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Decentralized power supply based on local and renewable energy sources: a case of Russian Arctic

Maria MORGUNOVA (Russian Federation), Dmitry SOLOVJOV (Russian Federation)

In a reality of growing interest towards Arctic socio-economic growth and natural resources development, the study aims to explore opportunities to improve energy supply in the Russian Arctic. The focus is on effective and environmentally friendly decentralized energy supply of small settlements and specially protected natural territories of the Russian Arctic based on local energy sources, including renewable energy. A wider use of decentralized energy systems can provide more industrial opportunities and serve as a basis for an integrated approach towards exploration and use of Arctic region energy potential. This includes natural resources exploration and exploitation, transport and energy infrastructure development, and overall industrial progress. Use of local and renewable energy sources gives an opportunity to threat Arctic region development in a more sustainable manner. The study provides analysis of energy provision of small settlements and specially protected natural territories, structure of energy consumption and load curves of potential energy consumers. Methods to improve energy usage are based on combination of traditional sources as fossil fuels and renewables. These include evaluation of potential wind and solar energy sources in Russian Arctic, and comparative analysis of energy accumulation systems based on climate parameters. Complex analytical method based on quantitative and statistical data on Arctic renewable energy potential with integrated principles of ecological safety and energy efficiency gives an insight into an optimal energy system structural change in the Russian Arctic. The reported study was funded by RFBR according to the research project No. 15-08-06048 a

Local Organising Committee
Lomonosov Moscow State University.
Faculty of Geography
GSP-1 Leninskie Gory
Moscow, 119991

E-mail: info@igu2015.ru
Tel.: +7 495 939 1552
URL: www.igu2015.ru