Residential heating tops sources of PM2.5 in Danube region's urban areas

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The JRC tool for screening for high emission reduction potential on air (SHERPA) was used to model PM2.5 concentrations in the main cities in the Danube macro-region. Credit: Fotolia, Eunika Sopotnicka

The European Commission's science and knowledge service, the Joint

Research Centre (JRC) has evaluated sources of air pollutants in the Danube macro-region, a necessary step for the design of action plans to improve air quality. The related study showed residential heating contributed up to 35 percent of PM2.5 pollution in the main cities in the Danube macro-region, followed by agriculture (up to 32 percent), energy production and industry (up to 30 percent) and transport (up to 25 percent).

The authors focused on PM2.5 as it is considered to be closely related with the health impact of atmospheric pollution. Fine particulate matter (PM2.5) is an air pollutant consisting of tiny particles of up to 2.5 μm in diameter that reduce air visibility and poses health risk due to its ability to penetrate deep into the lungs and blood streams

The Danube macro-region encompasses one of Europe's air pollution 'hot spots.' The geographical distribution differs among pollutants. PM_{10} and PM2.5 present hot spots in the south-east of the Danube region and a hot spot located in southern Poland affects the areas next to the northern border of the Danube region. SO_2 is present in higher levels in the eastern area of the Danube region while NO_2 occurs in urban areas throughout the Danube basin.

The analysis was carried out to quantify the contribution made by sources to PM2.5 and the geographic areas where the pollution originates. For that purpose, the SHERPA (Screening for High Emission Reduction Potential on Air) tool developed by the JRC was used to model PM2.5 concentrations in the main cities in the Danube macro-region: Bratislava, Budapest, Bucharest, Munich, Prague, Sofia, Vienna and Zagreb. The information was then integrated with the outcome of a previous source apportionment study.

Though energy production/industry, agriculture, residential heating and transport are the main sources contributing PM2.5 pollution, the extent

to which local emissions influence the concentration of pollutants varies. According to the present study, long-range transportation of pollution (coming from adjacent geographic areas) influences local concentrations in Sofia and Zagreb while in Munich and Vienna the city emissions have a considerable impact on local concentrations. Intermediate situations are observed in the other cities.

About one-quarter of the PM2.5 fraction in Sofia and Zagreb originates from beyond the EU-28 boundaries or is of natural origin. Thus, action across a broader area is required to abate concentrations in these cities. On the contrary, reductions in local emissions could lead to sizeable improvements in Munich and Vienna, with the main effort focused on transport, energy/industry and residential heating.

The outcome of this study suggests a better integration of sectorial policies covering energy, transportation, competitiveness and institutional capacity would be beneficial to the effectiveness of measures in this macro-region.

EU Strategy for the Danube Region

The EU Strategy for the Danube Region (EUSDR), launched in 2010, encompasses nine EU Member States: Germany, Austria, the Slovak Republic, the Czech Republic, Hungary, Slovenia, Croatia, Romania and Bulgaria, and five non-EU countries: Serbia, Bosnia and Herzegovina, Montenegro, the Republic of Moldova and Ukraine.

The EUSDR aims to promote the sustainable development of a macro-region that counts 115 million inhabitants by tackling key topics that require working across borders and national interests. The key issues identified are mobility, energy, water, biodiversity, socio-economic development, education, culture and safety.

The strategy is structured in four pillars: 'Connecting the region,' 'Protecting the environment,' 'Building prosperity' and 'Strengthening the region,' subdivided into 11 priority areas (PA). Environmental protection of natural resources such as biodiversity, air quality and soil is allocated under the sixth thematic PA.

JRC's support to the Danube strategy

The JRC provides scientific support to the EUSDR by supporting decision-makers and other stakeholders in identifying the policy needs and actions for the implementation of the strategy and by promoting cooperation across the scientific communities of the Danube region. The Scientific Support to the Danube Strategy initiative is subdivided into different flagship clusters and activities.

The Danube Air Nexus (DAN) is one of the EUSDR flagship projects coordinated by the JRC which aims to protect human health, ecosystems and climate from the impacts of atmospheric pollution.

More information: Air Quality in the Danube macro-region: Towards a coordinated science-based approach in support of policy development. ec.europa.eu/jrc/en/publicatio … roach-support-policy

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