

# Serbia: External Costs of Electricity Generation in Thermal Power Plants in Serbia

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The research results have shown that the external costs of electricity generation in coal-fired thermal power plants in Serbia amount to 3.3 billion euros, or 0.13 euros per kilowatt-hour. The majority of costs includes the impacts on people's health, primarily due to the high emission of sulphur-dioxide, which is responsible for 65 percent of the costs.

The study provides an assessment of the external costs of air pollution caused by the emissions of several pollutants - CO<sub>2</sub>, SO<sub>2</sub>, NO<sub>2</sub> and the particulate matter (PM). Their impact on the people's health, the yields on agricultural farms, the buildings and the biodiversity has been evaluated. The EcoSenseWeb software package has been used for the calculation, the package being based on the Impact Flow Method, which has been developed within the ExternE project, funded by the European Commission.

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The emissions of harmful gases represent external effects, since they are not adequately reflected in the price of electricity. On a theoretical level, the agreement has been reached about the importance of including the external costs into the economic analysis, so as to determine the real social price of the activity.

In Europe, there are huge external costs of the environmental impact of electricity generation. The previous studies showed that the harms to people's health and the environment, as a direct result of air pollution, amounted to between 66 and 112 billion euros in 27 EU countries.

The external costs of electric power systems depend on the energy mix, the efficiency of thermal power plants, the use of pollution reducing technology and the location of thermal power plants. In Serbia, electricity generation largely relies on lignite, which has a low calorific value and a high percentage of moisture, which increases the concern over its environmental impact. There is a large number of available solutions for reducing emissions, from the development of new technologies and technical solutions, to the use of fiscal instruments and the imposition of emission limitations.

24.2 gigawatt-hours of electricity were produced in the thermal power plants in Serbia during 2012, which represents about 70 percent of the electricity produced in the country. The research results have shown that the costs of harmful emissions from the Serbian thermal power plants for the year 2012 amount to 3.3 billion euros. The impacts on people's health

dominate the costs with a 75-percent share, whereas the costs of climate changes represent 21 percent. The damage caused to building materials and the loss of biodiversity incurs less than five percent of the external costs. The positive impact on crops can be explained by the influence of the sulphur-dioxide on the fertilization of fields.

The low price of electricity in Serbia does not reflect the real price of electricity, due to which there are no signals that are needed for making adequate decisions on the optimal use of resources. The results emphasize the possibility of a significant reduction of external costs by improving the energy efficiency and by using the pollution control technology. This particularly refers to the emissions of SO<sub>2</sub>, which is responsible for two-thirds of the pollution from the Serbian thermal power plants.