PhD Defence: Ganna Gladkykh

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Location

Pôle Tertiaire - Site La Rotonde - 26 avenue Léon Blum - 63000 Clermont-Ferrand

Room Pascal

Sustainable energy system narratives on a global scale

JURY

Robert Costanza, Professor, The Australian National University

Kirsten Jenkins, Doctor, University of Edinburgh

Darren McCauley, Doctor, St Andrews Sustainability Institute

Sandrine Mathy, Researcher, CNRS-Université Grenoble Alpes

Valeria Jana Schwanitz, Associate Professor, Western Norway University of Applied Sciences

Arnaud Diemer, Professor, CERDI, UCA

Sonia Schwartz, Professor, CERDI, UCA

Brynhildur Davíðsdóttir, Professor, University of Iceland

ABSTRACT

In my PhD thesis, I explore what can be considered a sustainable energy system on a global scale and what methods and tools can help sustainable energy policy design and assessment. Energy system modelling and sustainable energy system narratives are the two main areas of interest of this thesis. I started my PhD with exploring the current energy systems modelling practice as well as social science contribution in the sustainable energy research. I discovered several main research gaps related to the topic of this thesis: (1) Most of existing energy system models have unrealistic or oversimplified assumptions that can negatively impact the quality of the models' outputs and consequently the quality of decision-making informed by such models; (2) There is a limited instrumental value of the available theories related to a sustainableenergy system development; (3) There is a lack of global energy system narratives that would have a holistic understanding of the long-term energy system purposes (goals) and the principles of the energy system sustainable design. This thesis has become an attempt to close the identified research gaps in order to answer the main research questions. System dynamics, steady-state

economy and energy justice theory are the main methodological and conceptual components of the thesis' research design. The main results of my research are: (1) The list of questions defining the current energy paradigm which can be used as a guidance for a sustainable energy system modelling; (2) The developed steady state of energy concept implying that energy sufficiency should bea universal energy system goal in the context of a long-term energy system sustainability; (2) The list of requirements for a socially sustainable energy provision based on the energy justice principles which can be used as guidelines for a sustainable energy policy assessment and design; (3) The system dynamics model of electricity access provision in Sub-Saharan Africa which demonstrates an example of how energy system modelling can be combined with sustainable energy system narratives for addressing methodological and disciplinary gaps in the energy system research and for contributing to better sustainable energy system policy design and assessment.

KEYWORDS

Sustainable energy system, energy system modelling, energy sufficiency, energy justice, system dynamics, energy transition, energy access, energy paradigm, global north, global south.

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