

## Energy system challenges: what you told us

UKERC issued an open call to energy researchers asking what topics we should address in our conference on energy systems challenges, and used the responses to inform content development. Responses from the open call are reported below.

### What are the key energy policy challenges?

- Aligning energy policy with a wider set of (often more short term) policy objectives.
- Removing policy barriers to building a smarter, more flexible, more efficient energy system which unlocks better value for customers, the environment and keeps the lights on.
- Moving from a technical centralised system, to a consumer focussed decentralised system. Basically, turning the whole focus around and building it from the bottom up.
- The inclusion of energy rebound within energy/emissions policies.
- Integrating energy policy around power, heat and gas vectors as a whole systems approach.
- Democratising energy governance
- Making storage viable
- Inequalities in consumption, and how to reduce over-consumption
- How to provide the energy the world needs while removing carbon from the atmosphere to avert catastrophic climate change.
- Green heat. Maximising use of waste and bio-resource energy. Reducing domestic/commercial energy and heat demand. Decarbonising the heating sector has had relatively little focus but is a huge contribution to our emissions.
- Designing policies to reduce energy consumption through 'behaviour change'.
- Getting people on board – at home, in the workplace, etc. We need more support for programmes that investigate communication and behaviour change, e.g., how to design interfaces that are motivating, meaningful to people, that trigger social multiplication and behaviour change (including support for policy measures!).
- Unsupportive policy environment. Policies being championed which do not comply with emissions targets, & those that do being dropped.
- Politics. We know what to do but not how to get it done.

### What are the key energy systems research challenges?

- Considering wider economic and fiscal implications of potential energy system development
- What is the productivity prize for the UK of a more efficient electricity system; what policies are required to incentivise storage and demand-side innovation.
- The system is supply-led and optimised from the top down – need to turn that around and understand what this means in terms of technical, social and governance issues.
- Engaging and meeting the end user as a key part of energy system 'solutions'. Understanding the socio-technical as well as the technical challenge.
- Energy storage for intermittent renewables
- Low cost storage; rapid response
- Meeting the demand for electricity when we electrify transport, heating and cooking
- Effective energy storage
- How to transform the CO<sub>2</sub> removed from the atmosphere into valuable products and materials that can stabilize it on earth and make profits

- Optimising the holistic energy system including electricity, gas and other fuels over different companies with no central plan: how do we get to near optimal whilst accounting for market drivers and uncertainties? What is the role for gas and other transportable fuels – electricity networks cannot supply our full energy demand.
- Bringing social scientific ideas about energy demand into mainstream discourses.
- Developing good research on people – taking a quantitative approach that can feed into simulation! This is absolutely in its infancy but needs social scientists and behavioural scientists, and it really needs to go beyond qualitative approaches and focus groups!
- Demand reduction. Integration across other sectors e.g. transport, built environment, health etc., and identifying and promoting the co-benefits of a well-designed system
- We are in danger of over-complicating.

The conference includes an open session - please tell us what we ought to be talking about in it (For reference, we already have sessions on governance and co-ordination, innovation, energy security, the role of consumers, and natural resources.)

- The wider policy context (gaining traction with policy makers concerned with multiple, particularly industrial, economic and fiscal policy objectives)
- We need an efficient energy system that unlocks better value for customers. In a digital age with smart meters, internet-of-things, renewables and advances in storage, they have a vital role to play in keeping the UK's lights on, keeping bills low and creating a low carbon energy system.
- Enabling the development of a decentralised energy system
- Reducing energy demand : i.e. not just increasing energy supply, but instead reducing demand – which needs to take account of energy rebound
- The meaning of 'smart' in the energy system – understanding the need for holistic approaches that integrate technical smartness with social, political, environmental and economic smartness.
- The impact of the government's apparent lack of interest in low carbon energy; how to get storage up and running
- Energy REDUCTION not energy EFFICIENCY
- The climate equivalent of the Bretton Woods Institutions to help overcome the hot geopolitical and economic risks we face.
- Un-burnable carbon, green heat, demand reduction through behaviour change and insulation programmes. The future of more integrated and optimised energy systems. The required pace of change and the costs to meet low carbon targets.
- The challenges we're facing nowadays cannot be solved through technology only – we need more support for interdisciplinary projects that integrate technical and social science perspectives (check that funded programmes are NOT just 'ticking boxes' and actively talk to the behavioural science community, to psychologists who understand the cognitive and motivational processes leading to action). So additional sessions could talk about the differences in research methodologies and worldviews between technical and social disciplines. Another session could highlight how the social sciences are very diverse and offer different approaches, and discuss the pros and cons of these (qualitative such as focus groups vs large-scale/quantitative such as randomised controlled trials – I still have the

feeling that technical people don't realise this. How about a session on research methods for people from technical disciplines?

- Making the most of big data opportunities.
- Wider economic forces and energy. How significant is the falling oil price?

Please contact William Burns; email: [william.burns@ukerc.ac.uk](mailto:william.burns@ukerc.ac.uk); tel.: 020 7594 3129.

William Burns, 11 March 2016