eurelectric powering people

Medium Combustion Plants (MCP) Information Exchange

Eurelectric comments

May 2019

Eurelectric represents the interests of the electricity industry in Europe. Our work covers all major issues affecting our sector. Our members represent the electricity industry in over 30 European countries.

We cover the entire industry from electricity generation and markets to distribution networks and customer issues. We also have affiliates active on several other continents and business associates from a wide variety of sectors with a direct interest in the electricity industry.

We stand for

The vision of the European power sector is to enable and sustain:

- A vibrant competitive European economy, reliably powered by clean, carbon-neutral energy
- A smart, energy efficient and truly sustainable society for all citizens of Europe

We are committed to lead a cost-effective energy transition by:

investing in clean power generation and transition-enabling solutions, to reduce emissions and actively pursue efforts to become carbon-neutral well before mid-century, taking into account different starting points and commercial availability of key transition technologies;

transforming the energy system to make it more responsive, resilient and efficient. This includes increased use of renewable energy, digitalisation, demand side response and reinforcement of grids so they can function as platforms and enablers for customers, cities and communities;

accelerating the energy transition in other economic sectors by offering competitive electricity as a transformation tool for transport, heating and industry;

embedding sustainability in all parts of our value chain and take measures to support the transformation of existing assets towards a zero carbon society;

innovating to discover the cutting-edge business models and develop the breakthrough technologies that are indispensable to allow our industry to lead this transition.

Dépôt légal: D/2019/12.105/15

WG Environmental Protection

Contact:
Hélène LAVRAY, Senior Advisor Renewables & Environment & Public Affairs Coordination – hlavray@eurelectric.org

N°	Name of Expert	Name of Organization	Paragraph N°				Section title	Page N°	Selected information subject to comment	Comment (description)	Proposal for modification	Rationale & Supporting data	Evidence (document)
1	**Helene Lavray**	Eurelectric					Chapters 2-5	3-85	The plant size is not considered as factor related to performance, cost of technology and BAT technologies.	The difference between smaller and larger plants is not properly taken into consideration (except root cause analysis in chapter 3.1 and appendix 3). The size is a major effect expecially on costs of	The costs and BAT should be cathegorize according the size.		
2	**Helene Lavray**	Eurelectric					Chapters 2-5, Appendix 3	Chapters 2-5, Appendix 3	The essential factor for technology costs is that whether the plants is existing or only at the designing/procurement phase.	The difference between existing and new plants is not taken into consideration (except chapter 3.1.9.4). The cost of technologies is typically lower for new plants in which the tecnology has been	The costs and BAT should be cathegorize according the existing / new plants.		
3	**Helene Lavray**	Eurelectric					Chapters 2-5, Appendix 3	Chapters 2-5, Appendix 3	The plants having small amount of operational hours have not been mentioned and taken into account.	The emergency plants, the plants serving as start up units and plants used for peak loads typically have only few operational hours. The emergency units might normally have only test run periods which	It should be clarified that analysis does not cover these plants.		The environmental performance is not reported in questionnaires
4	**Helene Lavray**	Eurelectric	1	4			This document	2	Definitions and scope	It should be clarified that all definitions, scope, acronyms and aggregation rules used in the document are consistent with the MCPD if not otherwise stated.	Include clarification: *"If not stated otherwise, all definitions, scope, acronyms and aggregation rules used across this document follow the framework and provisions of the MCP Directive (EU) 2015/2193."*		
5	**Helene Lavray**	Eurelectric	2	1	1		Technology Readiness Level	3	*(a) Candidate best available technologies: those measures tested or used at commercial plants. These technologies will score 9 in the TRL scale. This group of technologies will undergo a deeper assessment step to select best performing ones. These are described in Section 2.2.*	Technologies that are tested at commercial plants should not be rated with a TRL of 9 but 8.	Text proposal: *"(a) Candidate best available technologies: those measures tested or used at commercial plants. These technologies will score 9 in the TRL scale* ***if they are actually in widespread use across commercial plants and score 8 in the TRL scale if they are tested at commercial plants****. This group of technologies will undergo a deeper assessment step to select best performing ones. These are described in Section 2.2."*	Technologies that are still tested should not be considered of equal TRL score than technologies that are widespread in use. The definition of the NASA would get lost and be changed incorrectly: • TRL 1 – Basic principles observed • TRL 2 – Technology concept formulated • TRL 3 – Experimental proof of concept • TRL 4 – Technology validated in lab • TRL 5 – Technology validated in relevant environment (industrially relevant environment in the case of key enabling technologies) • TRL 6 – Technology demonstrated in relevant environment (industrially relevant environment in the case of key enabling technologies) • TRL 7 – System prototype demonstration in operational environment • TRL 8 – System complete and qualified • TRL 9 – Actual system proven in operational environment (competitive manufacturing in the case of key enabling technologies; or in space)	
6	**Helene Lavray**	Eurelectric	2	1	1		Emerging technologies	3	(b) Emerging technologies are those not yet tested at commercial plants which will score between 7 and 9 in the TRL scale. These will be ready for testing in large pilot plants, semi works (large pilot plants) or demo sets. These are described in Section 2.3.	Emerging Technologies that are in development should not be rated with a TRL between 7 and 9 but between 1 and 7.	Text proposal: "(b) Emerging technologies are those not yet tested at commercial plants which will score between **1 and 7** in the TRL scale. **The TRL scale includes between 5 and 7 technologies which** will be ready for testing in large pilot plants, semi works (large pilot plants) or demo sets. These are described in Section 2.3."	Emerging Technologies that are still tested should classified in accordance with the NASA scheme	

N°	Name of Expert	Name of Organization	Paragraph N°				Section title	Page N°	Selected information subject to comment	Comment (description)	Proposal for modification	Rationale & Supporting data	Evidence (document)
7	**Helene Lavray**	Eurelectric	2	1	1		Other immature technologies	3	(c) Other immature technologies with a TRL score below 7. These technologies have not been included in the report.	The development of techniques is divided in defined stages. Whether a product will reach a higher stage depends on a lot of criterias. Positive results are nessessary for decisions in going the next develop step. The term 'other immature technologies' does not describe correctly the process and neglects main interims results.	(c) Other **emerging** technologies with a TRL score below **5**. These technologies have not been included in the report.	The classification of the NASA scheme should not be changed or reduced.	
8	**Helene Lavray**	Eurelectric	2	1	2		BAT Technology	3	*This document aims to select technologies that reduce the environmental impacts of MCPs. It assigns the term “best available technologies” to those measures that, when implemented in MCPs, can deliver optimal performance ranges.*	The concept of BAT is not restricted to the reduction of environmental impacts of a specific pollutant, but also including cross-media-effects and economic aspects.	Include corresponding clarification. Include reference to BAT definition of IED and BREF.		
9	**Helene Lavray**	Eurelectric	2	1	2		Optimal Performance Range (OPER) is not equal to BAT	3	*Table 2 1 describes the numerical criteria used to select the best available technologies. Regarding emissions reduction measures, best available technologies are those that deliver the Optimal Performance Emission Range (OPER)...*	The OPER concept of the study is purely based on statistical considerations and analysis of one single pollutant as described in Table 2.1 and cannot considered to be BAT. It is only a statistical proxy to identify "best performers" without considering cross-media impacts, cost-benefit-analysis or applicability restrictions for a given technology. Moreover, data collected are often results of puntual sampling, making photos of particular condition of operation affected by many parameters (e.g.: load, current fuel available, external condition) and are not representative of the continuous operation of the plant. The reliability of the data depends of the number of samples and it's not enough information available to define the OPER as BAT-AEL.	Clarify that the determined OPER are only rough proxies for identifying best performers for a particular pollutant among a pre-selected set of BAT candidates. It is not comparabel to a BAT-AEL range.	It has to be clarified that OPER should only apply on normal operating conditions. Unstable conditions are not captured.	

N°	Name of Expert	Name of Organization	Paragraph N°				Section title	Page N°	Selected information subject to comment	Comment (description)	Proposal for modification	Rationale & Supporting data	Evidence (document)
10	**Helene Lavray**	Eurelectric	2	1	2		Energy Efficiency Range (EER)	3	*...whereas for energy efficiencies measures, best available technologies are those that deliver the Energy Efficiency Range (EER) delivered by best performers.*	The EER concept of the study is purely based on statistical considerations and analysis of singulated plants without analysing the contextual information and cannot considered to be BAT. It is only a statistical proxy to identify "best performers" in a given sample without considering fuel properties, cross-media impacts, cost-benefit-analysis or applicability restrictions for a given technology. Moreover, data collected are often results of puntual sampling, making photos of particular condition of operation affected by many parameters (e.g.: load, current fuel available, external condition) and are not representative of the continuous operation of the plant. The reliability of the data depends of the number of samples and it's not enough information available to define the EER as BAT-AEEL.	Clarify that the determined EER are only rough proxies for identifying best performers among a pre-selected set of BAT candidates. It is not comparabel to a BAT-AEEL range.		
11	**Helene Lavray**	Eurelectric	2	1	2		Applicability of OPER	3	Relevance of OPER for plants operated for emergency use	Include clarification for plants for emergency use in line with corresponding clarification in the LCP BREF.	Include the following clarifying sentence before Table 2.1: *"The OPER derived in the following chapters do not apply to liquid-fuel-fired and gas-fired turbines and engines for emergency use operated less than 500 h/yr, when such emergency use is not compatible with meeting the OPER."*	In line with BREF LCP methodology	
12	**Helene Lavray**	Eurelectric	2	1	2		Table 2-1: Definition of OPER	3	*Emission value range delivered by best performers on a given MCP plant category (questionnaire data collection): from minimum emission value to 25th percentile*	The set of MCP analysed in the study represents a group of pre-selected BAT candidates. Assuming that OPER would refer to the 25th percentile is neglecting that MS pre-selected BAT candidates.	Text proposal: "*Emission value range delivered by best performers on a given MCP plant category (questionnaire data collection* ***of pre-selected BAT candidates****): from minimum emission value to 25th percentile* ***as a proxy for new plants and 75th percentile as a proxy for existing plants****."*		
13	**Helene Lavray**	Eurelectric	2	1	2		Table 2-1: Definition of EER	3	*Energy efficiency value range delivered by best performers (questionnaire data collection): from maximum efficiency value to 75th percentile*	The set of MCP analysed in the study represents a group of pre-selected BAT candidates. Assuming that EER would refer to the 75th percentile is neglecting that MS pre-selected BAT candidates.	Text proposal: *"Energy efficiency value range delivered by best performers (questionnaire data collection* ***of pre-selected BAT candidates****): from maximum efficiency value to 75th percentile* ***as a proxy for new plants and 25th percentile as a proxy for existing plants****."*		

N°	Name of Expert	Name of Organization	Paragraph N°				Section title	Page N°	Selected information subject to comment	Comment (description)	Proposal for modification	Rationale & Supporting data	Evidence (document)
14	**Helene Lavray**	Eurelectric	2	1	2		Table 2-1: Definition of OPER	3	Emission value range delivered by best performers on a given MCP plant category (questionnaire data collection): from minimum emission value to 25th percentile	For quantifying the OPER for a particular plant category, apparently only the average value of all periodic measurements of a reference plant in a given year was considered for sorting of plants by performance and subsequent determination of the 25th percentile. According to the MCPD the results of each of the series of measurements may not exceed the relevant ELV.	In the case of periodic measurement, consider the maximum values obtained under normal operating conditions during the reference year for deriving OPER.	See for example Figure 3-1 on NOx emissions from solid biomass boilers: The OPER of 178 mg/m³ was derived on the average emission values of 11 plants. However, 4 best performing plants would not be compliant with the derived OPER due to exceeding maximum values measured in the reference year. If the OPER derivation was based on maximum values, the resulting corresponding OPER of around 200 mg/m³ would have been achieved by all best performers for all series of measurements.	Annex II part 2 of MCPD: Assessment of compliance: "1. In the case of periodic measurements, the emission limit values referred to in Article 6 shall be regarded as having been
15	**Helene Lavray**	Eurelectric	2	2	1		Table 2-2 Generic candidate best available techniques for MCPs	4	*Advanced control system* *The use of a computer-based automatic system to control the combustion efficiency and support the prevention and/or reduction of emissions. This also includes the use of high-performance monitoring.*	Table 2-2 includes the description of an advanced control system. Since this is not a "... technology that ... can reduce the environmental impact" the information should be deleted.	delete the information about control systems	The Reference Report on Monitoring of Emissions to Air and Water from IED Installations describes totally the topic.	Please highlight that the comment is mainly referred to *high-performance monitoring*
16	**Helene Lavray**	Eurelectric	2	2	1		Table 2-2 Generic candidate best available techniques for MCPs	4	*Use of clean fuels (fuel choice) Choosing fuels with low Sulphur, Nitrogen and ash content. Co-firing with clean fuels.*	The 2nd sentence of the description does not include any new information. The 2nd sentence should be deleted.	Use of clean fuels (fuel choice) Choosing fuels with low Sulphur, Nitrogen and ash content. **~~Co-firing with clean fuels.~~**		
17	**Helene Lavray**	Eurelectric	2	2	1		Table 2-2 Generic candidate best available techniques for MCPs	4	*Desulphurisation of fuels* *Physical, chemical, or biologic treatment of fuels.*	Desulphurisation of fuels is not a generally applicable generic technology for MCP practised on-site. The general notion on the use of clean fuels is already included in this table.	~~Desulphurisation of fuels~~ ~~Physical, chemical, or biologic treatment of fuels.~~	Desulfurisation of fuels at an MCP site is not a generally applicable generic technology for MCP. Only in some specific cases of sulfurous gaseous fuels used in engines equipped with oxydation catalyst a sulfur removal (e.g. by applying activated coke filters) is required for preventing damage to the catalyst.	
18	**Helene Lavray**	Eurelectric	2	2	1		Generic techniques for MCPs	4	"Desulphurisation of fuels" in table 2-2	Not relevant and not common technique (not possible at plant site). This technique is understandable only in the contex of choosing low-sulpher fuels; and this technique is already in same table "Use of clean fuels, fuel choice".	Remove or clarify technique "Desulphurisation of fuels" in table 2-2.		

N°	Name of Expert	Name of Organization	Paragraph N°	Section title	Page N°	Selected information subject to comment	Comment (description)	Proposal for modification	Rationale & Supporting data	Evidence (document)
19	**Helene Lavray**	Eurelectric	2 2 2	Technologies to maximise energy efficiency	4	Candidate best available technologies to maximize efficiency	Technologies applicability and effectiveness.	After the sentence: *This section lists candidate best available technologies that can improve the energy efficiency of MCPs. These are described in Table 2-3 below, additional information on each technique can be found in Appendix 2.* Add the sentence: *The technologies listed have not the same applicability and effect on efficiency for the different kinds of MCPs, depending on different factors as, first of all, the kind of combustion system and the fuel, and, for example, the exhaust temperature, the operating condition of the unit (e.g.: base load, peak load, emergency)* or modify the table 2-4 listing the candidate technologies,separating them according to kind of combustion unit and fuel used, and specifying restriction fo applicability (e.g.: exhaust temperature, operating condition, number of operating hours...)	The technologies listed in the table 2-3 are not always applicable to all kinds of MCPs. Where applicable, technologies have different effect on energy efficiency. Many factors impact on the applicability and effectiveness of the technolgies listed, as the kind of combustion system and the fuel used, the exhaust temperature, the operating condition of the unit (e.g.: base load, peak load, emergency)	Examples: *Combined cycle* is not applicable to boilers and engines. *Supercritical steam conditions* is only applicable to boilers
20	**Helene Lavray**	Eurelectric	2 2 2	Technologies to maximise energy efficiency	5	Table 2-3 Candidate best available technologies to increase efficiency for MCPs	Many common techniques relevant expecially to MCPs are missing. Techiques mentioned in the table are mainly relavant only for larger plants.	Add "Combustion optimisation" and other relavant techniques also mentioned in LCP-BREF (BAT 12).		
21	**Helene Lavray**	Eurelectric	2 2 3	Technologies to reduce NO_x and or CO emissions	5	Candidate best available technologies to reduce NOx and CO	Technologies applicability and effectiveness.	After the sentence: *This section lists candidate best available technologies that can reduce emissions of CO and/or NOx from MCPs. These are described in Table 2 4 below, additional information on each technique can be found in Appendix 2.* Add the sentence: *The technologies listed have not the same applicability and effect on NOx and CO reduction, for the different kinds of MCPs, depending on different factors as, first of all, the kind of combustion sistem and the fuel, and, for example, the exhaust temperature, the operating condition of the unit (e.g.: base load, peak load, emergency)* or modify the table 2-4 listing the candidate technologies,separating them according to kind of combustion unit and fuel used, and specifying restriction for applicability (e.g.: exhaust temperature, operating condition, number of operating hours, space availability..)	The technologies listed in the table 2-4 are not always applicable to all kinds of MCPs. Where applicable, technologies have different effect on NOx and CO performances. Many factors impact on the applicability and effectiveness of the technologies listed, as the kind of combustion system and the fuel used, the exhaust temperature, the operating condition of the unit (e.g.: base load, peak load, emergency)	Examples: *Dry low-NOX burners (DLN)* are applicable only for gas turbines. *Use of clean fuels (fuel choice)* is possible according to the avilability of them in the area (e.g.: gas connection availability)

N°	Name of Expert	Name of Organization	Paragraph N°				Section title	Page N°	Selected information subject to comment	Comment (description)	Proposal for modification	Rationale & Supporting data	Evidence (document)
22	**Helene Lavray**	Eurelectric	2	2	3	1	Specific features of technologies to reduce NOx for engines	7	Fuel effect on engines NOx emissions	Specification of the effect of fuel on emission perfomances	Modify the sentence adding fuel effect: *The Otto cycle differs from the Diesel one and so does their ignition approach (compression or spark). Emission performance and abatement measures do also vary depending on* *fuel,* *speed (rpms) and strokes.*	NOx and CO emission levels are substancially different according to the fuel used (natural gas, gasoil, heavy fuel oil, biodiesel).	See differences in emission levels in the plants analyzed, considering also that the category "other liquid fuel" includes plants with different performances according to the kind of fuel (e.g.: heavy fuel oil with different characteristics, biodiesel). Teh details are inluded in the
23	**Helene Lavray**	Eurelectric	2	2	4		Technologies to reduce SO_2 emissions	7	Candidate best available technologies to reduce SO2	Technologies applicability and effectiveness.	After the sentence: *This section lists candidate best available technologies that can reduce the emissions of SO2 from MCPs. These are described in Table 2 5 below, additional information on each technique can be found in Appendix 2.* Add the sentence: *The technologies listed have not the same applicability and effect on SO2 emission reduction, for the different kinds of MCPs, depending on different factors as, first of all, the kind of combustion sistem and the fuel, and, for example, the exhaust temperature, the operating condition of the unit (e.g.: base load, peak load, emergency)* or modify the table 2-5 listing the candidate technologies,separating them according to kind of combustion unit and fuel used, and specifying restriction for applicability (e.g.: exhaust temperature, operating condition, number of operating hours, space availability, start-up and shut down frequency..)	The techonolgies listed in the table 2-5 are not always applicable to all the kinds of MCPs. Where applicable, tecnhonolgies have different effect on SO2 performances. Many factors impact on the applicability and effectiveness of the technolgies listed, as the kind of combustion sistem and the fuel used, the exhaust temperature, the operating condition of the unit (e.g.: base load, peak load, emergency, start-up frequency).	

N°	Name of Expert	Name of Organization	Paragraph N°	Section title	Page N°	Selected information subject to comment	Comment (description)	Proposal for modification	Rationale & Supporting data	Evidence (document)
24	**Helene Lavray**	Eurelectric	2 2 5	Technologies to reduce dust emissions	8	Candidate best available technologies to reduce dust	Technologies applicability and effectiveness.	After the sentence:*This section lists candidate best available technologies that can reduce the emissions of dust from MCPs. These are described in Table 2 6 below, additional information on each technique can be found in Appendix 2.* Add the sentence: *The tecnhonolgies listed have not the same applicability and effect on dust emission reduction, for the different kinds of MCPs, depending on different factors as, first of all, the kind of combustion sistem and the fuel, and, for example, the operating condition, exhaust temperature (e.g.: base load, peak load, emergency)* or modify the table 2-6 listing the candidate technologies,separating them according to kind of combustion unit and fuel used, and specifying restriction for applicability (e.g.: exhaust temperature, operating condition, number of operating hours, space availability, start-up and shut down frequency..)	The technologies listed in the table 2-6 are not always applicable to all kinds of MCPs. Where applicable, technologies have different effect on dust performances. Many factors impact on the applicability and effectiveness of the technolgies listed, as the kind of combustion sistem and the fuel used, the exhaust temperature, the operating condition of the unit (e.g.: base load, peak load, emergency, start-up frequency).	
25	**Helene Lavray**	Eurelectric	2 3 2	Technologies to reduce NOx	10	Emission level reported and state of maturity	Clarification on the reference emission level and maturity of Flameless Combustion	For *Flameless Combustion,* in the *Description* clarify the technology, the fuel and the specific condition related to the emission value reported in the tace: *Emission figures below 50 mg/Nm3 (at 3 % O2) have been reported (without additional primary or secondary measures).* In *Applicability restrictions* specify if it's applicable to all the technogies listed and to all the fuel considered, according to the refences. Specify also if it's in the R&D stage or if it's commercial for MCPs.	The performance of the technology change firts of all with the application to different kind of combustion unit and fuel .It's important to clarify to which case is referred to the emission level reported.	
26	**Helene Lavray**	Eurelectric	2 3 2	Technologies to reduce NOx	10	State of maturity	Clarification on CryoPower technology maturity	For *CryoPower,* in *Applicability restrictions* specify if it's in the R&D stage or if it's commercial for MCPs.		
27	**Helene Lavray**	Eurelectric	2 3 2	Technologies to reduce NOx	10	State of maturity	Clarification on LoTOx™ technology maturity	For *LoTOx* in *Applicability restrictions* specify if it's in the R&D stage or if it's commercial for MCPs and if it's applicable to all the technologies listed and to all the fuel considered in the study		
28	**Helene Lavray**	Eurelectric	2 3 2	Technologies to reduce NOx	11	State of maturity	Clarification on Low-swirl combustion of natural gastechnology maturity	For *Low-swirl combustion of natural gas* in *Applicability restrictions* specify if it's in the R&D stage or if it's commercial for MCPs.		
29	**Helene Lavray**	Eurelectric	2 3 2	Technologies to reduce NOx	11	State of maturity	Clarification on Catalytic ceramic bag filters technology maturity	For *Catalytic ceramic bag filters* in *Applicability restrictions* specify if it's in the R&D stage or if it's commercial for MCPs and if it's applicable to all the technologies listed and to all the fuel considered in the study.		
30	**Helene Lavray**	Eurelectric	2 3 2	Technologies to reduce NOx	11	State of maturity	Clarification on Electron beam flue gas treatment technology maturity	For *Electron beam flue gas treatment* in *Applicability restrictions* specify the kind of combustion unit and the fuel of the demonstration activity.		
31	**Helene Lavray**	Eurelectric	2 3 2	Technologies to reduce SO2	12	State of maturity	Clarification on Electron beam flue gas treatment technology maturity	For *Electron beam flue gas treatment* in *Applicability restrictions* specify the kind of combustion unit and the fuel of the demonstration activity.		

N°	Name of Expert	Name of Organization	Paragraph N°				Section title	Page N°	Selected information subject to comment	Comment (description)	Proposal for modification	Rationale & Supporting data	Evidence (document)
32	**Helene Lavray**	Eurelectric	3				Medium Combustion Plants performance	13-53	The 25th percentile determined is in many cases much lower than upper enf of LCP BAT-AEL.	The OPER as conclusion should in every category (fuel, unit type) be at least as high as upper end of LCP-BAT-AELS.	Do not report OPER values that are not consistent with LCP-BAT AELs.		
33	**Helene Lavray**	Eurelectric	3	1	1		Table 3-1 Summary of sample sizes	13	Table 3-1 - Sample sizes	The number of samples for several categories appears to be very small. But even for those categories that have more than 10 samples differences in plant size, fuel type, fuel quality, plant operation and applied technologies need to be considered and may reduce the meaningfulness of statistical analysis using percentiles as key criteria for identifying OPER and EER.	Include further clarifications on the highly aggregated fuel and plant categories. Explain in more detail which specific fuels and firing technologies are covered by the various categories and which plant and fuel types are not represented. Include analysis of plant sizes of the reference plant samples. Include analysis of operating regimes across plant categories and highlight numbers of emergency and peak load units.		
34	**Helene Lavray**	Eurelectric	3	1	1		Introduction	13	Type of plant	Formal comment on the table	In the table 3-1, correct the type of unit "gas" with "gas turbine"		
35	**Helene Lavray**	Eurelectric	3	1	1		Introduction	13	Table 3-1 Summary of sample sizes across the 17 categories	Figures in the table in the pdf file are not aligned to the figures in the same table available in the annex 1	Check and align		
36	**Helene Lavray**	Eurelectric	3	1	1		general	13	general	Information about fuels, thermal power and country are available only in the html file available in the appendix 1. It would be useful to have a table with the same figures also in the report	Include information about country, fuel, and thermal power related to each plant code also in the report.		
37	**Helene Lavray**	Eurelectric	3	1	1	2	Energy Efficiency methodology	15	*As a proxy for energy efficiency, the 'total fuel utilisation' is used. This is the most commonly available data point from both measured and design data, at 196 / 283 observations, and combines the output efficiency of thermal, electrical and mechanical energy. Other valuable data points, such as electrical efficiency, were not sufficiently filled in by operators, to the point where only very few plant categories could be analysed with them.*	Total fuel utilisation can be a useful proxy for energy efficiency when comparing heat only plants with each other or - with limitations - different CHP concepts. However, it is of utmost importance not to mix elecitrity only plants or gas turbines/engines for production of mechanical energy with heat only boilers or CHP plants.	The data analysis should distinguish between electricity only plants, CHP plants, heat only plants and plants for mechanical drive. Such a distinction is in particular needed for turbines and engines.The design values have to be considered as reference	In line with BREF LCP methodology. For efficiency, it's better to use the same approach as in the BREF LCP, considering the design values.	
38	**Helene Lavray**	Eurelectric	3	1	2	1	NOx emissions of solid biomass boilers	15	A number of technologies and their combinations are employed for NOx reduction by the solid biomass boilers. Of these, Air staging, SCR (selective catalytic reduction), SNCR (selective non-catalytic reduction), Fuel staging, SNCR, Exhaust/flue gas recirculation and Low NOx design are techniques applied by the 25% best performing plants at less than 178 mg/Nm3.	According to Figure 3-1, none of the solid biomass fired reference plants reported the application of SCR technology.	Delete reference to SCR in the cited sentence.		

N°	Name of Expert	Name of Organization	Paragraph N°				Section title	Page N°	Selected information subject to comment	Comment (description)	Proposal for modification	Rationale & Supporting data	Evidence (document)
39	**Helene Lavray**	Eurelectric	3	1	2		Chapter on solid biomass	15	Entire section on solid biomass needs to be reworked.	In light of the great changes to be made to the reference plant data (see further comments below regarding differing O2 reference conditions), the whole section on solid biomass needs to be reworked and the conclusions to be adapted.	To reflect comments and corrections (see below), the corresponding percentiles need to be recalculated. In addition, the sections concerning SO2, dust and CO should reflect the different types of biomasses used by the reference plants (wood waste, pellets, wood chips, herbaceous biomass/straw).		
40	**Helene Lavray**	Eurelectric	3	1	2	1	Solid biomass - Figure 3-1 (NOx)	16	NOx emissions of specific reference plants	Reference plant n° 659 reported a NOx emission value of 51 mg/m3, but did not report the corresponding O2 reference content. From the reported emission freight of 34 kt it can be assumed that the O2 reference content was 12% as for other Swedish plants as well.	Confirm O2 reference content of plant n°656 with national focal point. If O2 reference content cannot be confirmed, the data for this plant should be removed from all graphs mapping emissions.	See questionnaires of corresponding reference plant.	
41	**Helene Lavray**	Eurelectric	3	1	2	1	Solid biomass - Figure 3-1 (NOx)	16	NOx emissions of specific reference plants	Reference plant n° 448 reported NOx emissions of 103 mg/m3 and CO emissions of 877 mg/m³. The plant became operational in August 2017 and may have not reached stable operating conditions in the reported year 2017.	Consider removing reference plant n° 448 from the quantitative analysis of OPER for being an outlier. Data assessment should consider cross-media-effects and, hence, not include NOx emissions of plants with excessive CO emissions for statistical analysis. Adapt graph and calculation of percentiles, accordingly.	See questionnaires of corresponding reference plant.	
42	**Helene Lavray**	Eurelectric	3	1	2	1	NOx emissions from solid biomass boilers	16	...but correlation with size is not robust.	Nox-formation is highly fuel dependent. Biofuel is a heterogenous fuel type, where twigs and branches has a higher nitrogen content than stem wood. Nitrogen in the fuel contributes to the formation of NOx.	After selected information, add sentence:"This may be due to that biofuel is a heterogenous fuel type with a high variation of nitrogen content between different qualties. Nitrogen in the fuel is a major cause behind the nitrogen formation from combustion."	It is generally known that the nitrogen content in the fuel adds to the formation of NOx. E.g. this is recognised in the WI BREF FD, BAT 29, footnote 1.	Report Samuelsson Conversion of Nitrogen in Biofuels
43	**Helene Lavray**	Eurelectric	3	1	2	1	Figure 3-1 NOx emissions from solid biomass boilers	16	25th pct line in graph	Irrelevant or misleading information	Delete 25th pct line	The graph contains emission data from plants of various sizes and annual operation times. For this reason the authour should refrain from expressing statistical data which may lead to errounous conclusions regarding adequate future emission limit values for certain types of plants.	

N°	Name of Expert	Name of Organization	Paragraph N°				Section title	Page N°	Selected information subject to comment	Comment (description)	Proposal for modification	Rationale & Supporting data	Evidence (document)
44	**Helene Lavray**	Eurelectric	3	1	2	2	Figure 3-2 SO2 emissions from solid biomass boilers	17	25th pct line in graph	Irrelevant or misleading information	Delete 25th pct line	The graph contains emission data from plants of various sizes and annual operation times. For this reason the authour should refrain from expressing statistical data which may lead to errounous conclusions regarding adequate future emission limit values for certain types of plants.	
45	**Helene Lavray**	Eurelectric	3	1	2	3	Figure 3-3 Dust emissions from solid biomass boilers	18	25th pct line in graph	Irrelevant or misleading information	Delete 25th pct line	The graph contains emission data from plants of various sizes and annual operation times. For this reason the authour should refrain from expressing statistical data which may lead to	
46	**Helene Lavray**	Eurelectric	3	1	2	4	Figure 3-4 CO emissions from solid biomass boilers	19	25th pct line in graph	Irrelevant or misleading information	Delete 25th pct line	The graph contains emission data from plants of various sizes and annual operation times. For this reason the authour should refrain from expressing statistical data which may lead to errounous conclusions regarding adequate future	
47	**Helene Lavray**	Eurelectric	3	1	3		Chapter on other solid fuels	19	Analysis of reference plant data	All German and Czech reference plants are lignite-fired boilers. The fuels used of the Polish reference plants are not known as no information on the main fuel is available from the publicly available information	Confirm whether the sample of reference plants contains solid fuels other than lignite (products). Analyse potential influence of fuel type and fuel quality on air emissions.		
48	**Helene Lavray**	Eurelectric	3	1	2	5	Figure 3-5 Energy efficiency of solid biomass boilers	20	75th pct line in graph	Irrelevant or misleading information	Delete 75th pct line	The graph contains emission data from plants of various sizes and annual operation times. For this reason the authour should refrain from expressing statistical data which may lead to errounous conclusions regarding expected energy efficiency for certain types of plants	
49	**Helene Lavray**	Eurelectric	3	1	3	5	Figure 3-10 Energy efficiency of other solid fuel boilers	20	75th pct line in graph	Irrelevant or misleading information	Delete 75th pct line	The graph contains emission data from plants of various sizes and annual operation times. For this reason the authour should refrain from expressing statistical data which may lead to errounous conclusions regarding expected energy efficiency for certain types of plants	
50	**Helene Lavray**	Eurelectric	3	1	3		Other solid fuels - Figures 3-6 to 10	20	Wrong fuel classification of reference plant 602	According to the questionnaire, reference plant n° 602 from Romania uses wood waste (saw mill dust, wood residues) as main fuel. According to the classification of the MCP-Information-Exchange plant n° 602 should considered to be a plant using solid biomass. However, due to the special firing technology (fluidized bed combustion) and the specific biomass (saw mill dust from internal production), the plant should not be taken as reference for the bulk of other solid biomass fuel-fired boilers applying grate firing technology.	Remove plant n° 602 from Figures 3-6 to 3-10 and include plant n° 602 in the section on solid biomass. Due to the special plant configuration (FBC, sawmill dust) do not include the plant in the percentile calculations conducted in the Figures 3-1 to 3-5 (solid biomass).	See questionnaires of corresponding reference plant.	

N°	Name of Expert	Name of Organization	Paragraph N°				Section title	Page N°	Selected information subject to comment	Comment (description)	Proposal for modification	Rationale & Supporting data	Evidence (document)
51	**Helene Lavray**	Eurelectric	3	1	3	1	Figure 3-6 NOx emissions from other solid fuel boilers	21	25th pct line in graph	Irrelevant or misleading information	Delete 25th pct line	The graph contains emission data from plants of various sizes and annual operation times. For this reason the authour should refrain from expressing statistical data which may lead to errounous conclusions regarding adequate future emission limit values for certain types of plants.	
52	**Helene Lavray**	Eurelectric	3	1	3	2	Figure 3-7 SO2 emissions from other solid fuel boilers	22	25th pct line in graph	Irrelevant or misleading information	Delete 25th pct line	The graph contains emission data from plants of various sizes and annual operation times. For this reason the authour should refrain from expressing statistical data which may lead to errounous conclusions regarding adequate future emission limit values for certain types of plants.	
53	**Helene Lavray**	Eurelectric	3	1	3	3	Figure 3-8 dust emissions from other solid fuel boilers	23	25th pct line in graph	Irrelevant or misleading information	Delete 25th pct line	The graph contains emission data from plants of various sizes and annual operation times. For this reason the authour should refrain from expressing statistical data which may lead to errounous conclusions regarding adequate future emission limit values for certain types of plants.	
54	**Helene Lavray**	Eurelectric	3	1	3	4	Figure 3-9 CO emissions from other solid fuel boilers	24	25th pct line in graph	Irrelevant or misleading information	Delete 25th pct line	The graph contains emission data from plants of various sizes and annual operation times. For this reason the authour should refrain from expressing statistical data which may lead to errounous conclusions regarding adequate future emission limit values for certain types of plants.	
55	**Helene Lavray**	Eurelectric	3	1	4	1	NOx emissions from gas oil engines	24	Fig 3-11	All the selected engines in figure-11 represent engines of small rated thermal capacity (all of them less than 20 MW), which typically emit less NOx emissions than engines of larger rated thermal capacity. For larger engines (>20 MW)	Include samples of engines of engines with more than 20 MW or specify that the consideration are only valid for engines with rated thermal capacity lower than 20 MW.	In MCPD Anex 2 table 2 note 4 this division is considered.	
56	**Helene Lavray**	Eurelectric	3	1	4	1	NOx emissions from gas oil engines	24	Fig 3-11	NOx emissions depends on the load	The relationship between the operational load and the emissions provided need to be investigated.		
57	**Helene Lavray**	Eurelectric	3	1	4	2	Dust emissions from gas oil engines	24	Technologies applied for dust emission reduction	Inclusion of the technology used for plants 521 and 522	Correct the text by including information that 521 and 522 are equipped with dust abatement system DFP (dust particulate filter)	As included in the questionnaires plants 521 and 522 are quipped with dust abatement system (DFP)	
58	**Helene Lavray**	Eurelectric	3	1	4	2	Dust emissions from gas oil engines	25	Fig 3-12	Dust emission depends on fuel quality, engine load, maintenence status, oil consumption,…	Indicate the contextual information on operational conditions that cover the OPER of the figure.		

N°	Name of Expert	Name of Organization	Paragraph N°				Section title	Page N°	Selected information subject to comment	Comment (description)	Proposal for modification	Rationale & Supporting data	Evidence (document)
59	**Helene Lavray**	Eurelectric	3	1	4	3	SO2 emissions from gas oil engines	25	Figure 3-13 shows the SO2 emissions of gas oil reciprocating engines. No ELV is available in the MCPD for this plant-fuel-emissions category. Further, no technologies are employed by these plants to reduce SO2 emissions.	SO2 emission depends on the sulfur content (%S) in the fuel, but the analysis does not consider this sulfur content.	Investigate the relationship between the % of sulfur in the fuel and the corresponding SO2 emissions.		
60	**Helene Lavray**	Eurelectric	3	1	4	5	Energy efficiency of gasoil engines	27	Fig 3-15	Energy efficiency depends on the load and others (engine tuning,…).	Indicate that the EER for Gas-oil engines corresponds to a load higher than XX %, indicating the value of the questionnaire.		
61	**Helene Lavray**	Eurelectric	3	1	5		Performance of plants using other liquid fuels	27		The study is not showing the difference between 2-stroke engines and 4-stroke engines in order to make a suitable analysis of either efficiency or emissions, which have a correlation. Likewise, the size, the age and the average load percentage is not shown in the analysis. Moreover the different fuels used by the	Review the analysis, separating engines according to the fuel used (heavey fuel oil engines vs biodiesel engines), size, age and typical operating condition, and kind of engine (2-strokes/4-strokes)	The parameters listed affect the emission perfomances to a great extent. The direct comparison, without appropriately considering the differences listed, could lead to misleading considerations.	
62	**Helene Lavray**	Eurelectric	3	1	5	1	NOx emissions from other liquid fuel engines	28	Figure 3-17	1850 mg/Nm3 can be reached with primary measured but significantly reduce the efficiency of the engines.	Include the sentence: *1.850 mg/Nm3 can be reached with primary measures but such measures significantly reduce the efficiency of the engines.*		
63	**Helene Lavray**	Eurelectric	3	1	5	1	NOx emissions from other liquid fuel engines	28	Figure 3-16 NOx emissions from other liquid fuel engines	In the category of other liquid fuels are included both biofuel and HFO (heavy fuel oil). The analysis does not consider the influence of using such different fuels on	Differentiate the analysis separating at least the performances of engines burning HFO from engines burning biofuel.	The NOx emission levels change according to fuel caracteristics. The plants listed use HFO and biodiesel, with different effect on emission levels.	
64	**Helene Lavray**	Eurelectric	3	1	5	1	NOx emissions from other liquid fuel engines	28	Figure 3-17 Comparison of NOx emissions pre and post 2006 for gas oil and other liquid fuel engines.	In the cathegory of other liquid fuels are included both biofuel and HFO (heavy fuel oil). The analysis does not consider the influence of such different fuels on the corresponding NOx emission levels.	Differentiate the analysis separating at least the performances of engines burning HFO form engines burning biofuel.	The NOx emission levels change according to fuel caracteristics. The plants listed use HFO and biodiesel, with different effect on emission levels.	

N°	Name of Expert	Name of Organization	Paragraph N°				Section title	Page N°	Selected information subject to comment	Comment (description)	Proposal for modification	Rationale & Supporting data	Evidence (document)
65	**Helene Lavray**	Eurelectric	3	1	5	2	SO2 emissions from other liquid fuel engines	29	Figure 3-18 SO2 emissions from other liquid fuel engines	SO2 emission depends on %S in fuel. This is clearly represented in the figure 3-18. Plants 531 and 530 are using a fuel with a low %S.	Include the sentence: the data collected show a strict relation between SO2 emission values and the % of sulfur in the fuel. With no abatement system in place, a reduction of SO2 emission would need a change of fuel, with related constraints (e.g.: availability, logistic, costs).	The SO2 emission levels change according to fuel caracteristics. The plants listed use HFO and biodiesel, with different effect on emission levels, according to the %S.	
66	**Helene Lavray**	Eurelectric	3	1	5	2	SO2 emissions from other liquid fuel engines	29	Figure 3-18 SO2 emissions from other liquid fuel engines	In the cathegory of other liquid fuel are included both biofuel and HFO. the analysis does not consider sulfur content in the fuel	Differentiate the analysis separating at least the performances of engines burning HFO from engines burning biofuel.	The SO2 emission levels change according to fuel caracheristics. The plants listed use HFO and biodiesel, with different effect on emission levels, according to the %S.	
67	**Helene Lavray**	Eurelectric	3	1	5	1	NOx emissions from other liquid fuel engines	30	Figure 3-16 NOx emissions from other liquid fuel engines	Power plants with codes 530 and 531 are reported as dual fuel. These plants are not dual fuel engine. They were reported as dual fuel engines by mistake in the survey.	Indicate plants 530 and 531 as diesel engines only.		
68	**Helene Lavray**	Eurelectric	3	1	5	3	Dust emissions from other liquid fuel engines	30	Figure 3-19 Dust emissions from other liquid fuel engines	Dust emissions depend of many factors. First of all, they depend on fuel quality. Moreover, fuel %S, engine load, maintenance status, and oil consumption	Include the sentence: the data collected show a strict relation between dust emission values and the % of sulfur in the fuel. With no abatement system in place, a reduction of dust	The dust emission levels change according to fuel caracheristics. The plants listed use HFO and biodiesel, with different effect on emission levels.	
69	**Helene Lavray**	Eurelectric	3	1	5	3	Dust emissions from other liquid fuel engines	30	Figure 3-19 Dust emissions from other liquid fuel engines	In the cathegory of other liquid fuel are included both biofuel and HFO. The analysis does not consider the influence of such different fuels on corresponding dust emission levels.	Differentiate the analysis separating at least the performances of engines burning HFO from engines burning biofuel.	The dust emission levels change according to fuel caracteristics. The plants listed use HFO and biodiesel, with different effect on emission levels.	

N°	Name of Expert	Name of Organization	Paragraph N°				Section title	Page N°	Selected information subject to comment	Comment (description)	Proposal for modification	Rationale & Supporting data	Evidence (document)
70	**Helene Lavray**	Eurelectric	3	1	6	2	SO2 emissions from multifuel boilers	34	The root cause analysis	The root cause analysis have been done for SO2 emissions and plant age, rate and size. However, the sulphur content of the fuel(mix) is more relevant relationship to emissions.	Add info about S-content of the fuel(mix) to the root case analysis. When analysing the used fuels and their S-content, it has to be noticed that reported emissions are based on the measurement conditions; the used fuel mix at time of measurements might differ from the annual fuel mix.		
71	**Helene Lavray**	Eurelectric	3	1	7	1	3.1.7.1 NOx emissions from natural gas boilers	38	NOx emissions from natural gas boilers	The selected reference plants are used for different purposes: electricity, steam production, for continuous operation or only as auxiliary boilers. According to the "Activity of the installation"and the operation conditions, the performances	Separate the performances analysis according to "Activity of the installation" and the plant operation condition. For plants operating few hours (e.g: <500 h/y) or for auxiliary activity specify that performances cannot be optimized.		
72	**Helene Lavray**	Eurelectric	3	1	7	4	3.1.7.4 CO emissions from natural gas boilers	40	CO emissions from natural gas boilers	The plants used as reference are used for different purposes: electricity, steam production, for continuous operation or only as auxiliary boilers. According to the "Activity of the installation"and the operation conditions, the performances can be not optimized. If the plant, for example, work only a few hours for supporting start up of a large combustion plant.	Separate the performances analysis according to "Activity of the installation" and the plant operation condition. For plants operating few hours (e.g: <500 h/y) or for auxiliary activity specify that performances cannot be optimized.		
73	**Helene Lavray**	Eurelectric	3	1	7	10	NOx emissions from natural gas turbines	42	The root cause analysis (Steps 4 and 5) yielded no conclusive evidence of a strong relationship of emission values with plant rate, size or age.	It should be noted that all reference plants conducted periodic measurements at plant loads larger than 70% (in line with MCPD provisions). A significant relationship between NOx and load is usually relevant for loads < 70%.	Include clarification that all NOx emission values were measured at loads > 70% in line with the MCPD-provisions.	See questionnaires of corresponding reference plants.	

N°	Name of Expert	Name of Organization	Paragraph N°				Section title	Page N°	Selected information subject to comment	Comment (description)	Proposal for modification	Rationale & Supporting data	Evidence (document)
74	**Helene Lavray**	Eurelectric	3	1	7	10	Natural gas turbines - Figure 3-35 (NOx)	42	NOx emissions from natural gas turbines	In Figure 3-35 the reference plants n°366, 368 and 374 are missing. The latter three plants conducted only one annual periodic measurement in the reported year (in line with MCPD provisions for units < 20 MW). The corresponding result of measurement was reported in the field "maximum measured value".	Add reference plants n° 366, 368 and 374 to Figure 3-35. Recalculate corresponding percentiles.	See questionnaires of corresponding reference plants.	
75	**Helene Lavray**	Eurelectric	3	1	7	6	NOx emissions from natural gas engines	43	Figure 3-31 NOx emissions from natural gas engines.	There are several plant that report NOx emission below MCPD level for new plants without using SCR.	Provide technical explanation for these performances using only lean combustion, and explain limits for applicability.		
76	**Helene Lavray**	Eurelectric	3	1	7	11	Natural gas turbines - Figure 3-36 (CO)	43	CO emissions from natural gas turbines	In Figure 3-36 the reference plants n°366, 368 and 374 are missing. The latter three plants conducted only one annual periodic measurement in the reported year (in line with MCPD provisions for units < 20 MW). The corresponding result of measurement was reported in the field "maximum measured value".	Add reference plants n° 366, 368 and 374 to Figure 3-36.	See questionnaires of corresponding reference plants.	
77	**Helene Lavray**	Eurelectric	3	1	7	11	Natural gas turbines - Figure 3-36 (CO)	43	Excessive CO emissions from some reference plants	Several reference plants reported very high CO emissions well above 250 mg/m3 (according to questionnaire at 70% load). The same plants reported NOx emissions of less than 50 mg/m³ according to Figure 3-35.	In the report, the obvious trade-off between NOx and CO emissions of gas turbines should be further explored. It is questionable that such plant operation can be classified as OPER in the ocasion of NOx and outside of OPER for CO at the same time (e.g plant n°		

N°	Name of Expert	Name of Organization	Paragraph N°				Section title	Page N°	Selected information subject to comment	Comment (description)	Proposal for modification	Rationale & Supporting data	Evidence (document)
78	**Helene Lavray**	Eurelectric	3	1	7	12	Natural gas turbines - Figure 3-37 (Efficiency)	44	Energy efficiency of natural gas turbines	In Figure 3-36 the reference plants n° 366, 368 and 374 are missing.	Add reference plants n° 366, 368 and 374 to Figure 3-37.	See questionnaires of corresponding reference plants.	
79	**Helene Lavray**	Eurelectric	3	1	7	12	Natural gas turbines - Figure 3-37 (Efficiency)	44	Energy efficiency of natural gas turbines	In Figure 3-36 the reference plants n° 558 and 559 should be deleted. These plants are operated on offshore plattforms and are outside the scope of the MCPD according to Art. 2 (3) (b)	Delete reference plants n° 558 and 559 from Figure 3-37.	See questionnaires of corresponding reference plants.	
80	**Helene Lavray**	Eurelectric	3	1	7	12	Natural gas turbines - Figure 3-37 (Efficiency)	44	Energy efficiency of natural gas turbines	Figure 3-37 maps different types of gas turbines that are not comparable in terms of function and operational performance.	Split Figure 3-37 in gas turbines for mechanical drive (gas compressors) and gas turbines for electricity and heat production.	See questionnaires of corresponding reference plants.	
81	**Helene Lavray**	Eurelectric	3	1	7	8	CO emissions from natural engines	45	Figure 3-33 shows the CO emissions from natural gas engines. For CO there are no ELVs in the MCPD, so the upper end of the indicative values from the LCP BREF is displayed instead. ~ 74% performs below this value. No technologies are applied by the sample to reduce CO emissions.	In the study, the difference between DF (Dual Fuel) engines and spark ignition engines is not contemplated. If the values of CO shown are referred to DF engines, they seem not realistic for plants where an abatement system is not installed. In DF engines, catalytic oxidation exists to abate CO emissions.	Indicate for each engine if it is spark ignition or dual fuel.In case no DF engines are included,inlude the note; the value are referred only to spark ignition engines. Similar analysis should be done separately for DF engines.		
82	**Helene Lavray**	Eurelectric	3	1	8	4	Other gaseous fuels - Figure 3-41 (Efficiency)	48	Energy Efficiency of other gaseous fuel engines	The indicator "total fuel utilisation" is not a useful indicator for "other gaseous fuels". 4 out of 12 reference plants use mine gas from abandoned coal mines as main fuel. Such plants are usually operated close to the former mine facilities and it cannot be generally assumed that a heat sink for	The analysis of energy efficiency of other gaseous fuel engines should focus on the electrical efficiency of the gas engines.		
83	**Helene Lavray**	Eurelectric	3	1	9		Performance across plant categories	48	Correlations of CO with Nox emissions	The entire section needs to be updated in light of the major corrections and additions necessary to reflect O2 reference conditions and missing reference plants.	Update analysis and Figures 3-42 to 3-44		
84	**Helene Lavray**	Eurelectric	3	1	9	4	Performance across plant categories	51	Figure 3-45 - average emissions performance	The performance of new plants (commissioned 2016 onwards) should not be compared to all other existing plants across the board (including outliers). A better approach would be to compare the new plant values with the 25th percentiles (proposed proxy for OPER of new plants) and 75th percentiles (proposed proxy for	Include in Figure 3-45 the 25th and 75th percentiles as proxies for OPER of new and existing plants, respectively.		
85	**Helene Lavray**	Eurelectric	3	1	9	1	Performance across plant categories	53	Data was aggregated irrespective of combustion technology, to obtain enough data for robust correlation charts.	The performance of different combustion technologies - such as boilers and gas turbines - should not be compared in terms of concentrations, because concentrations are based on different O2 reference	Remove this section from the report, or use a different indicator in order to compare different technologies (e.g. mg/kWh gross input or g/GJ net heat input).		

N°	Name of Expert	Name of Organization	Paragraph N°				Section title	Page N°	Selected information subject to comment	Comment (description)	Proposal for modification	Rationale & Supporting data	Evidence (document)
86	**Helene Lavray**	Eurelectric	3	2	1		Table 3-2	53	EU wide most stringent ELVs	Table 3-2 includes some references to MCPD and BREF LCP. To be consistent, the Table should be complemented for each plant category with the MCPD requirement and the LCP BREF conclusions for the plant size of 50 - 100 MW. In some cases (notably from NL) the EU wide most stringent ELVs for MCP are more stringent than the BREF LCP (e.g. NOx for solid biomass boilers, other solid fuel boilers) and no reference plants were reported by the respective countries.	It should be confirmed that the most stringent ELVs are actually applied in real permits across all plant sizes in the respective countries and that no significant cross-media effects have been observed associated with the required application of SCR or SNCR technology (e.g. efficiency loss, ammonia slip, excessive CO emissions etc.).		
87	**Helene Lavray**	Eurelectric	3	2	1		Comparing optimal performance range with data from literature	53	Table 3-2 EU wide most stringent ELVs for each of the relevant categories	Other liquid fuel engines: Values indicated for SO2 and Dust correspond to a fuel of low %S and a very good quality (very low % ashes,…). Less than 10 mg/Nm3 of dust is very dificult to achieve for liquid fuel engines even with gas-oil and operating high load. SO2 depends on %S in fuel. The values of SO2 and Dust depend on fuel characteristics, but the dust limit of 3 mg/Nm3 seems not realistic according to engine suppliers without abatement systems still not available. Moreover 3 mg/Nm3 is not appropriate for existing plants, considering that this level is lower than the limit for new plants.	Verify if in the countries selected if there are plants with authorizations in place matching these very tight limits, and verify which kind of fuel is used or which kind of abatement technologies are applied. Specify these information for each limit reported, in order to undestand applicability.		
88	**Helene Lavray**	Eurelectric	3	2	2		Solid biomass plant data vs references	55	"From this figure therefore it can be concluded that even the most ambitious limit values can be met by applying a wide range of technologies"	The data gathered in the questionnaire concerned emissions during normal operation conditions. Therefore, it is not correct to compare them to ELVs.	The conclusions are not supported by the data. The comparison to ELVs shold be excluded. These concerns are also relevant for all other boilers and parameters in the report.		
89	**Helene Lavray**	Eurelectric	3	2	2		Solid biomass plant data vs references	55	…"all have a minimum value (…) that can meet this most ambitious emissionslimit values (ELV) "	The minimum and maximum emission values are short term averages, since that was what was asked for in the questionnaire. These cannot be compared to the ELVs. The ELVs are monthly- daily	The conclusions are not supported by the data. The comparison to ELVs shold be excluded. These concerns are also relevant for all other boilers and parameters in the report.		

N°	Name of Expert	Name of Organization	Paragraph N°				Section title	Page N°	Selected information subject to comment	Comment (description)	Proposal for modification	Rationale & Supporting data	Evidence (document)
90	**Helene Lavray**	Eurelectric	3	2	2		Solid biomass (SO2)	57	SO2 emissions of solid biomass boilers vs references	The analysis regarding SO2 is not distinguishing between different biomass categories.	The analysis should take into account the different types of solid biomass (wood chips, waste wood, straw etc.).		
91	**Helene Lavray**	Eurelectric	3	2	4	2	Gas oil engines and turbines	60	Gas oil engines and turbines	Section 3.2.4.2 deals with gas oil engines only.	Delete reference to turbines in the headline of the sub-chapter.		
92	**Helene Lavray**	Eurelectric	3	2	4	2	Gas oil engines and turbines	60	120 mg/Nm3 of Nox	To achieve this value an overdesigned SCR would be required, increasing CAPEX/OPEX/space/chemicals required compared to emission reduction. The applicability could be limitated according to specific contexts.	Check the specific design caracteristics of the SCR to reach 120 mg/Nm3 of NOx, with related constraints and specify them.		
93	**Helene Lavray**	Eurelectric	3	2	6	3	Natural gas turbines	65	NOx emissions of gas turbines	ELVs and survey data refer to normal operating conditions above 70% load. Due to the great relevance for gas turbines, the special situation of peak load and emergency units should be mentioned.	Clarify that all emission data refer to situations above 70% load. Note special situation of peak load and emergency units.		

N°	Name of Expert	Name of Organization	Paragraph N°				Section title	Page N°	Selected information subject to comment	Comment (description)	Proposal for modification	Rationale & Supporting data	Evidence (document)
94	**Helene Lavray**	Eurelectric	3	5	6	2	Natural gas engines	65	Figure 3-57	As previously commented, in many cases the reference plant data were not adjusted for the O2 reference content to reflect MCPD conditions.	Update Figures 3-57 after correction of O2 reference conditions of the German and Romanian reference plants. Revise conclusions, if necessary.		
95	**Helene Lavray**	Eurelectric	3	2	5	1	Other liquid fuel engines	66	Derogations according MCPD notes	1850 mg/Nm3 is not applicable for all the plants that a part of SIS and MIS. It's better to include directly the orginal text of the footnotes included in MCPD. The comments is applicable to all the other similar points of the document.	Substitute the sentence: *The MCPD is at the median of 190 mg/Nm3, with exception to 1850 mg/Nm3 for plants part of SIS or MIS, which is the least ambitious ELV in the data for new plants* with MCPD footnotes.		
96	**Helene Lavray**	Eurelectric	3	2	5	1	Other liquid fuel engines	67	Figure 3 54 Comparison of median, minimum and maximum values of various sources for NOx emissions from other liquid fuel engines.	It's not clear from which source the emission level of 25 mg/Nm3 of NOX was taken.	Include reference plant.		
97	**Helene Lavray**	Eurelectric	4				Cost of technologies for MCPs	72-77	Cost infromation is mainly given in unit EUR/MW annually.	This unit lead to biased conclusions. The investment cost for most technologies will not raise linearly along with unit size. When using the unit EUR/MW, the cost is typically much higher for small plants compared to bigger.	There is need to calssify costs according the plant size.		
98	**Helene Lavray**	Eurelectric	4	1			Technology cost	67	The values have been updated using the ECB's Harmonized Index of Consumer Prices (based on data from EU28) with cumulative rate of 3.5% and the base case lifetime for all abatement devices was assumed to be 20 years (consistent with literature review lifetime estimates). In reality, technology lifetimes can vary	For existing plants the remaining lifetime of the installation after reftrofitting of a new technology may be significantly less than 20 years. Special consideration is needed for plants for emergency and peak use. In many cases, advanced and complex abatement technologies are not compatible with the functional flexibility and operational reliability required for	Add further important aspects to this section: Acknowledge importance of limited operating hours on a yearly or remaining lifetime basis. Acknowledge special situation of peak load and emergency units as well as of plants operated in SIS and MIS.		
99	**Helene Lavray**	Eurelectric	4	1			Total annualised cost	67	Table 4-1	For MCP, the administrative and monitoring costs (both OPEX and one-off CAPEX) are usually very relevant, in particular for smaller units. When applying some of the secondary abatement techniques mentioned in Tabel 4-1, significant additional administrative cost	Additional administrative and monitoring cost associated with secondary abatement need to be taken into account - in particular for smaller units.	MCPD Art. 7 (4): "4. For medium combustion plants using secondary abatement equipment in order to meet the emission limit values, the operator shall keep a record of, or information proving, the effective continuous operation of that equipment."	

N°	Name of Expert	Name of Organization	Paragraph N°				Section title	Page N°	Selected information subject to comment	Comment (description)	Proposal for modification	Rationale & Supporting data	Evidence (document)
100	**Helene Lavray**	Eurelectric	4	1			Total annualised cost	67	Table 4-1	When applying SCR or SNCR, the complex issues associated with ammonia use and storage as well as potential ammonia slip may lead to very significant additonal administrative cost for impact assessment in urban or environmentally sensitive environments. The use of abatement technologies associated with	Additional administrative and monitoring cost associated with the application of SNCR or SCR techniques need to be taken into account.		
101	**Helene Lavray**	Eurelectric	3	2	6	2	Natural gas engines	69	Figure 3-56 Comparison of median, minimum and maximum values of various sources for NOx emissions from natural gas engines.	There are several plant that report NOx emission below MCPD level for new plants without using SCR.	Provide technical explanation for the performances using only lean combustion, and limits for applicability.		
102	**Helene Lavray**	Eurelectric	5				Best available tecnologies to reduce the environmental impact of MCPs	78-85	In general the applicability of tecknologies is not restricted as the same extend as been done in LCP-BREF.	The restrictions fot the MCPs should be same or broader compared to larger LCPs.	Add applicability restrictions concluded in LCP-BREF to every technology in this report .		
103	**Helene Lavray**	Eurelectric	5	1			BAT to reduce the environmental impacts of MCPs	73	*Building on the findings presented in the previous sections (analysis of questionnaires and additional literature sources), the following sections below present a set of best available*	In line with the BREF methodology, a sentence should be introduced at the end of this paragraph regarding the fact that the BAT described in chapter 5 are neither prescriptive nor exhaustive.	Add the following sentence: *"The best available techniques listed and described in chapter 5 are neither prescriptive nor exhaustive. Other techniques may be used that ensure at least an equivalent level of*	In line with BREF LCP methodology	
104	**Helene Lavray**	Eurelectric	5	1			BAT to reduce the environmental impacts of MCPs	73	*The following points should be kept in mind when reviewing each of the following sections:…*	When assessing BAT, it needs to be kept in mind that all conclusions drawn on the basis of the reference plant questionnaire or literature survey refer to normal	Include clarification that all conclusions refer to normal operating conditions at full load if not specified otherwise. Include further bullet point addressing the special situation of		
105	**Helene Lavray**	Eurelectric	5	1			BAT to reduce the environmental impacts of MCPs	78	*The following points should be kept in mind when reviewing each of the following sections:*	It is missing a note on uncertainties of measurement data. The uncertainty of a measurement system or a sampling procedure depends on a lot of parameters. It is determined by an independent institute and is not in the responsibility of the operator. Every discribed BAT has to take into account the added factor of the uncertainty of the associated	The following points should be kept in mind when reviewing each of the following sections: • **Uncertainty of a measurement procedure: The uncertainty of a measurement system or a sampling procedure is not taken into account in the following summary. This issue needs to be included in the determination of BAT.** • Primary measures: ...		
106	**Helene Lavray**	Eurelectric	5	2			Technologies to reduce NOx emissions	75	Table 5-3 on applicability restrictions for NOx reduction technologies	Include further applicability restrictions for some technologies in line with operator experiences and LCP BREF.	Include the following additional applicability restrictions: - Low NOx burner: The applicability may be limited in the case of turbine models where a retrofit pack-age is not available on the market or when water/steam addition systems are installed. - Lean burn concept: Only applicable to new gas-fired engines. - Water/steam addition: Applicable within the constraints of water availability. The applicability may be limited where no retrofit package is available	See LCP BREF - applicability restrictions for LCP	
107	**Helene Lavray**	Eurelectric	5	2			Technologies to reduce NOx emissions	75	Table 5-3 on applicability restrictions for NOx reduction technologies	Include further applicability restrictions for SNCR in line with operator experiences and LCP BREF.	Include the following additional applicability restrictions: - SNCR: The applicability may be limited in the case of combustion plants operated < 1 500 h/yr with highly variable boiler loads. For existing combustion plants, applicable within the constraints associated with the required temperature window and residence time for	See LCP BREF - applicability restrictions for LCP	

N°	Name of Expert	Name of Organization	Paragraph N°				Section title	Page N°	Selected information subject to comment	Comment (description)	Proposal for modification	Rationale & Supporting data	Evidence (document)
108	**Helene Lavray**	Eurelectric	5	2			Technologies to reduce NOx emissions	75	Table 5-3 on applicability restrictions for NOx reduction technologies	Include further applicability restrictions for SCR in line with operator experiences and LCP BREF.	Include the following additional applicability restrictions: - SCR: Not generally applicable to combustion plants < 20 MWth or combustion plants operated < 1 500 h/yr. There may be technical and economic restrictions for retrofitting existing combustion plants (e.g. related to availability of sufficient space or the required	See LCP BREF - applicability restrictions for LCP	
109	**Helene Lavray**	Eurelectric	5	2			Technologies to reduce NOx emissions	76	Table 5-4 on BAT for NOx emission reduction	The BAT status of lean burn concept for engines needs to be revised in light of the comments above regarding the adjustments for O2 reference content for engines fired with natural gas or other gaseous fuels.	Based on the reference plant data, the lean burn concept ("LB") should be classified as BAT for both engines for natural gas and for other gaseous fuels.		
110	**Helene Lavray**	Eurelectric	5	2			Technologies to reduce NOx emissions	80	Table 5-3 Applicability restrictions, cost and efficiensies for NOx reduction technologies **Air staging**	Applicability is stated as "generally applicable", what is too broad.	Add restriction: " There are restrictions to make technique funtioning efficiently in the existing units."		
111	**Helene Lavray**	Eurelectric	5	2			Technologies to reduce NOx emissions	80	Table 5-3 Applicability restrictions, cost and efficiensies for NOx reduction technologies **SNCR**	Applicability is stated as "generally applicable", what is too broad.	Add restriction: "Only applicable to largest new MCPs. The cost and technical restrictions limits retrofitting of existing units."	In the existing boilers furnase dimensions and desing might remarkably restrict retrofitting. Also the variable loads make designing difficult and doesn't allow good abatement efficiency.	
112	**Helene Lavray**	Eurelectric	5	2			Technologies to reduce NOx emissions	80	Table 5-3 Applicability restrictions, cost and efficiensies for NOx reduction technologies **SCR**	Applicability is stated as "Limited environmental benefits for lower emission loads", what is too broad.	Add restriction: "Generally not applicably to MCPs. Exceptionally applicable only to largest new MCPs. The cost and technical restrictions limits retrofitting of existing units."	The high cost and also space demand restrict the applicability of SCR.	
113	**Helene Lavray**	Eurelectric	5	2			Technologies to reduce NOx emissions	80	Table 5-3 Applicability restrictions, cost and efficiensies for NOx reduction technologies **Dry low NOx burner**	Applicability is stated as "generally applicable", what is too broad.	Add restriction: "Not applicable to boilers. Only applicable to liquid and gaseous fuels"		
114	**Helene Lavray**	Eurelectric	5	2			Technologies to reduce NOx emissions	80	Table 5-3 Applicability restrictions, cost and efficiensies for NOx reduction technologies **Flue-gas or exhaust-gas recirculation**	Applicability is incerrectly restricted to engines.	The technique might be applied also in boilers.		

N°	Name of Expert	Name of Organization	Paragraph N°				Section title	Page N°	Selected information subject to comment	Comment (description)	Proposal for modification	Rationale & Supporting data	Evidence (document)
115	**Helene Lavray**	Eurelectric	5	2			Technologies to reduce NOx emissions	Mar-00	Table 5-4 AS	Air staging (AS) is used quite in many solid biomass boilers, also in boilers refered to be OPER.	Add mark "Q" to the into the table 5-4 at least for solid biomass boilers.		
116	**Helene Lavray**	Eurelectric	5	2			Technologies to reduce NOx emissions	81	Table 5-4 DLN	Marked as "Q" for boiler which seems to be mistake.	See comment above.		
117	**Helene Lavray**	Eurelectric	5	3			Technologies to reduce SO2 emissions	77	Table 5-5 on applicability restrictions for SO2 reduction technologies	Include further applicability restrictions for seawater FGD in line with operator experiences and LCP BREF.	Include the following additional applicability restrictions: - Sea water FGD: Applicable within the constraints of sea water availability. Not generally applicable to combustion plants < 20 MWth or combustion plants operated < 1 500 h/yr. There may be technical and economic restrictions for retrofitting existing combustion plants.	See LCP BREF - applicability restrictions for LCP	
118	**Helene Lavray**	Eurelectric	5	3			Technologies to reduce SO2 emissions	77	Table 5-5 on applicability restrictions for SO2 reduction technologies	Include further applicability restrictions for wet FGD in line with operator experiences and LCP BREF.	Include the following additional applicability restrictions: - Wet FGD: Not generally applicable to combustion plants < 20 MWth or combustion plants operated < 1 500 h/yr. There may be technical and economic restrictions for retrofitting existing combustion plants.	See LCP BREF - applicability restrictions for LCP	
119	**Helene Lavray**	Eurelectric	5	3			Technologies to reduce SOx emissions	82	The flue-gas condenser reduces also SO2 emissions and is common in plants using moist fuels.	The common technology is missing.	Add flue-gas condenser into table 5-5 with restriction: "Applicable only for units using moist fuels in case there is enough demand for low-temperature heat. Add flue-gas condenser into table 5-6 related to solid biomass, other solid and multi-fuel.		
120	**Helene Lavray**	Eurelectric	5	3			Technologies to reduce SOx emissions	80	Table 5-5 Applicability restrictions, cost and efficiensies for SOx reduction technologies **Boiler sorbent injection**	Applicability is inadequate	Add restriction: " Not applicable to grate-fired boilers."	Technique can be used only in fluidised bed boilers.	

N°	Name of Expert	Name of Organization	Paragraph N°				Section title	Page N°	Selected information subject to comment	Comment (description)	Proposal for modification	Rationale & Supporting data	Evidence (document)
121	**Helene Lavray**	Eurelectric	5	3			Technologies to reduce SOx emissions	80	Table 5-5 Applicability restrictions, cost and efficiensies for SOx reduction technologies **Wet flue-gas desulphurisation or wet scrubbers**	Applicability is inadequate	Add restriction: "Generally not applicably to MCPs. Exceptionally applicable only to largest new MCPs. The cost and technical restrictions limits retrofitting of existing units."	Thje high cost and also space demand restrict the applicability.	
122	**Helene Lavray**	Eurelectric	5	3			Technologies to reduce SOx emissions	83	Table 5-5 Best available tecnology for SOx emission reduction in MCPs	The message of the of table is unclear.	It's unclear how to read table. For solid biomass there is only one mark (Q for FGD) and for the rest of boilers no marks at all.	There is BAT for every combination of fuel and unit type. Add BAT for every combination. For example solid biomass and multi-fuel boilers can achive very low SO2 emissions by choosing low-sulphur fuel.	
123	**Helene Lavray**	Eurelectric	5	4			Technologies to reduce dust emissions	78	Table 5-7 on applicability restrictions for dust reduction technologies	Include further applicability restrictions for bag filter in line with operator experiences and acknowledging the excessive investment costs for boilers < 5 MW.	Include the following additional applicability restrictions: - Bag filter: Not generally applicable to boilers < 5 MWth fired with solid biomass or other	See LCP BREF - applicability restrictions for LCP	
124	**Helene Lavray**	Eurelectric	5	4			Technologies to reduce dust emissions	78	Table 5-7 on applicability restrictions for dust reduction technologies	Include further applicability restrictions for ceramic filter in line with operator experiences and acknowledging the excessive investment costs for boilers < 5 MW.	Include the following additional applicability restrictions: - Ceramic filter: Not generally applicable to boilers < 5 MWth fired with solid biomass or other solid fuels or combustion plants operated < 500 h/yr.	See LCP BREF - applicability restrictions for LCP	
125	**Helene Lavray**	Eurelectric	5	4			Technologies to reduce dust emissions	78	Table 5-7 on applicability restrictions for dust reduction technologies	Include further applicability restrictions for ESP in line with operator experiences and acknowledging the excessive investment costs for boilers < 5 MW.	Include the following additional applicability restrictions: - Electrostatic precipitator: Not generally applicable to combustion plants operated < 500 h/yr.	See LCP BREF - applicability restrictions for LCP	
126	**Helene Lavray**	Eurelectric	5	4			Technologies to reduce dust emissions	83	The flue-gas condenser reduces also dust emissions and is common in plants using moist fuels.	The common technology is missing.	Add flue-gas condenser into table 5-7 with restriction: "Applicable only for units using moist fuels in case there is enough demand for low-temperature heat. Add flue-gas condenser into table 5-8 related to solid Biomass, other solid and multi-fuel		
127	**Helene Lavray**	Eurelectric	5	4			Technologies to reduce dust emissions	83	Table 5-7 Applicability restrictions, efficiensies and cost for dust reduction technologies **Bag filter**	Applicability is stated as "generally applicable", what is too broad.	Add restriction: " Bag filter demands space, what could be restriction to install BF to existing plants."		
128	**Helene Lavray**	Eurelectric	5	2			Technologies to reduce NOx emissions	79	Table 5-3 Applicability restrictions, cost and efficiencies for NOx reduction technologies	Check the applicability of the technology of *water steam addition* to boiler and to which kind of fuels.	Specify the applicability of the technology of water steam addition to boiler using gas as for table 5-4.		

N°	Name of Expert	Name of Organization	Paragraph N°				Section title	Page N°	Selected information subject to comment	Comment (description)	Proposal for modification	Rationale & Supporting data	Evidence (document)
129	**Helene Lavray**	Eurelectric	5	2			Technologies to reduce NOx emissions	79	Table 5-3 Applicability restrictions, cost and efficiencies for NOx reduction technologies	The *Reduction of the combustion air temperature* is able to reduce NOx production but affects combustion unit efficiency	Include the constraint: the reduction of the combustion air temperature affects combustion unit efficiency		
130	**Helene Lavray**	Eurelectric	5	5			Technologies to reduce CO emissions	80	Table 5-9 on applicability restrictions for CO reduction technologies	Include further applicability restrictions in line with operator experiences and LCP BREF.	Include the following additional applicability restrictions: - Oxidation catalyst: The applicability may be limited by the sulphur content of the fuel. Retrofitting existing combustion plants may be	See LCP BREF - applicability restrictions for LCP	
131	**Helene Lavray**	Eurelectric	5	6			Technologies to maximise energy efficiency	80	Table 5-10 on applicability restrictions for energy efficiency increase	Include further applicability restrictions for advanced control system in line with operator experiences and LCP BREF.	Include the following additional applicability restrictions: - Advanced control system: Generally applicable to new units. The applicability to old units may be constrained by the need to	See LCP BREF - applicability restrictions for LCP	
132	**Helene Lavray**	Eurelectric	5	6			Technologies to maximise energy efficiency	80	Table 5-10 on applicability restrictions for energy efficiency increase	Include further applicability restrictions for CHP in line with operator experiences and LCP BREF.	Include the following additional applicability restrictions: - CHP: The applicability may be limited in the case of gas compressors with an unpredictable operational heat profile as well as in the case of emergency or peak load units.	See LCP BREF - applicability restrictions for LCP	
133	**Helene Lavray**	Eurelectric	5	6			Technologies to maximise energy efficiency	80	Table 5-10 on applicability restrictions for energy efficiency increase	Include further applicability restrictions for combined cycle in line with operator experiences and LCP BREF.	Include the following additional applicability restrictions: - Combined cycle: Not applicable to boilers. Generally applicable to new units operated ≥ 1 500 h/yr. Applicable to existing units within the constraints associated with the steam cycle design and the space availability. Not applicable to existing units operated < 1 500 h/yr. Not applicable to mechanical drive gas turbines operated in discontinuous mode with extended load variations and frequent start-	See LCP BREF - applicability restrictions for LCP	

N°	Name of Expert	Name of Organization	Paragraph N°				Section title	Page N°	Selected information subject to comment	Comment (description)	Proposal for modification	Rationale & Supporting data	Evidence (document)
134	**Helene Lavray**	Eurelectric	5	6			Technologies to maximise energy efficiency	80	Table 5-10 on applicability restrictions for energy efficiency increase	Include further applicability restrictions for subcritical steam conditions in line with operator experiences and LCP BREF.	Include the following additional applicability restrictions: - Supercritical steam conditions: Only applicable to new boilers. For units combusting biomass, the applicability may be constrained by high-temperature corrosion in the case of certain biomasses.	See LCP BREF - applicability restrictions for LCP	
135	**Helene Lavray**	Eurelectric	5	2			Technologies to reduce NOx emissions	81	Applicability of NOx reduction technologies	The sentence "in this table, rows with no coloured cells indicate that no evidence has been identified for applicability limitations nor for delivering best performance (achieving OPER)" is misleading. The most important concept to be highlighted, is that there are no data from questionnaire or literature to confirm that the techniques are applicable and can be considered as BAT to the "type of plant" not coloured.	Substitute the sentence "in this table, rows with no coloured cells indicate that no evidence has been identified for applicability limitations nor for delivering best performance (achieving OPER)" with the following one "in this table, rows with no coloured cells indicate that no evidence has been identified for applicability"		
136	**Helene Lavray**	Eurelectric	5	2			Technologies to reduce NOx emissions	81	Table 5-4 Best available technology for NOx emission reduction in MCPs: notes	Incomplete information	Add: "Operation times have not been investigated. The table may not be valid for emergency plants (<500 h/year) and peak load plants (<1500 h/year)	The operation time of a plant is highly significant for its emission load and its economic endurance. The authors economic evaluation behind the Q&L classfications does not take the operation time into account. The operation time is major factor in the calculation of cost per avoided emission load. Neglecting the operation times may lead to inefficient use of resources.	
137	**Helene Lavray**	Eurelectric	5	3			Technologies to reduce SOx emissions	82	Table 5-5 Applicability restrictions, costs and efficiencies for SOx reduction technologies	As for table 5-3 specify also the fuel	As for table 5-3 specify also the fuel		
138	**Helene Lavray**	Eurelectric	5	3			Technologies to reduce SOx emissions	82	Table 5-5 Applicability restrictions, costs and efficiencies for SOx reduction technologies	Review the applicability of DSI considering only the type of plants in which it is commerially used. There are no example of application in the case of engines and gas turbines,	Review the applicability of DSI considering only to the type of plant in which it is commerially used.		

N°	Name of Expert	Name of Organization	Paragraph N°				Section title	Page N°	Selected information subject to comment	Comment (description)	Proposal for modification	Rationale & Supporting data	Evidence (document)
139	**Helene Lavray**	Eurelectric	5	3			Technologies to reduce SOx emissions	82	Table 5-5 Applicability restrictions, costs and efficiencies for SOx reduction technologies	Review the applicability of DS considering only the type of plants in which it is commerially used. There are no example of application for gas turbines,	Review the applicability of DS considering only the type of plants in which it is commerially used.		
140	**Helene Lavray**	Eurelectric	5	3			Technologies to reduce SOx emissions	82	Table 5-5 Applicability restrictions, costs and efficiencies for SOx reduction technologies	Review the applicability of SWFGD, SDA, FGD considering only the type of plants in which it is commercially used. There are no example of application on gas turbines.	Review the applicability of SWFGD, SDA, FGD considering only the type of plants in which it is commerially used.		
141	**Helene Lavray**	Eurelectric	5	3			Technologies to reduce SOx emissions	83	Applicability of SOx reduction technologies	The sentence "In this table, rows with no coloured cells indicate that no evidence has been identified for applicability limitations nor for delivering best performance (achieving OPER)" is misleading. The most important concept to be highlighted, is that there are no data from questionnaire or literature to confirm that the techniques are applicable and can be considered as BAT to the "type of plant" not coloured.	Substitute the sentence "in this table, rows with no coloured cells indicate that no evidence has been identified for applicability limitations nor for delivering best performance (achieving OPER)" with the following one "in this table, rows with no coloured cells indicate that no evidence has been identified for applicability"		
142	**Helene Lavray**	Eurelectric	5	3			Technologies to reduce SOx emissions	83	Table 5-6 Best available technology for SOx emission reduction in MCPs: notes	Incomplete information	Add: "Operation times have not been investigated. The table may not be valid for emergency plants (<500 h/year) and peak load plants (<1500 h/year)	The operation time of a plant is highly significant for its emission load and its economic endurance. The authors economic evaluation behind the Q&L classfications does not take the operation time into account. The operation time is major factor in the calculation of cost per avoided emission load. Neglecting the operation times may lead to inefficient use of resources.	
143	**Helene Lavray**	Eurelectric	5	4			Technologies to reduce dust emissions	83	Table 5-7 Applicability restrictions, efficiencies and cost for dust reduction technologies	Review the applicability of bag filters, electrostaic precipitators and ceramic filters for engines and gas turbines (no examples found).	Review the applicability of bag filters, electrostaic precipitators and ceramic filters for engines and gas turbines (no examples found).		

N°	Name of Expert	Name of Organization	Paragraph N°				Section title	Page N°	Selected information subject to comment	Comment (description)	Proposal for modification	Rationale & Supporting data	Evidence (document)
144	**Helene Lavray**	Eurelectric	5	4			Technologies to reduce dust emissions	83	Table 5-7 Applicability restrictions, costs and efficiencies for dust reduction technologies	As for table 5-3, specify also the fuel	As for table 5-3, specify also the fuel		
145	**Helene Lavray**	Eurelectric	5	4			Technologies to reduce dust emissions	84	Applicability of dust reduction technologies	The sentence "In this table, rows with no coloured cells indicate that no evidence has been identified for applicability limitations nor for delivering best performance (achieving OPER)" is misleading. The most important concept to be highlighted, is that there are no data from questionnaire or literature to confirm that the techniques are applicable and can be considered as BAT to the "type of plant" not coloured.	Substitute the sentence "in this table, rows with no coloured cells indicate that no evidence has been identified for applicability limitations nor for delivering best performance (achieving OPER)" with the following one "in this table, rows with no coloured cells indicate that no evidence has been identified for applicability"		
146	**Helene Lavray**	Eurelectric	5	4			Technologies to reduce dust emissions	84	Table 5-8 Best available technology for dust emission reduction in MCPs: notes	Incomplete information	Add: "Operation times have not been investigated. The table may not be valid for emergency plants (<500 h/year) and peak load plants (<1500 h/year)	The operation time of a plant is highly significant for its emission load and its economic endurance. The authors economic evaluation behind the Q&L classfications does not take the operation time into account. The operation time is major factor in the calculation of cost per avoided emission load. Neglecting the operation times may lead to inefficient use of resources.	
147	**Helene Lavray**	Eurelectric	5	6			Technologies to maximise energy efficiency	85	Table 5-10 Applicability flue gas condenser: ...enough demand for low-temperature heat"	Incomplete information	"and access to an appropriate recipient for the resultingflue gas condensate."	Even with waste water treatment some pollutants may remain in the outgoing condensate. This is not acceptable at all places.	
148	**Helene**	Eurelectric					Appendix 2		Technology name: Electrostatic	It's in theory possible to add number of	Remove the sentence.		
149	**Helene**	Eurelectric					Appendix 2		Technology name: Ceramic filter	Ceramic filter seems not to be common in	The availability and applicapility to be		

Eurelectric pursues in all its activities the application of the following sustainable development values:

Economic Development

- Growth, added-value, efficiency

Environmental Leadership

- Commitment, innovation, pro-activeness

Social Responsibility

- Transparency, ethics, accountability

Union of the Electricity Industry - Eurelectric aisbl
Boulevard de l'Impératrice, 66 – bte 2 - 1000 Brussels, Belgium
Tel: + 32 2 515 10 00 - VAT: BE 0462 679 112 • www.eurelectric.org
EU Transparency Register number: 4271427696-87