

EnviSuM Project

Environmental Impact of Low Emission Shipping: Measurements and Modelling Strategies

Project objective:

to study technical efficiency and socio-economic impacts of clean shipping solutions

Project specific objectives:

- to provide policy makers and authorities with tools and recommendations for the development of future regulations benefiting the environment and public health in the Baltic Sea Region
- to provide tested and analysed results on efficiency of the different clean shipping solutions
- to assess present and future compliance costs, health and environmental effects of ship emissions in view of the IMO regulations that entered into force in January 2015*
- to enhance sustainable development in the form of cost effective means for clean shipping

** The regulations to reduce sulphur oxide emissions introduced a global limit for sulphur content of ships' fuel oil, with tighter restrictions in designated emission control areas. Since 1 January 2015 the sulphur limit for fuel oil used by ships in SOx Emission Control Areas (ECAs) established by IMO has been 0.10% m/m. The ECAs established under MARPOL Annex VI for SOx are: the Baltic Sea area; the North Sea area; the North American area (covering designated coastal areas off the United States and Canada); and the United States Caribbean Sea area (around Puerto Rico and the United States Virgin Islands). www.imo.org*

Programme area



Project activities:



Work package 1:
Project
management and
administration –
University of Turku



Work package 2:
Emissions and
abatement
strategies –
Chalmers
University of
Technology



Work package 3:
Air quality and
deposition –
Norwegian
Meteorological
Institute



Work package 4:
Social and political
impact –
University of Turku



Work package 5:
Economic impacts
– Tallinn University
of Technology

[Work package 1](#)

Concerns the coordination tasks and responsibilities of the Lead partner. The aim is to ensure effective and smooth implementation of the project. The Lead Partner ensures that the tasks are implemented as they were planned and that the project achieves the planned aims. The coordination responsibilities also include financial administration and communication tasks.

[Work package 2](#)

The aim is to create detailed emission data on SO_x, NO_x and PM emissions in the SECA area since the introduction of vessel fuel sulphur content reductions in 1.1.2015. The emission data of fixed site measurements collected in three large urban areas located in different parts of the Baltic Sea region (Gothenburg in Sweden, the Tri-City region of Gdansk, Sopot and Gdynia in Poland, and Saint Petersburg in Russia) are used together with emission data gathered from two flight campaigns in the Baltic Sea. The data from these measurements are combined with AIS-based ship emission modelling and measurements carried out on ships utilising scrubbers and LNG.

This work package also includes demonstration actions on energy efficiency of LNG fuel, the efficiency of scrubbers regarding particle emission reductions, Clean Shipping Café (organised in connection to Danish Maritime Fair 2016) and a study trip for 30 maritime stakeholders to introduce them clean shipping technological solutions.

[Work package 3](#)

Focuses on assessing the effect of ship exhaust gas emissions on air quality and depositions before and after the introduction of SECA regulations in the Baltic Sea in the beginning of 2015. The emission measurements conducted in WP2 as well as modelling are used to estimate air quality at regional scale in Europe (with focus on the Baltic Sea region) and at urban scale in three port cities: Gothenburg in Sweden, the Tri-City region of Gdansk, Sopot and Gdynia in Poland, and Saint Petersburg in Russia. The model calculations of air pollution from ships at different geographical scales combined with measurements provide gridded results for concentrations and depositions. These results in turn form the basis for calculations based on future emission scenarios (for the years 2020 and 2030), and for the assessment of health and environmental impacts carried out in WP4.

[Work package 4](#)

The health impact assessment is carried on the basis of results on pollutants concentrations and depositions achieved in WP3. The effects of vessel originated air pollutants on land vegetation (forests and farm crops), soils and water systems are estimated on the basis of measured and calculated concentrations of air pollutants.

On the basis of health and ecosystem-level impacts a cost-benefit analysis of the SECA regulations is carried out followed by visualization of alternative futures based on different policy options regarding different clean shipping solutions, and influencing of decision-makers and maritime stakeholders on the benefits of emission regulation.

[Work package 5](#)

Analyses the costs and benefits of emission abatement costs, administrative burdens, transport modal shift, and other socio-economic impacts both on macro and micro levels on the basis of previous studies, a survey, case studies, focus group meetings, expert interviews, a study visit to the Isle of Samso, and the results of other WPs. The aim of the analysis is to produce “Economic guidelines for SECA” comprising policy and business recommendations, and an economic decision making tool.

Project partners	Associated Organizations:
University of Turku (Finland - lead partner)	Committee for Nature Use, Environmental Protection and Ecological Safety of St. Petersburg (Russia)
Finnish Meteorological Institute (Finland)	State Company Mineral (Russia)
Chalmers University of Technology (Sweden)	Ministry of Infrastructure and Development (Poland)
Maritime Development Center of Europe (Denmark)	Port of Gothenburg (Sweden)
Norwegian Meteorological Institute (Norway)	Finnish Port Association (Finland)
Maritime University of Szczecin (Poland)	Faergen (Denmark)
Tallinn University of Technology (Estonia)	DFDF A/S (Denmark)
City of Gothenburg (Sweden)	SPC Finland
University of Gothenburg (Sweden)	Man Diesel & Turbo (Denmark)
Baltic Marine Consult GmbH (Germany)	Union of the Baltic Cities (Poland)
Nordkalk Corporation (Finland)	Port of Tallinn (Estonia)
HELCOM (Finland)	Ministry of Energy, Infrastructure and State Development Mecklenburg-Vorpommern (Germany)
	Agency of Regional Air Quality Monitoring in Gdansk (Poland)
	Port of Gdynia Authority (Poland)
	Port of Gdansk Authority (Poland)
	Port of Szczecin and Swinoujscie Authority (Poland)
	Polish Shipowners' Association (Poland)

Project duration:

March 2016 – February 2019

Detailed information:

<https://blogit.utu.fi/envisum/>

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