SOCOPSE

SOURCE CONTROL OF PRIORITY SUBSTANCES IN EUROPE

Material Flow Analysis on Priority Substances

The objectives for using material flow analysis (MFA) are related to the early recognition of potentially harmful or beneficial accumulations and depletions in stocks, as well as prediction of future environmental loadings. In the SOCOPSE project, MFA is used to describe current European sources, fluxes, and endpoints in the environment for the selected priority substances (PSs). This information is used for identifying important source categories and for setting priorities for emission control measures. The MFA can also be updated and used to integrate environmental and economic decision-making tools by assessing the effectiveness and impacts of various emission reduction measures.

Information on the flows of PSs has been derived from several sources such as: Establishment of inventories of goods and their PSs concentrations; Statistical information on use of PSs in different economic sectors; Content of PSs in raw materials. Data was collected from national authorities, international organisations and programmes. In cases where data were not available, emissions were estimated from information on emission factors, release rates and statistical information from national and international statistical yearbooks.

The main focus of the analysis was to assess sources and pathways of PSs for the aquatic environment. As an example from the analysis on PSs, a simple material flow diagram for mercury in Europe is presented in figure 1.

From the diagram, it is evident that the largest share of emissions results from anthropogenic sources where mercury is released as a by-product. Reduction of atmospheric emissions and direct discharges of the studied substances to the terrestrial ecosystems can be the major step towards reducing mercury contamination of the aquatic environment.

The results from the flow analysis on PSs were prepared for use in the decision support system by creating a European scale database which can be used at local scale by compiling European emission factors and site-specific activities into sector/source specific emissions.

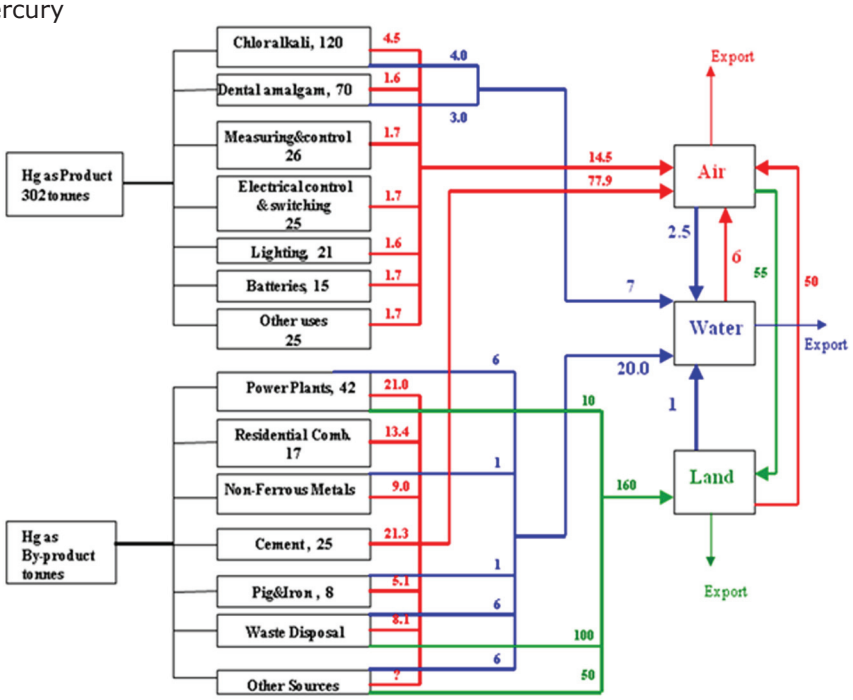

Figure 1. A simple material flow diagram for mercury in Europe

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MAIN CONCLUSIONS

• MFA has proved to be a very useful method to describe sources, fluxes, and end points in the environment for PSs selected within the SOCOPSE project.

• Atmospheric deposition has been found as a major pathway for some of the studied PSs entering the aquatic environment including heavy metals and PAHs. In contrary, agricultural application is the most important pathway for pesticides in the aquatic environment. Thus, solutions for reduction of atmospheric emissions and direct applications of the studied substances to the terrestrial ecosystems can be a more important step towards reducing the contamination of the aquatic environment in Europe in comparison to the reduction of direct releases to the aquatic ecosystems.

• The amount of information on sources and fluxes of many of the studied PSs has been very limited for proper development of complete and accurate transfer paths of substances in the MFA diagrams. This is a serious problem limiting the application of the MFA method for policy making tasks. The PSs selected within the SOCOPSE project are among the most studied in comparison to many other contaminants. This means that even less information is available for majority of substances not studied within the project.

• The SOCOPSE project contributes substantially to the improvement of the completeness and accuracy of information needed for development and application of MFA diagrams for important contaminants of the European environment with focus on aquatic environment. This process is carried out through the integration of data from variety of research projects in the past and storage of these data in the SOCOPSE database. Of particular importance is the information on emission factors for the studied PSs released to the air, water and land. In this way, the SOCOPSE project contributes significantly to the improvement of information presented in current emission factor guidebooks and guidelines.

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