
EUROMOT POSITION

New LCP BREF (2017) and Future Aspects of the Industrial Emissions Directive 2010/75/EU

22 Mar 2018

Executive Summary

The new Best Available Techniques (BAT) conclusion for large combustion plants was published in the EU Official Journal (OJ) on 17 August 2017 /1A/. This paper provides recommendations of EUROMOT on certain aspects of the LCP-BREF (Large Combustion Plant-Best Available Techniques reference document) /1B/, /2/.

In particular, EUROMOT recommends:

- Using the maximum (upper) limit value of the BAT-AEL (Best Available Technique - Associated Emission Limit) emission range given by the LCP BREF in the permitting procedure for zones where the ambient air quality standard is fulfilled; and
- Using the “dissenting (“approved split”) views” in chapter 12 of the LCP BREF when working out future Annex V limits for liquid fired engines. This is needed in order to maintain a meaningful balance between costs and environmental benefits, i.e. the derogation possibility for special areas. This will also give industry a possibility to develop new/improved BAT technologies which are not commercially available on today’s markets.

Furthermore, a brief overview is given on the emission derogation policies in emergency situations. Some text needs some further clarification in IED 2010/75/EU in order to avoid misinterpretations.

In order to harmonize emission limits in the EU, additional emission components to those present in LCP BREF /2/ for the affected prime mover technology should not be imposed on

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national/regional levels. See also below text (in item 1). In principle, harmonized emission limits in the EU would facilitate the development of more cost-effective power plant solutions. All emission concentration values in this document are expressed at 15 vol-% O₂ as is also the case in the EU LCP BREF document for the reciprocating internal combustion engine.

1. General Introduction

The final LCP (Large Combustion Plant) BREF (Best Available Techniques Reference document) 2017 was published on the website of EIPPCB in beginning of December 2017 /2/. This was the final step of a process which started up already in year 2011. According to Article 21(3) of the IED (Industrial Emissions Directive) 2010/75/EU authorities shall **within 4 years** of the publication (in the EU OJ) of the decisions on BAT conclusions apply the new BREF in national permitting processes.

IED 2010/75/EU ("IED") Articles 13(7), 15(3) and 19 refer to the LCP BREF document in regard of BAT emission values to be followed. Article 15 of the IED clearly stipulates that a set emission limit value may not exceed the set BAT levels of the LCP BREF document.

Article 18 stipulates where required by an environmental quality standard, stricter conditions than those achievable by best available techniques additional measures shall be included in the permit without prejudice to other measures which may be taken to comply with environmental quality standards. Article 15(4) stipulates that the competent authority may in specific cases set less strict (than BAT) emission limit values (i.e. a derogation) if the environmental quality standard is fulfilled. The text of this Article continues as:

*"Such a **derogation may apply only** where an assessment shows that the achievement of emission levels associated with the best available techniques as described in BAT conclusions **would lead to disproportionately higher costs compared to the environmental benefits** due to:*

- a) the geographical location or the local environmental conditions of the installation concerned; or*
- b) the technical characteristics of the installation concerned.*

The competent authority shall document in an annex to the permit conditions the reasons for the application of the first subparagraph including the result of the assessment and the justification for the conditions imposed.

*The **emission limit values set in accordance with the first subparagraph shall, however, not exceed the emission limit values set out in the Annexes to this Directive**, where applicable.*

The competent authority shall in any case ensure that no significant pollution is caused and that a high level of protection of the environment as a whole is achieved."

In Annex V of the IED 2010/75/EU emission limits related to combustion plants are included, amongst all for gas fired lean burn engines. That means, **Annex V contains the highest emission limits (as less strict emission values are not allowed) which a derogation can be based on.**

In order to make the implementation of the new LCP BREF (2017) document based on a cost

effective and available technique BAT approach, EUROMOT has in this paper included some information from the LCP BREF writing (update 2011 - 2017) process and also some advice for the next steps i.e. the national implementation of the new LCP BREF and future update of the IED.

Amongst all following items are briefly described in below text:

- Background information about some set BAT emission span (thresholds);
- Recommendation why the maximum span value shall be used in the permitting process
- Recommendation why dissenting views (approved split views) expressed in chapter 12 of the LCP BREF shall be included in the future IED Annex V when working out the emission “safety net” limits; and
- Emission compliance requirements in emergency situations.

This document is focusing only on new plants. According to the LCP BREF, a new plant is a combustion plant first permitted at the installation or a complete replacement of a combustion plant on the existing foundations following the publication of the BAT conclusions.

2. BAT (Best Available Techniques) emission value in the permitting process

2.1. Liquid fired engines

Article 10.3.2 of the LCP BREF 2017 /2/ contains a time limited derogation for HFO (Heavy Fuel Oil) and/or gas oil fired reciprocating engines in SIS (Small Isolated System)/MIS (Micro Isolated System) as:

“As regards HFO- and/or gas-oil-fired engines, secondary abatement techniques for NO_x, SO₂ and dust may not be applicable to engines in islands that are part of a small isolated system ... or a micro isolated system.., due to technical, economic and logistical/infrastructure constraints, pending their interconnection to the mainland electricity grid or access to a natural gas supply. The BAT-AELs for such engines shall therefore only apply in small isolated system and micro isolated system as from 1 January 2025 for new engines, and as from 1 January 2030 for existing engines“.

See Article 2 of Directive 2009/72/EC for more information about SIS/MIS. Above derogation (although time limited) seems to be built on the Article 15(4) spirit of the IED.

2.1.1. NO_x (Nitrogen Oxides) emission span level

In table 10.18 /2/ of the LCP BREF BAT AELs (Associated Emission Levels) for NO_x is given. In order to achieve the set NO_x limits an efficient secondary abatement technique such as SCR is needed, see chapter 3.2.2.3.11 /2/ text:

*“Selective reduction of nitrogen oxides with ammonia or urea in the presence of a catalyst ... The degree of NO_x removal depends on the catalyst used: at high NH₃ to NO_x ratios, a **high NO_x removal efficiency** can be obtained, but simultaneously the **amount of unused ammonia (NH₃ slip) in the clean flue-gas increases** considerably. The ammonia slip should be as low as possible, in order to avoid the risk of NH₃ reacting*

with SO₃ in the flue-gas during cooling of the flue-gas, which can lead to fouling and corrosion of the heating surfaces by the ammonium bisulphates ((NH₄) HSO₄ or 'ABS') formed“.

Further text in chapter 10.1.3 /2/ for BAT 7- associated emission levels of ammonia states:

“In the case of plants combusting biomass and operating at variable loads as well as in the **case of engines combusting HFO and/or gas oil, the higher end of the BAT-AEL range is 15 mg/Nm³**“.

The EUROMOT Position paper /3/ attachment 1 C shows some NO_x/NH₃ measurement results from the Maltese plant which was the main reference for the set NO_x BAT span in LCP BREF. As can be seen from the attachment the **recommended ammonia higher limit value of 15 mg/Nm³ (15 % O₂) was frequently exceeded at low NO_x levels.**

EUROMOT recommendation: The maximum span NO_x value of table 10.18 /2/ shall preferable be used as the permitting level in order to have an optimal balance for the overall plant emissions (to reach an optimal balance between NO_x and NH₃ emissions).

2.1.2. Indicative CO and TVOC - HFO (Heavy Fuel Oil) mode emission span levels

The text below table 10.18 /2/ of the LCP BREF is stating **indicative** CO and TVOC emission spans for HFO burning plants.

2.1.2.1. CO (Carbon monoxide)

The gathered reference plant information in BATIS¹ showed that use of SCR led to increased CO emissions (page 7 /4/) from the plant. According to BAT 33 /2/ applicability of an oxidation catalysts is not recommended in context with fuels containing sulphur. Source /4/ also concluded that the BATIS (HFO plant) CO information was probable only high load operational values – at lower engine loads CO increases steeply.

EUROMOT recommendation: If the *indicative* CO value for a HFO fired plant is used in the plant permitting process only the maximum value of the span should be used. The preferable approach should be to not use the indicative CO span at all and instead to use the practical BAT approach of LCP BREF 2006 /5/ chapter 6.5.5.5 and stipulate: “For the minimisation of air emissions, good maintenance of the engine is regarded as BAT“.

2.1.2.2. TVOC (Total Volatile Organic Carbon)

EUROMOT informed (page 8 /4/) that the set *indicative* TVOC span values for the HFO fired engine plant were too low based only on a few measurements. Used emission measurement method was not an EN based method with a differing measurement approach (different minimum sampling line temperature), measurements done probable only on high load conditions (TVOC increases steeply on lower loads) and the highest measured TVOC value of

¹ European Commission – Joint Research Centre, Best Available Techniques Information System (BATIS) under:, <http://eippcb.jrc.ec.europa.eu/batis/>

74 mg/Nm³ (expressed as C) was (EIPPCB simply claimed that Portuguese emission law TVOC limit is lower which is NOT correct) disregarded by EIPPCB. Thus, EUROMOT considers the **indicative TVOC span level to be too low and erroneous**. See also text (not recommended in context with fuels containing sulphur) about oxidation catalyst above.

EUROMOT recommendation: The *indicative* (erroneous) TVOC span level shall not be used. If TVOC limit conditions are needed in the environmental permit process the BAT approach of LCP BREF 2006 /5/ chapter 6.5.5.5 is recommended:

“For the minimisation of air emissions, good maintenance of the engine is regarded as BAT“.

2.1.3. SO₂ (Sulphur dioxide) emission span level

The SO₂ emission BAT AELs span (table 10.19 /2/) is largely set on the basis of the obtained measurement data from the **only** (Maltese) engine plant with FGD in the BATIS. All other reference plants in BATIS were disregarded. It shall be noted that the HFO quality used in the Maltese plant equipped with a FGD (Flue gas Desulphurisation) unit was of a low sulphur brand maximum 0.7 wt-% S /6/. A lot of “faults”/operation disturbances occurred in the plant:

“The plant, commissioned in 2012, has been dogged by a series of problems, which the Energy Ministry has blamed on the complexity of the engines and the abatement system that cleans exhaust before it is released into the air“ . /9/

This Maltese reference is today converted to a plant operating on natural gas (as already mentioned as ongoing a few years ago on page 2 in /6/).

A normal HFO has a sulphur content of 1 .. 5 wt-% depending on the source. If a 3 wt-% S HFO is used a SO₂ reduction efficiency of minimum about 94 % should be required in order **to fulfil the upper limit value of the set emission span**. For lower emission limit values, a higher reduction efficiency of the FGD should be required. If a dry FGD technology (as in the Maltese case) should be the chose a high reagent over stoichiometry is needed with a huge end product amount (containing a lot of unreacted reagent) as the result.

In order to optimize the overall environmental performance: minimize reagent consumption and end product (waste) generation (which needs to be disposed in an environmentally acceptable way), minimize reagent and water (needed if a wet FGD is the choice) usage of the upper span emission limit value is recommended. A lower SO₂-limit value should disable usage of some FGD technologies (dry methods) especially in context with higher sulphur heavy fuel oil brands.

EUROMOT recommendation: The set SO₂ limit shall be such that as a minimum a light fuel oil (LFO) with a maximum 0.1 wt-% S can be used without FGD if commercially available for a plant. Set SO₂ limit shall not be such low set that some FGD technique options are unfeasible. The maximum span SO₂ values of table 10.19 /2/ to be used in the permitting process in order to have an overall optimized environmental approach (according to the IPPC (Integrated Pollution Prevention and Control)) spirit) of the plant in cases where FGD is part of the plant design.

2.1.4. Dust emission span level

The dust emission BAT AELs span (table 10.20 /2/) is set on the basis of the obtained measurement data from the **only** (Maltese) engine plant with a secondary dust abatement technique, a dry FGD (with bag filters) in the BATIS. Bag filters are **not** a viable technique in most engine power plants due to the high flue gas temperature (250 ... 400°C depending on engine type /11/) and thus cooling of the flue gas is needed otherwise the material of the commercial available bag filters will be destroyed; in the Maltese plant flue gas was 170°C (page 14 /11/), flue gas to be below 170 ... 180°C in order to protect the filter material (page 9 in /10/).

Thus, EUROMOT has thus continuously during the whole LCP BREF process without success stated that **the set BAT AELs for dust are beyond BAT**, some more details below.

The measurement data in the Maltese reference plant indicated that the set dust limit should be needed to set higher than 20 mg/Nm³ (15 % O₂) to fulfil the 95th percentile of the plant operation profile, the plant also had big operational challenges /3/. Thus, set BAT span in the LCP BREF is too low and in EUROMOT view the minimum level representing the BAT today is 30 mg/Nm³ (15 % O₂) /3/.

The other secondary particulate abatement technique besides the bag filter is an ESP (Electro Static Precipitator) for a big liquid fired engine plant. The dry ESP is today not ready developed for fulfilling the set dust BAT AELs span /3/.

Diesel particulate filters (DPFs) are not developed for engine units > 5 MWth (about 2 MWe) (page 258 /7/), In context with DPFs ULSD (Ultralow Sulphur Diesel) with max. 0.001 ... 0.0015 wt-% S is a prerequisite /12/.

Operating a low Sulphur (maximum 0.1 wt-% s) and low ash diesel oil will still create higher dust emissions than the set BAT span maximum value. Operation on ULSD **on high loads** might be enough to fulfil the higher dust span limit (lube oil contributes besides the burned fuel to the dust emission). Note that in previous LCP BREF anno 2006 the dust BAT AEL was for high engine loads > 85 % MCR, in the new LCPP BREF there is no such load threshold limitation set. Particulate emission increases at part loads.

EUROMOT recommendation: The **maximum span dust values of table 10.20 /2/ shall preferable be used** as the permitting level. As stated above ULSD usage might be a must for fulfilling the upper span range dust value at higher engine loads.

2.2. Gas fired engines (lean burn type)

2.2.1. NO_x (Nitrogen Oxides) emission span level

In table 10.25 /2/ the NO_x BAT AELs is given in the LCP BREF. In order to meet the set NO_x emission span, set a secondary technique namely a SCR is needed. A SCR need a reagent urea or ammonia in order to enable the NO_x reduction reactions. Note that the set BAT AELs in table 10.25 do not apply to the GD (high pressure Gas Diesel) type engine type.

EUROMOT recommendation: The maximum span NO_x value of table 10.25 /2/ should preferable be used in the permitting process in order to have an overall optimized environmental approach (according to the IPPC (Integrated Pollution Prevention and

Control) spirit – production and transportation of the needed reagent to plant site create additional NO_x and CO₂ emissions).

2.2.2. Indicative CO emission span level

Indicative CO BAT AELs span is given in text below table 10.25 /2/. In order to fulfil the set span emission limits a secondary abatement technique such as an oxidation catalyst is needed.

EUROMOT recommendation: If the indicative CO value for a gas fired plant is used, the upper span emission limit value should be used, by this the oxidation catalyst size can be optimized (and avoid too frequent changes).

2.2.3. SG (Spark Ignited) lean burn type engine HC (Hydrocarbon emission span level)

2.2.3.1. Formaldehyde

In table 10.26 /2/ is the formaldehyde BAT AELs span given. In order to fulfil the set emission limits a secondary abatement technique such as an oxidation catalyst is needed. The lower span limit range would lead to frequent changes of the oxidation catalyst (a very efficient catalyst required), thus the higher range limit is preferred in order to have reasonable operational costs in the long run. The oxidation catalyst is prone to poisoning/deactivation of sulphur, etc. which might be present (e.g. in odorants, etc.) in the natural gas. The changed operational profile of the thermal power plants in EU in recent years– more start and stops due to increased intermittent renewable electricity generation ratio in the grid – is likely to have a degradable impact on the catalyst performance /8/, chapter 7.1.3.2.5 /2/. In light of the ongoing H-gas standardization in EU /13/ (the approved EN 16726:2015 standard allows very high maximum sulphur contents (up to 30 mg/m³ for odorized and up to 20 mg/m³ for non-odorized gas)) which might lead to amongst all high sulphur contents in the future in the natural gas, thus the upper span formaldehyde emission limit value is recommended.

EUROMOT recommendation: The maximum span formaldehyde limit value of table 10.26 /2/ should preferable be used in permitting in order to avoid frequent catalyst changes.

2.2.3.2. Methane (CH₄)

In table 10.26 /2/ is the CH₄ BAT AELs span given. Note this limit value is given **at engine** full load operation and **calculated as “C”** (carbon). EUROMOT highlighted continuously in the LCP process that the set lower span limit is too low, according to BATIS it **is based on a single sample (not a periodic monitoring once a year as expressed in LCP BREF table 7.7 of chapter 7.1.2.2) and thus unreliable /8/**. There are no commercial available oxidation catalysts on the market today for short chained alkenes such as CH₄ (chapter 11, section 11.6.1.2 /2/). In BAT 45 /2/ is stated “*Oxidation catalysts are not effective at reducing the emissions of saturated hydrocarbons containing less than four carbon atoms*”

EUROMOT recommendation: Only the maximum span CH₄ value (set at engine full load operation and calculated as C) of table 10.26 /2/ should be used in permitting process – no commercially available feasible secondary abatement techniques exist

today for the methane slip.

3. Derogation emission value in specific cases

Quotes from the IED 2010/75/EU:

- Article 30(9) stipulates: *“For the following combustion plants, on the basis of the best available techniques, the Commission shall review the need to establish Union-wide emission limit values and to amend the emission limit values set out in Annex V: a) the combustion plants referred in paragraph 8... “.*
- *“Amongst all the diesel engine”* is referred to in paragraph 8 of Article 30.
- Article 41 stipulates: *Implementing rules shall be established concerning: a) the determination of the start-up and shut-down periods ...”*

The Article 41 task regarding start-up and shut-down periods was finalized in May 2012 /14/ and LCP BREF 2017 /2/ (published in EU OJ in August 2017) contains emission limit spans for e.g. the liquid fired diesel engine. Thus, it is expected that IED 2010/75/EU will be revised in the near future.

According to IED Article 15(4) competent authority may set less strict emission limit values than LCP BREF prescribes in *specific cases* (see above section 1 and below text for more details). Article 15 (4) states further on:

“The emission limit values set in accordance with the first subparagraph shall, however, not exceed the emission limit values set out in the Annexes to this Directive, where applicable“.

In Annex V of the IED are currently only CO and NO_x limits for the **lean burn gas fired engine** included, these are **similar to the maximum span limit values found in the LCP BREF 2006**. The liquid fired diesel engine has currently no emission limits set in Annex V (see also Article 30 (8)). Annex V emission values are “safety net” limits which cannot in any case be exceeded when granting an environmental license to a plant. In above text has been shown that **some of the BAT emission span limit values of the recent approved LCP BREF are very demanding and not technical viable today such as the particulate limit for new liquid fired engines**.

In order to maintain the intention/meaning with the IED derogation Article 15 (4),

*“Such a derogation may apply only where an assessment shows that the achievement of emission levels associated with the best available techniques as described in BAT conclusions would lead to **disproportionately higher costs compared to the environmental benefits due to: (a) the geographical location or the local environmental conditions of the installation concerned; or b) ...”***

the dissenting views (“approved split views”) expressed in chapter 12 of LCP BREF 2017 /2/ should be utilized. *“Dissenting views expressed”* of chapter 12 (result after thorough work by the TWG members) is a new feature (missing in the previous LCP BREF 2006) and should be used for this purpose.

By this approach the industry should get more time to develop the needed abatement techniques and the environmental cost impact versus benefit be taken into account, the (old) “maximum span “value” approach used for current Annex V limit values of IED 2010/75/EU should disable (or “nil”) the derogation possibility for specific cases and make Article 15 (4) meaningless. I.e. for liquid fired engines dissenting views expressed contents in chapter 12 of the LCP BREF should be utilized when working out the future Annex V chapter emission limits, such as:

- No 59: BAT 35 – dust (table 10.20 /2/):
 - Increase higher ends of yearly (to 20 mg/Nm³) and daily (to 30 mg/Nm³) BAT AELs for new plants in general;
 - Increase higher ends of yearly (to 35 mg/Nm³) and daily (to 45 mg/Nm³) BAT AELs for new plants in remote SIS/MIS islands.
- No 54. BAT 32 – NO_x (table 10.18 /2/):
 - Increase higher ends of the yearly (to 240 mg/Nm³) and daily (to 300 mg/Nm³) NO_x BAT-AEL ranges for new plants equipped with SCR and located on remote islands;
 - Apply also footnotes 1 and 2 to new plants that cannot be fitted with secondary abatement techniques for techno-economic reasons.
- NO 58: BAT 34: - SO₂ (table 10.19 /2/):

Modify footnote 3 as follows: The higher end of the yearly SO₂ BAT AEL range is 280 mg/Nm³ and the higher end of the daily SO₂ BAT AEL range is 300 mg/Nm³ if no secondary abatement technique can be applied and apply it both to existing and new plants.

4. Emergency cases

It takes time to heat up combustion engine secondary abatement systems such as SCR to reach the temperature required to be effective and thus often sustained periods of operation at significant load are needed to maintain performance and operational safety. Additionally, the reagent used for many NO_x secondary abatement systems has a limited storage life.

To maintain reliability, the engines used in emergency applications should not be overly complex and should avoid the unnecessary cost of secondary abatement techniques that, based on the low running hours, would not be cost effective to the society. In LCP BREF 2017 and IED 2010/75/EU a technique and cost-effective approach towards emergency situations can be seen:

- LCP BREF 2017 /2/ chapter 10 in “General Conditions” states:

“The BAT-AELs set out in these BAT conclusions may not apply to liquid-fuel-fired and gas-fired turbines and engines for emergency use operated less than 500 h/yr, when such emergency use is not compatible with meeting the BAT-AELs.”
- IED 2010/75/EU, preface section (32):

“In the case of a sudden interruption in the supply of low-sulphur fuel or gas resulting from a serious shortage, the competent authority should be able to grant temporary derogations to allow emissions of the combustion plants concerned to

exceed the emission limit values set out in this Directive. “

- IED 2010/75/EU, Articles 30 (5) (6):

(5) *“The competent authority may grant a **derogation** for a maximum of 6 months from the obligation to comply with the emission limit values provided for in paragraphs 2 and 3 for sulphur dioxide in respect of a combustion plant which to this end normally uses low-sulphur fuel, in cases where the operator is unable to comply with those limit values **because of an interruption in the supply of low-sulphur fuel resulting from a serious shortage ... “***

(6) *“The competent authority may grant a **derogation from the obligation to comply with the emission limit values provided for in paragraphs 2 and 3 in cases where a combustion plant using only gaseous fuel has to resort exceptionally to the use of other fuels because of a sudden interruption in the supply of gas and for this reason would need to be equipped with a waste gas purification facility. The period for which such a derogation is granted shall not exceed 10 days except where there is an overriding need to maintain energy supplies“***

Article 30 (6) text is not clear enough and might lead to a misinterpretation. A text clarification similar to as in the UNECE Gothenburg Protocol (sub note “d)” below table 4 of Annex V /15/):

*“A Party may **derogate** from the obligation to comply with the emission limit values for combustion **plants using gaseous fuel** which have to resort exceptionally to the use of other fuels because of a sudden interruption in the supply of gas and for this reason would need to be equipped with a waste gas purification facility. The exception time period shall not exceed 10 days except where there it is an overriding need to maintain energy supplies. “*

5. Conclusions

EUROMOT has in this document discussed issues related to the implementation of the recent approved LCP BREF 2017. Recommendations are given on the following issues:

- In the permitting process the maximum emission span value(s) should be applied in order to maintain a meaningful balance between environmental and cost aspects;
- In order to **maintain a meaningful derogation possibility** for special cases also in the future, approved split views (worked out by TWG experts) in chapter 12 of the LCP BREF 2017 should be included into/used in Annex V of the future IED 2010/75/EU; and
- IED (Article 30(5) and Article 30(6)) and LCP BREF (emergency use text) have a cost-effective approach regarding emissions in emergency cases. IED text should need some minor change (see above UNECE Gothenburg Protocol text) in order to make it clearer. In order to achieve the EU environmental ambitions in a cost-effective way above mentioned texts should be implemented into national laws and not left out.

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6. References

/1A/ EU OJ (August 17th, 2017) at link: <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:L:2017:212:FULL&from=EN>

/1B/ LCP BREF Final Draft June 2016 at link http://eippcb.jrc.ec.europa.eu/reference/BREF/LCP_FinalDraft_06_2016.pdf

/2/ LCP BREF 2017 at link http://eippcb.jrc.ec.europa.eu/reference/BREF/LCP/JRC107769_LCP_bref2017.pdf

/3/ EUROMOT Position “LCP BREF Position for remote areas”, April 2017 at <https://www.euromot.eu/wp-content/uploads/2018/02/EUROMOT-LCP-BREF-position-for-remote-areas-such-as-MIS-and-SIS-plants-Liquid-fired-reciprocating-engine-plant-2017-04-04.pdf>

/4/ EU LCP BREF – Feedback on Liquid Fuel Engines; May 2015 at link https://www.euromot.eu/wp-content/uploads/2017/03/LCP_BREF_EUROMOT_Feedback_Liquid_Fuel_Engines_2015-05-20.pdf

/5/ LCP BREF 2006 at http://eippcb.jrc.ec.europa.eu/reference/BREF/lcp_bref_0706.pdf

/6/ EUROMOT Position “Comments on Maltese Plant Data submitted to EEB (European Environmental Bureau) on December 2014”, January 2015 at link https://www.euromot.eu/wp-content/uploads/2017/03/LCP_BREF_EEB_Maltese_plant_data_EUROMOT_comments_2015-01-23.pdf

/7/ UNECE “Guidance document on control technologies for emissions sulphur, NOx, volatile organic compounds and particulate matter ..”, January 2015 at link http://www.unece.org/fileadmin/DAM/env/documents/2012/EB/ECE.EB.AIR.117_AV.pdf

/8/ EUROMOT Position “LCP BREF EUROMOT Feedback on gaseous Fuelled Engines”; May 2015 at link https://www.euromot.eu/wp-content/uploads/2017/03/LCP_BREF_EUROMOT_Feedback_Gaseous_Fuel_Engines_2015-05-20.pdf

/9/ “Times of Malta” article at <https://www.timesofmalta.com/articles/view/20131120/local/Faults-are-still-dogging-power-station-engines.495446>

/10/ EUROMOT Position Paper “EUROMOT Response to CEFIC comments as of July 2014”; November 2014 at link: https://www.euromot.eu/wp-content/uploads/2017/03/LCP_BREF_BAT_Response_to_CEFIC_comments_2014-11-20.pdf

/11/ EUROMOT Position “Draft 1 Large Combustion Plants BREF – BAT AELs for HFO-fired Engines”; September 2013 at link https://www.euromot.eu/wp-content/uploads/2017/03/LCP_BREF_BAT_AELs_for_HFO-fired_engines_2013-09-23.pdf

/12/ EUROMOT Position “Comments regarding the review of smaller combustion plants carried out under the Industrial emissions Directive”; January 2013 at link: https://www.euromot.eu/wp-content/uploads/2017/03/EU_IED_Review_plants_smaller_than_50_MW_2013-01-04.pdf

/13/ EUROMOT Position “Gas Quality sulphur levels in natural gas”; April 2012, link https://www.euromot.eu/wp-content/uploads/2017/03/GAS_QUALITY_sulphur_levels_in_natural_gas_2012-04-04.pdf

/14/ "Commission Implementation Decision concerning start-up and shut-down periods for the purposes of Directive 2010/75/EU .."; May 2012, link <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32012D0249&from=EN>

/15/ UNECE Gothenburg Protocol 2012 update at link http://www.unece.org/fileadmin/DAM/env/documents/2013/air/eb/ECE.EB.AIR.114_ENG.pdf

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DOOSAN

GE POWER & TRANSPORTATION GROUP

HATZ

ISUZU MOTORS GERMANY

JCB POWER SYSTEMS

JOHN DEERE

KAWASAKI EUROPE

KOMATSU ENGINES

KUBOTA

LIEBHERR

LOMBARDINI-KOHLER GLOBAL POWER GROUP

MAN GROUP

MITSUBISHI TURBO & ENGINE EUROPE

MOTEURS BAUDOIN

ROLLS-ROYCE POWER SYSTEMS

SAME DEUTZ-FAHR

SCANIA

STEYR MOTORS

VOLVO CONSTRUCTION EQUIPMENT

VOLVO PENTA

WÄRTSILÄ

WINTHERTHUR GAS AND DIESEL

YANMAR GROUP

ZETOR

SMALL SI ENGINE MANUFACTURERS

BRIGGS & STRATTON

DOLMAR

EMAK

HONDA EUROPE

HUSQVARNA GROUP

KAWASAKI EUROPE

KOHLER GLOBAL POWER GROUP

SOLO

STIHL

TOHATSU

TORO EUROPE

WACKER NEUSON

YAMABIKO GROUP