

**COMMISSION RECOMMENDATION****of 8 May 2006****on the promotion of shore-side electricity for use by ships at berth in Community ports****(Text with EEA relevance)**

(2006/339/EC)

THE COMMISSION OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Community, and in particular Article 211 thereof,

Whereas:

- (1) In November 2002 the Commission adopted a Communication to the European Parliament and the Council on a European Union strategy to reduce atmospheric emissions from seagoing ships<sup>(1)</sup>, which urged port authorities to require, incentivise or facilitate ships' use of land-based electricity while in port.
- (2) The European Parliament, in its resolution on the strategy of 4 December 2003<sup>(2)</sup>, pointed out that the use of land-based electricity in port could be facilitated by the production of a report describing positive examples of these measures, as well as their costs and benefits.
- (3) The Council, in its Conclusions on the strategy of 22 December 2003<sup>(3)</sup>, recognised that not all environmental problems are properly addressed at international level and that, in particular, the contribution of seagoing ships to the concentration of particulate matter and of ozone and its precursors in ambient air needed further consideration.
- (4) The Commission, in the context of its Communication 'The Clean Air for Europe (CAFE) programme: Towards a thematic strategy for air quality'<sup>(4)</sup>, re-examined the contribution of shipping to the concentration of air pollutants in ambient air and found it to be significant, particularly in port areas. In some port areas, the attainment of air quality standards may be jeopardised by ship emissions.
- (5) CAFE found that reducing ship emissions is increasingly cost-effective compared to further measures in other sectors. Most ship pollutant emissions at berth can only be reduced through engine and after-treatment measures or through the use of shore-side electricity.
- (6) Ship engine emissions are regulated at international level through the International Maritime Organisation (IMO). The evolution of these standards is insufficient to respond to port air quality problems in the Community.
- (7) Article 4b of Council Directive 1999/32/EC of 26 April 1999 relating to a reduction in the sulphur content of certain liquid fuels and amending Directive 93/12/EEC<sup>(5)</sup> as regards the sulphur content of marine fuels, exempts ships which switch off all engines and use shore-side electricity while at berth in ports from the requirement to use 0,1 % sulphur marine fuel.
- (8) Council Directive 2003/96/EC of 27 October 2003 restructuring the Community framework for the taxation of energy products and electricity<sup>(6)</sup> permits Member States to apply total or partial exemptions or reductions in the level of taxation to electricity under certain conditions.

HEREBY RECOMMENDS:

1. Member States should consider the installation of shore-side electricity for use by ships at berth in ports; particularly in ports where air quality limit values are exceeded or where public concern is expressed about high levels of noise nuisance, and especially in berths situated near residential areas.
2. Member States should take note of the advice, set out in the Annex, on the cost-effectiveness and practicality of using shore-side electricity to reduce emissions for different types of ships, routes and ports. Nevertheless, the environmental benefits and cost-effectiveness should be evaluated on a case by case basis.
3. Member States should work within the International Maritime Organization (IMO), in the context of the ongoing review of the International Convention for the Prevention of Pollution from Ships (MARPOL Convention), to promote the development of harmonised international standards for shore-side electrical connections, taking into account ongoing work.

<sup>(1)</sup> COM(2002) 595 final.<sup>(2)</sup> OJ C 89 E, 14.4.2004, p. 107.<sup>(3)</sup> OJ C 8, 13.1.2004, p. 3.<sup>(4)</sup> COM(2001) 245 final.<sup>(5)</sup> OJ L 121, 11.5.1999, p. 13. Directive as last amended by Directive 2005/33/EC of the European Parliament and of the Council (OJ L 191, 22.7.2005, p. 59).<sup>(6)</sup> OJ L 283, 31.10.2003, p. 51. Directive as last amended by Directive 2004/75/EC (OJ L 157, 30.4.2004, p. 100, corrected by OJ L 195, 2.6.2004, p. 31).

4. Member States should consider offering economic incentives to operators to use shore-side electricity provided to ships, taking advantage of the possibilities set out in Community legislation.
5. Member States should promote awareness of shore-side electricity among local authorities whose responsibility includes port areas, maritime authorities, port authorities, classification societies and industry associations.
6. Member States should encourage port authorities and industry to exchange best practice concerning shore-side electricity supply and harmonising procedures for this service.
7. Member States should report to the Commission on the action they intend to take to reduce ship emissions in ports, particularly where air quality limit values are exceeded.

Done at Brussels, 8 May 2006.

*For the Commission*  
Stavros DIMAS  
*Member of the Commission*

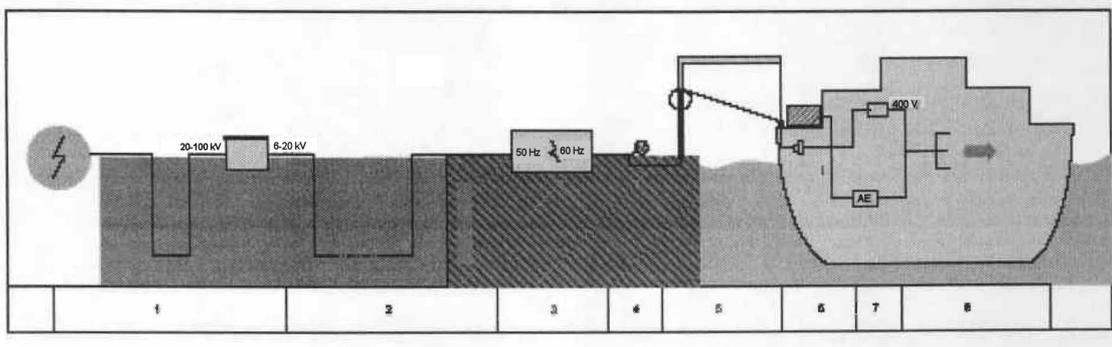
## ANNEX

**SHORE-SIDE ELECTRICITY SUMMARY ADVICE**

This Annex provides pertinent information on the costs and benefits of shore-side electricity. More detailed information is contained in the recent report for the Commission, Service Contract on ship emissions assignment, abatement and market-based instruments: Shore-side electricity<sup>(1)</sup>. The emissions and cost figures here are for seagoing ships, but the technique is also well suited to inland vessels.

**1. Technical requirements — typical configuration**

The diagram below illustrates typical requirements for a shore-side electricity connection. Other configurations are possible, depending on the ship and berth. The International Electrical Commission and International Association of Classification Societies are currently working on industry standards, which can, in the future, be considered by the IMO.



1. A connection to the national grid carrying 20-100 kV electricity from a local substation, where it is transformed to 6-20 kV.
2. Cables to deliver the 6-20 kV power from the sub-station to the port terminal.
3. Power conversion, where necessary. (Electricity supply in the Community generally has a frequency of 50 Hz. A ship designed for 60 Hz electricity might be able to use 50 Hz electricity for some equipment, such as domestic lighting and heating, but not for motor driven equipment such as pumps, winches and cranes. Therefore, a ship using 60 Hz electricity would require 50 Hz electricity to be converted to 60 Hz).
4. Cables to distribute electricity to the terminal. These might be installed underground within existing or new conduits.
5. A cable reel system, to avoid handling of high voltage cables. This might be built on the berth supporting a cable reel, davit and frame. The davit and frame could be used to raise and lower the cables to the vessel. The cable reel and frame could be electro-mechanically powered and controlled.
6. A socket onboard the vessel for the connecting cable.
7. A transformer on board the vessel to transform the high voltage electricity to 400 V.
8. The electricity is distributed around the ship, and the auxiliary engines switched off.

**2. Benefits — emissions reductions**

Shore-side electricity is a tool that can be used to achieve local air quality improvements. The benefits from its use vary greatly depending on a range of factors. The Impact Assessment accompanying this Recommendation provides an illustration of the benefits that could be achieved through a larger use of this tool within the EU. Before proceeding with individual installations it will be necessary to perform an analysis of the costs and benefits for the specific circumstances.

<sup>(1)</sup> See: [http://www.europa.eu.int/comm/environment/air/pdf/task2\\_shore-side.pdf](http://www.europa.eu.int/comm/environment/air/pdf/task2_shore-side.pdf)

The Impact Assessment illustrates the reduction in air pollutant emissions for 500 berths assuming medium-sized engines. One important factor influencing the benefits is the sulphur content of the fuel. Community law sets tighter limits on the content of sulphur in fuel used at berth in most conditions from 2010. Therefore illustrations are provided for fuel sulphur content of 2,7 and 0,1 %. It is shown that the use of shore-side electricity would realise total monetised benefits in a range of between EUR 252 and 708 million per annum where 2,7 % sulphur fuel would have been used and between EUR 103 and 284 million per annum where 0,1 % sulphur fuel would have been used. These reflect improved human health and reduced material damage as a result of reductions in air pollutant emissions <sup>(1)</sup>.

Switching to shore-side electricity will also result in other benefits that are not included in these figures. It will reduce carbon dioxide (CO<sub>2</sub>) emissions by over 50 %, carbon monoxide (CO) emissions by about 99 %, and nitrous oxide emissions (N<sub>2</sub>O) by over 50 %. It will eliminate vibrations and noise from auxiliary engines, which has been measured at 90-120 dB in close proximity and improve maintenance conditions for the ships' engineers.

### 3. Costs — capital expenditure and operating costs

The costs of installing and using shore-side electricity are split between the port and the ship, and will vary significantly depending on existing infrastructure, particularly on the port side. The Impact Assessment provides indicative calculations of the total annualised system costs for an average berth and for new and retrofit vessels with different auxiliary engine sizes. The results are shown in table 1.

It can be seen that overall costs are much lower for ships with larger auxiliary engines, which are also likely to result in the greatest pollutant emission reduction. Costs are also much lower where shore-side electricity is installed in newly built ships as opposed to retrofitting. Fuel and electricity costs are a very significant factor in the cost to ships. Fuel costs vary, but lower sulphur fuel will be more expensive than higher sulphur fuel. Lowering taxation on electricity supplied to ships at berth increases the attractiveness of shore-side electricity.

Table 1

SHIP TYPE Auxiliary engine size	Annualised total system costs	
	with tax low fuel price	no tax high fuel price
	(EUR/berth/year)	(EUR/berth/year)
<b>NEWBUILD</b>		
Small	164 659	82 315
Medium	269 416	39 904
Large	521 630	- 72 298
<b>RETROFIT</b>		
Small	202 783	120 439
Medium	324 402	94 890
Large	617 999	24 071

### 4. Comparison of benefits and costs

The annual monetised benefits of reducing the four pollutants at 500 berths are estimated to be between EUR 103 and 284 million where 0,1 % sulphur fuel would have been used and between EUR 252 and 708 million where 2,7 % sulphur fuel would have been used. The range of values depends on various methodological factors including the assumed value of statistical life. For more detail see the Thematic Strategy on Air Pollution <sup>(2)</sup> impact assessment.

The annualised total system costs per berth set out in table 1 depend on three factors: the size of the ships' engines, whether the technology is introduced to a new or an old ship and on electricity and marine fuel costs. The Impact Assessment shows that the cost of ships using shore-side electricity at 500 berths is estimated to be EUR 185 million more annually than ships using marine fuel, in a scenario with a low marine fuel price and full electricity tax paid by vessels. In a scenario with a higher fuel price and electricity tax were fully exempt, the total cost would reduce by 80 % to about EUR 34 million per annum.

<sup>(1)</sup> See [http://europa.eu.int/comm/environment/air/cafe/activities/pdf/cafe\\_cba\\_externalities.pdf](http://europa.eu.int/comm/environment/air/cafe/activities/pdf/cafe_cba_externalities.pdf) (page 4). Values are national averages (urban and rural combined) so benefits may be higher in city centre ports.

<sup>(2)</sup> SEC(2005) 1133.

These figures show that for many situations the benefits of shore-side electricity outweigh the costs. In many case the benefits are a large multiple of the costs.

#### 5. Conclusion

The benefits and costs of shore-side electricity vary significantly depending on the existing configuration and location of the port, berth and ship. This means that its cost-effectiveness needs to be studied on a case-by-case basis, and that direct reduction of marine engine emissions should continue to be pursued.

In environmental terms, shore-side electricity achieves emission reductions well beyond those achieved from switching to 0,1 % sulphur fuel at berth (as Directive 2005/33/EC requires from 2010), particularly for NOx and PM. It therefore merits particular consideration in ports where ship NOx and PM emissions are contributing to local air quality problems, such as exceedances of ambient air quality limit values for ozone and particles.

In general the figures suggest that for ships with larger engines regularly visiting the same port, switching to shore-side electricity should be both environmentally and economically preferable to using 0,1 % sulphur fuel. In economic terms, shore-side electricity should generate savings compared to low sulphur fuel for new-build ships regularly visiting the same ports, especially, but not only, if electricity tax reductions are offered as allowed under Directive 2003/96/EC. Member States and local authorities might wish to consider other means to encourage ports to invest in shore-side electricity infrastructure and to ensure its use.

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