

## **Negative effects of autarky on the example of power generation in Russia**

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The current political situation has negatively and radically affected the Russian economy. In particular, this concerns the mass suspension of the supply of products by companies, extreme restrictions on capital flows and efforts to reduce imports of fossil fuels from Russia. As a result, there was a real risk of autarky. All these effects will affect not only short-term economic problems, for example, a sharp increase in the problem of poverty, but also long-term problems that will have an impact for many decades.

First of all, this concerns investments. It is unlikely that investments made in conditions of limited capital, and difficulties of access to the most advanced technologies will be energy efficient, and with a minimum level of harmful emissions. The situation is irritated by the uncertainty of any investment in such conditions.

Fossil fuel combustion generates significant health social costs that are usually ignored in energy planning. This paper shows the social and health costs of fossil fuel-based power production in Russia. The significant use of coal to produce electricity in the Russia leads to high concentrations of harmful air pollutants. We developed a linked modeling system to estimate the additional mortality from this air pollution. The RUTIMES comprehensive energy system model uses detailed data on electricity production to calculate emissions of PM2.5, SO2 and NOx. These emissions are input to an air dispersion model which generates ambient concentrations, which are then input into a health risk module that calculates the resulting annual mortality. Our most likely conservative estimate of mortality in 2019 attributable to the electric power sector in Russia is about 33,000 people. This is for a population of about 55 million who live near power plants.

We modeled Business as Usual and three policy scenarios to estimate potential reductions in mortality and carbon emissions. The scenarios we modeled include two that consider the recent invasion of Ukraine. According to our results, a change in political conditions may lead to at least 55 thousand additional deaths from harmful emissions of the electric power industry by 2050. Moreover, the electric power industry is becoming less sensitive to climate policy. Thus, the imposition of the same tax on CO2 leads to a reduction in total mortality by only 28 thousand people, compared with 450 thousand people.