently variable and therefore fuel/waste quality assessment should not be used as an alternative to the specified minimum monitoring frequencies.
- Waste is characterized by its varying composition, in particular regarding halogen content and copper which is catalysing the PCDD/F formation. Therefore it is simply not possible to prove for such a fuel characterized by high variation of copper and halogen content to prove that emission levels are sufficiently stable.

EIPPCB assessment
Availability of information on which the split view is based:
- Documents and information mentioned in the split view were available

Validity of supporting rationale:
- The validity of the part of the rationale based on the halogen and copper content of municipal waste is questionable, considering that plants co-incinerating mixed municipal waste are excluded from the scope of the LCP BAT conclusions. For the case of hazardous waste, while it is known that the composition can be highly variable, the characteristics/composition of the waste is usually verified at the incineration plants by means of a check analysis of all essential parameters. In sum, a clear demonstration that in certain cases it may not be possible to demonstrate sufficient stability of emissions is missing in the submitted rationale.
- The rationale does not demonstrate that keeping the minimum six-monthly frequency would allow short-term emission fluctuations to be captured significantly better than by applying the conditions of footnote (8), which furthermore maintains the IED provisions specific to the incineration of waste.

EIPPCB conclusion
Taking these aspects into account, the EIPPCB considers that there are not enough appropriate technical arguments to support the split view. This split view will therefore not be reported in the 'Concluding remarks and recommendations for future work' section of the BREF.