Appendix 3.  EXISTING ENVIRONMENTAL DIFFERENTIATION SCHEMES

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1. ‘Environmental taxes and charges are being used in all EC/EEA Member States and they also play an increasing role in environmental policy in the Central and Eastern European countries that have applied for EU membership’: Commission Communication on *Environmental Taxes and Charges*, paragraph 5. Only a few, however, are applicable, or potentially applicable, to ships, and these are examined in this Appendix in descending order of apparent significance for a Community policy based on environmentally-differentiated shipping dues.

2. The Nordic States have given a lead in terms of State application of economic instruments to shipping. As early as 1994, the Swedish Environmental Protection Agency (SEPA) published a report of the Nordic Council’s Group of Government Environmental Officials (SEPA, 1994). This set forth an environmental-indexing system designed to be capable of universal application to ships, after modification to take into account national differences and different purposes (whether application by States to flag vessels or in ports, application by Classification Societies, or otherwise). There are echoes of this in the, far more complicated, Norwegian system described in Section 3 below. It is not surprising, therefore, that the two most important precedents relevant to this Study arise from two Nordic countries that are also the only Parties to MARPOL Annex VI to date, and strong supporters of regional SOxECAs, Sweden and Norway. It can be expected from the outset that their laws already satisfy the minimum standards set out in that Annex (and described below in Annex 4, Section 3.1), and that they have been exploring ways to persuade ships to go beyond them. A third significant scheme originates in a Finnish port and might well be followed by a nation-wide initiative. At least as encouraging as this is the fact that Europe’s largest port, Rotterdam, lies behind the most significant relevant private sector initiative, the Green Award, and that each of the Nordic countries in question regards this as a complementary scheme, and even a potential engine of growth for its own scheme.

**A3: 1 The Swedish System**

**A3: 1.1 Introduction**

3. Economic instruments are a key element of Swedish environmental policy. From 1 January 1998, Sweden introduced the first and, to date, only system of environmentally-differentiated shipping dues. Many port and part of the nationally-administered fairway dues are differentiated according to eligible ships’ SOx and NOx emissions. As Swedish ports have traditionally been responsible for levying their own port dues, and the Swedish Maritime Administration (SMA) deals with fairway and other dues, the system is a two-part one. New legislation (the 1997 Ordinance and 1998 Decree 12), described below, was necessary only in respect of fairway dues. Each of the 52 Swedish port authorities decides for itself whether or not to differentiate, and the levels at which it sets, its port dues (by October 1999 more than 20 ports had introduced a differentiated dues system (Kågeson, 1999, Section 8), and the rest were expected to follow (SEPA, 1999a), but only ten have done so in respect of NOx emissions: Kågeson, ibid. Notwithstanding that total port due receipts are likely to be approximately four times greater than the new fairway dues (Elvingson, 1999), in view of the difficulties of researching the
practices of so many ports, the discussion below will be general, and concentrated on the fairway dues system.

4. This will, in our opinion, still be sufficient to present the Swedish approach for the purpose of informing Commission policy, bearing in mind that EC legislation, while ideally displaying sufficient flexibility to permit national and local differences to be catered for (see paragraphs A3/23 and A4/343-49 below), need not be unduly restricted by the peculiarities of Member States’ national institutional arrangements concerning shipping dues (as to these, see Kågeson, 1999, Section 10). All Member States, for example, have port dues systems, although not all charge fairway dues. It is hardly likely that the Commission will wish, especially in the light of the subsidiarity principle, to change rather than build on these basic facts (indeed, it would be constrained in the case of the Sound by Denmark’s obligation under the various Sound Dues treaties not to charge fairway or similar dues in there). Contra, Kågeson, ibid., Section 16, who proposes an EC Directive ‘that makes all Member States and accession countries, that have not already done so, introduce fairway dues that, if possible, take account of the distance travelled. The revenue from the connected environmental charges would in this case reduce the need for raising funds by other elements of fairway charging. Such a system would have the advantage over differentiated port dues of being non-negotiable and completely transparent’.

5. It should be emphasised ab initio that the Swedish system arose out of developments in industry and a voluntary agreement between government and shipping industry and port bodies. The lead was given by the Baltic ferry companies, which had been using bunkers with a sulphur content below 0.5% on a number of their ships for several years (Stena Line also fitting SCR on a new ferry). In addition, AssiDomän, the forestry company, accepted a 1% sulphur content limit for its ship in 1996, and Stora adopted a 0.2% limit for its ships in the Karlstad-Iberia trade: Elvingson, 1997, p. 4. This has coincided with the decline in Swedish East Coast bunker supply of MDO and the growth of a good supply of low sulphur bunker fuel: Lemieszewski discussion. In April 1996, the SMA, Swedish Shipowners’ Association and Swedish Ports’ and Stevedores’ Association (SPSA) entered into a ‘principle agreement’. They promised to reduce ships’ emissions, and in particular to seek to reduce emissions of SO2 and NOx from shipping calling at Swedish ports by 75% within five years of a differentiation scheme’s coming into force (i.e. by the end of 2002): text available, as updated, on the Swedish ports web-site. It was subsequently decided to take 1990 as the reference base year for SO2, and 19995 for NOx. Finally, in 1997, the Swedish forestry industry in effect committed itself, through a voluntary agreement with the Government, to fulfil the tripartite agreement’s goals by effecting a transition to the use of maximum one per cent sulphur bunker fuel on all its ships: SEPA 1999b.

6. The shipping dues system seeks to act as the main vehicle of the tripartite agreement, primarily by ‘stimulat[ing] the ferry traffic and other frequent maritime traffic to and from Sweden, regardless of the ships’ flag state, to take [relevant] measures which would benefit the environment’: SMA, 1997a. Approximately 80% of ship-source sulphur emissions in Swedish waters comes from the 10% of ferries, ro-ro vessels and other vessels in dedicated trade (approximately 320 in
number): Elvingson, 1998. It was also agreed to try to promote the adoption of similar systems internationally: SMA/SSA/SPSA 1997.

7. The shipping dues system is also central to SEPA’s aim, announced in 1997, to achieve 60% of its planned further SO2 emissions reductions (25,000 tons by 2010), as well as further NOx reductions, through measures relating to shipping (notwithstanding that shipping only contributes about 22% to Swedish emissions): SEPA, 1997. The SO2 target, it considered, could be achieved, if all Swedish vessels used bunkers with a maximum sulphur content of 0.5%: ibid.

8. Several factors emerge from the above: the pressure from and involvement of Swedish industry stakeholders (bearing in mind that the Scandinavian shipping, ports and oil industries already operate to a high environmental standard, and that consequently low sulphur bunkers and control technology are readily available); the high level of ambition; the inclusion of all shipping using Swedish ports, regardless of flag; and the desire, partly for competitiveness reasons, to see the system extended elsewhere. In the latter regard, the very conclusion of this Study can be seen as a measure of success. In addition, Åland has adopted a similar system (see Section 2 below); a similar system might emerge from the Norwegian environmental indexing process, discussed in Section 3 below: Elvingson, 1999, citing Ofstedal, then of the Norwegian Ministry of Environment (but see paragraphs A3/35 and 48 below); the ports of Hamburg, Bremen and Lübeck are considering systems based on it; and Canada and the USA have shown some interest in emulating it: Lemieszewski letter.

9. The Swedish system is intended to be revenue-neutral, and so results in higher dues for some ships and rebates for others; the rebates are intended to compensate ships for the higher operating costs resulting from their emission-control measures: SMA/SSA/SPSA 1997. Broadly speaking, the less air pollution a vessel can prove it emits, the lower the fairway and port dues it has to pay. For the cleanest vessels, this can be a matter of halving their dues: SEPA, 1999a (and see below). Before 1998, the fairway dues on goods and light dues were set at SEK 3.90 per gross registered ton (GRT) for oil tankers and SEK 3.60 for other ships: Lemieszewski, 1998, p. 2. The new fairway dues that replace them are higher for virtually all vessels, but there are now substantial differences in the dues payable by the most and by the least polluting vessels. That the differentiations adopted by ports are smaller is suggested by the account in Section 1.3 below. For vessels that install SCR, moreover, investment subsidies are available, regardless of the ships’ nationality. Ships with a gross tonnage below 400 tonnes, however, as well as cruise ships, vessels engaged in towage, salvage or SAR, mobile offshore units, ‘working vessels’ and some domestic shipping are exempted from all fairway dues: Sections 2 of the 1997 Ordinance and 1998 Decree 12. (Exemptions granted by ports are not necessarily the same.) All three Swedish organisations party to the 1996 agreement claim the system to be a truly cost-effective system: SMA/SSA/SPSA 1997. According to the SMA, the environmental benefit of reducing nitrogen oxides emissions is estimated at about SEK 60 [revised upwards in May 1999 from 40] per kilo. The total cost for vessels to reduce their emissions of NOx by one kilo is only between SEK 3 and SEK 6 [revised downwards from SEK 7.50, in May 1999], depending on the size of the ship:
Lemieszewski telecon. The operation of the system has been regularly monitored, and a review completed at the end of 1999, which suggested no major changes.

**A3: 1.2 Differentiated Fairway Dues**

10. The new fairway dues are payable to the SMA by vessels loading or unloading cargo or landing or taking on passengers in Sweden: Sections 1 and 4, 1997 Ordinance. They are collected in two parts, and only the part that corresponds to the former light dues (totalling SEK 281 million in 1992) is differentiated at present. The undifferentiated part (equivalent to the old fairway dues on goods - SEK 395 million in 1992) is based on the volume of cargo being transported. The present rate is SEK 3.60 per tonne cargo, or SEK 0.80 for bulk cargoes of low value: Section 11, 1998 Decree 12. Differentiation of this part of the fairway dues too was considered in the 1999 review, but rejected.

11. The differentiated part of the dues is calculated on the basis of ship size, computed in accordance with its gross registered tonnage (GRT). In both cases, oil tankers’ segregated ballast tanks and other double bottom/hull non-cargo-carrying compartments are excluded from the calculations, in accordance with Regulation 2978/94/EC, discussed in Section 5 below: Section 5, 1998 Decree 12. A Declaration containing particulars of the vessel and its cargo is required of the ship owner or operator to the customs authorities wherever cargo is loaded or unloaded or passengers are taken on or landed: Section 6, 1997 Ordinance; Sections 15-17, 1998 Decree 12. This forms the basis for calculating the amounts payable. Passenger ships, railway ferries and other vessels in scheduled traffic in accordance with a timetable notified to the SMA in advance may be permitted to submit periodic Declarations valid for up to one calendar month, as long as the owner, operator or ship’s representative has a business registration number in Sweden: Section 18, 1998 Decree 12. A person failing to submit a Declaration, and to comply with an SMA order to do so, is liable to an administrative fine between SEK 2,000 and 10,000: Section 10, 1997 Ordinance. Deliberate or negligent failure to do submit one, or the submission of incorrect information, will result, according to the seriousness of the offence, in either an administrative or a criminal fine: *ibid.*, Section 11.

12. The differentiated part of the fairway dues is charged a maximum of 18 times within a calendar year for a passenger ship or railway ferry, and 12 times for any other vessel; thereafter only the undifferentiated part is payable: Section 21, 1998 Decree 12. This appears to be to avoid unduly penalising regular traffic: Elvingson, 1998. The rates are under review (Elvingson 1999), but at present the position is as follows:

13. The maximum charge payable (by the most polluting ships) in respect of the differentiated part of the fairway dues was set at SEK 5.30 per GRT for oil tankers and SEK 5 for other vessels; this might be reduced after the 1999 review is complete. A rebate of SEK 0.90 per GRT is payable, if ‘a guarantee has been given in a special certificate, [a ‘SOx Reduction Attestation’ issued pursuant to Section 11, 1998 Decree 13], that the sulphur content of the fuel for operation of the vessel [at all times] does not exceed 0.5% by weight for a passenger ship or a
railway ferry, or 1% by weight for other vessels’: Section 8, 1998 Decree 12. There is no upper limit to the amount chargeable, other than the limit on the number of times a vessel can be charged in a calendar year. It should be noted that, whereas in the case of NOx Sweden has created a linear scale, in relation to SO2 it has created a simple choice.

14. If a ship’s NOx emissions are 12 grams or more per kilowatt-hour (calculated as NO$_2$) at 75% engine load and stable running conditions (12 g NOx/kWh), the full charge will be payable with respect to the differentiated part of the due (SEK 4.10 per GRT for a ship with a SOx Reduction Attestation, or 4.40 for an oil tanker). For lower emissions the charge is reduced on a linear scale (see table 1 below) down to 2 g Nox/kWh, ending at SEK 2.50 (2.80 for oil tankers) for a ship with a SOx Reduction Attestation. The differential between the most and the least polluting vessels (in terms of SOx and NOx) is thus SEK 2.50 per GRT. This scale contrasts favourably with that in the MARPOL Annex VI NOx curve, which runs only between 10 and 17 g NOx/kWh, especially when it is realised that emissions below 6g NOx/kWh coincide with the use of SCR. Payments are, however, subject to the totals specified in Section 7 of 1998 Decree 12, which appear, like the ceiling on the number of times the dues are payable, to aim to avoid unduly penalising regular traffic: Elvingson, 1998. We set out our interpretation of these totals in table 2 below, but it should be noted that the English translation of Section 7 is ambiguous as to the status of passenger ships and railway ferries (we do not have ready access to the authentic Swedish version).

Table 1 (Source: Section 6, 1998 Decree 12)

<table>
<thead>
<tr>
<th>EMISSION LEVEL, GRAM NOx/kWh</th>
<th>FEE, SEK/GROSS TON</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Oil tankers</td>
</tr>
<tr>
<td>2</td>
<td>2.80</td>
</tr>
<tr>
<td>3</td>
<td>2.96</td>
</tr>
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<td>4</td>
<td>3.12</td>
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<td>11</td>
<td>4.24</td>
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<tr>
<td>12</td>
<td>4.40</td>
</tr>
</tbody>
</table>
Table 2 (Source: Section 7, 1998 Decree 12)

<table>
<thead>
<tr>
<th>EMISSION LEVEL, GRAM NOx/kWh</th>
<th>TOTAL FEE (THOUSANDS OF SEK)</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Oil tankers</td>
</tr>
<tr>
<td>2</td>
<td>100</td>
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<td>154</td>
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<tr>
<td>12</td>
<td>160</td>
</tr>
</tbody>
</table>

15. It follows from the above that in a given calendar year, at present rates, the most that a (non-passenger and railway ferry) vessel can normally be charged is SEK 1.2 (1.6 for oil tankers) million plus SEK 10.8 times its GRT, if it is a heavy polluter. The corresponding minimum for the least polluting frequent visitors (those visiting at least 12 times per calendar year) is SEK 0.72 million (1.2 million for tankers). The position of passenger ships and railway ferries is less clear.

16. As an additional incentive to effect NOx emission reductions, an investment subsidy is offered to ships of any nationality calling at Swedish ports to cover part of the cost of purchasing and installing SCR (which the SMA says effects the highest degree of purification of any of the available NOx-reduction technologies: SMA Pamphlet). This takes the form of a refund of fairway dues, both in the year of installation and in the four following years to vessels certified by the SMA to have successfully installed SCR (pursuant to Sections 2 and 3, 1998 Decree 13), so bringing NOx emissions below 2 g/kWh: Section 9, 1998 Decree 12. Obtaining a NOx Reduction Certificate from the SMA before 2000 guarantees a total rebate of dues of 40% by value, dropping thereafter to 30%: ibid. From January 2002, however, there will be no further investment subsidies. Section 5.1 of Decree 1998 13 is a new provision, which provides: ‘The ammonia slip in the exhaust from engines provided with NOx-reducing catalysts shall be controlled and are not to exceed 10 ppm’.

17. The NOx Reduction Certificate states the calculated average value for the ship’s total NOx emissions: Section 2, 1998 Decree 13. It is valid for three years and must be retained on board for port State control (PSC) purposes: ibid. In order to first obtain it, a measurement report from an accredited control laboratory and a ‘NOx Reduction Attestation’ must be obtained: ibid., Sections 4-6. The laboratory measurements must be conducted in accordance with ISO 8178 and the MARPOL Annex VI NOx Technical Code: ibid., Section 4. In addition, the
equipment of essential importance to the correct operation of the NOx reduction system is permanently sealed in order to permit control and verification that it is in continual use: *ibid.* The laboratory’s measurement report must specify which of four methods (SCR, water-injection, HAM or adjustable fuel injection) are in continuous use and how follow-up and control procedures are to be ensured: *ibid.*, Section 5. In the case of SCR, the most commonly used technique, verification of purchase and consumption of urea and other NOx reducing agents is to be ‘available for presentation’, and their addition and consumption recorded in the relevant logs, together with the engines’ running times, and a sealed, continually-registering means of verification is to be fitted: *ibid.*

18. If the measurement report shows the ship’s and stable running conditions emissions are below 12 g/kWh and, where appropriate, that the functioning of a NOx-reducing technology is ensured, a NOx Reduction Attestation is issued: *ibid.*, Section 6. This shows the measured levels of NOx emissions for each engine (as grams NO2/kWh to the nearest decimal). It also shows, where SCR is fitted, the measured and calculated consumption, at the time of measurement of urea or other catalytic agent, expressed in kilograms per running hour. Once this is obtained, a NOx Reduction Certificate can be issued, and a Declaration made.

19. Upon renewals of the Certificate, an accredited control laboratory will carry out and report ‘less comprehensive test measurements’, in accordance with the NOx Technical Code, on all engines, and will re-seal essential components: *ibid.*, Section 7.

20. The burden of verification that NOx-reduction measures have been taken and that the reduction methods are in continuous use lies on the ship owner or operator: SMA, 1997b, p. 3. A ship which no longer fulfils the conditions, must surrender its Certificate, which will be declared invalid: Section 8, 1998 Decree 13. The same occurs in the case of non-notification to the SMA that the NOx-reduction or measuring equipment is out of operation (*ibid.*, Section 9); in this case a minimum four month penalty and re-qualification period is imposed, during which the full fairway dues must be paid: *ibid.*, Section 10.

21. A SOx Reduction Attestation (see paragraph A3/12 above), must be signed by the ship owner or operator, sent to the SMA for approval and renewed at least every three years and whenever the owner or operator changes: *ibid.*, Section 11. Verification is through random PSC inspection, which may involve sampling the sulphur content of the fuel in all the bunker tanks and/or the examination of bunker receipts and other documents, which must be kept on board for a minimum of three years: *ibid.*, Section 12 (cf. MARPOL Reg. VI/18(4)). If the contents of any fuel tank fail to meet the requisite standard, the ship is obliged to repay the SEK 0.90 per GRT additional fairway due and must undergo a four month penalty and re-qualification period prior to re-certification: *ibid.*, Section 13. The emphasis upon ship owner/operator declarations and the restriction of verification to spot checks is in line with the IMO’s International Safety Management (ISM) Code’s emphasis upon greater industry responsibility in safety and environmental matters.

22. Notwithstanding the Swedish scheme’s greater emphasis on NOx emissions,
much greater take-up of the incentives has occurred in relation to SOx. After only one year, 1,100 vessels had attested that they were using only low sulphur bunkers, more than twice the number expected: SEPA, 1999a. Although this was only 1100 out of 3500 vessels entering Swedish ports, ‘the remaining ones seldom [sic] come to Sweden and so make up for no more than a small part of the total traffic (sic)’: Elvingson, 1999. By 1 June 2000, the number had increased to 1,353 (Lemieszewski telecon 2). Of these, the majority are using bunkers with a sulphur content between 0.5 and 0.9 per cent (Kågeson, 1999, Section 6), and a number gas oil with a 0.1-0.4% sulphur content (Lemieszewski letter) and only 119 are Swedish-registered. Very few appear to have been in violation: Lemieszewski letter.

23.In contrast, only 17 ships (mostly ferries calling frequently at Swedish ports) had NOx Reduction Certificates by 1 June 2000: Lemieszewski telecon 2. These, however, have achieved total NOx emission reductions of 17,000 tonnes per annum, and some are achieving figures as low as 0.5 g/kWh. In addition, 30 more ships are in the process of applying. Most of the certified vessels are new-builds, but there is also some retrofitting of ferries and other ro-ro vessels. The techniques used are SCR, water injection or HAM: Lemieszewski e-mail. When introduced the scheme did not apply to abatement techniques other than SCR. It thus had the disadvantage of not promoting new and potentially even more cost-effective techniques such as HAM’: Kågeson, 1999, Section 8. In 1999, therefore, the SMA decided to extend the scheme to installations other than SCR that reduce NOx by a similar amount. By October 1999, therefore, ‘Seven [of the then 13 certified vessels had] installed SCR, two applied water injection, three [were] cargo vessels that have relatively low emissions (7-8 g/kWh) without having installed SCR, and one [was] a high speed craft moved by low-NOx-emitting gas turbine engines’: ibid. SMA records showed that only 17 ships world-wide had SCR fitted to 50 engines, in August 1998. This had risen to 38 ships with 139 engines by June, 1999. ‘Half of them [were] Swedish, and several of the others [were] ships frequently calling at Swedish ports’: ibid., Section 7.

A3: 1.3 Differentiated Port Dues

24.Less can be said about port dues. The general intent can be derived from the SPSA’s Recommendation (1996), which states that ‘The intention of the tripartite agreement is for the ports to compensate the shipowner for up to 1/3 of the additional costs incurred for environmentally friendly operation. It is also presumed that this will occur within the frame of the financial responsibility of the individual port. This refers to financial inducement aimed at reducing both nitrogen oxides (NOx) and sulphur oxides (SOx)’: paragraph 4. The text that follows is worth setting out in full:

4.1 The Agreement
Each port is urged, in the spirit of the principle agreement, to take initiatives to limit disturbance to the environment caused by shipping, effective as of 1998. This means that the work of looking over agreements and port rates with a view to implementing environmental differentiation should be started as soon as possible in order to facilitate planning and calculation for all parties concerned.
4.2 Environmentally differentiated charges/prices
The Association neither can nor wishes to intervene in how members set their charges or in their price policy. The ports are therefore recommended, according to their own judgement, to offer such financial inducement to shipowners that - in combination with the differentiated shipping lane dues offered by the Swedish Maritime Administration - environmentally friendly operation in ports and their vicinity is encouraged. The intention is that traffic that does not take appropriate measures shall sustain higher costs and thus contribute to the discount for others.

4.3 Target group
The target group for financial inducement such as environmentally differentiated charges/prices, consists primarily of ferries and secondarily of other ships in frequent, weekly traffic throughout the year.

4.4 About the use of catalyzers in particular
Installation of catalyzers entails an increase in capital and running costs for the ship. The question of differentiating charges should preferably be solved within the scope of the business relationship (contract or rate) between the port and each customer. The Association agrees with the Swedish Shipowners’ Association that it is in the first place ferry services that are involved and after that other frequent services in accordance with point 4.3 above. To provide guidance for economic consideration we recommend the analysis produced jointly by the Swedish Maritime Administration and the Swedish Shipowners’ Association (Appendix 1).

4.5 Other measures to reduce NOx
The ports are recommended to observe the environmental classification of ships to be presented by the Swedish Maritime Administration and to consider rewarding other NOx-reducing measures of a technical nature. The limit for maximum discounts has been set at an emission of less than 6g NOx per kWh, which is equivalent to catalyzer operation. For emissions between 6 and 12 g NOx per kWh, less significant discounts are recommended. Finally SPSA recommends that no discount be given to ships whose emissions are higher than 12g NOx per kWh, which means that no measures are taken by ships to reduce NOx emissions.

4.6 Special information concerning low-sulphur bunkers
Differentiated charges based on the grade of fuel used should preferably be related to putting in at respective ports. This means that harbour dues should be differentiated in favour of those ships propelled by fuel not exceeding 0.5% sulphur for passenger ferries and 1.0% for conventional ships, since this entails increased running costs for the shipowner. How differentiation is implemented in practice (agreement or rates) is a question for the individual port. However, the Association recommends ports to state clearly in the rates for harbour dues the cost of putting in for ships operated with or without low-sulphur fuel.

4.7 Control and information
The Swedish Maritime Administration’s control system should be used as a basis for environment-promoting initiatives of the ports. By this is meant the obligation to exert Port State [control] as enjoined by Convention. The control will be expanded in the future to include the sulphur content in bunkers and NOx emissions as well.

A function information system is also necessary and SPSA will therefore work towards a uniform reporting system being arranged between Swedish Maritime Administration and ports, and listing ships as they become entitled to differentiation, and also ships found
not to keep within the stipulated levels of emission.

4.8 Relevant to ferry services in particular
It is desirable to encourage ports in other countries having frequent ferry services with Sweden to subscribe to a system with environmentally differentiated charges similar to that now to be implemented in Sweden. This will ensure a more just distribution of the financial undertaking. The Swedish Ports’ and Stevedores’ Association will work through the available channels such as Nordic cooperation and through ESPO, the European Ports’ Organisation, to ensure the success of this venture. At the same time individual ports are encouraged in "bilateral discussions" of their own, to endeavour to convince ports at the other end of a ferry service of the importance to offering financial inducement aimed at more environmentally friendly shipping.

4.9 Port information
It is important for member businesses to openly and in suitable manner report on the measures undertaken by them with regard to initiatives to improve the environment in accordance with this recommendation, e.g. by presentation in their annual reports or other public documents.

25. The emphasis placed in this on ferries is understandable, as ferry traffic accounts for 75% of all ships calling at Swedish ports: SMA/SSA/SPSA 1997. It is, therefore, very useful to have Lemieszewski’s account (1998) of measures taken in four of the larger ferry ports. He shows (at p. 2) that three of them (Helsingborg, Malmö and Stockholm) have adopted identical rebates for achieving the government’s sulphur content targets, but have adopted different rebates according to different levels of NOx reduction. Gothenburg, in contrast, increases its port dues for failure to meet the relevant sulphur content standard, but does not give a rebate for meeting it. It does offer rebates for NOx emission reductions, varying according to the degree of reduction achieved, but it also increases its dues for failure to act on NOx. In any event, as ports need to cover their costs and are in competition with each other, the rebate is likely to be small relative to the size of the dues payable. For instance, in the case of Malmö the nominated harbour tariff is SEK 3.65 per [GRT] for cargo ships and SEK 1.85 for ferries... The harbour fee is supplemented by cargo and passenger fees. The cargo fee depends on the type of cargo and the amount loaded or unloaded. It should also be kept in mind that substantial rebates may occur as a result of bargaining. If no rebates were negotiated and the vessel had to pay nominated fees for each entry, the effect of the port due differentiation for NOx would approximately equal the effect of the annual fairway discount for a ferry between Stockholm and Helsinki. In reality, the effect of port due differentiation is probably a great deal smaller than the incentive provided by the differentiated fairway due: Kågeson, 1999, Section 8.

26. Two things appear to emerge: (i) the advantage of leaving individual ports to determine their own differentiation system is that they take account of their own circumstances, with a view to maintaining their competitive position (Lemieszewski cites the extreme example of the port of Helsingborg, 38,500 out of 40,000 calls to which are ferry calls: ibid.); and (ii) the consequence of the system for most ports is likely to be a reduction of income from port dues (Lemieszewski suggests of SEK 3-5 million p.a. for Helsingborg and SEK 3-10 million p.a. for Stockholm: ibid.).
A3: 1.4 Evaluation and Conclusions

27. It is possible to calculate quite accurately the reductions in NOx emissions directly resulting from the differentiation of fairway dues (and associated subsidies), given the small numbers of ships involved. It is less easy to determine the impact of the various port due systems. Judging from urea consumption figures and "[b]ased on known planned installations, the [SMA] expects that by 1 January 2001 the scheme will have reduced NOx emissions from ships calling at Swedish ports by 40-45 per cent compared to the situation in 1995": ibid. About 17% of Sweden’s (239%) reduction in NOx emissions during the 1990s is, moreover, estimated to be attributable to shipping: Lemieszewski telecon.

28. Exactly how much the emissions of SO2 have fallen as a direct result of differentiation of both fairway and port dues is at the moment impossible to say, partly because many of the big ferries were already running on low-sulphur fuel before the system came into effect. The SMA’s current estimate, is that a reduction of 60% from the 1990 baseline has been achieved: Lemieszewski letter. An accurate assessment is to be made: Elvingson, 1999. Meanwhile, an indication of the degree of success might be given by the results to date of the Swedish forestry industry’s 1997 voluntary agreement with government, mentioned in paragraph A3/3 above. In the first two years, the Swedish Forest Industries Federation has reduced its ships’ SO2 emissions by 70%, and as a result been rewarded with the shipping trade’s environmental diploma. To date, however, only one forestry industry ship has been equipped with SCR, although the industry aims to introduce it for other vessels too: SEPA 1999b. See also the analysis in Kågeson, 1999, Section 12.

29. The reason for the relatively low take-up of NOx Reduction Certificates might well be that the dues are not sufficiently differentiated (Elvingson, 1998) and/or the investment subsidies enough to constitute a sufficient inducement on their own. The SMA’s feeling is that the costs of conversion to SCR are too high for vessels not calling frequently at Swedish ports, and that the system will not really ‘take off’ until similar systems become more widely accepted abroad: Lemieszewski, 1998, p. 3. One vehicle for achieving this might be the Green Award system discussed in Section 4 below; this does not yet apply in any Swedish port. Even a minimum harmonisation at EC level might, moreover, prove a positive stimulus to the Swedish system and any other national system that might be adopted in the EU/EEA. This is already likely to be the effect of EC Directive 1999/32. Approximately one half of the vessels participating in the Swedish scheme (as well as most Swedish fishing vessels) now use marine diesel or gas oils: Lemieszewski telecon. Unlike heavy fuel or intermediate oils, these are caught by the Directive and are required to contain less than 0.2% sulphur by mass by July 2000 (and see further paragraph A4/318 below). This is likely to further reinforce the positive trend achieved by the differentiation system.

30. The SMA believes that it will achieve the tripartite agreement’s 75% reduction goal by 2003: Lemieszewski, 1998, p. 3. It also claims that the system applies the
polluter pays principle: SMA Pamphlet (but, as to the difficulties surrounding this concept, see Appendix 4, Section 4.1.3.4). Finally, it claims that it ‘is neutral as regards competition. It is therefore both politically and practically more easy to implement this kind of economic instrument than to develop viable and strict common rules. Strictly regulated emission limits might be unfair to a country’s own fleet compared to vessels from other counties which will not have to face the same demands’: SEPA, 1999a. Achieving the 75% target will be impressive. On the other hand, it does not take synergies into account as well as a multi-pollutants approach would. Kågeson’s comments (1999, Section 13) are also very pertinent:

The White Paper [on Infrastructure Charging] says that charges should reflect true costs as much as possible. The Swedish system for environmental differentiation clearly does not meet this requirement as neither port dues nor fairway dues reflect distance. The distance travelled is very important as the amount of pollutants emitted is roughly proportional to the length of the haul. In the Swedish system ships that make short journeys pay relatively more than those travelling longer distances between ports. This effect, however, is at least partly counteracted by discounts given to frequent visitors. One way of making the charge fully reflect emissions would be to take account of the distance travelled since the latest port call (or since entering east of a line from, say, Brest via Ireland to the Faroe Islands), and refrain from giving frequent visitors favourable treatment. However, before deciding on a distance-based scheme it is necessary to look more closely at the administrative cost of taking distance into consideration. Another problem with the current Swedish scheme is that high speed craft moved by, for instance, gas turbine engines may get a low due despite having large emissions of NOx per passenger or tonne-kilometre. Turbine engines have low specific emissions of NOx per kWh. High speed ships, however, generally have large engines and use plenty of fuel. Total emissions of NOx may therefore be a great deal higher than from a conventional vessel of equal capacity. Being relatively light, high speed craft also benefit in an unjustified way from charging systems based on gross-tonnage. To avoid giving high speed ships a competitive advantage, a European scheme could alternatively relate the NOx discount to gram per kW installed engine shaft output.

60. It is best, however, to see the present system as only a first step towards a potentially much more sophisticated set of economic instruments aimed at reducing ship emissions.

61. Finally, the shipping dues system should not be seen in isolation from Sweden’s strong marine pollution regulations (see, for example, paragraph A4/435 below), nor from its other ‘green’ taxes. Sweden’s SO2 tax appears, for example, to apply to ships, at least in principle, though not its NOx or CO2 taxes.

**A3: Finland/Åland**

62. Finland has, since the 1980s, differentiated the payments to its oil pollution fund from companies transporting oil in Finland so as to encourage the use of double-bottomed tankers. Companies failing to use them must pay double the normal fee, because of the higher risk of oil pollution arising from the grounding of single-bottomed vessels around Finland’s rocky shores. In practice, this has encouraged the use of double-hulled, and not merely double-bottomed, tankers: Kamarainen conversation. It appears to have inspired Ivar Manum, Director of the
Norwegian Maritime Directorate, to strive for the environmentally-differentiated system described in the next Section: King, 1998, p. 68.

63. Finland itself has not progressed beyond this, but the Port of Mariehamn, in the Finnish autonomous region of Åland, has differentiated its basic dues with regard to ship’ emissions of NOx and SO2 since 1 January 2000. The Åland system gives ships emitting less than 10 g NOx/kWh a rebate on a linear scale where the reduction of the port due is 8% for ships emitting less than 1g/kWh and only 1% for ships emitting 9 g/kWh. Ships using bunker oils with less than 0.5% sulphur (by weight) receive an additional reduction of 4%. Vessels both using bunker oils with less than 0.5% sulphur and having NOx emissions of less than 1 g/kWh receive an additional rebate of 8%. It follows that such ships receive a total rebate of 20%: Kågeson, 1999, Section 8. Mariehamn's lead might well stimulate Finland-wide action.

A3: 3 Norway

A3: 3.1 Introduction

35. Norway has been studying environmental indexing of and/or differentiated fees and dues for ships for several years. Proposals from the Norwegian Green Tax Commission, which sat between 1994 and 1996 (NGTC, 1996), led to a Norwegian study and initiative on environmental indexing as a tool for environmental differentiation of dues and fees for ships, the report of which was presented to the IMO in September 1998: MEPC 42/17/2. Elvingson wrote, in March 1999, moreover, that, ‘According to Sveinung Oftedal, of the Norwegian [Ministry of E]nvironment, a proposal for differentiated dues is.. being prepared for Norway, with hope of a decision before the year is out’: Elvingson, 1999. In the event, the Government presented instead, in Summer 1999, only a proposal for environmental differentiation of the tonnage tax payable by Norwegian flag vessels (including those on the Norwegian International Ship Register): Proposition No 1 1999/2000. The Stortinget’s adoption of this effected an amendment to (S. 8-16 of) the Norwegian Tax Law, to come into effect following a public hearing and a further decision of the Stortinget upon regulations being made under the Tax and the Shipping Control Laws, later in 2000.

A3: 3.2 The Green Tax Commission

36. The Green Tax Commission suggested that approximately 15% of Norway’s SO2 and 75% of its NOx emissions come from mobile sources: NGTC, 1996, p. 36. Its reference scenario estimates that Norwegian ‘emissions of SO2 grow moderately up to 2010 [and at about ½% p.a. from then until 2050], while emissions of NOx fall somewhat up to the end of the century and grow moderately thereafter’, changing little between 2010 and 2050: ibid., pp. 26 and 27. This already seem unlikely to be fully borne out in practice. While preliminary data for 1995 suggested a Norwegian NOx emissions reduction of 6% since 1987 (ibid., p. 26), between 1990 and 1998, NOx emissions increased by 3%: NPCA, 1999. As Norway has a political commitment to reduce them by 30% by 2010, the Norwegian Pollution Control Authority re-examined possible reduction measures in 1999. It considered forty-six
possible measures for reducing emissions and concluded that one of the four most important is catalytic reductions (through SCR) aboard ships: *ibid.*, *ENDS Daily*, 1999. It considered reductions of up to 75% to be technically feasible, but left the cost of such reductions unconsidered: NPCA, *loc. cit.*

37. Norway is, moreover, like Sweden, a net importer of acidifying pollution. Whereas it reduced its SO2 emissions by 75% between 1980 and 1995, for example, precipitation of sulphur over Norway was reduced by only 35% between 1988 and 1995: Ministry of Environment, 1997, p. 7. According to a separate NPCA study, moreover, the critical loads for acidification are still being exceeded over almost a fifth of the country, even though the acidity of the lakes has fallen by more than 25 per cent since 1985: *ENDS Daily*, 1999.

38. The studies considered here should not, however, be seen to be motivated solely by environmental concerns. They are intimately connected with competitiveness issues too, particularly in terms of reducing the costs of Norwegian labour taxes and other labour-related measures. The main points in the Green Tax Commission’s mandate were to investigate how to change the present tax system away from taxation of labour and towards activities that imply increased use of resources and harmful emissions in a longer term perspective: NGTC, 1996, Foreword. It was asked to aim for revenue-neutral proposals, to consider Norway’s role as a large energy exporter and ‘the desire of Norwegian authorities to be an international “instigator” regarding both employment.. and environmental policies’: *ibid.* It recommended a large number of changes and increases over a broad range of ‘green’ taxes and the reduction and abolition over time of a number of subsidies adversely affecting the environment, with hypothecation of the additional revenue to the reduction of taxation on labour and other labour-related measures: *ibid.*

39. Paragraph 3.6.9 of the Green Tax Commission’s report is devoted to ‘Environmentally differentiated taxes on ships and shipping’, as follows:

> It is regarded as a growing problem in international shipping that the fleet is aging (sic) and that the standards of the ships therefore are diminishing. This may cause environmental problems of an operational nature (operational emissions and waste management), and increase the risk of mishaps and serious accidents.

Environmentally differentiated taxes on ships and shipping would exert a dynamic effect in that they would make it profitable to invest in ships with good environmental qualities, compared with the operation of ships with bad environmental qualities. A documentation of the ships’ environmental qualities in a system of environmental indexation would provide the basis for creating such incentives. An indexation system might for instance be used in the formulation of a tax on calls at ports. It could also influence the calculation of insurance premiums. If the tax is to be differentiated, it would be necessary to develop an international indexation system. Norway was instrumental in obtaining agreement that the development of an environmental indexation system should be put on the agenda of IMO (International Maritime Organisation). However, as in other large international organisations, it may take time before agreement on an operational system has been established.
If a Norwegian indexation system is developed, it may form the basis for environmental differentiation of existing and any new taxes. The revenue potential will depend on the level and formulation of the tax(es).

**A3: 3.3 Follow-up: Phase One**

40. The Norwegian Maritime Directorate (NMD) has followed up the Green Tax Commission’s report in two phases. The first involved a study by Det Norske Veritas (DnV) in co-operation with MARINTEK. The resulting (1998 DnV/MARINTEK) report was presented to the Ministry of Environment and formally considered by the Storting, in Spring 1998. A summary was attached to IMO doc. MEPC 42/17/2, mentioned above, and a copy given to each State delegation at MEPC 42, in September 1998.

41. The DnV/MARINTEK report discusses the establishment of a system of ‘Environmental Declarations’ by ships, the making of which would entitle all ships calling at Norwegian ports to a reduction in the dues and fees payable, differentiated according to the environmental standard of each ship evidenced in its Declaration (as to the Norwegian system of dues, see Kågeson, 1999, Section 10). It also suggested the possibility of their use in connection with the reduction of (flag State) annual registration fees for Norwegian ships operating internationally: MEPC 42/172, Annex, ‘Introduction’. Perhaps ironically, it is only the latter that has, to date, led to a concrete Government proposal (Proposition No 1 1999/2000) and legislation.

42. The DnV/MARINTEK report merely formulated a broad environmental indexing system as the basis for a differentiation scheme, and did not discuss which taxes, dues or fees should be differentiated, nor the levels that the Storting should set. The report to the IMO (MEPC 42/17/2) presented it as only a tool ‘to give technical and operational guidelines to ships and their owners, in order to prepare for environmentally based dues and fees (emphasis added)’: paragraph 2. It is, as yet, an incomplete tool. Safety aspects, which the NMD believes should be considered in tandem with environmental protection (Manum, cited by King, 1998, p. 68) are to be factored into the indexing system later. The system is, in addition, restricted to technical measures of pollution control; operational and maintenance factors need to be factored in too.

43. The philosophy behind the tool’ is stated to be ‘to find a way to give premium (sic) to ships applying standards above the present minimum standards laid down by the conventions, [including, but not limited to] ships using low sulphur fuels [and] ships using catalytic or other reduction measures for NOx’: MEPC 42/17/2, loc. cit. In fact the mooted approach is, in principle at least, much broader than Sweden’s in that ‘all recognised and proper documented (sic) pollutants from a vessel to sea and air were evaluated (emphasis added)’, on the basis of both their environmental impact and their reduction potential: *ibid.*, Annex, ‘Method of Work’. On the other hand, it was stated that ‘The criteria which were developed should be both simple and robust, hence only pollutants with a high environmental impact and very good reduction potential. Other groups of pollutants included are those with high global impact and good reduction possibilities (sic)’: *ibid.*
44. ‘Due to the very different nature of the pollutants, i.e. air pollutants, oil and chemical discharges, wastes, etc. a strictly scientific or technical system for ranking between different categories of pollutants were difficult or impossible to establish \((sic)\): ibid. Thus a ‘systems engineering’ approach was taken. Under this categories of emissions and discharges were given weight factors (expressed as fractions of ten), according to their relative importance: ibid. ‘Operational discharges to air’ was one of these, and was given a moderately high weighting factor (3.5 out of 10). Within each category, different measures aimed at the reduction of discharges or emissions of the listed significant pollutants (in relation to ‘operational discharges to air’, NOx and SOx, as well as CO2 and VOCs, are considered) were given internal gradings according to their degree of efficacy. Since, moreover, different types of vessel have different pollution potential, it was found necessary to separate vessels into five categories and to have different categorisations, weighting factors and internal gradings for each: ibid. These were: oil tankers; chemical tankers; passenger ships; reefer ships; and other ships. For each category of ship, therefore, it was possible, through averaging the weight factors (adjusted for internal grading) for each category of emission or discharge, to achieve a unique number representing the ‘environmental performance’ of the ship in question: ibid., ‘Conclusions’. This, and a calculation table, could then be listed in Environmental Declarations made by ship owners or operators, to which would be attached compliance documentation. In respect of NOx emissions, this should include at least the engine certificate and in respect of SOx emissions bunker receipts and delivery notes. These Declarations would then be approved by the NMD or an authorised Classification Society.

45. The Environmental Declarations could then, the report suggests, serve as the basis for the calculation of due or fee reductions, according to the differentiation scheme to be devised by the Stortinget. They would be verified by random PSC (or, in the cases of Norwegian ships, flag State) inspections: DnV/MARINTEK, 1998, Section 6.3. Non-conformity would result in sanctions, which were conceived ‘primarily [as] temporary suspension of environmentally based dues reductions until the necessary documentation for a new Environmental Declaration can be produced by the Owners’: ibid., p. 67.

46. The DnV/MARINTEK report considered the possibility of basing an environmentally-differentiated system of dues and fees growing out of the indexing system upon MARPOL Annex VI NOx emission standards (even, one presumes in relation to existing engines: as to Norway’s support for the extension of those standards to such engine, see paragraph A4/295 below). It rejected it, however, on principle: it would be restricted to ships with diesel main engines: ibid., p. 32. In the view of DnV and MARINTEK, therefore, additional national NOx emission standards should be involved. The Report also recognised that ‘[v]erification of NOx emission levels requires accurate measuring equipment and clearly defined procedures’ (probably to be defined in accordance with the NOx Technical Code): p. 33. As to SO2 emissions, it recommended that these too should be included in an environmentally-differentiated system of dues: ibid. Its proposal for a ‘differentiation approach’ (at p. 34) was not entirely clear, but seemed to favour an indirect effort to influence the sulphur content of bunker fuels, used both in the North Sea SOxECA (which the report expected, correctly it turns out, to be
designated) and in international waters, through a port State approach. It suggested that differentiation measures be applied in three steps: first to encourage the use of fuels with a maximum sulphur content of 2.5%, moving on later to 1.5% and then to 0.5%. No time frame was suggested. Verification would be through examination of the bunker delivery note and the International Air Pollution Prevention (IAPP) Certificate issued under MARPOL Annex VI, which DnV and MARINTEK expected, optimistically, to come into force by 2002.

A3: 3.4 Follow-up: Phase Two

47. The second phase has involved the Norwegian National Maritime Directorate (NMD) designing a set of guidelines standardising the process of making and receiving Environmental Declarations, thereby implementing a differentiation scheme: Sandvik, 1998, p. 17. The intention is that ship owners or operators will determine their vessels' total environmental rating, will declare it (and the technical measures implemented to reduce emissions) in the Declaration and will sign it and ensure the individual ships' masters counter-sign it. In a departure from the DnV/MARINTEK report's approach, the NMD has decided that its role should be limited to verifying the correctness of the declaration: MEPC 42/17/2, paragraph 3. Like the Swedish system of SO2 declarations described in Section 1 above, the NMD's position is consistent with the increased emphasis on ship owner/operator responsibility in the ISM Code, for which reason, its Director, Ivar Manum (cited in Sandvik, loc. cit., and King, 1998, p. 70), thinks 'it is very important that the declaration is the sole responsibility of the shipowner'.

48. The other departure from the DnV/MARINTEK report's approach has, of course, been the limitation of the amendment to the Tax Law to Norwegian flag vessels. The differentiation the Law seeks 'is based on a Ship Environment Index System (SEIS) which is [along the lines suggested by DnV/MARINTEK, but with only four categories of ship] in turn based on up to seven different environmental parameters, including sulphur and NOx emissions, and ships that meet all requirements can at best receive 10 environmental points. Abatement of NOx and sulphur emissions makes up six out of the system's 10 maximum points for tankers, general cargo vessels and passenger ships. For other ships (including towboats, fishing vessels, research ships, barges and [off-shore] supply and standby ships.) all 10 points refer to emissions of NOx and sulphur. This means, as shown in Table 3, that not all ships get the same credit for an equal reduction of NOx and sulphur': Kågeson, 1999, Section 8.
Table 3 Points earned for different reductions of NOx and SO2 Emissions under the Norwegian model

<table>
<thead>
<tr>
<th></th>
<th>Tankers</th>
<th>General Cargo</th>
<th>Passenger Ships</th>
<th>Other Ships</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NOx</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IMO NOx Curve</td>
<td>0.75</td>
<td>0.75</td>
<td>1.05</td>
<td>1.75</td>
</tr>
<tr>
<td>IMO curve - 15%</td>
<td>1.50</td>
<td>1.50</td>
<td>2.10</td>
<td>3.50</td>
</tr>
<tr>
<td>IMO curve - 60%</td>
<td>3.00</td>
<td>3.00</td>
<td>4.20</td>
<td>7.00</td>
</tr>
<tr>
<td><strong>Sulphur</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.5% S</td>
<td>0.75</td>
<td>0.75</td>
<td>0.45</td>
<td>0.75</td>
</tr>
<tr>
<td>1.5% S</td>
<td>1.50</td>
<td>1.50</td>
<td>0.90</td>
<td>1.50</td>
</tr>
<tr>
<td>0.5% S</td>
<td>3.00</td>
<td>3.00</td>
<td>1.80</td>
<td>3.00</td>
</tr>
<tr>
<td><strong>Total points for best emission reduction practice</strong></td>
<td>6.00</td>
<td>6.00</td>
<td>6.00</td>
<td>10.00</td>
</tr>
</tbody>
</table>

* The IMO’s NOx curve is approximately equal to emissions from new ships that do not use any special abatement technique, such as SCR or HAM. Any of these techniques will earn a new ship a maximum credit.

Source: Kågeson, *ibid.*

49. The indexing/differentiation studies discussed above should not be seen in isolation. The Norwegian tax system already includes several environmental taxes of relevance to shipping, although the Green Tax Commission admitted that it ‘treats the shipping sector lightly’ (such that, in its view, it might be economically correct and environmentally favourable to increase taxes on it): NGTC, 1996, p. 110. The Government, indeed, is committed to refining ‘the tax and duties system so that it promotes sustainable development’ (Ministry of Environment, 1997, p. 11), including in respect of shipping. The 1996 Regulation on Refunding of Mineral Oil Tax, which grants tax refunds on a differentiated scale according to the sulphur content of the oil in question applies to international shipping and off-shore supply ships, although inland maritime transport ships are exempt: see also NGTC, 1996, p. 137. The tax rate was set, in 1996, at about NOK 17 per kilo/SO2, and the rebate scale designed so as in general to favour the use of oils with sulphur content of 1% or less in most areas, and 2.5% in others: Oftedal, 1996, p. 48. Norway has no NOx tax or charge, but it made grants totalling NOK 35 million over 5 years in the early 1990s to encourage NOx emission reductions: *ibid.*, p. 50. According to Langjord (1996, p. 10), NOK 7.5 million p.a. is given to Norwegian ships operating in coastal waters to help reduce their NOx emissions. In addition, the Green Tax Commission suggested the possibility of a tax on leisure craft, partly because of their contribution to air pollution: *ibid.*, p. 122. International ships remain exempt from Norway’s CO2 tax, levied on the carbon content of mineral
oils, although inland maritime transport and off-shore supply ships have been taxed since 1 January 1999, albeit at a reduced rate (NOK 26/l.): Storting Decision, 17 June 1998. In 1995, moreover, Norway introduced a ‘green’ passenger tax on all domestic flights for which there is a rail alternative and on all international flights from Norway. This has operated sufficiently well for it to be cited as evidence that a charge on air passenger movements/tickets is feasible (CECET, 1998, pp.74, 93, 167). It might prove to carry lessons for application to passenger ships and ferries too.

50. Finally, several Norwegian maritime R & D programmes have been devoted, since the 1990s, to ship-source pollution control and reduction. Among these was the 1991-95 ‘Green Ships’ project, which focused on, *inter alia*, atmospheric and sea pollution during normal ship operation. A more ambitious programme for the period 1998-2001 is now analysing, *inter alia*, investment in environmental improvement. It aims to show that such investment is financially attractive to shipowners, and that ‘environment-friendly’ operation is to ship owners’ and operators’ competitive advantage: Evans, 1999

**A3: 3.5 Evaluation and Conclusions**

51. Shipowners appear to have been supportive of the idea of environmentally-differentiated shipping dues or fees: King, 1998, p. 70. Some concern has, however, been expressed that the incentives to be offered might not be enough to secure the desired improved environmental performances. ‘Shipowners are already making huge investments with smaller increases in value than they would have under this system’, states Jens Henning Koefoed, NMD Environmental Adviser, and ‘There are limits to what the tax will achieve by itself’: *ibid.* The NMD’s hopes for success appear to lie in three possibilities: (i) the ‘educational’ effect on the owner/operator and master of having to make and sign the Declaration; (ii) promoting and extending the system abroad, including ultimately via IMO recognition; and (iii) the voluntary creation of additional incentives by industry: *ibid.* In the latter respect, the NMD points out that there is no conflict with the Green Award system (discussed in Section 4 below), which indeed it accepts as a possible vehicle for the scheme’s internationalisation: Sandvik, 1998, p. 18. According to Koefoed (cited *ibid*), ‘We would, in fact, expect the Green Award Foundation to offer assistance to shipowners in obtaining environmental declarations’ under the Norwegian scheme.

52. While the DnV/MARINTEK indexing system deals with a broad range of pollutants, it (like the Swedish system described in Section 1 above) is not well designed to take into account the synergies operating between different pollutants, as opposed to the individual pollutants themselves. In trying, moreover, to attach broad values to types of reduction efforts in respect of individual pollutants, grouped in categories, and in representative sets of circumstances, it can be accused of being too subjective and complex but crude in its approach. On the other hand, no system that accurately reflects the peculiarities and precise true cost of every instance of ship-source pollution, actual or potential, could possible be devised,
and DnV/MARINTEK’s efforts, while ambitious, are conducted by researchers with a great deal of relevant experience on which to base subjective judgements. The incentives system proposed by the Norwegian Government is something of an anti-climax, in that it applies only to flag vessels, and is likely to represent only about 15% of the scale of the Swedish system in terms of the financial incentives on offer. If it alone is adopted, it will certainly justify the fears that incentives to change will be insufficient.

53. More importantly, from a selfish European point of view, given the Norwegian fleet’s specialisation in cross-trading, a very large proportion of the vessels affected will operate substantially or completely outside EU waters, so that the scheme’s contribution to the reduction of acidification in Europe will be limited.

A3: 4 Green Award

54. This scheme, originally set up, in 1994, by the Dutch government and the Rotterdam Municipal Port Management (MPM), permits oil tankers to gain a ‘Green Award’ designation for good environmental practices, which might well include in individual cases practices relating to their air polluting emissions: see IMO doc. MEPC 40/16/2. It has been very successful in terms of: its spreading to other ports (as well as several shipping service providers), now 35 in five countries (the Netherlands, Portugal, Spain, South Africa and the UK); the attractiveness of the financial incentives on offer (see below); and the growth in the number of ships, particularly tankers, in gaining the Award (the 100th vessel was certified on 4 September 1999). It illustrates a growing willingness of ship owners and operators, as well as ports, to embrace sound environmental principles.

55. The Green Award Foundation is a unique international independent foundation with headquarters in Rotterdam. The Green Award scheme is administered by a small Green Award Bureau. Initially offering certification to oil tankers of 50,000 dead-weight tons (dwt) and above, the scheme now caters for those of 20,000 dwt and above. Negotiations are well under way, moreover, with a view to extending it to dry bulkers from 2000: Port of Rotterdam web-site. In order to join, vessels must pass an inspection by Green Award surveyors, which is repeated upon renewal every three years. Owners or operators pay a joining fee and after the first year, an annual membership fee, which vary according to the size of the vessel: Wolters interview, 1997. In 1997, a 50,000 dwt tanker would have paid $4,300 as a joining fee and a $2,500 membership from 1998. A ULCC would have paid $6,000 and $3,300 respectively.

56. Ports are prepared to offer incentives (chosen by themselves), because they face lower pollution risks and receive publicity as ‘good ports’. The following ports offer the following incentives to Green Award ships (see Green Award Bureau web-site): in the Netherlands, a 6% rebate on their port fees: Rotterdam, Flushing and Dordrecht; in Portugal, a 5% rebate on the tariff of port use and the pilotage tariff; Sines; in South Africa, a 5% port dues rebate in all South African Portnet ports the (Saldanha, Cape Town, Mossel Bay, Port Elisabeth East London and Durban), if not already enjoying a 5% rebate in terms of the double-hulled/SBT scheme; in Spain, a 7% rebate on the T1 tariff in State ports: Bilbao, Santander, La Coruna,
Huelva, Cadiz, Algeciras, Malaga, Cartagena, Valencia, Castellon, Tarragona, Barcelona, Sta. C. de Tenerife and other ports; and in the UK, a 5% reduction on port dues: Sullum Voe. In addition, various (mainly Dutch) service providers also offer incentives in some of these ports.

57. When considered in combination with Regulation 2978/94/EC, discussed in Section 5 below, the potential savings for SBT or double-hull tankers increase (in Rotterdam’s case to 10% of the port fees: Port of Rotterdam web-site).

58. The Port of Rotterdam is now pursuing the idea of green shipping in the field of bunker quality too. A Rotterdam Bunker Monitor Platform has been set up with the aim of ‘safeguard[ing]’ the name and fame of Rotterdam as a bunker port by actively promoting self-regulation with the aim of protecting the quality and quantity of bunker deliveries, and to serve as a model for other ports’ Struijs, 1998. In its Suppliers Working Group, in which members from both independent and major oil companies are represented, the design and introduction of a voluntary ‘quality mark’, or ‘hallmark’, is under discussion. ‘As a difference of opinion arose between [certain] Independents on the one hand and the Majors and a few [other] Independents..., on the other, it was decided.. to first discuss only the possibility of introducing a hallmark with a limited number of people’: ibid.

59. The Rotterdam MPM bunker co-ordinator and the Director of the Green Award Bureau both participate in the small ‘Hallmark Introduction’ working sub-group. In addition, the Green Award Bureau has been asked to look into the possibility of its being able and willing, as an independent agency, to actually carry out the hallmarking and audits. The philosophy behind this voluntary, self-regulatory certification is that it characterises the ‘good’ supplier. In addition, fewer PSC inspections and/or insurance difficulties might follow for the management that orders bunkers from companies which do not have a hallmark. In addition, consideration can be given, in consultation with the inspection services, to more targeted inspection for the ‘non-awarded’ or ‘not-willing-to-be-awarded’ suppliers: ibid. and Port of Rotterdam web-site. Finally, it could eventually be tied into a differentiated dues and fees scheme.

A3: 5 Incentives for Segregated Ballast Tank/Double-Hulled Tankers

60. Oil tankers with segregated ballast tanks (SBTs), double bottoms or hulls and other spaces not normally used for cargo as an environmental-protection measure suffer in comparison with other (usually older, and less ‘environmentally-friendly’) tankers from a loss of cargo-carrying capacity relative to their gross registered tonnage (GRT).

61. The Finnish differentiation in favour of double-bottomed tankers has been discussed in Section 2 above. In November 1993, the IMO, by Resolution A.747(18), recommends that ports deduct the segregated ballast tank tonnage from the GRT wherever their dues are based on the latter, and pilotage authorities to do the same with respect to pilotage dues. Port dues thus calculated should be at least 17% lower than those for an oil tanker of the same GRT but without segregated ballast tanks. Alternatively, the said authorities are encouraged to
assess dues on a basis other than that of gross tonnage as long as the dues are no less favourable than they would be if calculated by the above method. See also the Fourth (1995) North Sea Conference Declaration, Annex 3, para. 2.2(ii).

62. A year later, Regulation 2978/94/EC required Member States to implement the provisions of that Resolution in their national laws on a mandatory basis, with effect from 1 January 1996. The Regulation applies to oil tankers: equipped with tanks specially designed to carry segregated ballast; designed, built, adapted, equipped and operated as segregated ballast oil tankers, including double hull tankers of an alternative design; meeting the requirements of the 1969 International Convention on Tonnage Measurement of Ships; and holding the International Tonnage Certificate (1969). The Regulation also establishes an advisory committee comprised of Member State representatives and chaired by a Commission representative, to consider and advise on implementation efforts.

63. Transposition and implementation appears to have been above the norm for EC environmental legislation. Infringement proceedings were brought by the Commission and reasoned opinions sent only in relation to Belgium and Portugal for non-notification of transposition of the Regulation. The proceedings against Portugal were later dropped but a case for non-notification pursued against Belgium: COM (98) 317 final, section 15.5. This is a much better record than that in relation to the PSC Directive, for example, perhaps because a Regulation was used instead of a Directive. The latest Commission proposals, made in the wake of the Erika incident, involve making substantial amendments to the Regulation.

A3: 6 The Failed US Administration’s Incentive-based, Ship-related Proposal

64. The US EPA has provided an example where a fee-based incentive program was successfully resisted by industry, suggesting the importance of the latter’s cooperation. In May 1994, a Federal Implementation Plan (FIP) proposal reflected the then-proposed emission standards for MARPOL Annex VI. Because those standards alone would not have achieved the desired reductions, the FIP proposal contained several additional programmes. Among these was a fee-based incentive programme designed to accelerate replacement of older ships’ engines with newer, cleaner engines. The fee would be reduced for vessels meeting the MARPOL Annex VI standards, and eliminated for vessels using even cleaner engines. The FIP also proposed that all vessels use land-based sources of power when berthed in port (i.e. ‘cold ironing’: see paragraph A4/453 below). Finally, it considered that additional reductions could be made through port infrastructure improvements and reducing the speeds of vessels approaching port.

65. Concerned that the proposal would reduce port traffic, US ports proposed an alternative plan that include most of the FIP proposal elements, but dropped the fee-based incentive programme. In February 1995, the EPA finalised the FIP measure for marine vessels along these lines, but even this was rescinded by the US Congress, in April 1995.
Finally, on May 22, 1998, the U.S. Environmental Protection Agency (EPA) issued an advanced notice of proposed rule-making (63 FR 28309) describing its plans to propose emission standards and other related provisions (40 CFR part 89) for new propulsion and auxiliary marine compression-ignition engines at or above 37 kW. This followed closely the NOx Technical Code, and contained no incentive-based element. As to additional measures taken in California, see paragraph A4/452 below.

**A3: 7 Other Examples of ‘Environmental Indexing’ Systems**

Finally, it is worth noting that Oftedal (1996, p. 49) suggests the existence of a number of other ‘environmental indexing’ systems, which might be worth further study: the ‘Green Bonus’ system (Australia); the US Coast Guard ‘Safety Point System’; the States’ of Washington and California NOx measures; Norway’s Sture Terminal’s VOC measures; and Helsinki’s SO2 measures.
**A3: 8 Bibliography To Appendix 3**

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