



SWEDISH MARITIME
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Environmentally Differentiated Fairway Charges in Sweden

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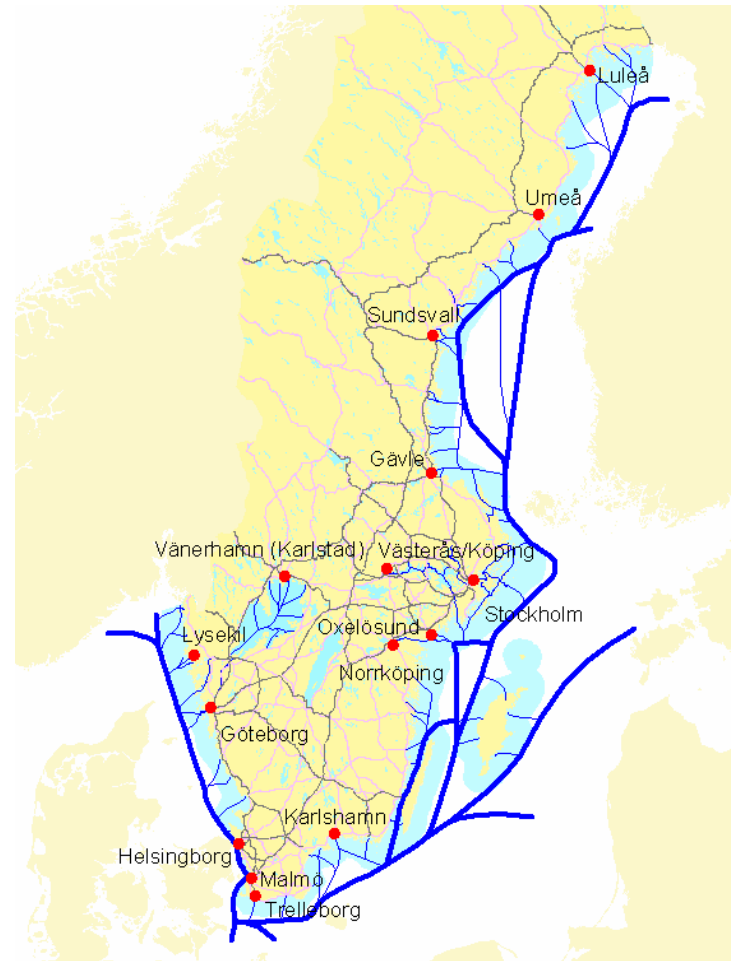
Disposition

- Background
- Description of the Swedish system for fairway dues (1998-2004)
- The revised system 2005
- Diffusion of abatement measures and estimates of effects on emissions
- Comment on the relation between the social benefits and the incentives of the system
- New ideas and the way ahead



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Major off coast fairways



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Three separate cost calculations

- Navigation in coastal waters
- Navigation from coastal waters in access fairways into the port area
- Loading and unloading of goods (passengers) to/from ships



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	MC _{infra}	$Q^* \frac{dAC_{user}}{dQ}$	MC _{ext}
Off coast	Low Marginal Cost		Air, Water pollution
Port access fairways	MC charges		Regulation? permits?
Port operations	Market Prices		Noise Air Water

MC charges?

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	MC _{infra}	$Q^* \frac{dAC_{user}}{dQ}$	MC _{ext}
Off coast	Low Marginal Cost Public goods->financing problem->user charges?		Air, Water pollution
Port access fairways	MC charges MC pricing opens for infrastructure competition		Regulation? permits?
Port operations	Market Prices Some infra competition. Transparency controls subsidies		Noise Air Water

MC charges?

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THE SWEDISH FAIRWAY DUE

A two part due based on

- the ships' gross tonnage (GT)
- loaded or unloaded cargo volume

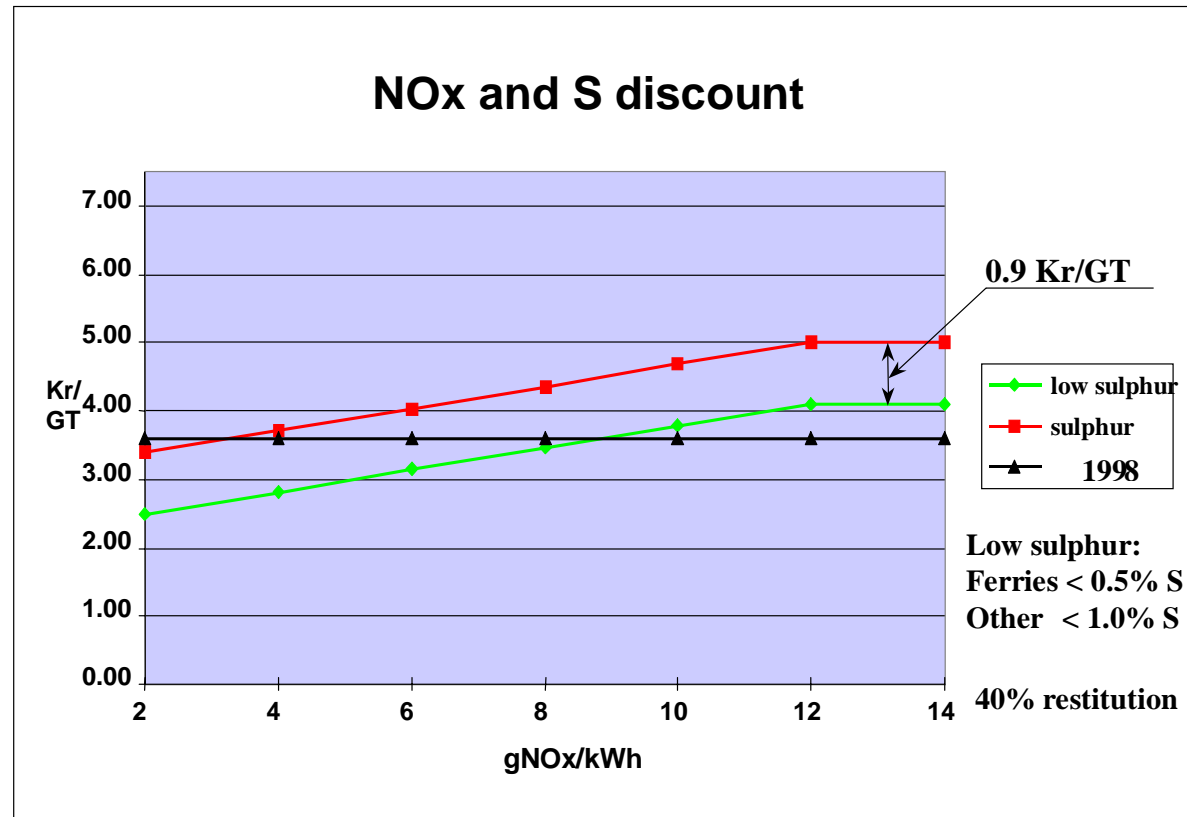
The GT part is differentiated according to the emission of NO_x and the sulphur content of the fuel

The differentiation system must be financially neutral



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ENVIRONMENTAL DIFFERENTIATION 1998-2004

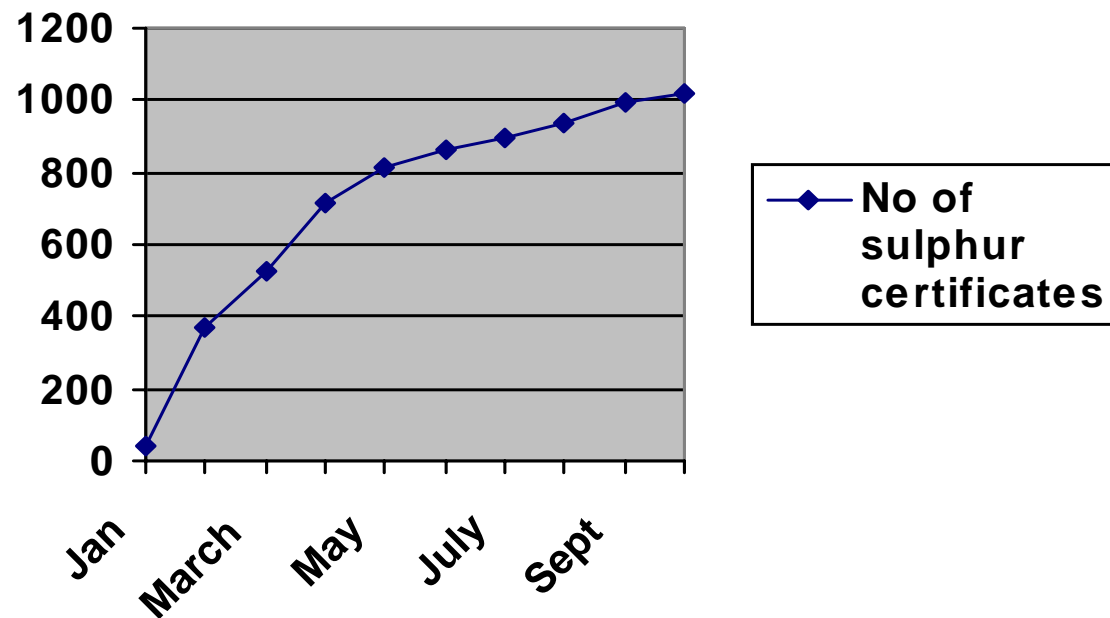


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Rapid establishment of stock of sulphur certificates



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Fairway charging system revised as of January 1 2005; objectives

- Increase incentives for NO_x and SO_x reductions in general
- Create an incentive to implement NO_x abatement measures also for auxiliary machinery
- Improve reflection of external social marginal cost
- Eliminate some some rebates
- Adapt to new regulatory and technical standards
- The system must again be financially neutral



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The revised environmental differentiation of the 2005 system

- Discount all the way from 0 to 9,9 g/kWh of NO_x emissions (the earlier system from 2-12 g/kWh)
- The extra charge for sulphur contents of fuel revised; + 0,6 SEK/GT unless:
 - 0 SEK/GT for S < 0,2 per cent
 - 0,30 (0,20) for 0,21 < S < 0,50
 - 0,40 for 0,51 < S < 1,00 (other than passenger ships)



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How to better reflect the marginal external cost (exhaust to air)?

- Every call generates emissions in Swedish waters
- Effect of engines and distance in Swedish waters largely determine emissions to air
- The financing restriction has to be maintained.
- Thus; frequent traffic with strong engines should pay more



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Why not “ideal parameters” in the revised system?

- Effects of engines not formally established as firmly as GT
- Charge based on kW would punish ice-capabilities of ship
- Relating to port access distance could have adverse effects for ports with long access fairways
- International port competition restricts overall levels of fees



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Co-ordination with port charges

- Ports apply environmental differentiation of dues on a voluntary basis
- Out of 50 major ports 25 apply a differentiation scheme for NO_x and SO_x. The basis is the SMA-certification process
- Emissions from ships at berth > emissions from other machinery



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NOx-certified ships and nominal NOx-reduction

	2001	2003	2004
No of NOx certificates	30	37	38
Estimated reduction	27000	36000	41000
Total NOx emissions from ships in Baltic Sea calling SE ports	93000	95000	

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Ships with SOx certificates and nominal SOx-reductions

	2001	2003	2004
No of SOx certificates	1050		1200
Estimated reduction (1000s of tons)	50000		50000
Total SOx emissions from ships in Baltic Sea calling SE ports	35000		37000

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Fairway dues in the perspective of economic efficiency

- Basic function of fees: to finance fairways, sea safety measures etc.
- Emissions to air from ships cause damage in all coastal waters
- With regular values for exhaust gases damage cost becomes significant
- Abatement cost is probably much lower
- Impossible for one county to provide the full economic incentive



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Further issues for social marginal cost pricing and differentiation

- Geographical delimitation of the area subject to pricing of emissions or considered relevant for differentiation
- Different values in different areas
- Emissions from ship (auxiliary) engines in ports
- Charging parameters; real exhaust flows, kW, distance, NT, GT?



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Two alternative damage cost estimates

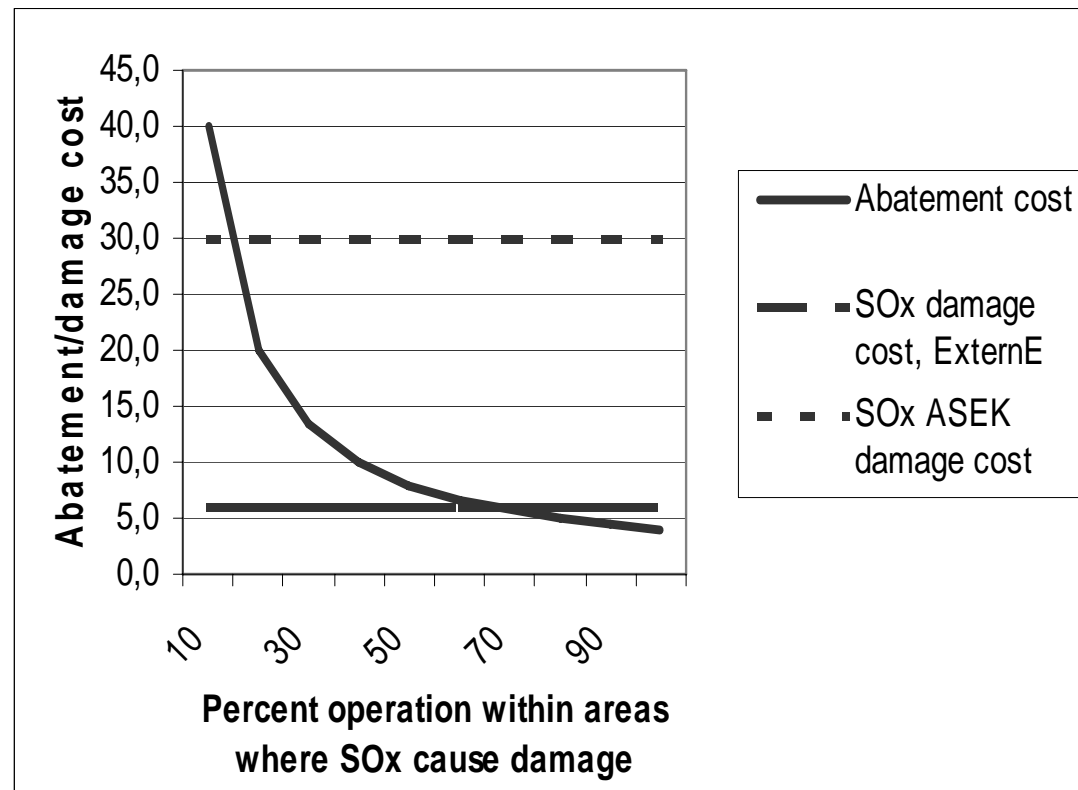
	Sulphur oxides SO _x			Nitrogen oxides NO _x		
	Local	Regional	Total	Local	Regional	Total
ASEK	10	20	30	0	60	60
Pilot/Ex-temE	0,1	6	6,1	0	14	14

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justified abatement measures for SO_x as a function of percentage operation in SO_x sensitive areas





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justified abatement measures for NOx as a function of percentage operation in NOx sensitive areas





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Current issues in Sweden as for economic incentives for reduction of maritime emissions to air

- Including the maritime sector in the CO₂ emission trading scheme
- Applying charges according to the provisions of the energy directive
 - For domestic maritime traffic
 - For EU-internal international traffic based on bi lateral agreem
- Emission trading systems for NO_x and SO_x



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CONCLUSIONS

- Differentiation of dues has contributed to reductions of emissions of NO_x, SO_x from ships calling Swedish ports
- The link between differentiation and emission reduction is not quite firm
- Estimates of effects of the revised system are not yet available
- New interesting ideas are emerging
- Regulation and/or economic incentives?



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Some characteristics of the 2005 Swedish fairway charges

- No of calls with GT-charge increased:
 - from 18/year à 3,6 SEK to 5 per month à 1,80 SEK for passenger ships (i.e. 60 calls/year)
 - From 12/year à 3,60 SEK to 2 per month à 2,05 SEK for other ships
 - Cruising traffic will be phased into the system gradually