2nd annual wholeSEM conference (Hybrid Energy Modelling – Linkages and Interdisciplinarity), 6-7 July 2015, Cambridge, UK

Abstract for the session "Practices and demand linking to technological transition" session

Mission (im)possible:

Embracing parametric, structural and socio-political uncertainties in modeling energy transitions

Evelina Trutnevyte, ETH Zurich, Switzerland

Ability to develop a comprehensive picture of the potential future developments in the energy sector is a must in order to inform today's decisions on mitigating climate change, ensuring energy supply security, and still keeping energy affordable. Development of such a comprehensive picture has parallels with a jigsaw puzzle: different methods, from energy systems modeling to social scientific approaches, provide important pieces of information, but none of them deliver a complete picture. Energy system analysts should thus aim to bring the different jigsaw puzzle pieces together, regardless the very diverse forms of information and methods.

In the presentation I will reflect on how such a comprehensive picture of the potential energy futures could be developed. I will start by discussing what can energy analysts know about the future energy system with certainty and what needs to be accepted as uncertain. I will then present my visions of a toolbox of methods that deliver the individual jigsaw puzzle pieces. This toolbox includes multiple energy system models that deal with parametric and structural uncertainties as well as storylines and surprise-revealing techniques that capture socio-political uncertainties.

I will provide two concrete examples on how to link different methods to explore the UK electricity sector transition. The first example will focus on simultaneous analysis of parametric and structural uncertainties with the D-EXPANSE model (Dynamic version of the EXpolration of PAtterns in the Near-optimal energy ScEnarios). The second example will link analysis of socio-political uncertainties with the D-EXPANSE model, using story-and-simulation approach.

Eventually, I will close with a discussion whether the energy analysis community may have been too cautious in saying that energy future cannot be predicted. Instead, I will propose and at the same time critically reflect on the goal of defining the envelop of predictability (as phrased by S. Cornell, R. Constanza, S. Sorlin and S. van der Leeuw) or defining bounds and orders of magnitude (as phrased by E. A. Casman, M. G. Morgan, and H. Dowlatabadi).

Biography

Dr Evelina Trutnevyte is a senior researcher at the USYS Transdisciplinarity Lab, ETH Zurich, and in the Risk team of the Swiss Competence Center for Energy Research-Supply of Electricity (SCCER-SoE). She is an energy systems analyst and modeler, specializing in energy-related decision making under risk and uncertainty and at science-society interface. Since 2015 she holds a Swiss National Science Foundation Ambizione Energy fellowship for analysis of cross-technology and spatial risk trade-offs in Swiss electricity generation portfolios. Before her current role, in 2012-2014 she worked as a research associate at University College London (UCL) Energy Institute. She is an engineer by training and completed her PhD studies at the Institute for Environmental Decisions, ETH Zurich.