Abstract for “Developing UK energy scenarios from ESME modelling”

The Energy Technologies Institute (ETI) is a partnership between global energy companies and the UK Government, working to accelerate the development of low carbon technologies. To support its strategic decision making, the ETI has developed the internationally peer-reviewed Energy System Modelling Environment (ESME) to identify least-cost pathways for decarbonisation across power, heat, transport, industry and energy infrastructure.

In 2015 the ETI has published two scenarios, Clockwork and Patchwork, which build upon energy system modelling using ESME to explore two distinct transitions to a low carbon UK energy system. I will present the two scenarios and some of the key insights emerging from ETI analysis. I will also discuss our approach to constructing the scenarios, drawing on an extensive body of energy system modelling work to select two scenarios and to develop corresponding narratives.

The Clockwork scenario depicts a transition in which well-coordinated long term investments allow new energy infrastructure to be installed like clockwork. National-level planning enables regular build of new nuclear, CCS and renewables, as well as large-scale district heating networks. A phased decarbonisation is lead led by emissions reduction in the power sector, followed by buildings and finally transport. A strong role for emissions offsetting allows for people and businesses to continue buying and using vehicles in a similar way to today, albeit with regulation and innovation continuing to improve efficiency.

In the Patchwork scenario we imagine that society is more actively engaged in the transition and that central planning takes less of a role, leading to a patchwork of distinct regional strategies. Popular attention is paid to air quality and other environmental values, as well as cost, leading to a greater role for renewables. Transformation of the power sector is followed by parallel abatement of the buildings and transport sectors. With a more limited role for carbon offsetting, fuel cell and plug-in vehicles become a substantial part of the transport sector.

The scenarios try to depict two plausible and affordable transitions, but of course the UK does not face a simple two-way choice. The scenarios are not predictions or forecasts of the future, but rather they are intended to stimulate debate about the key technologies and some of the key choices ahead.

Speaker biography:

Dr Chris Heaton, Modelling Strategy Manager, ETI

Chris Heaton leads the energy modelling team at the Energy Technologies Institute, leading work on the ESME model in particular as well as coordinating modelling across the ETI. Since joining the ETI in 2008 I have worked on the ESME project through the prototyping and development phases to its application in research projects and dissemination work.

Prior to joining the ETI in 2008 I was a Research Fellow of Trinity College Cambridge, a researcher in the Department of Applied Mathematics and Theoretical Physics in the University of Cambridge, and a visiting researcher at Ecole Polytechnique, Paris. I have a BA and MMath in Mathematics, and a PhD in Applied Mathematics from Cambridge University.