

APPLICATION OF THERMOELECTRIC ENERGY CONVERTERS IN LINE WITH «GREEN ECONOMY» PRINCIPLES

Anastasia Pavlova¹
Violetta Savoskula¹
Olga Sergienko¹

*¹St. Petersburg National Research University of Information Technologies,
Mechanics and Optics, ITMO University, St. Petersburg, Russia*

Abstract

The principles of "green economy", developed in the framework of sustainable development more than 20 years ago, as was noted at the conference of the "Rio +20", despite many failures and crises, continue to develop and move around the world. The importance of this issue to the international community and Russia is confirmed by the adoption of the Paris Agreement within the "Framework Convention on Climate Change" in December 2015 and Sustainable Development Goals 2030 set by the United Nations, in which the need for the intensification of efforts for preventing climate change (including the development and spread of social and environmentally optimal energy technologies) is emphasized. In accordance with the "Climate Doctrine of the Russian Federation", the application of new non-carbon energy sources and their fabrication technologies is an urgent problem of the third stage of Russian energy-sector development, which consists in a gradual transition to power engineering of the future with radically new technological possibilities for further development based on the highly efficient use of traditional energy resources.

The aim of the paper is to present the results of GalTEC project, which deals with electricity generation by means of waste heat recovery on a river boat. The project investigates the use of heat pipe to increase thermal energy extraction from the exhaust gases. Exhaust pipe of diesel generator is equipped with 138 thermoelectric generator (TEG) modules. It aims at generating 4.5 kWh from exhaust gases with the temperature range between 200°C and 380°C and decreasing of the carbon footprint of the river boat by 10.86 t (CO₂-eq) per one navigation. The study shows economic and environmental profitability of TEC application.

Keywords: thermoelectric energy converters, circular economy, energy efficiency, Paris Agreement, Sustainable Development Goals.