



Sectoral contributions of anthropogenic emissions within the Nordic countries: pollution levels, health impacts and associated costs

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The sectoral contributions of anthropogenic emissions in the four Nordic countries; Denmark, Finland, Norway and Sweden, on air pollution levels and the associated health impacts and costs are calculated in framework of the "Effects of short-lived climate pollutants on atmospheric chemistry, health and climate in the Nordic and the Arctic region" - FREYA project. The Danish Eulerian Hemispheric Model (DEHM) has been used on a 50 km resolution over Europe for the year 2015. DEHM model has been employed with the tagged mode in order to calculate the response of a 30% reduction of each source sector in each Nordic country individually. The emission sectors considered in the study were energy production, residential/commercial heating, industry, traffic, off-road mobile sources, and waste management/agriculture. Following the air pollution modelling, surface concentrations of CO, O₃, SO₂ and PM_{2.5} have been used as input to the Economic Valuation of Air Pollution (EVA) model in order to calculate the associated premature mortality and their costs. The contributions of each emission sector in the different Nordic countries to the estimated premature mortality and costs have been calculated. Results showed that more 80% of PM_{2.5} concentrations in the Nordic countries are transported from other countries. The leading local sector in each country is found to be residential combustion (by more than 70% of the PM_{2.5} mass), except for Sweden, where industry contributes to PM_{2.5} similar to residential combustion. Residential combustion is followed by industry, agriculture and traffic. The main contribution to PM_{2.5} comes from organic carbon in all countries, which suggests residential wood burning is the dominant source of pollution in the Nordic countries. Results also show that Sweden receives the highest levels of pollutants from other Nordic countries. Results from the premature mortality and associated cost estimates suggest that residential combustion, together with industry and traffic are the main sectors to be targeted for emission mitigation strategies.