LITHUANIAN ENERGY INSTITUTE

ADMISSION TO PHD STUDIES FOR THE YEAR 2026

DOCTORAL RESEARCH TOPIC:

Numerical Investigation of the Sustainable Transformation of a District Heating System

RESEARCH FIELD:

Energetics and Power Engineering (T 006)

BRIEF DESCRIPTION OF RESEARCH TOPIC:

This year, the “National Energy Independence Strategy” (hereinafter referred to as the Strategy) was prepared and presented. The strategy has been prepared to implement fundamental changes in the energy sector—to ensure that Lithuania produces as many energy resources as it consumes and that by 2050, the energy sector becomes entirely climate neutral. The uneven and unpredictable production of renewable sources will require energy infrastructure to be flexible, able to store excess energy, and ensure its uninterrupted supply to all consumers.

The main consumers of final energy in Lithuania in 2022 were the transport sector (40.4%), households (28.5%), and the industrial sector (16.8%).

The energy sector must develop in accordance with Lithuania’s international obligations and commitments. These commitments aim to manage the effects of climate change and reduce greenhouse gas emissions. The countries of the European Union have agreed to move towards climate-neutral technologies in the energy sector, as enshrined in the European Green Deal Communication.

Changes in the heat supply sector by 2050 will be determined by the following main directions: an increase in the energy efficiency of buildings, a shift towards energy-using technologies for the environment (for example, heat pumps), and the growing use of RES technologies. Overall, heat consumption is expected to decrease gradually as a result of climate change and increased energy efficiency. The aim is to transition away from using fossil fuels in the heating sector, promoting the use of electricity (heat pumps, electric boilers), waste, and renewable energy sources.

In the long term, to survive, expand, and compete with the rapidly gaining popularity and competing decentralized methods of heat supply, the DH sector will have to increase its competitiveness by exploiting economies of scale, reducing heat supply losses in networks, diversifying the technologies used in RES heat production, and ensuring a variety of innovative technologies.

Both centralized and decentralized heat supply sectors should develop similarly: abandoning the use of polluting fuels, switching to RES, increasing the use of waste heat and environmental energy, introducing seasonal heat storage solutions where it is technologically possible and economically advantageous, and modernizing and expanding DH systems by connecting new consumers.

We invite students to develop their competencies and choose one of the topics related to theoretical and numerical research on the use of energy from all types of renewable energy sources and the sustainable integration of innovative technologies in the development of advanced models for future district heating systems, suitable for doctoral research. The studies would cover a wide range of applications, such as:

- improving the efficiency of energy systems,
- energy from renewable sources,
- low potential environmental energy,
- waste heat,
- reducing the vulnerability of the energy supply system,
- increasing operational reliability,
- reducing system degradation,
- horizontal integration of energy systems,
- technologies for short- and long-term storage of energy,
- and many others.

Using advanced computer technologies, the doctoral student will carry out relevant simulations of the integrations of energy systems and innovative technologies and present the obtained research results to the experts who formulate the policy in the energy sector, participate in internships of young scientists in leading European scientific centers, international conferences abroad, and expand the circle of his like-minded people.

Young scientists interested in pursuing doctoral studies in these areas are invited to consult the project's scientific manager for more detailed information.

SCIENTIFIC SUPERVISOR:

Dr. Justas Šereika
Laboratory of Heat-Equipment Research and Testing
Lithuanian Energy Institute
Breslaujos 3, 44403 Kaunas
Lithuania

Justas.Sereika@lei.lt

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