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When experts disagree: Using the Policy Delphi method to reveal divergent expert expectations and preferences on energy futures

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Context: disrupted energy systems …

Today's energy system is undergoing a quiet revolution, driven by an everchanging global political landscape, climate change challenges and a range of innovations influencing energy consumption

(IET, 2017)

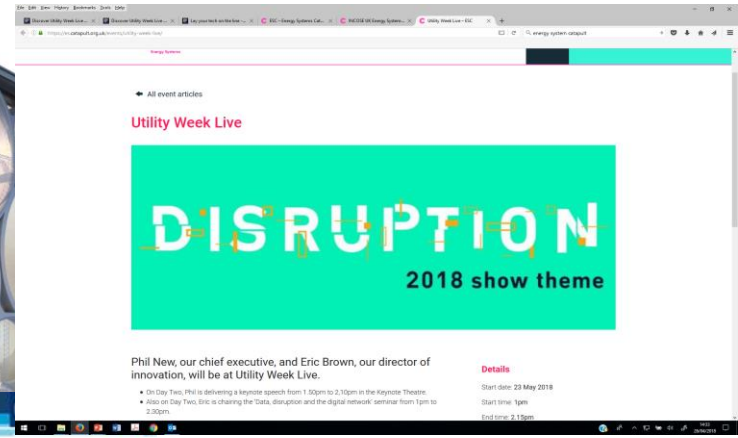
The pace of … change is accelerating well beyond the speed … believed possible. From a scale-driven, centralised and standardised model, the sector is set to evolve to one that is digital, distributed and personalised.

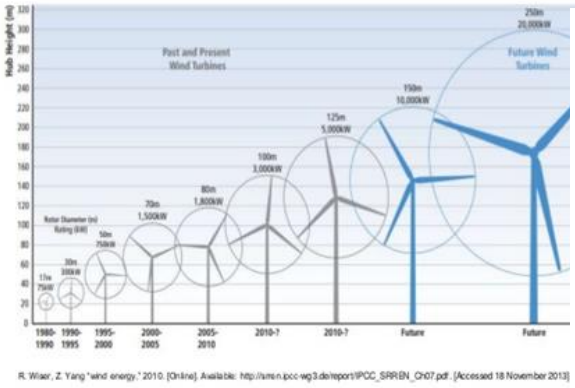
(PWC, 2016)

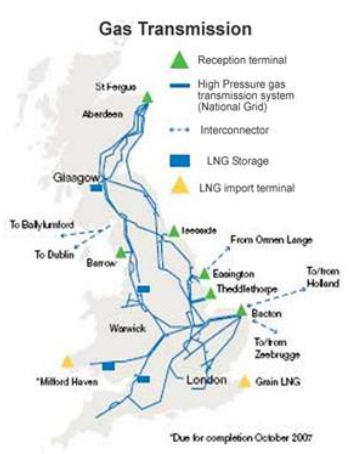
… BUT at the same time, energy systems exhibit continuity and adaptation around scale economies, sunk costs, available skills, supply chains, regulated standards etc.

and some incumbents are capable of driving and absorbing innovation … 'creative accumulation' rather than 'creative destruction'

(Bergek et al., 2013)







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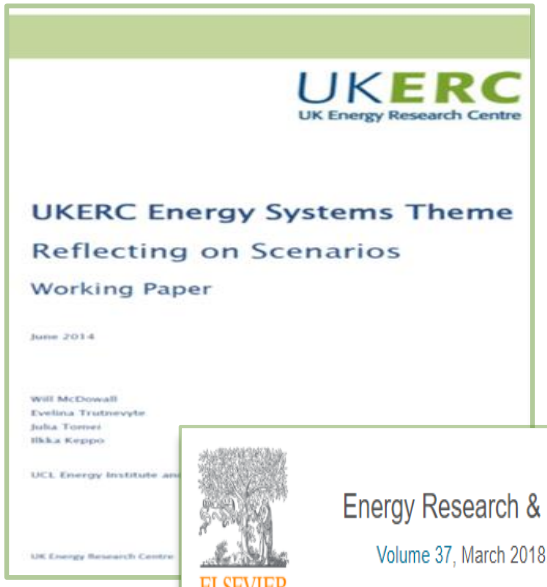
Experts and Values

- UKERC's *Reflecting on Energy Scenarios* (2014) highlighted problems of confirmation biases, availability heuristics and a lack of transparency in many energy system scenarios

- Competing evidence bases and expert opinions may be tied to competing value-based political or ethical positions
  (Nelkin, 1975; Sarewitz, 2004)

- *'no amount of quantitative analysis is likely produce a single "right" answer, and clear value judgements and preferences need to be brought to the table to enable decisions to be made'*
  (Li and Pye, 2018)

- Rather than consensual 'best guesses', Policy Delphi aims to '*reveal options and alternatives, points of agreement and disagreement, clarify arguments and uncover the strength of evidence associated with diverse viewpoints'*
  (de Löe et al., 2016, pp. 78-79).



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Survey design: Alternative 'transition logics'

- In a **Disruption-based transition**, policies, technologies, business models and behaviours provoke a fundamental remaking of the UK energy system.
- Existing organisations and infrastructures can't respond sufficiently and are largely displaced.
- Wide-ranging decentralisation of the system, both technically and institutionally.
- End users become more actively involved

- In a **Continuity-based transition**, system change is pursued mainly by adapting and repurposing existing organisations and infrastructures.
- New technologies, business models and behaviours are adopted as extensions and adaptions of existing ones in order to meet policy objectives.
- Scale economies remain important; national strategy and regulation dominate.
- Wider public don't actively participate much

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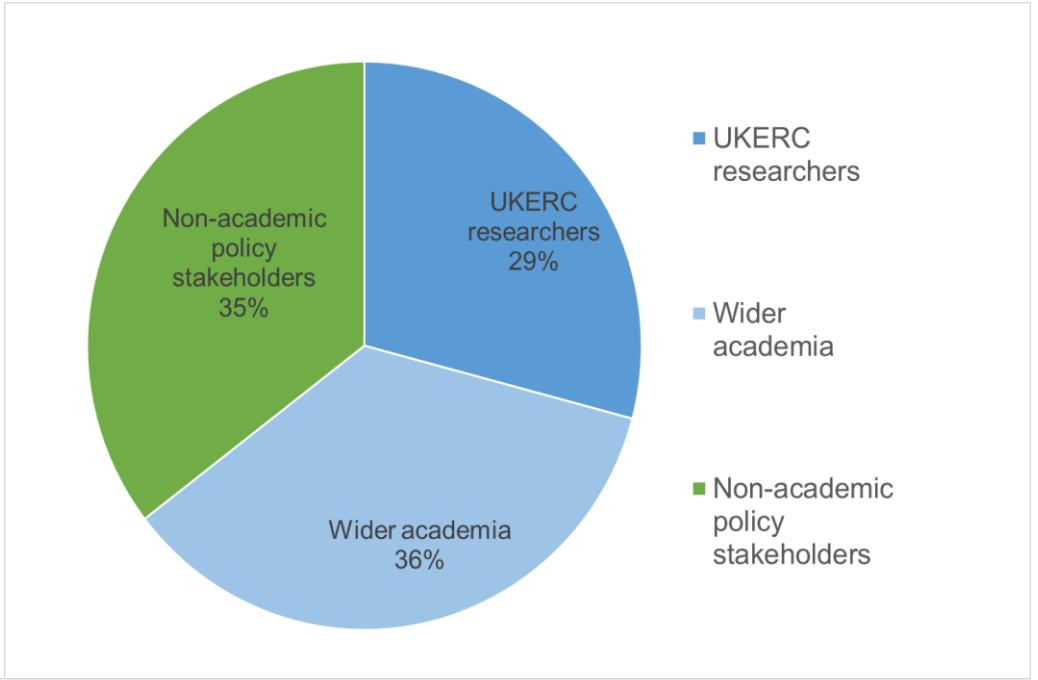
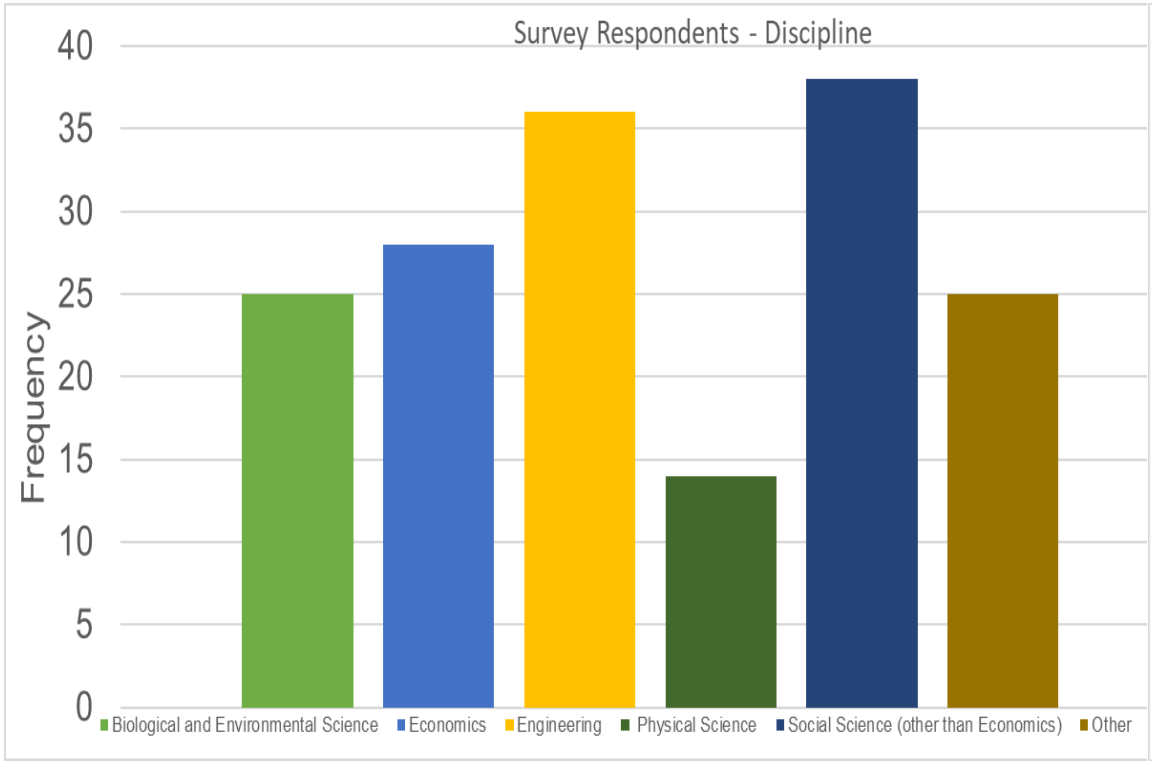
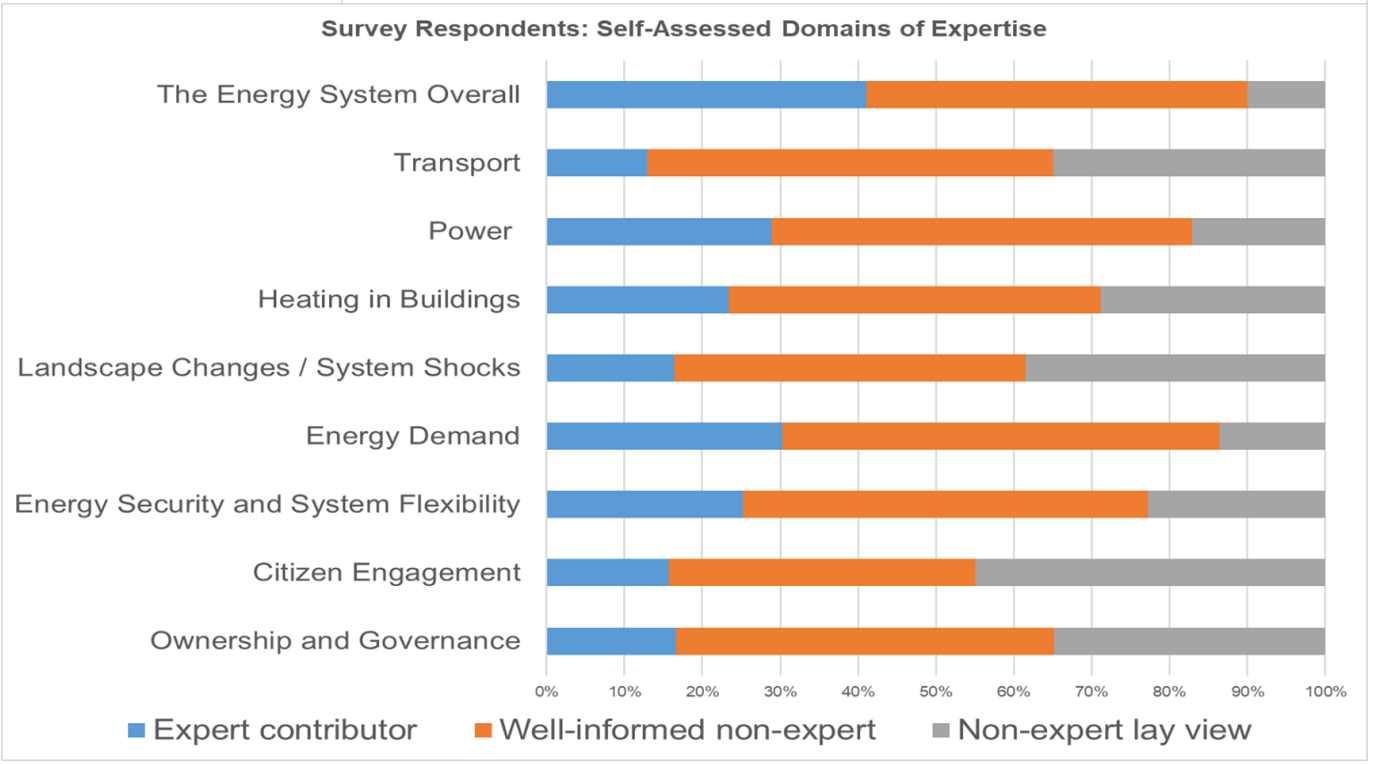
Our survey sample (n=127): interdisciplinary, diverse and holisitic







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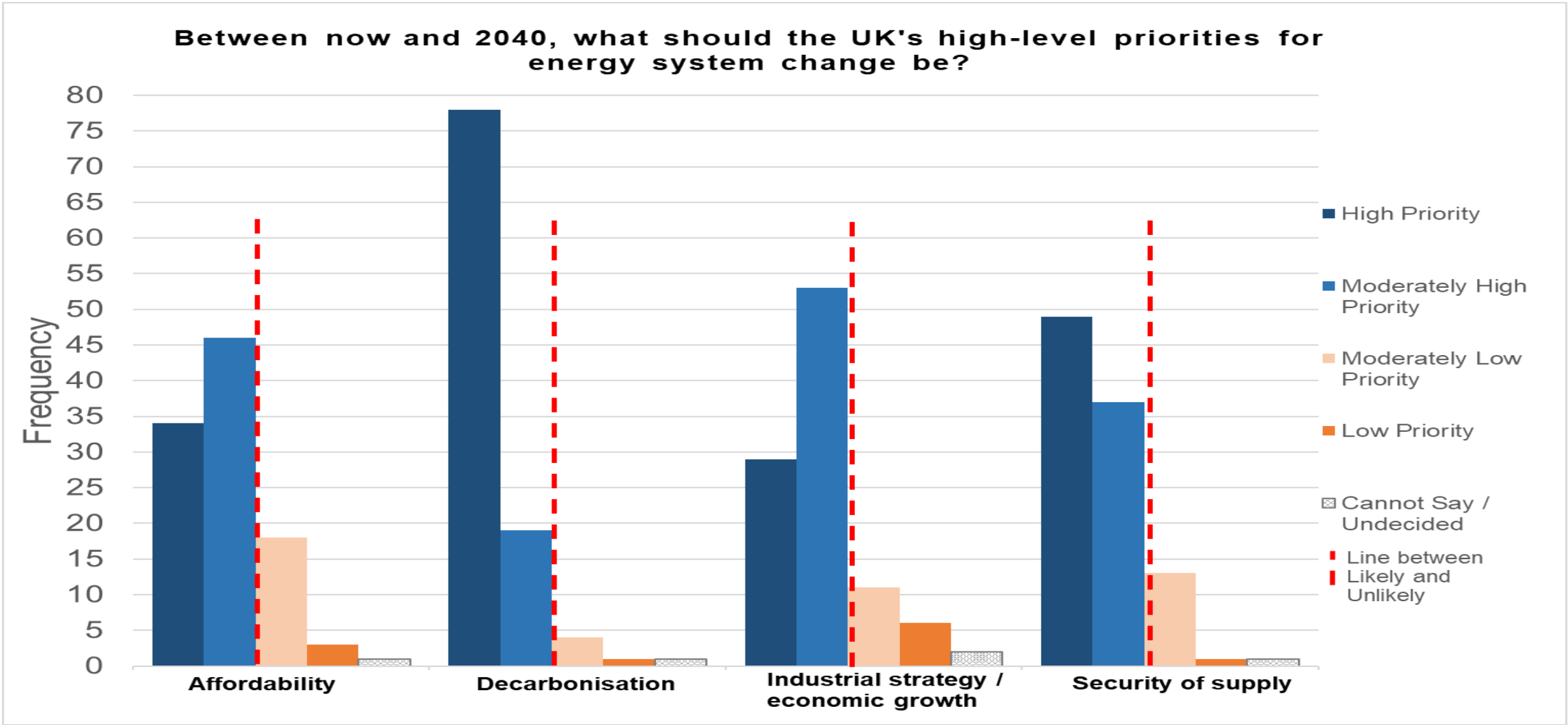
Consensus on preferred policy priorities …



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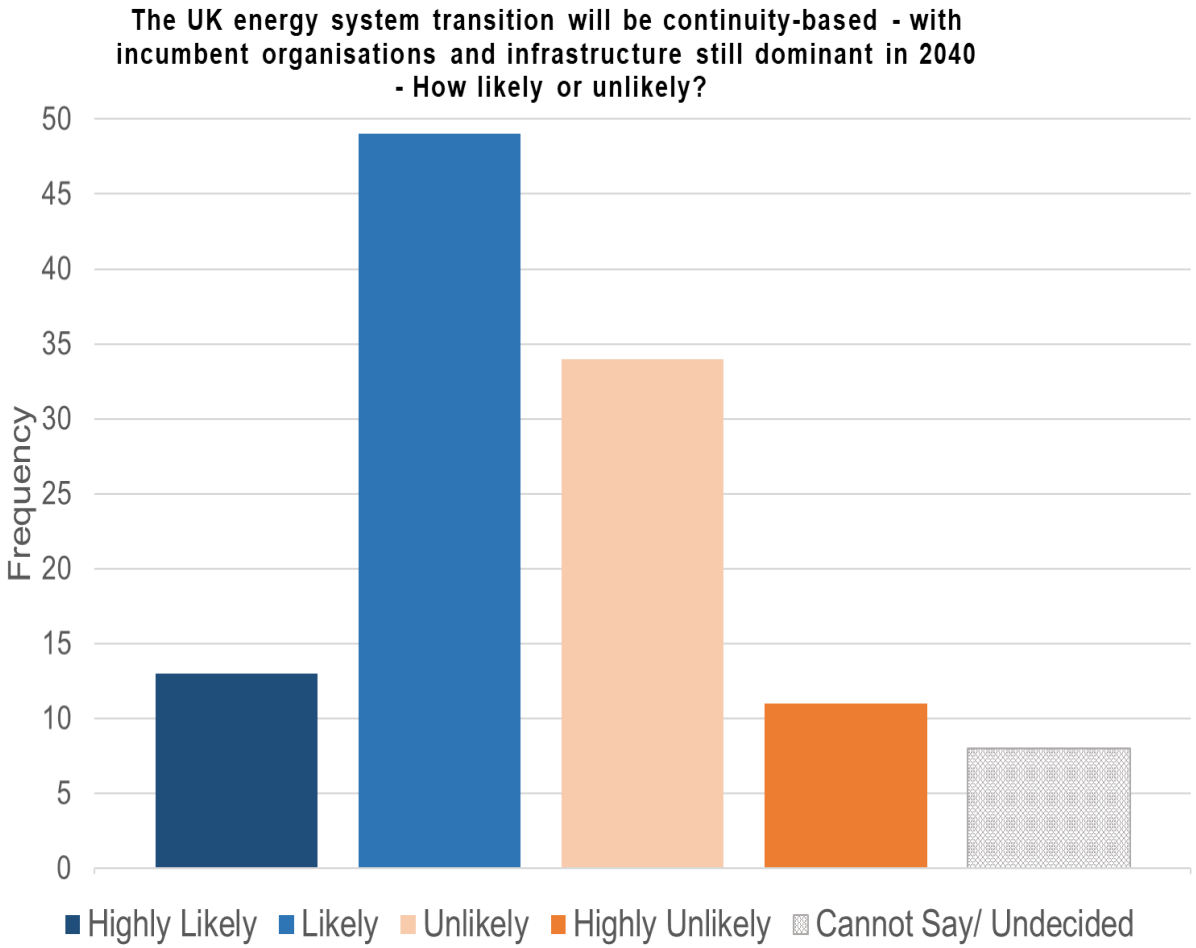
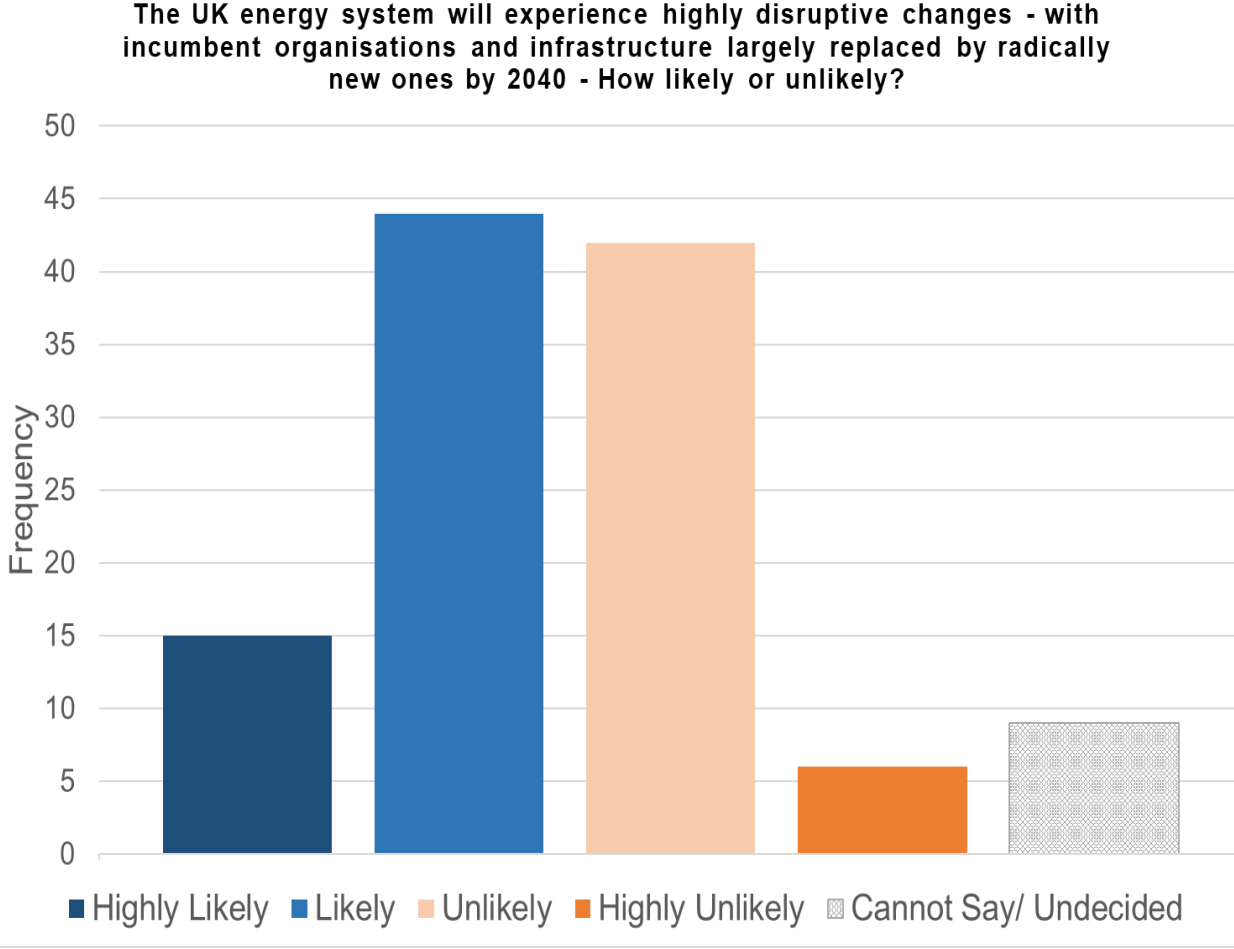
… but no consensus on *expected* future path

Continuity…



… or Disruption ?



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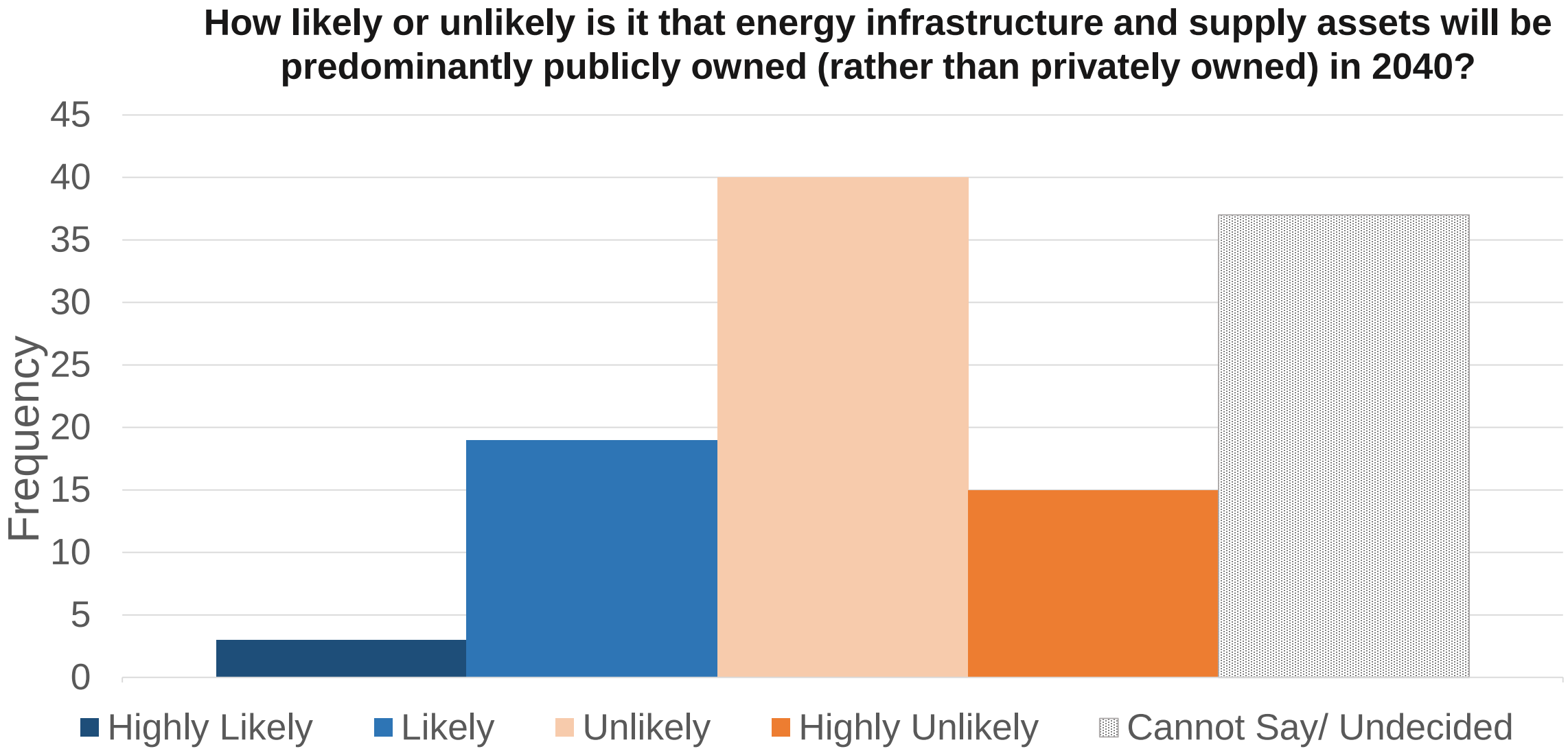
System Ownership



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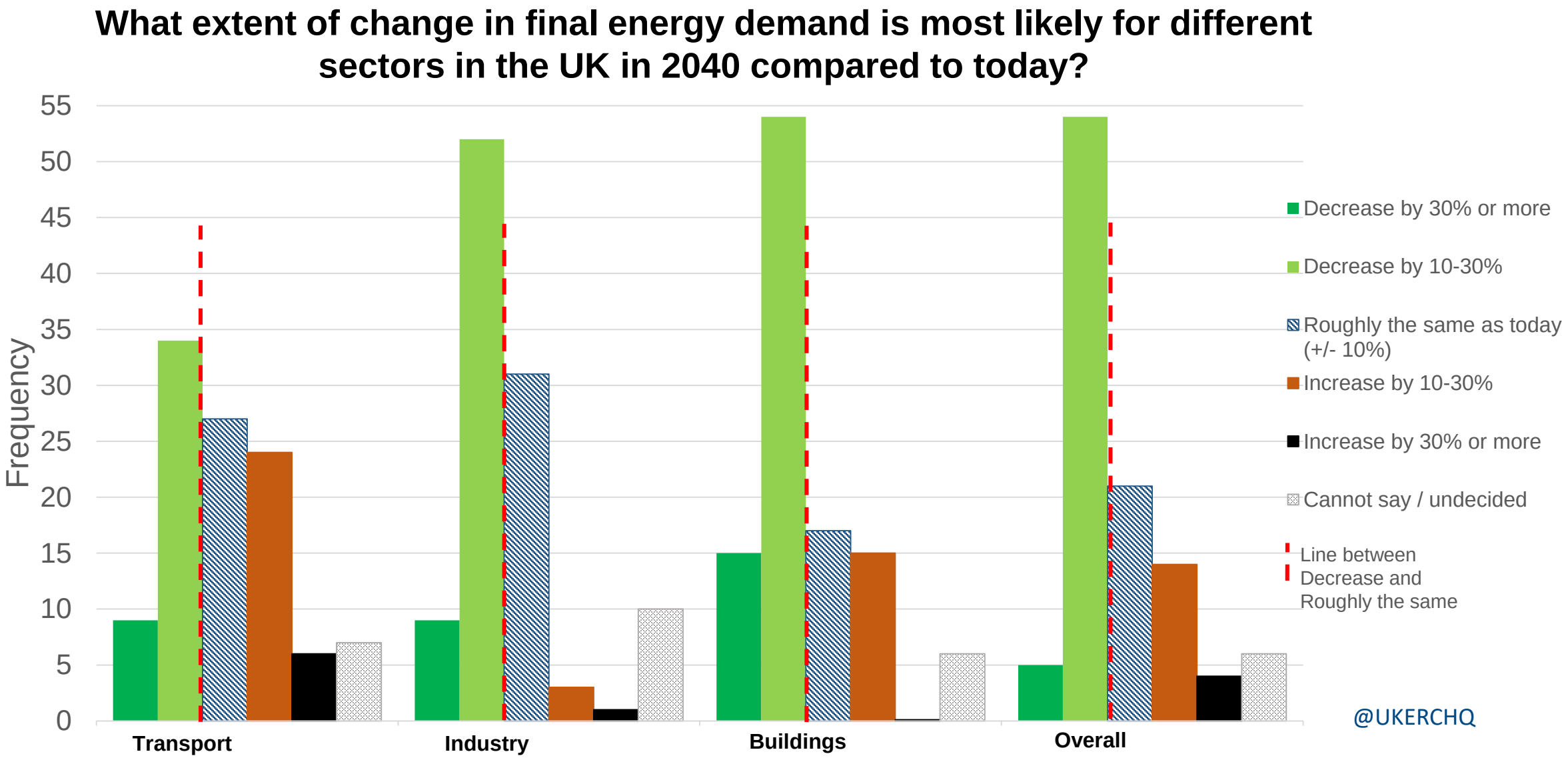
Energy Demand



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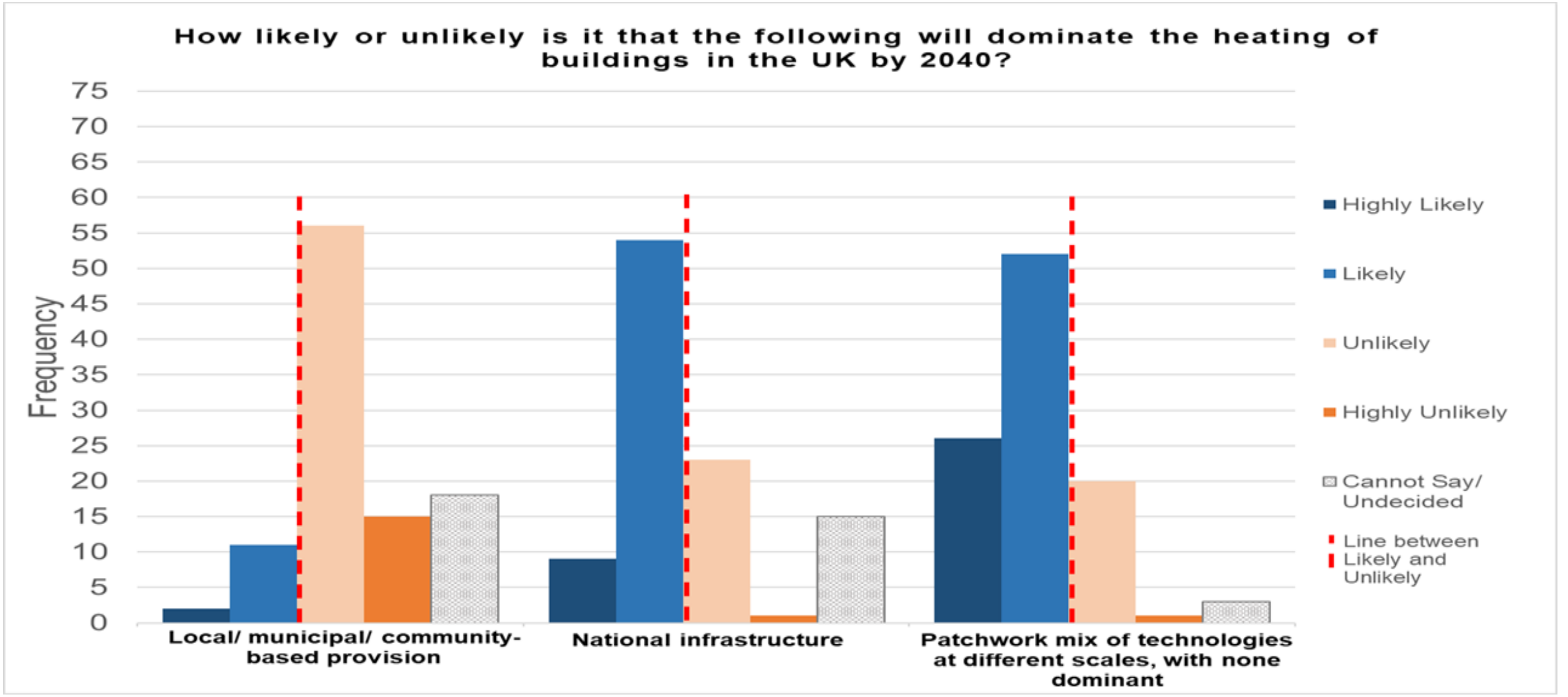
Heating in buildings



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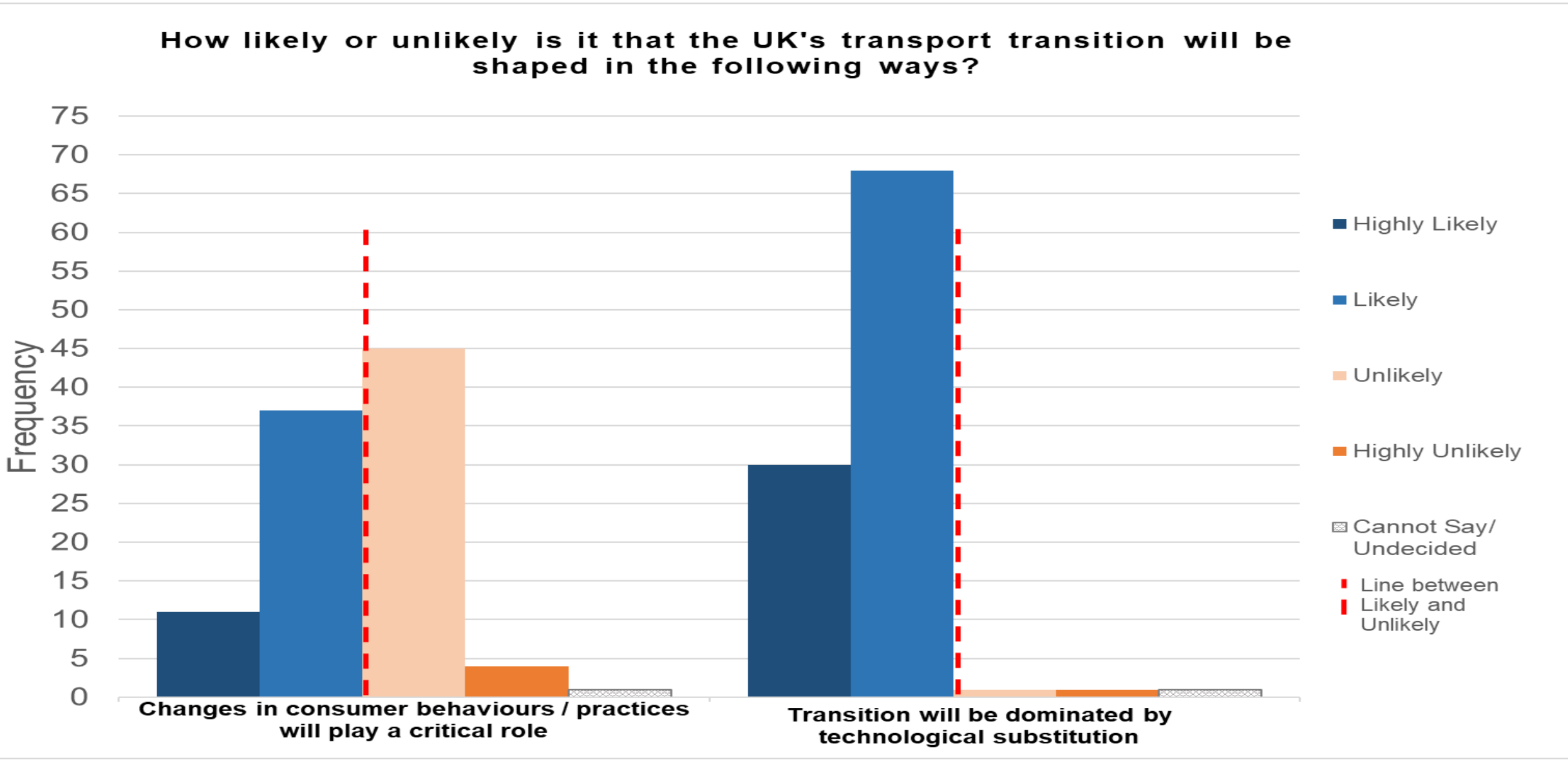
Personal Transport



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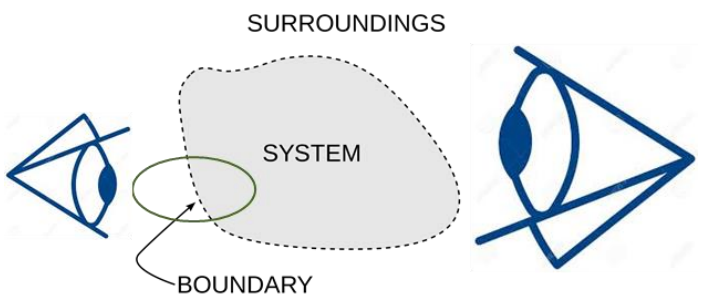
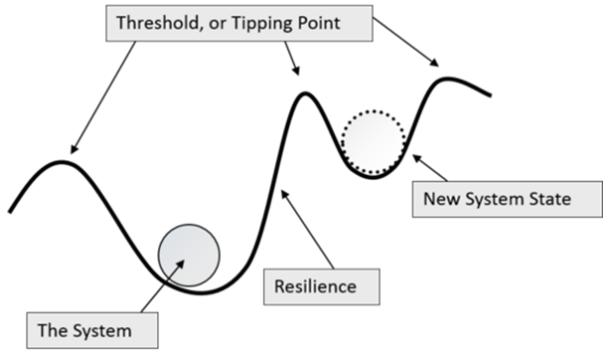
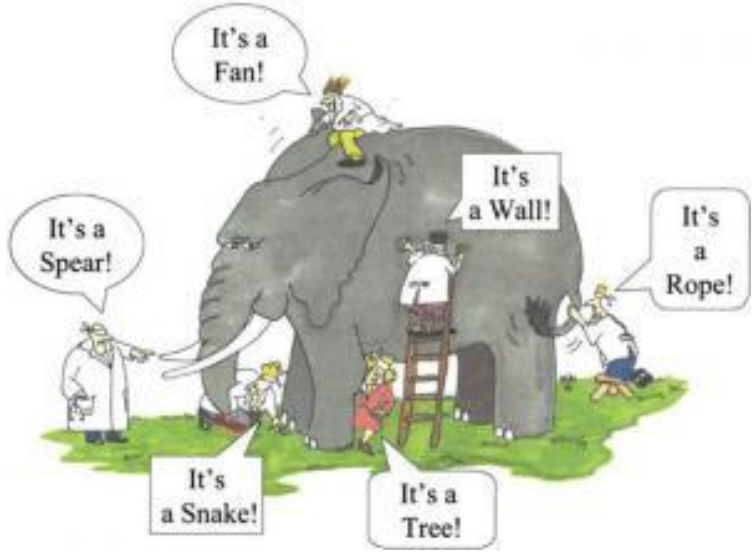
Understanding experts' disagreement

1. *Parametric uncertainties* – agreement on what the factors are, but disagreement on how they might change
2. *Structural uncertainties* – complex relationships between factors make the system indeterminate
3. *Different issue frames and values – different experts 'see' different systems*
   - *and formal sources of evidence are rarely cited when experts are asked to offer a view on likelihood or preference*







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1. Parametric Uncertainties (e.g. future transport demand)

Electric vehicles are far more efficient than combustion

Major investments in transport infrastructure will increase capacity in road and rail networks… and there will be a corresponding increase in transport activity but this will be [constrained] by on-going trends to travel less.

Whilst the per person demand for travel has shown positive signs of saturation, increased prosperity and population growth will still drive a net increase in travel demand and that requires energy.

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2. Structural Uncertainties (e.g. consumer engagement with transport technology)

The potential for demand reduction and modal shift seems pretty limited … [and] transport electrification will make this largely irrelevant to GHG emissions.

The transition from internal combustion engines … easily able to get petrol, to those that require electricity to charge, will change the paradigm of ownership … which in turn impacts energy demand.

My gut feeling is that consumers will riot in the streets before giving up their cars and cheap flights

Consumers seem to be moving towards mobility as a service, particularly the younger generation

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3. Issue framing and value differences (e.g. public or private ownership)

The UK has achieved considerable success through privately financed (but publically incentivised) technology roll-out… there seems little clear benefit in moving to a public financing and/or public ownership model.

There will be a move away from private provision – it is just not up to the challenge of decarbonisation.

History has shown very large swings between public and private ownership of assets, and the transition can succeed in either case.

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Cited evidence informing expert opinion

No source explicitly cited (of those who did write something)	652
Current trends	181
Specific government decisions already taken/ in discussion	45
Academic modelling, research or community (e.g. UKERC, EUED, CESI)	37
Energy company/ industry analysis (including National Grid scenarios)	30
Historical examples	16
Government analysis or statistics	16
Ofgem	7
Committee on Climate Change	7
Non-government organisations	6
Anecdotal (specifically conversations)	5
Energy Technologies Institute	3
Evidence from Parliament (Parliamentary Office of Science and Technology)	1
Total	**1006**

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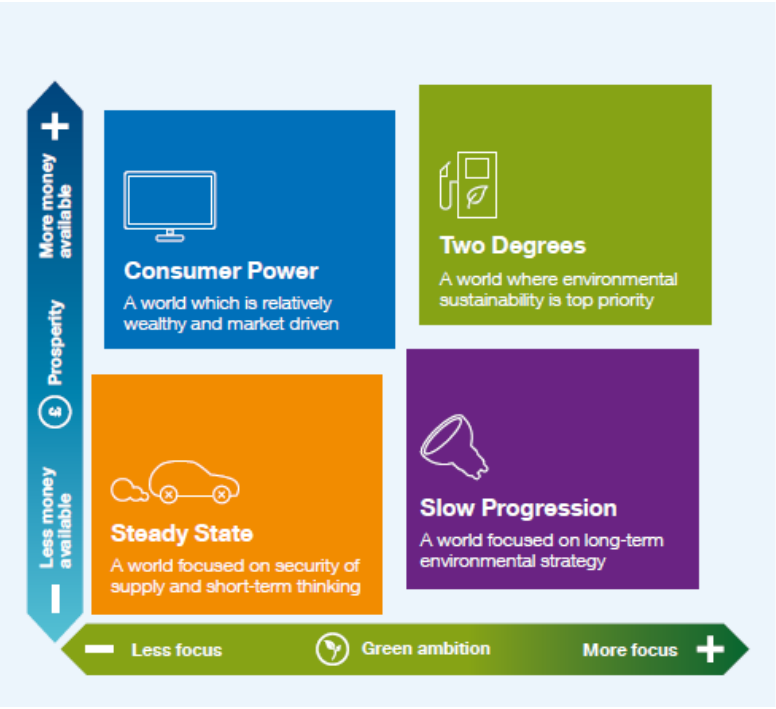
Implications for energy scenarios

- Broad expert consensus on the scale and direction of energy system transition, but on transition pathways, disagreement is widespread
- Many energy scenarios and models still offer limited coverage of the different reasons why experts (and publics) differ
  - Where experts frame and interpret evidence differently, little prospect of consensus formation through more & better evidence
  - Scenarios need to go beyond parametric and structural uncertainties, to reflect value and framing differences, using both qualitative storylines and quantitative analysis
  - Continuity-led and disruptive narratives offer useful proxies for capturing framing and value differences



'Future Energy Scenarios', National Grid, 2017

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Policy Delphi and Policy Making

1. Help identify *areas of* expert agreement and disagreement
    - For high consensus areas (e.g. electrification of personal vehicles) policy can focus more on deployment support and monitoring
    - For low consensus areas (e.g. buildings heating) policy should focus on information discovery and feedbacks to system analysis
2. Better appreciate the different *reasons* for expert disagreement
    - In some areas (e.g. private vs. public ownership) expert disagreement reflects framing and value differences
    - Need to make value differences more explicit, and openly & independently investigate and compare alternative solutions reflecting different values

    … and recognise the limits of expert consultation and evidence gathering to resolve policy disputes

"I know nothing about the subject,
but I'm happy to give you my expert opinion."

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Thank you
Questions and Comments?

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