

Interdisciplinarity and whole systems research

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Presentation structure

What do we mean by whole systems energy research? How to achieve it?

1. What does 'whole systems' mean?
2. The UK Energy Research Centre (UKERC)
3. UKERC review of interdisciplinarity
4. Common barriers
5. Lessons learned

What is whole systems energy research?

Many approaches:

Whole-systems energy research aims at a better understanding of the energy landscape, incorporating socio-economic, physical, natural, environmental and biological systems, at all spatial and temporal scales. It addresses complexities, interactions and interdependencies within the landscape, and with other systems.

Whole-systems energy research necessarily draws upon a wide range of disciplines and methodologies. It does not demand comprehensive coverage at the level of individual projects, but projects must be aware of and demonstrate this approach.

Source: Scientific Advisory Committee, Research Councils Energy Programme

What is whole systems energy research?

UKERC working definition:

- 1. Relating to different aspects of the energy system, e.g. supply and demand*
- 2. Exploring the relationship between energy and other systems, e.g. energy and the environment*
- 3. Interdisciplinary – terminology: ‘multidisciplinarity’ vs ‘interdisciplinarity’ vs ‘transdisciplinarity’*

UKERC research programme

2004–09: What does a decarbonised the UK energy system in 2050 look like?

2009–14: Making it happen: how can decarbonisation by 2050 be achieved?

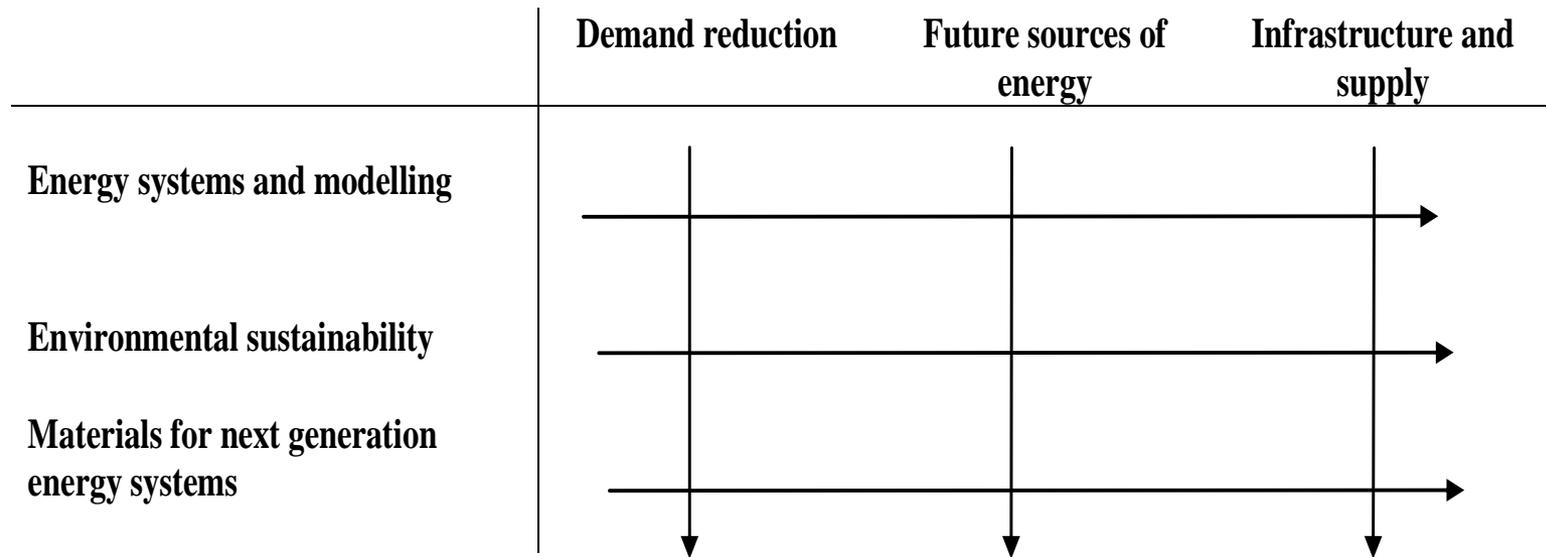
2014–19: The UK energy transition in an uncertain world: challenges and trade-offs

Focus on interdisciplinary, whole systems research and engagement

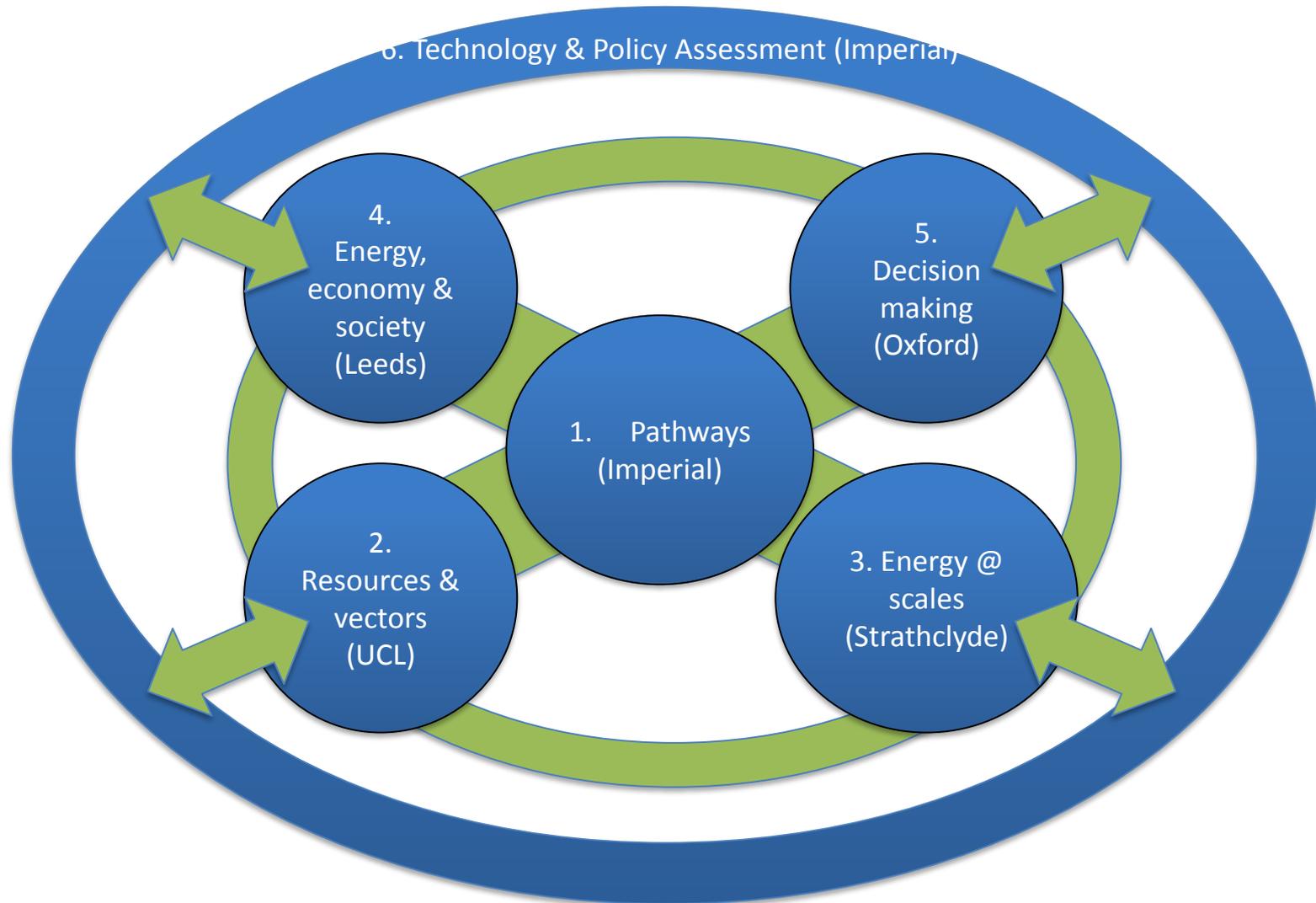
‘The research challenges are many and diverse. Nearly all cross the boundaries of physical science, engineering, environmental science, socio-economic and sociopolitical sciences, and life sciences ... A multidisciplinary approach is essential in this area.’ (ERRG, 2001)

UKERC research programme: 2004–2006

FIGURE 1: UK ENERGY RESEARCH CENTRE: THEMATIC STRUCTURE



UKERC research programme: 2014 –2019



UKERC interdisciplinarity review

- Workshop session, online survey, interviews
- Orientation towards real-world, complex problems
- interdisciplinary perspective seen by all as essential

'the big questions cut across disciplinary boundaries'

'whole systems' means understanding the interconnectedness between all the aspects'



Common barriers

- Extra effort involved and negative career impact

'[it's] easier to progress as an academic if you can give yourself a strong disciplinary home'

'being interdisciplinary can have negative effects on publication rankings and career prospects'

- Particular concerns for early career researchers

'we need more evidence of their progression beyond the post-doc-phase'

- Mixed views on value of metrics

'metrics are difficult for interdisciplinarity ... we need surveys to identify usefulness, rather than trying to metricise it'

- Wider structural problems

'the RCs put a lot of emphasis on inter-disciplinarity ... [but] research is evaluated on a disciplinary-based REF panel'

'talking about the power relations ... between Research Councils would be regarded as extremely impolite'

- Heavy reliance on committed individuals

Research programme design

- Be explicit interdisciplinary ambition

- No single best practice blueprint
- Clarify aspirations regarding multidisciplinary, interdisciplinarity and transdisciplinarity – different requirements regarding research design and resource requirements

- Recognise and allow for the extra time and effort involved

‘Interdisciplinary research is hard ... sociotechnical systems are complex’

‘it takes time to develop interdisciplinary and transdisciplinary understandings, and a big personal investment’

‘The best collaborations come out of relationships of trust ... formed from multiple interpersonal interaction’

- Develop mechanisms for collaboration with the wider research community and other stakeholders

- Events, co-funding, research co-design and co-production
- Independence vs openness

Top-down *and* bottom-up

‘Root and branch’ interdisciplinary research strategy at different levels: researcher/ project/ theme/ programme level

- Researcher level: designate a proportion of researcher time to work *across* projects
- Project level: design collaborative projects
- Theme level: insist on regular theme meetings / assign theme leaders and deputy theme leaders from different disciplines
- Programme level: create opportunities for informal thinking / stage-gate funding / dedicated resources for integration

Drawing lessons

Set up an explicit strategy for interdisciplinary development and stakeholder engagement

- Integration from day 1

‘start with integrating aspirations from the beginning.’

‘get specific input from people who specialise in interdisciplinary studies’

- Stronger publication strategy to help interdisciplinary academics
- Recognise the wider structural issues... serve the individual needs of different funders?
- Recognise trade-offs: flexibility/ diversity and integration/coherence

‘it’s about working with people who have the passion and drive... finding the right people’

Thank you!

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