Assessment of the potential of nuclear energy in reducing CO2 emissions using multisectoral macroeconomic model - the case of Poland

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In October 2016 Poland ratified the Paris Agreement of 2015 (PA), which aim is to strive for climate neutrality, i.e. leveling of emissions with the amount of CO2 absorbed by, among others through forests. This agreement is supposed to protect the climate, and at the same time allows to preserve the specificity of national economies. In the Polish the specificity result from large indigenous deposits of hard coal and lignite. Nowadays still over 80% of electric energy in Poland is generated base on the two most polutogenny of fossil fuels. According to the official government statements a substantial reduction of the emission of CO2 is possible with use of cutting edge technologies in construction of the new power blocks and sequestration of CO2 by the forests in the perspective of 30-40 years. At the same time, the high share of coal in electricity production will be reduced systematically by investment in gas turbines, renewable energy sources and nuclear energy. The paper concentrates on the role of nuclear energy in meeting national targets of greenhouse gas reduction. Can nuclear power plant give an important step forward in pursuit of reducing GHG emissions in Poland? This is the main research question of the paper and to answer it, a multisectoral macromodel of Inforum-type (MM model) is developed.

The model is focused on structural changes in the electric energy sector, where nuclear technology is implemented as well as on GHG emissions. In the paper specific problems of the model construction and implementation for Poland are presented as well as preliminary results of scenario analysis assuming various paths of economic development and technological changes.