ECOSONOS

EMISSIONS OF CO_2, SO_2 AND NO_X FROM SHIPS

Duration of the project: 15/12/2003 – 30/04/2006
Budget: € 139.973
Keywords: Air Pollution, Emission Data, Emission Reduction Policy, Data Assessment

CONTEXT

Parties to the United Nations Framework Convention on Climate Change have an obligation to report emissions from international marine bunker fuels. In addition, Parties are required to provide an explanation on how they distinguish between domestic marine emissions and international bunker emissions in their national inventory reports, and to explain how consumption of international marine bunker fuels was estimated and separated from the domestic consumption. Assessments of CO_2 and NOx emissions by ships mainly use either a "top-down approach" or a rough "bottom-up approach". In our research we will explore possibilities of combining existing databases in Belgium to assess CO_2, SO_2 and NOx emissions from a bottom-up approach. By doing so we expect to improve Belgian emission data from ships entering and leaving Belgian ports.

PROJECT DESCRIPTION

Objectives
The aim of this project is to assess the methodology used in Belgium to monitor air pollution from ships (CO_2, NOx, SO_2 only), whether there is any quality assurance/control as regards data, what problems administrations may encounter, to verify whether Belgium is able to comply with the relevant international conventions (Annex VI of MARPOL and UNFCCC), and to suggest improvements for Belgian data reporting.

Methodology
Firstly the actual reporting and monitoring methodology of CO_2, SO_2 and NOx emissions from ships will be studied, based upon emission estimations in international literature and taking into account the UNFCCC standards, in particular IPPC guidelines, further developments under the Kyoto Protocol and the work within the IMO. The review will lead to an assessment of the different methodologies used. In particular the reliability and/or the limitations of the emission factors and the calculation methods will be assessed. This task will also include a brief analysis of the comparability of UNFCCC emissions data with other reporting frameworks for atmospheric emissions and bunker fuel statistics, such as for example the International Energy Agency.

Secondly, the methodology of monitoring, reporting and estimating ships' emissions of CO_2, SO_2 and NOx in Belgium will be evaluated. Problems will be identified and proposals for improvement will be suggested, taking into account new reporting and monitoring options for SO_2 and NOx emissions from ships via bunker fuel delivery notes, upon entry into force of Annex VI MARPOL 73/78. Various databases (Port State Control, Pilotage, Vessel Traffic Service, Sea Ports and others) with ships' particulars and databases generating bunker fuel statistics (Federal Energy Administration, Customs and others) will be analysed and classified according to following parameters:
1. quality of data and potentials for quality control and estimating SO_2 and NOx emissions from ships;
2. short time frames to deliver basic data (preferable electronic);
3. multi-purpose reporting;
4. potentials for geographical emission allocations, such as national (Belgian ports, Belgian part of the North sea) – international;
5. potential for improvement (technical, cost and policy) and connections with other databases;
6. user friendliness.

Thirdly, a fine tuning of CO_2, SO_2 and NOx emissions from ships in the Belgian part of the North Sea will take place for the year 2002 as example. In contrast to international studies using simple "top-down" approaches, this project will use a "bottom-up" approach in order to identify SO_2 and NOx emissions from ships in the Belgian ports, the Belgian Territorial Sea (TS) and Exclusive Economic Zone (EEZ). Therefore we need to identify vessels sailing to and from Belgian seaports, their technical particulars and average sulphur content, the fuel consumption (daily), sailing days, … in order to gain more detailed information on a smaller geographical scale (grid) compared to international studies, to calculate those emissions and to be able to review emissions factors and calculation methods.

Following steps will be taken:

1. To explore the use of different Belgian database information sets on ship movements and ship particulars (pilotage, VTS, ports) and their potential to improve information on ship movements and ship particulars necessary to assess CO_2, NOx and SO_2 dedicated to ships visiting Belgium ports and transit shipping in the North Sea under Belgian jurisdiction.
2. To describe the potential pros and cons of those various databases.
3. To study what kind of adjustments to Belgian/Flemish datasets or links of databases would be necessary for easy yearly updates of estimations of CO_2, NOx and SO_2 emissions from ships in Belgian ports and the Belgian part of the North Sea.
4. To assess emissions of CO_2, NOx and SO_2 from ships that entered and left Belgian ports during 2002.

Interaction between the different partners
The cooperation between the partners is based on a common interest to improve methodology and to explore new opportunities for assessing CO_2, NO_x and SO_2 emissions from ships under Belgian jurisdiction.

Expected results and/or products
The outcome of the project will contribute to improve marine bunker fuel methodologies, to enable Belgium to participate in international decision making processes related to reporting methodologies and guidelines (UNFCCC), as well as emission reduction policy options related to air pollution from ships. Furthermore we hope to correct bunker fuel information based on bunker fuels delivered in Belgium and to link the assessment of CO_2, SO_2 and NOx emissions to the Belgian part of the North Sea.

PARTNERS

Activities

UGent - MI
MI is a research institute of the Department of Public International Law of Ghent University. It is a multidisciplinary group of 14 researchers specialised in international law of the sea, maritime law, national and international environmental law, transport law and hereto related policy topics. As an independent research unit, the Institute advises and carries out studies on behalf of governmental and non-governmental organisations and private companies.

ECOLAS
ECOLAS is an environmental consultancy company (>50 empl.) of which a majority work on applied or strategic studies for governments and policy makers and who are experts in a wide range of disciplines (marine, freshwater, air and soil, ecotoxicology, risk analysis, nature, environmental economics, sustainable development, ...).

UCL - ASTR
This institute is part of the Physics Department of the Université catholique de Louvain (Louvain-la-Neuve). Over the last 30 years, it has gained a worldwide reputation for the study of climate, climatic changes, and mesoscale meteorology. All its research activities are well integrated in Belgian, European, and international research programmes. So far, UcL - ASTR's scientists have authored, co-authored, or edited over 300 books and refereed papers.

CONTACT INFORMATION

Coordinator

Frank Maes
Universiteit Gent (UGent)
Maritiem Instituut (MI)
Universiteitstraat 6
B-9000 Gent
Tel: +32 (0)9 264 68 95
Fax: +32 (0)9 264 69 89
Frank.Maes@ugent.be
www.maritieminstituut.be

Partners

Bart De Wachter
ECOLAS nv
Lange Nieuwstraat 43
B-2000 Antwerpen
Tel: +32 (0)3 233 07 03
Fax: +32 (0)3 233 81 20
bart.dewachter@ecolas.be
www.ecolas.be

Jean-Pascal van Ypersele
Université Catholique de Louvain (UCL)
Institut d'Astronomie et de Géophysique Georges Lemaître (ASTR)
2, chemin du Cyclotron
B-1348 Louvain-la-Neuve
Tel: +32 (0)10 47 32 96
Fax: +32 (0)10 47 47 22
vanypersele@astr.ucl.ac.be
www.astr.ucl.ac.be

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