

Evaluating deep decarbonization impact on productivity and growth

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With the new Paris climate agreement 195 nations agreed to lower planet-warming greenhouse gas emissions and try to avoid growth of earth temperature higher than 2C, with a target 1.5C. This goal requires that every country should radically cut their emissions, i.e. deeply decarbonize their economies, rebuild both energy supply and use sectors. Even bigger challenges meet natural resources exporting countries, which have to reshape not only their energy sectors, but also find a new sources for growth, grow new businesses to replace revenues from energy export.

Here we consider several impacts of deep decarbonization policy on an economy, productivity and growth. First, the action requires higher level of investments. Low- and zero-carbon technologies, many of which are already cost-competitive with traditional fossil-fuels-based techs, are normally having higher investment costs, but zero (or low " for biomass) fuel costs. Therefore decarbonization demands higher investments upfront, unlike traditional fossil-fired technologies. The second important change is a downshift in energy use, as a result of energy efficiency improvements and rise of share of renewable energy in total primary energy consumption.

As participants of Deep Decarbonization Pathways Project (DDPP, by UNSDSN), the authors use outputs of DDPP scenario modeling, based on "Bottom-Up" technology choice models, as an input to the analysis and perform a "thought experiment", estimating the impact of low carbon scenario on economy. We use three different models for the analysis: basic input-output (IO), computable general equilibrium (CGE), and overlapping generation (OLG) endogenous growth models to evaluate structural shifts, and changes in potential growth of Russian economy as result of deep decarbonization policy.

The results suggest several positive effects, including growth of machinery and high-tech sectors, reduction of importance of natural resource extracting sector, higher demand on R&D and skilled labor, overall employment growth, and higher potential of economic growth. All the effects are completely agreed with acclaimed by the Russian government strategic targets of long-run development: diversification and modernization of the economy, reduction dependence of the economy of natural resource export, improving the role of innovation and R&D in long-run economic growth and development.