

PPC Position on NOx emissions from Diesel Engines,

expressed during the Meeting : Tuesday 27.2.2008 VDMA, Frankfurt
(Questions to manufacturers not included).

- We have heard up to now presentations mainly from engine manufacturers. PPC is within the EU one of the main user of large diesel engines for power generation in the islands. Therefore, it is very important in such discussions to consider the experience that has been gained, if we wish to establish future emission limits that are realistic, feasible and sustainable.
- NTUA & PPC wish to state that the main purpose of engines used in the Greek Islands is to produce power.

Diesel engines are in practice the only power generation technology, available for the electrically isolated islands.

This is due to their technical characteristics, such as high efficiency, high flexibility in load variation, size, etc., as well as the non availability of fuels other than heavy fuel oil on the islands.

We should not forget the particularities of the circumstances, when we are discussing emission limits. In this case, beyond NOx, other issues have to be seriously considered, i.e. security of electricity supply, the efficiency of the units (CO₂ emissions), reliability, etc.

Reliability is extremely important, because any technique that will affect the efficiency of a main unit may have an indirect effect on emissions that has to be considered for (i.e. the use of an older unit that may emit more, in case of a main unit failure, etc.).

- Up to now (from all presentations etc.) for future NOx emissions limits, engine type is considered for, only through its bore. But, in IMO, which is the current active NOx emission legislation, there is a clear, technology oriented, distinction between 2 and 4 stroke engines using their operating speed. Based on this, **we believe it is necessary to define different limits for different types of engines, using speed as criteria.** Otherwise, a significantly higher NOx reduction percentage will be required for the 2-stroke engines, which will create problems (including commercial ones, competition, etc.).
- For the case of NOx reduction with water, there is a problem to be considered i.e. the availability of water. As known, there is shortage of water in the Greek Islands. Water availability should be considered for when evaluating NOx reduction techniques.
- From PPC experience obtained during the last decades, both existing and newly installed engines operate at extremely variable conditions in electrically isolated networks, due to power fluctuations from the Grid, introduction of wind mills etc. Also, in most cases, engines need to start-

up and shut down frequently, even during the day. As presented here and known from the literature (LCP BREF), this creates problems for SCR system operation and efficiency. This should be considered for when setting or proposing future emission limits.

Most presentations made here refer to applications, where the units were used in the main Grid. But the conditions are totally different in the non-interconnected Greek Islands.

- Our impression up to now is that diesels engines are mainly used in the Greek islands and one or two other member states in Europe. Therefore, it is obvious that provision should be made to consider for the problems associated with their use. Our engines operate on heavy fuel oil, which makes the application of some primary techniques for NOx reduction difficult. Also, in this case, use of SCR is a problem (catalyst poisoning, temperature fluctuation etc.) and the cost should be seriously considered for. Furthermore, the Urea infrastructure is difficult to develop in Greek islands.
- Natural gas is not available in the Greek Islands because it is extremely difficult to transport and store, and there is no market for its use (therefore, economically not sustainable). Therefore, the only fuel available for power generation is heavy fuel oil.
- **Concluding, our position for the control of NOx emissions from diesel engines operating with liquid fuels, is that SCR in most cases is not applicable, due to various restrictions, both technical and economic and that only primary measures can be applied.**

Our position is in line with the conclusions for diesel engines fired with liquid fuels, as sited in the LCP BREF document (2006): “**SCR cannot be seen as BAT for engines with frequent load variation, including frequent start up and shut down periods due to technical constraints. A SCR unit would not function effectively when the operating conditions and the consequent catalyst temperature are fluctuating frequently outside the necessary effective temperature window**” (Chapter 6, § 6.5.5.4 NOx emissions, page 406).