Abstract

Resource rich and with a growing economy, the Russian Federation is currently targeting improvement of public funds allocation via program based budgets. First attempted by Moscow as a region of Russia in 2012, this ambitious transformation has subsequently been taken up by the national government followed by regional governments. Effectively, over 83% of the national budget or over $360 billion was allocated to 39 state public programs in 2014. Although the proposed program based budget system is novel for modern Russia, it has its foundations in the existing practice of public program development and implementation in Russia. Analysis of this practice demonstrates the limitations of the existing system highlighting the lack of economic analysis at the earlier stages of public program development. It reveals the potential for improvement in the program planning and budgeting system in the region and country.

The objective of this research is to develop recommendations for the integration of specific tools for economic analysis which would address the current problems of program planning and budgeting in Russian regions within the constraints of evolving institutional arrangements. This requires identifying, developing and adapting economic evaluation and modelling techniques as well as applying them to a specific public program before they can be recommended for implementation.

Russia is frequently referred to as a country with enormous energy efficiency and green energy prospective. The potential for energy efficiency improvement is estimated to be 45% of primary energy use. In 2009 Russia introduced national goals targeting a 40% decrease in energy intensity by 2020 across all sectors in the economy. This goal was taken up by Russian regions, which were required to establish regional energy efficiency targets and implement public programs to meet them. Moscow is one of several regions where energy efficiency and energy savings programs have been in place since 2004. The current goal for Moscow is a 40% reduction in energy intensity by 2020. The ambitious goal and the importance of improvements in energy efficiency motivated the selection of the Moscow regional energy efficiency program as a case study for this research.

Based on a literature review and analysis of current Russian energy sector operations, this research identifies two decision support tools - levelised cost of energy model (LCOE) and multicriteria analysis evaluation (MCA). Both have a demonstrated international reputation for their robustness and efficiency, but have had limited application in Russian regional energy sector studies.

This research applies the MCA PROMETHEE method to identify and prioritise policy alternatives targeting energy efficiency improvements in the Moscow industry sector. The analysis ranked policy options by using an iterative and discursive approach which sought stakeholder involvement to identify policy objectives, alternative approaches to meet the objectives and criteria against

which to measure the ability of alternatives to meet the objectives. The evaluation identified government support of energy management for industrial organisations as the best performing policy alternative. Overall, the research recommends integration of MCA into regional public program development procedures to assist in specification and selection of policy objectives, alternatives and measures for public programs in energy efficiency.

The LCOE is proposed to complement the MCA in addressing other issues with current practise in public program development in Russia, including determination of quantitative parameters and estimates of least cost technology for energy programs for the regions. This research develops a modified LCOE with separation coefficients for heat and electricity cost determination in combined heat and power generation (CHP). Providing over a third of the installed generation capacity in the country, CHP plays a crucial role in the Russian energy sector. The LCOE application in this research provides robust outcomes and recommends the cost efficiency of CHP generation in regional conditions. The modelling is undertaken for two natural gas price scenarios raising discussion about the independence of regional energy systems. The results also raise questions about the feasibility of renewable generation targets and stimulation of new technology adoption in Russia. Overall, the research develops recommendations on the application of the modified LCOE for regional energy program development.

This research modifies existing analytical tools and tests them in an application to the energy efficiency program in a Russian region. However, the potential implementation of this research includes a wider range of regional public programs in Russia and neighbouring countries. The research outcomes have also demonstrated applicability for the purposes of regulatory impact assessment (RIA).