Decarbonising the UK Revisited:

Lessons from Two Decades of Energy Scenario Development

An expert workshop report

Gaurav Gharde, Sarah Mander, Carly McLachlan,
Chris Jones and Alice Larkin

Tyndall Centre for Climate Change Research,
University of Manchester

2026

Tyndall Manchester
Climate Change Research

MANCHESTER 1824
The University of Manchester

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Acknowledgement: We are grateful to all workshop participants for their time, expertise, and thoughtful contributions to the discussions.

Please cite as:

Gharde, G., Mander, S., McLachlan, C., Jones, C., & Larkin, A., *Decarbonising the UK revisited: Lessons from Two Decades of Energy Scenario Development, an expert workshop report*, Tyndall Centre for Climate Change, published 11 March, 2026.

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INTRODUCTION

At the midpoint of this critical decade for climate action, atmospheric CO_2 concentration is accumulating at roughly twice the rate needed to keep warming below 1.5°C, a trend that continues to accelerate (Met Office, 2026). Climate action is no longer a 'green choice'; it is a fiscal and national security necessity, and a prerequisite for global economic and social stability (Stiell, 2026). How the UK navigates this challenge will depend, in no small part, on how it imagines its energy future, and on whether the tools and approaches used to explore that future are fit for purpose.

Energy scenarios have long shaped the boundaries of what policymakers consider feasible and ambitious. Yet scenarios are not neutral tools; they are shaped by the institutions that commission them, the models that underpin them, the people that create them, and then in turn the assumptions, not always made explicit, about what counts as plausible. **The Decarbonising the UK Revisited (DUK25) project** set out to examine institutional, methodological and political conditions that shape energy futures. To do this we reviewed over 80 UK energy scenarios developed between 2000 and 2009 and compared the futures they explored with what actually materialised and better understand the features of these scenarios and the assumptions that shaped them. The project's first report (Gharde et al., 2025) found that, of all the scenarios reviewed, only one explored energy demand decreasing to the level that has materialised, suggesting that the level of ambition around demand-side change within scenario exercises was too constrained. Many energy scenarios explored coal with carbon capture and storage (CCS) operating at scale by 2022, yet CCS remains absent from UK electricity generation and, indeed, coal has exited the system altogether. Meanwhile, renewables, which were already a small part of the mix in 2002, saw a more than tenfold increase, an outcome that exceeded the ambition of most scenarios. These findings raise a fundamental question: **what institutional, methodological, and political factors shaped what was imagined, and what remained under-explored?**

The stakes could scarcely be higher. Carbon budgets compatible with 1.5°C are rapidly diminishing, and the window for effective action even to avoid 2°C of warming continues to narrow. If future energy scenarios are to support the level of ambition required by the Paris Agreement, they must engage seriously with how past scenario practice has shaped the possibility space. This report is a contribution to that effort, presenting findings from the next stage of the DUK25 project.

In February 2026, the DUK25 project organised a workshop bringing together ten expert stakeholders from across UK energy and climate research to reflect on past scenarios with hindsight and consider the lessons for future scenario

development. The session was structured around a presentation of the DUK25 report findings, followed by two facilitated discussions: the first exploring factors that might explain the differences between historical scenario futures and realised outcomes, and the second turning to lessons for future scenario development. Data were captured through five sources: the workshop meeting transcript (hereafter Transcript), participant contributions to two Padlet boards corresponding to each discussion session (Padlet 1 and Padlet 2), a Microsoft Teams chat running alongside the session (Teams chat), and concurrent notes taken by a member of the project team. The workshop data are analysed using reflexive thematic analysis, following Braun and Clarke (2021), with full methodological detail provided in the Appendix. Five themes are identified, encompassing twenty sub-themes. Figure 1 presents a thematic map of the analysis.

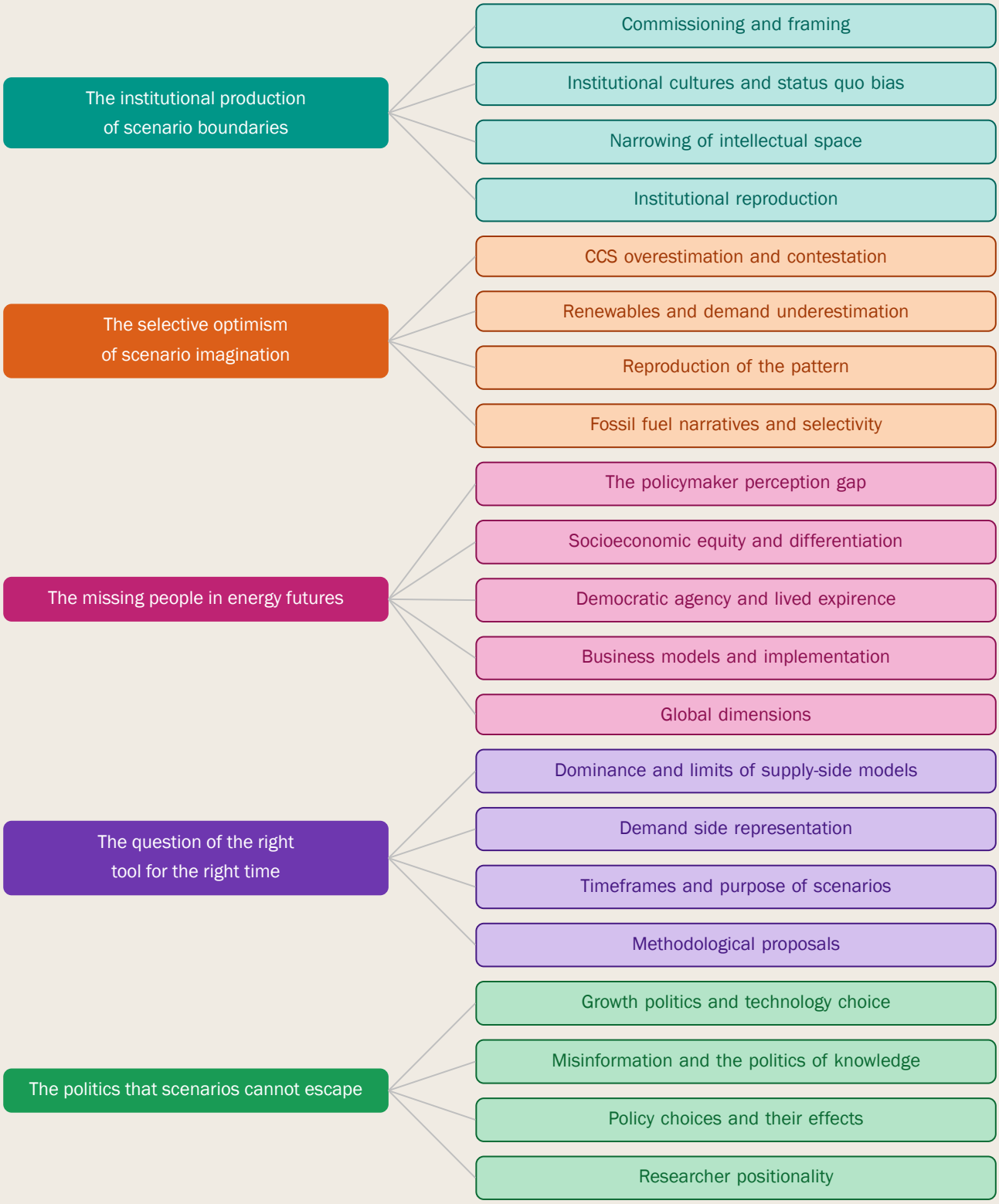

Figure 1. Thematic map: lessons for UK energy scenario development

FINDINGS: WHAT SHAPES UK ENERGY SCENARIO PRACTICES, AND WHAT ARE THE IMPLICATIONS FOR THE FUTURE?

Drawing on the workshop discussions, five themes were identified, each capturing a distinct dimension of how UK energy scenarios have been shaped and what this means for future practice:

- the institutional production of scenario boundaries;
- the selective optimism of scenario imagination;
- the missing people in energy futures;
- the question of the right tool for the right time; and
- the politics that scenarios cannot escape.

Together, they offer an account not just of past oversights but of the structural and methodological tendencies within energy scenario practice that omit potentially transformative options from the policy toolkit – tendencies that, without deliberate intervention, risk being reproduced in the scenarios informing today's policy decisions. The following sections develop each theme in turn, weaving in the connections and tensions between them.

Theme 1: The institutional production of scenario boundaries

Table 1. Theme 1: sub-themes and constituent discussion points

Theme	Sub-theme	Discussion points
The institutional production of scenario boundaries	Commissioning and framing	Government framing shaped scenarios; who commissions modelling matters; participation limited to experts and industry; Performance and Innovation Unit report as counter-example
	Institutional cultures and status quo bias	Normative assumptions embedded in technical frameworks; power dynamics shape outcomes; institutional cultures constrain imagination; status quo as the reasonable default
	Narrowing of intellectual space	Narrowing of what is deemed reasonable; intellectual freedom then vs now; academic community complicit in constraining debate
	Institutional reproduction	CCC reproducing same patterns; need for independent academic research; research funding constrains what gets studied

This theme captures how the institutional conditions surrounding scenario development, including commissioning arrangements, advisory structures, and academic research cultures, have functioned as boundary-setting mechanisms, determining what falls within and outside the scope of analysis before any modelling begins. The unifying idea across the themes is that scenarios are not neutral explorations of the future but are produced within institutional contexts that actively shape their content. The theme draws on fourteen discussion points organised across four sub-themes, as shown in Table 1.

Participants with direct experience of government-commissioned modelling described how the identity and interests of the commissioning body conditioned what was explored. A researcher working on energy systems modelling reflected that early studies were *"very much commissioned by specific government departments, who obviously had a specific frame that they were bringing to this whole scenario exercise"* (Transcript). This was not presented as a failing of individual analysts but as a structural feature: the same participant noted in their Padlet contribution that many studies were undertaken with government, *"shaping assumptions and framing"* (Padlet 1).

A researcher working on energy systems modelling reflected that early studies were ***"very much commissioned by specific government departments, who obviously had a specific frame that they were bringing to this whole scenario exercise."***

What is striking, given that this point was raised independently by participants working on energy systems modelling, climate governance, consumption-based emissions, sustainability transitions, and climate policy, is not simply that commissioning shaped scenarios – an observation that might seem unsurprising in itself – but that participants across very different disciplinary positions converged on the same structural explanation. Whether approaching the question from modelling practice, governance research, or the project team's own retrospective analysis, the diagnosis pointed in the same direction: scenario boundaries were shaped by prior commitments before the analytical work fully began. In cost optimisation models, these boundaries were explicit. In backcasting methodologies, like the Mander et al. (2008) and Anderson et al. (2008) studies, which were deliberately unconstrained by economic optimisation, the constraints were subtler but still present: the 60% reduction target set the level of ambition from the outset. Although some scenarios challenged engineering constraints and significantly contracted the energy system, no scenario explored substantially lower economic activity as a route to reduced demand. This convergence across different methodological traditions suggests something more than individual observation; it points to a widely recognised but rarely addressed feature of how energy futures are produced in climate change research. The language used is also revealing: participants spoke of 'framing', 'shaping', and 'power' – the vocabulary of constraint rather than enablement – suggesting that the institutional context was experienced not as a resource but as a limitation on what could be imagined.

Beyond the direct influence of commissioning, participants identified subtler mechanisms through which institutional cultures constrained imagination. Institutional cultures were described as *"really crucial and overlooked"* (Padlet 1). This extended to the treatment of the status quo as the neutral default. Several participants observed that departures from existing arrangements were treated as ideological, whilst the status quo itself was treated as apolitical. Assumptions reflecting current patterns of fossil fuel use, economic growth, and consumption went largely unquestioned, whilst alternatives on the demand side (e.g. assuming more flying and more car travel by 2050, rather than exploring reductions) were framed as

politically motivated.

The narrowing of intellectual space was characterised as a self-reinforcing cycle. A researcher working on climate policy argued that constrained research produces constrained policy options, which in turn constrain what researchers feel able to explore. The same participant went further, arguing that the expert community has been *"systematically hollowed out,"* functioning *"less as a source of challenge than as a mechanism for stabilising the status quo"* (Teams chat). This cycle of intellectual contraction connects directly to the politics discussed under Theme 5. The image of a "*hollowed out*" expert community is worth engaging with critically, not as an accusation directed at individuals or institutions, but as a description of a systemic dynamic. If the intellectual space available to scenario developers has been gradually constrained – not through deliberate intent but through the cumulative effect of commissioning structures, funding priorities, and disciplinary norms – then the gap between scenario futures and realised outcomes documented by Gharde et al. (2025) is not primarily a story about poor foresight, but about the boundaries within which futures were explored. It is a story about the conditions under which knowledge is produced. This interpretation shifts the focus from the quality of individual scenario exercises to the broader institutional environment in which they are conducted, and suggests that improving future scenario work may require attention to governance and funding structures, not only to methods and assumptions.

Theme 2: The selective optimism of scenario imagination

Table 2. Theme 2: sub-themes and constituent discussion points

Theme	Sub-theme	Discussion points
The selective optimism of scenario imagination	CCS overestimation and contestation	CCS consistently overestimated; CCS maturity contested; technology complexity under one banner
	Renewables and demand underestimation	Renewables underestimated; high energy demand over-explored; low energy demand consistently under-explored; broad agreement on supply-side bias
	Reproduction of the pattern	Removals and CDR repeating CCS pattern; innovations fast but incumbents cling on; technology-neutral policies not neutral
	Fossil fuel narratives and selectivity	CCS and negative emissions technologies (NETs) as delay tactics; fossil fuel narratives shaped scenarios; qualifying techno-optimism framing; nuance needed on technology claims

If Theme 1 concerns the institutional conditions that set boundaries, **Theme 2 addresses what happened within those boundaries: a systematic pattern in which certain technologies were treated with persistent optimism whilst others were underestimated, and in which demand-side change was consistently downplayed.** The central organising concept is that the optimism embedded in UK energy scenarios was not general but selective, directed towards supply-side, technology-based solutions compatible with existing economic infrastructures. The theme encompasses fourteen discussion points across four sub-themes (Table 2).

The most extensively discussed example was coal with carbon capture and storage. The Gharde et al. (2025) report showed that coal CCS and hydrogen, to a degree, were significant and common features of past scenarios, yet in the UK two decades later full-scale CCS, even linked to gas or bioenergy, remains pre-operational and low-carbon hydrogen use remains limited. Participants differed markedly in how they explained this gap. A researcher working on climate policy provided stark figures: by 2024, only 0.03% of global fossil fuel CO_2 emissions were being captured and stored through CCS (Global CCS Institute, 2024), arguing that "*the primary function of CCS, NETs, blue hydrogen, and similar constructs has been less about delivering deployable solutions at scale and far more about delaying regulation*" (Teams chat). A researcher working on energy-environment-economy modelling

countered that it had been perfectly reasonable at the time to expect coal CCS to succeed, arguing that it was "*absolutely mature in the sense they'd been using it for enhanced oil recovery for many, many years. And it's basically just pipes and compressors*" (Transcript). A researcher working on CCS offered the most nuanced position, observing that "*CCS is a bunch of very, very different things all under one umbrella*" and that people can hold quite different positions depending on which part of the technology system they have in mind (Transcript).

A researcher working on CCS offered the most nuanced position, observing that ***"CCS is a bunch of very, very different things all under one umbrella"*** and that people can hold quite different positions on the same statement depending on which part of the technology system they have in mind.

This exchange uncovers a difficulty that runs through how complex technologies are handled in scenario development. The CCS discussion showed that participants holding quite different disciplinary perspectives were, in an important sense, interpreting the same term differently. For the engineering-oriented modeller, CCS referred to a set of established component technologies. For the climate policy researcher, it referred to a promise that had functioned to forestall more disruptive policy action. For the CCS specialist, the term was itself the problem: it encompasses so many different systems at different stages of readiness that aggregate claims about maturity or immaturity become unreliable. These are not simply disagreements about timelines; they reflect different meanings for the same label. This matters for scenario development because if key technology terms can sustain multiple legitimate readings simultaneously, then the confidence embedded in scenario assumptions may rest on less stable foundations than it appears. It is worth considering whether this kind of terminological ambiguity has, in practice, made it easier for optimistic assumptions to persist unchallenged – though the workshop discussion did not resolve whether this was a product of genuine complexity, institutional priorities, the policy landscape of the time, or some combination of all three.

The discussion also surfaced a concern that selective optimism is being reproduced with newer technologies. The researcher working on energy-environment-economy modelling stated that they were "*absolutely certain that we are doing that with removals now,*" describing current carbon dioxide removal modelling results as "*totally fantastical, given where the technologies are at the moment*" (Transcript). Notably,

the same participant had defended the original confidence in CCS as reasonable given the state of knowledge at the time, making their concern about removals all the more striking, since it suggests that even those who do not regard the CCS experience as a case of misplaced optimism recognise a similar dynamic at work today. The researcher working on climate governance added a parallel observation: they identified a pattern where innovations take hold quicker than anticipated but incumbents cling on for longer than anticipated because of institutional power, leaving a situation where some new low-carbon technologies have done better than expected but fossil fuel majors also have "*more power (especially political power) than ever before*" (Padlet 2).

The Gharde et al. (2025) report showed that the high level of optimism around CCS was mirrored by a corresponding low level of optimism around renewable energy and a limited exploration of energy demand reduction. Workshop participants engaged with this pattern, characterising the optimism embedded in past scenarios as not uniform but selective – too pessimistic on renewables and too optimistic on CCS. A researcher working on sustainability transitions described the assumed levels of energy demand as "*the most striking thing*" in the Gharde et al. (2025) findings (Transcript). Only one scenario – Tyndall's demand-reduction focused Red scenario – explored energy demand close to the actual 2022 level of 116 Mtoe. Most scenarios explored demand levels well above this, with some exceeding even the 2002 baseline of 147 Mtoe (see Figure 3 in Gharde et al., 2025). This underscores how consistently limited the exploration of demand reduction was in the wider scenario community.

The asymmetry identified here – persistent overconfidence in CCS alongside persistent underestimation of renewables and demand reduction – is too systematic, appearing in almost all scenarios, to be explained by the inherent difficulty of technology assessment alone. If the assumptions underpinning scenario exercises were simply uncertain, one would expect optimism and pessimism to be distributed more evenly across the technology portfolio. Instead, the pattern is directional: scenarios consistently explored futures that favoured technologies compatible with existing economic structures and gave less attention to those that imply structural change. This pattern is better understood through the institutional lens of Theme 1: the same commissioning arrangements and disciplinary cultures that set scenario boundaries also shaped which technologies were treated as credible candidates for optimism. The picture is not entirely one-directional, however: offshore wind succeeded in part because it was compatible with existing offshore infrastructure and was supported by targeted policy instruments, suggesting that where economic structures, infrastructure, and policy align, rapid deployment can follow, even when scenarios did not model it. A participant working on energy politics sharpened this point, arguing that the techno-optimism about CCS and the weakness of renewables reflected "*the*

popular narratives and strategies of delay pursued by fossil fuel industries," where demand-side change was treated as not politically feasible so that policy would pursue *"non-transformative goals based on largely existing infrastructure with oil and gas"* (Padlet 1).

Theme 3: The missing people in energy futures

Table 3. Theme 3: sub-themes and constituent discussion points

Theme	Sub-theme	Discussion points
The missing people in energy futures	The policymaker perception gap	Demand-side seen as difficult or political; policymaker perception gap on public opinion; building public voices into modelling
	Socioeconomic equity and differentiation	Not all in this together; locked-in vs discretionary emissions; elite group dominates thought process; climate action as win-win for majority; allow emissions to rise for poorest; socioeconomic characteristics in modelling
	Democratic agency and lived experience	Don't assume what's better for people; resistance to car restrictions across classes; qualifying equity framing
	Business models and implementation	Implementation gap; desirability, viability, feasibility framework; retrofit not understood or funded; bottom-up feasibility vs top-down modelling; wider participation in modelling
	Global dimensions	Gap between modellers and social scientists; Global South perspectives absent; broader social imaginary lacking; better social research needed

This theme captures the various ways in which people – as publics, as differentiated socioeconomic groups, as practitioners navigating implementation, and as communities living with climate impacts – have been absent from or inadequately represented in energy scenario development. The central organising concept is that the energy futures constructed through scenario exercises have been futures without people, or more precisely, futures that assume a particular kind of person whose interests and circumstances are generalised to the whole population. The theme is the broadest, encompassing twenty-one discussion points across five sub-themes (Table 3).

The researcher working on climate governance highlighted what is often called a 'perception gap', between what policymakers believe the public think about climate action and what people actually think. They argued that decision-makers' perceptions of where the public "*are absolutely critical in all of this,*" noting that this was "*something that we just didn't think about 20 years ago, but we have to be thinking about it now*" (Transcript).

A researcher working on consumption-based emissions reinforced with specific figures: ***"25% of households in the UK do not own a car, over half do not fly in any given year, and 25% have no savings whatsoever. But it really is a very elite group that dominates the thought process around climate policy."***

The perception gap is analytically significant because it connects the institutional constraints identified in Theme 1 to the selective technology optimism of Theme 2. When decision-makers hold inaccurate assumptions about what the public will accept, these assumptions shape what scenario developers treat as politically feasible, narrowing the range of futures explored before any modelling begins. Demand-side measures are a clear example, though it is important to recognise that demand-side covers a wide spectrum, from home insulation to reduced flying, and public acceptability varies considerably across these. If policymakers believe the public will resist changes to consumption patterns, such measures are less likely to feature prominently in the scenarios that inform policy – regardless of whether that belief reflects actual public opinion or applies equally to all demand-side interventions. The perception gap is partly a communication problem, and better evidence about public attitudes can help to address it. But it also has a structural dimension: where inaccurate assumptions about public acceptability become embedded in institutional routines and commissioning briefs, they can persist even as the evidence base improves. This was a point underscored by the researcher working on climate governance, who described still encountering the same resistance to demand-side measures within government and advisory bodies, despite improving evidence on public attitudes. Addressing this requires not only drawing more effectively on existing public engagement research but attention to how assumptions about feasibility enter the scenario development process in the first place.

The question of socioeconomic differentiation produced some of the sharpest exchanges. A researcher working on climate policy argued forcefully that "*we're not all in this together*" and that framing climate action as a shared burden conceals the reality that different socioeconomic groups have fundamentally different relationships to emissions, both in how much they contribute and how much responsibility they bear. Those in the highest-income groups have large discretionary emissions from high-consumption lifestyles, including frequent flying and large homes, whilst a considerable percentage of the population

lives in poor housing, cannot afford electric vehicles, and has emissions that are effectively locked in by material circumstances (Transcript). A researcher working on consumption-based emissions reinforced this with specific figures: *"25% of households in the UK do not own a car, over half do not fly in any given year, and 25% have no savings whatsoever. But it really is a very elite group that dominates the thought process around climate policy"* (Transcript).

Yet the discussion contained an important qualification. The researcher working on climate governance pushed back against any assumption that because a more equal net-zero system would objectively benefit disadvantaged groups, those groups would necessarily support it. *"We really mustn't fall into the trap of saying that this putative, more equal, net zero system is better for poor people, therefore they must agree with it,"* they cautioned, arguing for the importance of taking people's actual life experiences and values seriously rather than assuming they should think a certain way (Transcript). They noted that resistance to low-traffic neighbourhoods came from wealthier boroughs, such as Kensington and Chelsea, complicating any simple class-based narrative.

This tension between structural equity analysis and the emphasis on democratic agency has direct implications for how scenarios handle the socio-political dimension of the energy transition. The researchers working on climate policy and consumption-based emissions argued that a more equal system would benefit the majority of the population, which provides a compelling case for demand-side scenarios that redistribute costs and benefits. But as the discussion made clear, it does not follow that communities whose material interests would be served by such a transition will necessarily support it. For scenario development, this suggests that better distributional modelling, whilst important, is not sufficient on its own. Scenarios that take the socio-political dimension seriously would also need to draw on qualitative social research and public engagement to understand how people actually experience and respond to energy system change – something that dominant modelling frameworks such as Integrated Assessment Models (IAMs) are not designed to capture.

Participants also identified a gap between what scenarios explored and what can be delivered through existing business models, supply chains, and institutional capacity. A researcher working on sustainable business models described how scenarios typically address technical feasibility but neglect viability (whether the funding and business models exist) and desirability (whether anyone actually wants the proposed solution). The example of domestic retrofit was cited as a case where householders do not understand what is involved, cannot access adequate funding, and the workforce to deliver at scale does not exist (Transcript).

A researcher working on sustainable agriculture and innovation raised the question of whether scenario development is sufficiently inclusive, asking what scenario assumptions mean for the most vulnerable, including small farmers and rural communities, and whether modellers

need to *"leave the lab to collaborate with other social scientists"* (Transcript). This concern connects directly to the broader argument of this theme: that energy futures have been constructed without adequate attention to the diversity of people's circumstances and experiences.

Theme 4: The question of the right tool for the right time

Table 4. Theme 4: sub-themes and constituent discussion points

Theme	Sub-theme	Discussion points
The question of the right tool for the right time	Dominance and limits of supply-side models	Supply-side engineering models dominated; models cannot capture innovation dynamics; models treated as reality by policymakers; modellers pile into new technologies; don't blame the model, blame the framing; model complexity obscures normative assumptions; IAMs incompatible with rapid change; optimisation tools can be used differently
	Demand-side representation	Demand harder to quantify than supply; macroeconomic drivers of demand; new demand pressures: AI and data centres; rebound effects and sufficiency
	Timeframes and purpose of scenarios	Abandon 2050 framing; are more energy scenarios needed?; scenarios still needed for post-2040; carbon space has shrunk; net zero 2050 date no longer viable; climate impacts now part of energy reality
	Methodological proposals	Simplicity and transparency as strengths; carbon budget as starting point; exclude overshoot in core scenarios; policy fingerprints in data; invisible energy policy; robustness over optimality; implementation-oriented analysis; production-consumption as coupled systems; global-to-national downscaling; hidden assumptions in scenario construction; adverse adaptation and rebound

This theme addresses the methodological dimension: what kinds of analytical tools and approaches have been used, what their limitations are, and what alternatives might be more appropriate. The central organising concept is that the relationship between method and question has not been sufficiently interrogated. Tools developed for one purpose have been applied to quite different questions, and the dominance of particular modelling approaches has itself shaped what scenarios could imagine. This theme generated the highest number of individual discussion points (twenty-nine across four sub-themes), reflecting the detail of the methodological discussion in the workshop (Table 4).

There was broad agreement that the dominant modelling approach in the 2000s was engineering-focused, supply-side optimisation. A researcher working on energy systems modelling described the prevailing tools as capturing technology deployment but not *"those sort of underlying drivers of kind of where society was going"* (Transcript). Models struggled to

capture innovation dynamics, particularly the pace of cost reduction in renewables. The same participant recalled that even in 2009, authoritative reports were indicating that offshore wind would remain expensive for some time – an assumption overtaken by events.

A researcher working on climate policy took a stronger view, arguing that complex Integrated Assessment Models embed subjective judgements within quantitative parameters, such as discount rates, demand elasticities, and cost-benefit valuations, thereby ***"obscuring deeply normative assumptions behind a veneer of technical objectivity."***

The observation that dominant models could not capture "*where society was going*" points to a tension between the tools that were available and the nature of the transitions they were being used to explore. Optimisation models are designed to identify cost-effective pathways within defined parameters; they are less well suited to representing the kind of rapid, non-marginal change that characterised the renewables revolution or the policy-driven phase-out of coal. Where the available tools assume change is incremental and cost-driven, futures involving rapid policy-driven or socially mediated transformation are less likely to be explored – not because they are implausible but because the method is not designed to represent them.

Participants differed, however, on whether the problem lay with the models themselves or with how they were used. The researcher working on energy systems modelling argued that "*you can still do good scenario analysis using some kind of optimisation tool*" if it is used in a more participatory, simulation-based mode (Transcript). They also proposed a shift from optimality to robustness: methods that explore vulnerability and risk across the scenario space rather than seeking a single optimal pathway (Padlet 2). A researcher working on climate policy took a stronger view, arguing that complex IAMs embed subjective judgements within quantitative parameters – discount rates, demand elasticities, and cost-benefit valuations – thereby obscuring deeply normative assumptions behind a veneer of technical objectivity (Padlet 2). They made a detailed case for intentionally simple, transparent, spreadsheet-based scenario frameworks anchored in Paris-aligned carbon budgets, arguing that simplicity enhances scrutiny and accessibility and should be regarded as a methodological strength rather than a limitation.

A member of the project team, contributing to the discussion, questioned whether scenarios are even the right tool for the problem now being discussed. The original purpose of scenarios was to explore plausible possibility space over long time horizons. But if the timeframe has shortened, if the question is what can be achieved in the next ten years within policy cycles, then different forms of evidence may be more appropriate. A researcher working on carbon capture and storage acknowledged this as "*a really interesting provocation*" but argued that scenario work retains value for thinking beyond the immediate decarbonisation push, "*particularly for residual emissions and long-term removal options post-2040*" (Transcript). A researcher working on consumption-based emissions proposed abandoning the 2050 framing altogether, arguing instead for ten-year plans that treat production and consumption as coupled systems and focus on what can be achieved in the near term within policy cycles (Transcript).

What emerged from this debate was not a consensus on a single alternative but a recognition that different questions require different tools operating across different timeframes. Near-term decarbonisation planning, longer-term residual emissions strategy, and the retrospective analysis of how past policy choices shaped energy outcomes each call for distinct approaches. The central lesson of this theme is that the relationship between method and question needs to be made explicit: not only which tool is appropriate for which question, but what question is being asked in the first place, over which timeframe, and with what assumptions made visible. The methodological debate was also, implicitly, a debate about the role of expertise: who should participate in constructing energy futures, and whose knowledge counts.

Theme 5: The politics that scenarios cannot escape

Table 5. Theme 5: sub-themes and constituent discussion points

Theme	Sub-theme	Discussion points
The politics that scenarios cannot escape	Growth politics and technology choice	Post-growth and wellbeing economy; growth agenda drives CCS and hydrogen; post-growth more academic than political reality
	Policy choices and their effects	Policy choices mattered for outcomes; scenarios as ammunition for policy battles
	Misinformation and the politics of knowledge	Electrification as non-transformative continuation; misinformation shapes public assumptions; political dynamics excluded from models
	Researcher positionality	Modellers should be self-critical; good social research valuable in itself; desire for deeper engagement

The final theme addresses the political dimensions that pervade all aspects of scenario development, from the macro-politics of economic growth to the micro-politics of researcher positionality. The central organising concept is that scenarios are inescapably political objects: they are shaped by political conditions, they embody political choices, and they are used as political instruments, whether or not their producers acknowledge this. The theme draws on eleven discussion points across four sub-themes (Table 5).

A researcher working on sustainability transitions made the connection between growth politics and technology choice explicit: the political emphasis on achieving higher levels of economic growth "*is one of the drivers behind current investment in CCS and hydrogen technologies*" (Teams chat). Moving towards a wellbeing economy perspective, they argued, would naturally shift emphasis towards demand-side solutions.

The connection drawn here between growth politics and technology choice helps to explain why the selective optimism described in Theme 2 took the form it did. If political and economic priorities favoured continued industrial activity and consumption growth, then technologies that promised to decarbonise without restructuring existing production – such as CCS and hydrogen – were more likely to attract investment, research attention, and optimistic assumptions in scenario exercises. On the other hand, approaches that implied reduced consumption or structural economic change were less likely to be explored in depth. This does not mean that growth politics was the only factor shaping scenario assumptions: as discussed under Theme 1, commissioning arrangements, disciplinary cultures, and

modelling conventions all played a role. But the political context within which scenario work was commissioned and funded is part of the picture.

> The researcher working on climate governance made a related point, arguing that researchers need to ***"think very carefully about the interests, worldviews, power dynamics of the people in the system, which includes us."***

The researcher working on climate governance offered the sobering observation that post-growth ideas are "*much more talked about in the academic community than anywhere else*" and that questioning growth is "*not present in the political debate at all*" (Transcript). This suggests that even where researchers recognise the connection between growth politics and scenario content, the political conditions for acting on that recognition may not yet exist. This exchange captured a recurring tension in the workshop between the scale of transformation that participants' analyses implied and the political realities within which they work. Yet this structural analysis sat alongside a more pragmatic orientation. The Gharde et al. (2025) findings were described as potential "*ammunition*" for ongoing policy debates – evidence to be deployed in "*the same fights*" with government and the Climate Change Committee about the underrepresentation of demand-side measures (Transcript). This pragmatic orientation, using scenarios as tools in policy battles, complemented the more structural analysis of how scenarios are produced and constrained.

An important illustration of how policy choices shape energy outcomes in ways that scenarios did not explore came from a researcher working on carbon capture and storage, who highlighted the role of European policy in driving the decline of coal. They noted that "*European policy (translated into UK law) has had a significant influence*" on coal's trajectory and that "*before the Large Combustion Plant Directive etc, I suspect that many people would have doubted that it would be possible to make such a big change*" (Padlet 1). This is analytically significant because the Gharde et al. (2025) report showed that no scenarios reviewed explored futures without either coal or coal CCS by 2022, yet the UK closed its last coal-fired power station in late 2024. The coal story illustrates how unanticipated policy interventions can produce outcomes that fall entirely outside the possibility space explored by scenarios, reinforcing the argument that institutional and political dynamics must be taken more seriously in scenario construction.

A participant working on energy politics raised the role of misinformation in shaping public assumptions about what is possible, arguing that the assumptions feeding into scenarios are themselves shaped

by information environments, including deliberate misinformation, which constrain the perceived plausible possibility space (Transcript). They also raised a concern that the current focus on electrification may repeat the CCS pattern, "*promising consumption need not change, whilst creating new environmental problems*" from resource extraction and deforestation (Padlet 2). This represents a dimension of power that is not about the overt exercise of authority, but about the shaping of what is thinkable.

The workshop also surfaced questions about researcher positionality. The researcher working on sustainable agriculture and innovation called for modellers and analysts to be self-critical about where they sit within the system and how their own positions shape the work they produce. The researcher working on climate governance made a related point, arguing that researchers need to "*think very carefully about the interests, worldviews, power dynamics of the people in the system, which includes us*" (Transcript). One participant went further, arguing that the academic community has constrained its own debate by confining itself to marginal adjustments rather than challenging the boundaries within which it operates. This was not a universally shared view, but it raised an important question: **how far can researchers working within existing institutional and funding structures critically examine the very frameworks that support their work?** The observation that researchers have increasingly adopted the constraints of commissioning and funding structures, narrowing what they explore in order to maintain access, impact, and relevance, makes the case for independent research more important than ever. This suggested that participants saw this tension not as a reason for paralysis but as a reason to be more deliberate about maintaining the intellectual space for challenge.

CONCLUSION

This report presents the key learning from a workshop in which ten leading UK energy experts discussed the findings of Gharde et al. (2025). The discussions highlighted ways in which future energy scenarios can be strengthened to provide policy options that embrace innovative ideas and the bold, transformative, socially just change consistent with the scale of the climate challenge.

The analysis of the expert workshop highlighted five areas for future scenario development to address: how commissioning institutions shape the boundaries of scenarios; how selective optimism influences technology expectations; how the social world, although influential for energy systems, is poorly characterised; how an often limited range of scenario methods constrains scenarios; and the role of embedded socio-political assumptions in shaping what is considered possible and desirable.

As well as identifying these concerns with past scenarios, the workshop discussions also provide insights into how those developing the next generation of energy scenarios can learn from their predecessors. **What would scenario practice look like if these insights were implemented?** It would mean scenario exercises commissioned by a broader range of institutions, with explicit statements of the assumptions and priorities that commissioners bring. It would mean deep interrogation of energy demand changes – treated not as optional additions but as core components of any scenario set. It would mean methodological pluralism, in which the choice of tool is justified against the question being asked, rather than defaulting to the dominant modelling tradition. And it would mean that the people whose lives energy transitions reshape – as workers, householders and communities – are present in the process, not just as data points but as participants whose knowledge and values shape what gets explored.

The findings of Gharde et al. (2025) and the workshop discussions reinforce these points. Of the more than eighty scenarios reviewed, the one whose energy demand trajectory came closest to what has since materialised was Tyndall's Red scenario – the scenario with the most transformative vision of how much energy the UK would use. This is not an argument that scenarios should aim to predict the future. Rather, it illustrates that when scenario exercises give serious attention to demand-side transformation, rather than treating it as marginal, they are more likely to explore the futures that turn out to matter. The case for methodological diversity, broader commissioning, and genuine openness to reducing the scale of energy use is not only principled; it is supported by the evidence of the past two decades.

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APPENDIX: METHODS

The analysis follows the six-phase process of reflexive thematic analysis as set out by Braun and Clarke (2021). This approach is chosen because it foregrounds the researcher's interpretive role and is well suited to analysing qualitative data from a relatively small group of expert participants where the aim is to identify patterns of shared meaning rather than to quantify prevalence. The epistemological orientation is broadly critical realist: the analysis treats participants' accounts as offering meaningful insight into how energy scenarios are shaped, whilst recognising that these accounts are themselves situated within institutional and disciplinary contexts that form part of the analytic interest.

Data were systematically coded across all five sources using NVivo 14, operating at both semantic and latent levels: semantic codes capture what participants explicitly say, whilst latent codes (discussion points) identify underlying assumptions and tensions. 89 codes were generated, each documented with source references and speaker attributions. Of these, sixteen were oriented by the findings of Gharde et al. (2025), for instance codes relating to CCS deployment expectations, renewables underestimation, and demand-side underrepresentation. The remaining three-quarters were generated through the coding process itself, capturing ideas that participants introduced independently of the workshop's framing, such as the policymaker perception gap, researcher positionality, growth politics, the desirability, viability, and feasibility framework, and the tension between structural equity and democratic agency. Consistent with Braun and Clarke's position that analysis continues to develop through writing, the report itself represents a final phase of analytic refinement.

Participants are referred to by broad research area descriptors.