"The 5 key research challenges of Energy Systems Integration"

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What is Energy Systems Integration?

Energy Systems Integration (ESI) seeks to optimize the energy system and other large scale infrastructures, in particular water and transport, by leveraging the synergies across all scales and pathways (i.e. electricity, fuels, heat). ESI is a multidisciplinary area ranging from science, engineering and technology to policy, economics, regulation and human behaviour. The research scope is potentially vast, however, ESI research is most valuable at the interfaces where the coupling and interactions are strong and represent a challenge and an opportunity. The importance of ESI is being recognised globally. For example ESI is central to the updated integrated road map of the EU SET Plan recently published and the European Energy Research Alliance (EERA) is initiating the development of a JP focused on ESI. The US DOE has recently invested $150M in a purpose-built ESI research facility at NREL.

iiESI

Seeing the growing importance of ESI, NREL, PNNL, EPRI, DTU, Ku Leuven and UCD established the International Institute for Energy Systems Integration (iiESI) in 2014. The mission of iiESI is: *Through knowledge capture, management, and transfer, to ensure that investments in energy systems integration are coordinated and optimized to yield the greatest value possible to the global community.* Within the past year, the iiESI partners have hosted three workshops in Washington, Copenhagen and Kyoto, co-hosted a workshop with the IEA and run a PhD introductory course.

Why the workshop ?

The emergence of ESI is having a profound and long lasting impact on the research methods, models and the skills. To create a common understanding of the complex area of ESI and to help guide ESI research and development across the world iiESI is hosting a workshop with the specific goal of identifying a core set of research challenges. The workshop is invite only to a select group of researchers from academia and industry. The workshop output will be made public in the form of a white paper and will be circulated to key stakeholders to assist the research community in defining a focused prioritised research agenda.

Participants preparation for the workshop

To make best use of the time available at the workshop a short briefing document and associated brief questionnaire will be circulated in advance. The responses to the questionnaire will be used to structure the first session (PM March 30th), where the full scope of ESI will be discussed and a number of priority research areas will be defined. These priority areas will form the basis of a small number (approximately 5) of breakouts in the second session (AM March 31st). These breakouts will flesh out in detail each of the challenges identified. The final session (PM March 31st) will bring the entire group together to report on the breakout outcomes, summarise progress and agree next steps.