

Transition pathways for a UK low carbon energy system: combining demand-side and supply-side measures



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Title of the Paper

[Transition pathways for a UK low carbon energy system: combining demand-side and supply-side measures](#)

Form of Presentation

- Poster
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Short Description (maximum 2500 characters)

The European Union's 20-20-20 targets for improving energy efficiency, expanding renewable energy and reducing carbon emissions by 2020 are intended as a step towards achieving a sustainable, secure and affordable energy system in 2050. This will require a transition in systems for energy consumption and production in all EU member states. This paper describes research that develops and analyses a set of transition pathways to a highly electric, low carbon UK energy system, and argues that changes in energy service consumption patterns, development of smart grids and energy efficiency improvements may all be needed to achieve a low carbon energy future.

The three core transition pathways explore alternative futures dominated by market, government and civil society logics respectively:

- **Market Rules:** this pathway envisions the broad continuation of the current market-led governance pattern, leading to a concentration on large-scale low carbon technologies: coal and gas CCS, nuclear power and offshore wind, under incentives from a high carbon price.
- **Central Co-ordination:** this pathway envisions greater direct government involvement in the governance of energy systems, leading to greater reductions in energy service demands, but still a focus on centralised generation technologies. This is achieved through a government-created 'Strategic Energy Authority' that uses contracts with large energy companies to reduce the risks of low-carbon investments.
- **Thousand Flowers:** this pathway envisions more local, bottom-up diverse solutions, driven by innovative local authorities and citizens groups, such as the Transition Towns movement, and energy service companies (ESCOs) becoming key actors, developing local micro-grids and incentivising reductions in energy service demands. Small-scale renewable technologies emerge from niches, as positive feedbacks lead to 'virtuous cycles' in deployment of these technologies.

These pathways show that alternative ways of achieving a decarbonised electricity

system that meets power, lighting, heating and electric vehicle demands are possible, but that they will require significant changes to current electricity systems. Analysis shows that realisation of these pathways will require significant amounts of demand-side participation, additional back-up generation capacity and smart control of distribution networks, in order to meet peak electricity demands and manage surpluses.

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