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Executive summary - The Demo Project

Project organization

The primary stakeholders of the Demo project are; Broström, Rederiaktiebolaget Gotland (Gotlandsbolaget), the Peninsular and Oriental Steam Navigation Company (P&O), Stena Line, SEAA T (Shipping Emissions Abatement and Trading) and the Swedish Shipowners' Association. The sponsors of the project are VINNOVA (Swedish Agency for Innovation Systems), Swedish Maritime Administration, Wallenius Lines and Biofriendly Ltd. The project has been conducted by Sustainable Business Solutions at PricewaterhouseCoopers, Sweden. IVL (The Swedish Environmental Research Institute) and CA Clase have contributed to the tasks in the project.

Background to the Demo Project

The launch of the Demo Project was a direct response to the initiative by DG Environment as regards a request for a demonstration that monitoring and verification of nitrogen oxides (NO_x) and sulphur dioxide (SO₂) emission reductions at sea are feasible. The request to execute the demonstration was made to the Swedish Shipowners' Association and PricewaterhouseCoopers following their presentation to DG Environment of the proposal for an EU-wide emission trading system of NO_x and SO₂, which includes shipping. At a meeting with the head of the Margot Wallström Cabinet, the cabinet showed great interest in an emission trading system, as a successful way to reduce emissions from shipping in EU waters.

To strengthen the possibilities for such a legislative development the EU officials recommended and requested that some critical issues should be demonstrated and clarified. The main issues to be demonstrated and clarified were that the reductions can be monitored and verified in practice, that the reductions are real and that trading can be cost-efficient.

A similar request by DG Environment was made to the primary stakeholder SEAA T when presenting the proposal for SO₂ emissions trading in a shipping benchmarking consortium.

Scope of the Demo Project

The scope of the Demo Project is to demonstrate (in practice) that the monitoring and verification of NO_x and SO₂ emission reductions from sea-going ships is feasible. The monitoring and verification will be tested on reduction techniques for NO_x emissions (Selective Catalytic Reduction and Internal Engine Measures) and reduction techniques for SO₂ (Low Sulphur Fuel and Scrubbing technology).

Project phases

In the Demo Project the following project phases have been conducted:

Pre-evaluation of potential methodologies for monitoring and verification

In this phase a pre-evaluation of potential methodologies to monitor emission levels, to calculate emission reductions and verify emissions reductions from different SO₂ and NO_x reduction techniques have been conducted. The phase has also included discussions regarding general requirements for trading of emission reductions in European waters.

Onboard testing of the selected monitoring methodologies

Within the scope of the project five on-board tests (on the ships of the project participants) have been performed by and/or engaged by the project participants. One test each for the reduction

techniques listed in the scope of the DEMO project has been conducted (NOX emissions: Selective Catalytic Reduction (SCR) and Internal Engine Measures and SO2 emissions: Low Sulphur Fuel and Scrubbing technology). Additionally one test was focusing on the positions monitoring, logging of parameters and reporting of emission reductions.

Practical testing of verification methodologies

The verification methodology developed in the pre-evaluation phase was tested in practice on three of the on-board monitoring tests.

Communication of results and recommendations

Communication of results and recommendations to policymakers and other stakeholders has been an important task of the project. The results and activities of the project are presented on the web page of the project: <http://www.demoproject.org/>.

Main results and conclusion of the DEMO project

The conclusions of the Demo Project are based on the pre-evaluation and the following practical tests. The main results and conclusions from the DEMO project are the following:

- Monitoring of NO_x emission reductions created by ships equipped with SCR or Internal Engine Abatement is feasible
- Monitoring of SO₂ emission reductions created by ships equipped with Scrubbing Technology or by ships using Low Sulphur Fuel is feasible
- The construction of an onboard full scale monitoring and reporting system, sending emissions data to a server ashore, is feasible
- Verification of reported NO_x and SO₂ emission reductions created by moving ships at sea is feasible. Additionally the verification process has the ability to offset any uncertainties in the measuring process, and hence make the reductions credible.
- The policies and routines important for the monitoring and reporting of NOX and SO2 emissions/emission reductions could be included into the overall management or security systems of the ships
- There is potential for cost-effective emissions trading:
 - Cost-effectiveness is the balance between the costs of implementing emission abatement and monitoring technology together with their operating and maintenance costs, opposed to the financial gains from trading emission reductions. Consequently the regulators must take the cost effectiveness into account when deciding on the demands for measurement uncertainty.
 - The DEMO project has in general focused on continuous emissions monitoring methods with low uncertainty levels in the same range as the larger land-based emitters. If the cost effectiveness of the system is to be improved the monitoring (and verification) requirements could be adjusted to the amount of emissions each ship creates, e.g. a larger emitter could be required to report with higher accuracy and smaller emitters could use simplified and less expensive methods (as has been the approach in the EU Emissions Trading Scheme for Greenhouse Gases).
 - A launch of an emissions trading scheme for NO_x and SO₂ will drive the development and marketing of new monitoring techniques which may enable monitoring at a reduced cost and improved measurement uncertainty.

More information is presented in the “Summary” and the “Final report” on the DEMO project web page <http://www.demoproject.org/>.
