LITHUANIAN
ENERGY
INSTITUTE

ADMISSION TO PHD STUDIES FOR THE YEAR 2026

DOCTORAL RESEARCH TOPIC:

Political and economic measures to ensure electricity market stability while maintaining competitive prices while addressing uncertainties arising from climate change.

RESEARCH FIELD:

Economics (S 004)

BRIEF DESCRIPTION OF RESEARCH TOPIC:

Despite the US's abandoning all climate change mitigation targets, it is still expected that the remaining major countries, and especially the European Union, will not reduce their ambitions to achieve complete decarbonization of the electricity sector and at least partial decarbonization of the entire economy in the medium term (by 2050). With the gradual transition to carbon free electricity generation, an increasing share of intermittent sources (such as solar and wind), the importance of electricity storage and demand management will increase. Industry, buildings, and to some extend transport will directly use electricity or e-fuels (such as hydrogen or synthetic fuels). Technical solutions for the complete decarbonization of the entire economy already exist today, but practical implementation require complex solutions that encompass not only technological but also economic and social dimensions. It is particularly important that climate change mitigation does not undermine business and increase energy poverty and exclusion. Storage/increase.

The problem. To transition to an economy based on renewable energy, huge investments into the transformation will be needed, both by the government, business/industry, and ordinary citizens. |To support private investments, a whole range of solutions are already in use, such as grants, subsidies, guarantees of origin, guaranteed market access, guaranteed minimum purchase prices, net-billing, or combinations of these measures. While it helps to address decarbonization challenges in the short term, it also contributes to distortions of competition and/or increased social exclusion. The problem is further complicated by climate change, which affects both energy consumption (cooling and heating) and production (solar and wind power plants, heat pumps). At present, it remains unclear how an electricity system should function in which every consumer can also act as a producer or a provider of system services. There are still no universally accepted approaches for integrating not only large corporations but also small businesses and all segments of society into this transition, without distorting market competition or exacerbating energy poverty.

Tasks. Analyze and propose a set of regulatory and economic measures that would enable energy producers and consumers to participate in energy supply markets on an equal footing, without favoring specific technologies and based solely on techno-economic and environmental criteria.

Develop solutions that allow electricity producers and consumers to actively contribute to the reliable and efficient functioning of the energy system through participation in energy generation, consumption, and balancing markets.

Assess the resilience of the proposed framework under changing climate conditions, ensuring its effective operation even in extreme scenarios such as prolonged cold, windless winters or significant reductions in hydropower resources.

Expected results. New knowledge on how different incentive schemes or combinations thereof can influence energy production, consumption, and supply reliability, contributing to the reduction of energy poverty and the maintenance/increase of mobility accessibility.

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