
UTILITY 2050

Decision Theatre: Policy and Regulation
Empirical Report

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Utility 2050 Decision Theatres: Policy and Regulation

1.0 Introduction to the Utility 2050 project decision theatres.

The utility 2050 project assess the impacts of low-carbon energy futures on electricity utilities, and explores how they can access new markets.

The Utility 2050 project recognises that the energy sector faces uncertainty. There are many possible futures with different generation mixes, flexibility technologies, final demands, consumer preferences, and political priorities. The Utility 2050 project uses innovative interdisciplinary approaches to quantify and explore big questions about future market sizes, regulatory priorities and customer preferences.

This empirical report summarises the output of the decision theatre held on 31st October 2017 in central London. Decision theatres present participants new data on a specific multi-stakeholder problem. In this case the Utility 2050 project, findings were presented (see section 3.1). The information given to participants was used to reach a decision on the following question:

What are the most important CHANGES needed to enable utilities to access new markets in the energy transition?

The rest of this report is structured in four sections. Section 2 summarises the decision theatre method, and the justification for its selection for this study. Section 3 summarises the data given to participants prior to the decision theatre and once again at the start of the workshop. Section 4 describes the decision theatre process and the results of each stage, including the final decision. Section 5 concludes and explains next steps.

2.0 The decision theatre method

Decision Theatres (DTs) are workshops that culminate in participants or stakeholders making a decision. DTs are one off events often within a longitudinal research process that may involve several DTs, groups of participants, and decision-making dilemmas.

Arizona State University pioneered the use of decision theatres to consider decision-making in a context of climate uncertainty. Their study explored the complex relationships that exist between rapidly growing populations and finite water supplies¹. Decision theatre techniques have been used to explore complex issues of resource and infrastructure governance such as local energy infrastructures², urban flooding³, and forestry management⁴. Decision theatres are being used internationally to tackle complex, multi stakeholder issues with cutting edge analytics.

The Utility 2050 decision theatre work package aims to run four separate decision theatres with three groups of energy system decision makers. These are present utilities (both established and new entrants), international stakeholder, and policy and regulation. The central question and preparatory material will be common to all the decision theatres. This process will generate four sets of prioritised changes to the energy system that are designed to make a breakthrough in UK energy system planning. Results of prior decision theatres will be disclosed to participants at the conclusion of their own DT.

The Utility 2050 Policy and regulation decision theatre comprised nine participants from the UK: these were 2 x Civil Servant regulators, 6x Civil servant policy makers from energy, infrastructure and industrial departments, 1 x System operator representative. The stakeholders were purposively sampled to provide insight from across the policy and regulatory space within the UK's energy market.

3.0 Preparatory Utility 2050 data

At the beginning of the decision theatre facilitators shared the findings of the Utility 2050 project to date. This information was sent to participants prior to arrival and comprised three datasets from the Utility 2050 project. The data presented to participants was:

3.1 Dataset #1: New financial opportunities 'Value Pools'.

The Utility 2050 project explores new financial opportunities in future energy systems. These new opportunities were called 'value pools'. The value pools quantified by the research team are either new revenues to the system or avoided costs i.e. through technology switching or efficiencies.

¹ White, D.D., Wutich, A.Y., Larson, K.L. and Lant, T., 2015. Water management decision makers' evaluations of uncertainty in a decision support system: the case of WaterSim in the Decision Theater. *Journal of Environmental Planning and Management*, 58(4), pp.616-630.

² Bush, R.E., Bale, C.S., Powell, M., Gouldson, A., Taylor, P.G. and Gale, W.F., 2017. The role of intermediaries in low carbon transitions—Empowering innovations to unlock district heating in the UK. *Journal of Cleaner Production*, 148, pp.137-147.

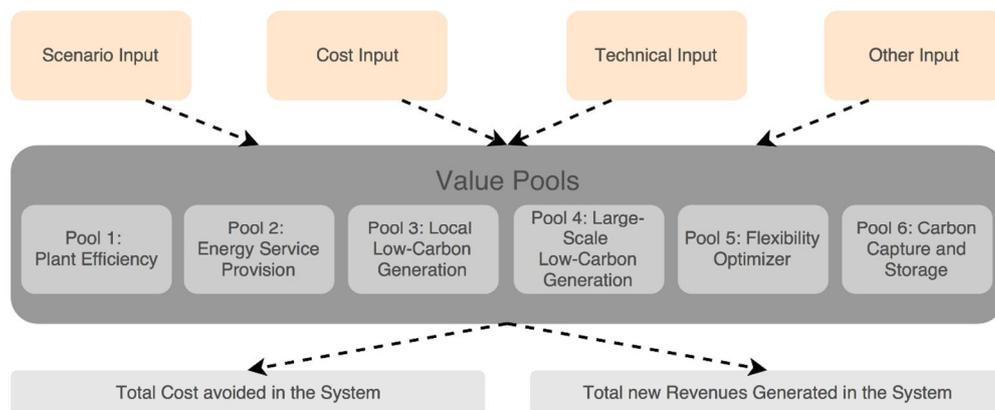
³ Walsh, C.L., Glendinning, S., Dawson, R.J., England, K., Martin, M., Watkins, C.L., Wilson, R., McLoughlin, A., Glenis, V., Parker, D., 2013. Collaborative platform to facilitate engineering decision-making. *Proc. ICE Eng. Sustain.* 166, 98e107.

⁴ Boukherroub, T., D'Amours, S. and Rönnqvist, M., 2016. Decision theaters: a creative approach for participatory planning in the forest sector. In *Proceedings of the 6th International Conference on Information Systems, Logistics and Supply Chain (ILS'2016), Bordeaux*.

The six value pools we quantified were:

- VP#1: Plant efficiency, the easiest avoided cost to understand, simply what can be saved by investing in the existing generation portfolio to make it more efficient over time.
- VP#2: Energy services, this value pool includes all new revenues available by installing energy efficient appliances and management systems in homes as well as electric vehicle charging equipment *and* revenues from the electricity to charge electric vehicles.
- VP#3: Local low carbon (distributed) generation. Essentially the market for microgeneration, this is where utilities companies offer solar PV lease and servicing along with offering trading or brokerage platforms for local generators.
- VP#4: Large scale low carbon generation. This value pool is an ‘avoided cost’ value pool because, depending on carbon prices and fuel prices, low-carbon generation should become cost competitive with gas CCGT in the future. Therefore, with the right carbon price, companies would choose to build low carbon as opposed to traditional generation to cover the same net capacity. This value pool is calculated without feed in tariff subsidies.
- VP#5: Flexibility, the value of battery storage and demand response can be both new revenues or avoided costs, this value pool captures price arbitrage and the provision of energy services to the transmission system operator.
- VP#6: Carbon Capture and Storage, estimates the costs avoided by building CCS plant under a range of carbon prices.

Figure 1: Value pools identified and conceptual model map.



To test the values pools, we selected eight UK future energy scenarios. These were:

Author	Name of the Scenario
DECC – 2050 Calculator (2010/2011)	High Renewables, higher Energy Efficiency Higher Nuclear, less Energy Efficiency Higher CCS, more Bioenergy
National Grid (2016)	Gone Green No Progression
Realising Energy Transition Pathways (2008)	Market Rules Central Coordination Thousand Flowers

The results show that in 2050, depending on the scenario assessed some value pools are very robust, some are volatile, and some are destroyed completely. Across the scenarios tested these new revenues and avoided costs were compared against the size of the entire market. Figure 4 shows that new revenues and avoided costs combined are a maximum of 31% and a minimum of 14% of the future market size across the scenarios. Across the surveyed scenarios, the potential new revenues in the UK energy system are up to £12.8bn per year in 2050. The cost savings potential is up to £9.7bn per year in 2050.

Figure 2: Cumulative new revenues across system futures in 2050 by value pool

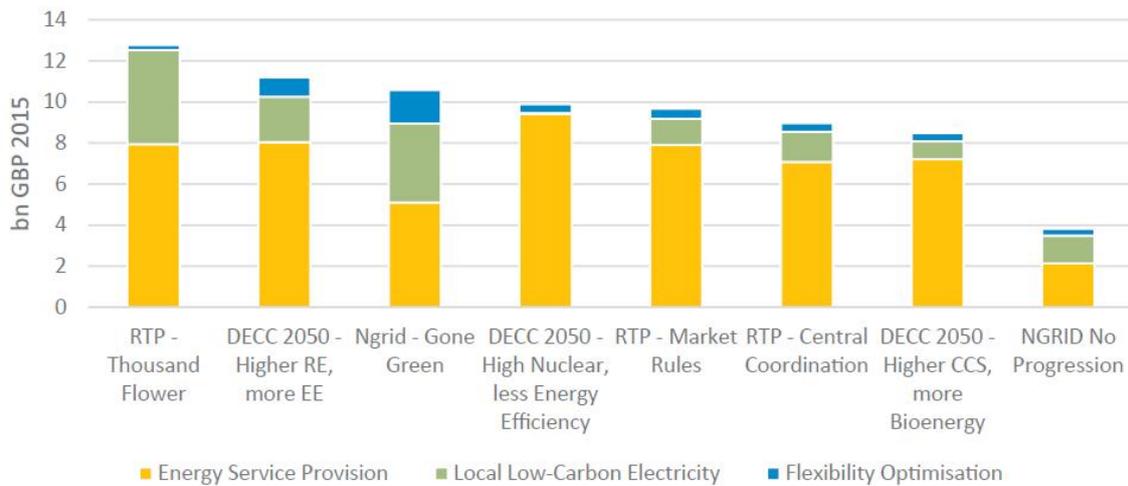


Fig. 15. Cumulative new revenues across system futures in 2050 by value pool.

Figure 3: Cumulative avoided costs across system futures in 2050 by value pool

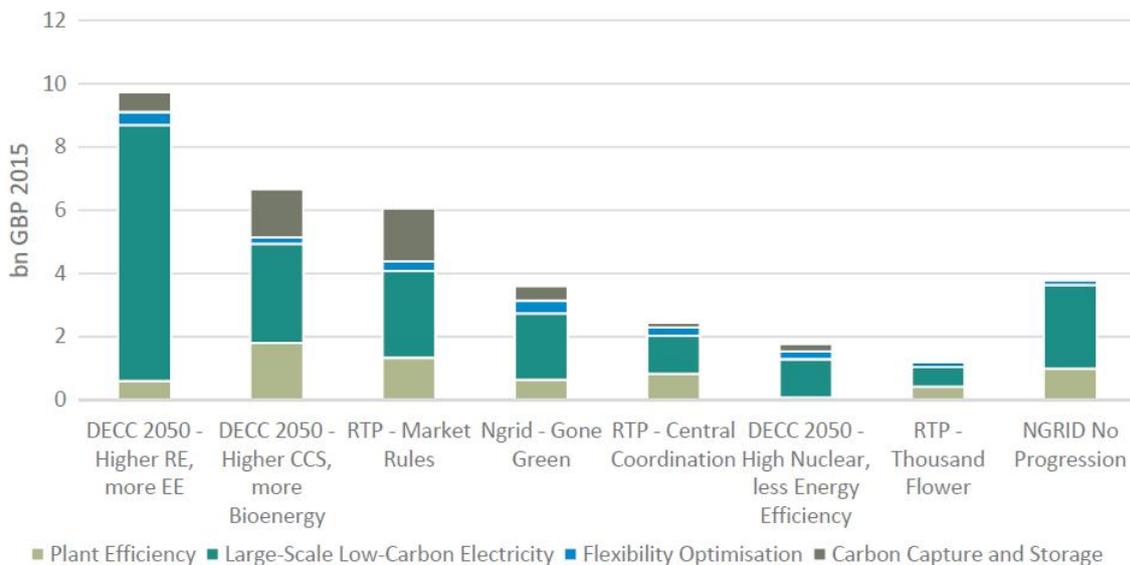


Figure 4: Comparison of indicative market size against new revenues and avoided costs in 2050.



The main insights from this work are summarised below, specific questions were encouraged from participants during the decision theatre. Each insight is accompanied by a 'provocation' which led into activity #1 of the decision theatre.

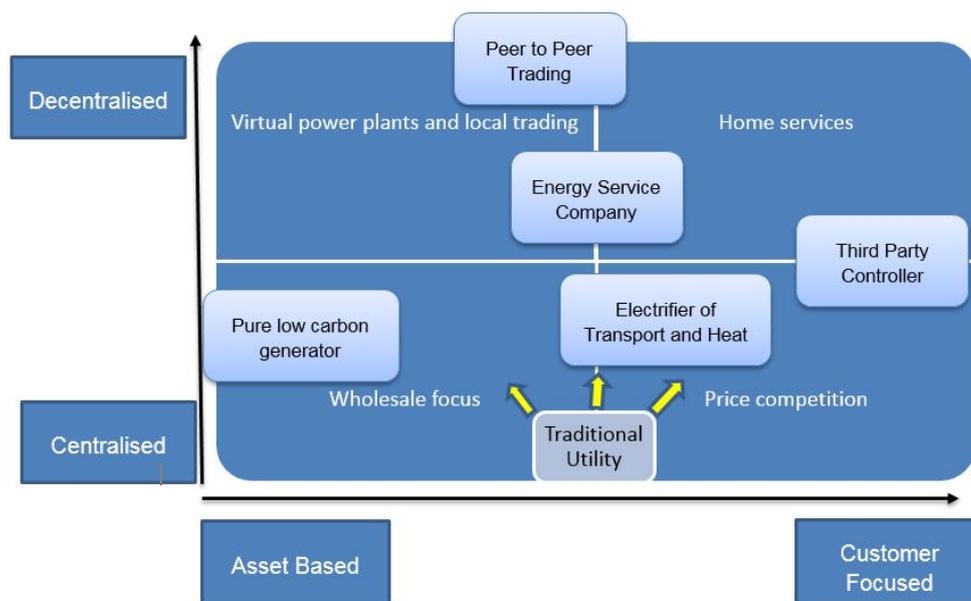
1. The cost of carbon in the UK's carbon price floor is critical to both CCS and large scale low carbon generation value pools. We used the Committee on Climate Change's expected carbon prices. Without direct subsidy the main driver for firms to construct large scale low carbon generation (VP#4) are the cost differentials between these and conventional technologies. Across the scenarios analysed the carbon price only reaches a sufficiently high value to make these value pools positive in 2050. These points support previous analysis in suggesting that linked long term subsidy contracts of low carbon generation alongside carbon pricing will continue to be necessary to deliver required levels of large scale low carbon generation. However, this analysis demonstrates carbon capture and storage is extremely sensitive to what future energy scenario is followed. This raises **Provocation #1: Will anyone really invest in CCS when it is such a volatile value pool?**
2. The energy service provision value pool is robust across all scenarios, and the dominant driver of new revenue is the electric vehicle service element. Across all climate compatible scenarios there is a substantial commercial opportunity available in electric vehicle service provision. Indeed electric vehicle services are the single biggest element of new revenues available across all assessed future energy scenarios including 'no-progression'. This prompts **Provocation #2: Utilities can capture lots of value from electric vehicles so they will lead the way on promoting them.**
3. Revenues and avoided costs from flexibility markets (i.e. batteries and demand response) are extremely volatile across scenarios. Through the operation of battery storage technologies new revenue streams in the range of 46–565 mGBP in 2030, and 46–1040 mGBP in 2040 & 2050 can be accessed in the power and balancing market. Power firms can potentially generate new revenues from DSR in the balancing market between 160–390 mGBP in 2030, 190–550 MGBP in 2040 and 210–610 mGBP in 2050. While at the same time DSR can avoid wholesale cost in the order of 115–270 mGBP in 2030, 140–375 mGBP in 2040 and 150–410 mGBP in 2050. Despite this volatility, storage, demand response, and flexibility are key enablers in other parts of the energy market. **Provocation #3: Flexibility value is so volatile only small start-ups will bother with it and it will never reach the scale needed.**

4. In the National Grid Gone Green and RTP Thousand Flowers scenarios the combined value pool #3 for distributed generation is £3.8 and 4.5bn in 2050, where in those scenarios with more centralised generation the value pool is often below £1bn by 2050 or in some does not exist at all. This value pool envisages utilities leasing consumers' microgeneration equipment (largely solar) and providing local power exchanges for trading. **Provocation 4 is: Distributed energy and electricity utilities will always be in competition because large utilities won't pursue this value pool.**

3.2 Dataset #2: Business model innovation

In summer 2016 the Utility 2050 team ran a workshop on the utility business models of the future. The 5 business models proposed were: low carbon generation only businesses focussed on building low carbon capacity and/or CCS, a 'New Electrifier' which installed electric heating and electric vehicle charge provision, Energy Service Companies offering appliances, efficiency retrofit and electric vehicle services, peer to peer trading platforms for local generation, and 'Third Party Control' which essentially bundles utilities around consumer needs and takes switching decisions on the consumers behalf. These business models were placed on the following matrix:

Figure 5: business model market positions.



Adapted from: White, N., Ingham, K., von Bechtolsheim, D. M., Haischer, M. & Francis, D. R. (2013) *The future of energy utilities - How utilities can survive the "perfect Storm"*. Arthur D. Little.

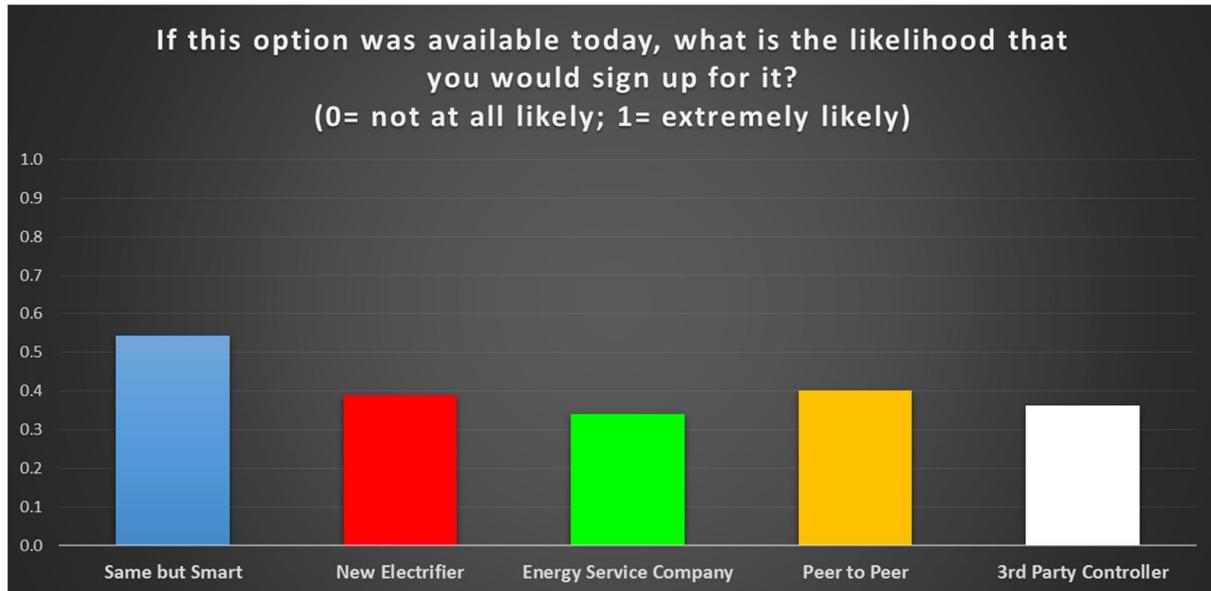
Each of the business models can capture one or more of the value pools proposed above. The intricacies of each business model were not presented at length but DT participants were asked to use them as ways of understanding how utilities might capture new value pools. The provocations which came from this analysis are:

- **Provocation #5: Regulation gets in the way of business model innovation**
- **Provocation #6: Some business models just too risky for the levels of return in the sector**
- **Provocation #7: Some business models are technically possible but just too complex to understand**

3.3 Dataset #3: Consumer Insight

Business model innovation will only turn ‘value pools’ into revenue if consumers want what is being sold. The Utility 2050 team undertook a consumer facing survey. We presented key attributes of the business models we generated to a representative sample n=2000+ of UK energy bill payers and asked which of the business models they found attractive. The attributes and results are shown in figure 6 below:

Figure 6: Spread of preferences in comparative choice exercise



We expected consumers would want business models closer to what they are familiar with. However, the Peer to Peer Trading (which means more control and engagement) and the Third Party Controller (which means giving up both control and data access) models scored very well. This suggests consumers are happy to give up data and have more or less control in return for some benefit (financial or lifestyle). There was no ‘total loss’ business model i.e. all BMs were attractive to one market segment. This means consumers may be more segmented than we think. The provocations we can draw from this are:

- **Provocation #8: Consumers are more engaged than we think when given meaningful choices.**
- **Provocation #9: Consumers are not as engaged as they say and any business model based on deep engagement is bound to fail.**

3.4 Provocations

The nine provocations provided by the facilitators were:

- *Provocation #1: Will anyone really invest in CCS when it is such a volatile value pool?*
- *Provocation #2: Utilities can capture lots of value from electric vehicles so they will lead the way on promoting them.*
- *Provocation #3: Flexibility value is so volatile only small start-ups will bother with it and it will never reach the scale needed.*
- *Provocation #4 is: Distributed energy and electricity utilities will always be in competition because large utilities won't pursue this value pool.*
- *Provocation #5: Regulation gets in the way of business model innovation.*
- *Provocation #6: Some business models just too risky for the levels of return in the sector.*
- *Provocation #7: Some business models are technically possible but just too complex to understand.*
- *Provocation #8: Consumers are more engaged than we think when given meaningful choices.*
- *Provocation #9: Consumers are not as engaged as they say and any business model based on deep engagement is bound to fail.*

4.0 Decision theatre results.

Stage 1 was designed to facilitate discussion whereby further provocations identified by the attendees to generate discussion around the aims of the DT. Those generated by the Policy and Regulatory attendees were:

- The flexibility market *can* be opened up so there is value for all types of entrants.
- Consumers are more engaged when given simple & clear information and choices. Some will never engage.
- Value can be derived from CCS by repurposing existing assets.
- Traditional energy suppliers will need to offer a wide range of services to remain relevant
- There is no new value attributed to networks, therefore to network investment, power should be traded rather than energy.
- First movers will become price setters in new value pools.
- With bundled services electricity price becomes too small/meaningless.
- The risk profile of energy investment is dominated by "lumpiness" of investment required. Therefore CCS & Centralised gen solutions fail where small scale investments on a large scale succeed.
- Energy service contracts need attaching to the building not the owner.
- Lack of trust in utilities in the home will hold back value being unlocked.
- 'Law of unintended consequences' this is complicated and may points of failure meaning value won't be realised.
- Vested interests of incumbents will hold things back.

- How can consumers navigate different business models when many struggle to navigate the tariff noise, let alone the pros and cons of completely different offerings.
- Distributed energy generation and balancing services will kill the transmission network and large generators.
- Consumers don't like contracts for energy services that are too long. Business models that require these won't be very successful.
- There will always be a role for traditional supplier model as provider of default supply to disengaged customer.
- Models that enable off grid supply will be encouraged but costs (i.e. stranded networks) will be collected via social policy tariffs.
- The concept of the utility becomes obsolete as and consumers seek products and services from and increasing variety of providers. Energy will continue to be an essential service and therefore heavily politicised.
- Innovation and flexibility will have a good 10-year run but something will happen to make the state step in to control energy supply more centrally.
- Data could be the new natural resource, but its use will not be optimised.
- Smart/flexibility cannot monetise a full range of services it will deliver.
- Regulation is a *necessary* break on innovation to protect energy investments.
- Utilities will only address new markets when new players trump their business models.
- Electricity is less than 20% consumer energy so big energy companies are best placed to capture the transition.
- Drive to smart homes and the whole lifestyle specific industry will dominate the domestic agenda hence our future energy/utility supplier will be Amazon.

This discussion phase of the decision theatre is designed to allow participants to adopt a 'system' mind-set and pay attention to long term trends rather than the current moment of energy policy. These issues are not analysed in this report. This will be done in the final report from the four Decision Theatres. Clear themes of: flexibility; consumer protection; incumbent behaviours; bundled services and; business model innovation were picked up and developed in stage 2. The following four stages, [2-5] comprised the active stage of the decision theatre.

Stage 2 – Playing god/system architect

In stage 2 participants were asked to take account of the data presented and the provocations proposed, and adopt the role of a powerful 'system architect' to 'play god' and decide what changes they would make to the system so that new financial opportunities could be exploited and low carbon energy futures be delivered. Participants were asked to 'think big' to 'not be constrained by the current system' and to individually prepare 3 specific changes needed in one to three sentence explanations recorded on A5 report cards.

The changes proposed by individuals are presented below in no particular order with a short explanatory summary. Some changes are grouped where they share an outcome or theme. The suggestions at this stage were not intended as balanced recommendations, only answers to what would be necessary to allow the value pools presented above to be captured. The change proposals were:

- **Insulate the consumer from innovation risk:** Insulate the consumer from innovation by using insurance mechanism or indemnity guarantee to allow consumers to experiment with new supplier positions funded by the market (think ATOL for energy)
- **Public ownership of the networks:** Remove profit motive and self-preservation by nationalising the networks and automating the system operator function, thereby reducing overall costs by eliminating profit maximisation and self-preservation decision making.
- **Put a suitable data framework into place:** Regulate data to facilitate interoperability and system optimisation. Create a central data provider and enable the right data flows across the system so all players can have access. Including two-way flow of data to consumers and the right level of consumer education.
- **Introduce disruptive government utilities:** To build trust and competition in new types of business models and with a focus on different value pools.
- **Establish outcomes focussed regulation agnostic of supplier:** End the role of the supplier and identify 'desired outputs' for businesses to serve.
- **Create a single market for flexibility:** Less of a bi-lateral contracting approach and more of a single liquid market. Develop a market that enables true price discovery and puts a true value on flexibility, taking into account system needs.
- **Take social issues out of energy policy:** Depoliticise energy by having no concept of vulnerable energy consumers by protecting vulnerable consumers via wider social policy and not via the energy market.
- **Create future utilities policy framework:** Create a clear, coherent, whole system (electricity, gas, heat, transport, industry) energy policy framework that does not pick winners – technology agnostic – to provide level playing field. Put the development of energy policy into the hands of an independent expert committee and energy policy delivery in the hands of a democratically accountable local energy board.
- **Create a customer transparency and engagement programme:** Minimise the negative impact of [social] media on positive developments, particularly regarding accountability questions. Educate consumers about new business models, ensure consumers can make an informed decision on utility offers, and that automation can occur efficiently where needed.
- **Enable a single national trading market:** no hurdles, no minimum entry to trade all products at any time with perfect charging for network distances used.
- **Change regulatory system to maximise cross system value:** Change the regulatory system to regulate producers, networks, consumer markets, rather than by sector (i.e. Gas/Water/Telecoms) to enable cross plays at all levels. Have a clear rationale for each intervention by regulators and have them explain why there is no other way.
- **Rely [more] on consumer protection law:** Remove all bespoke regulation/licensing and rely on consumer protection regulations. This will unlock innovation by removing regulatory barriers. The role of the supplier license to become redundant, a new arrangement to be introduced to facilitate consumer protection needed.

Stage 3 - prioritise the changes

Stage 3 asked participants to work together with the change proposals listed above. Participants were asked to order the change proposal by priority, remaining within the mind-set of being 'in charge' of the system, seeking to access the value pools identified. This was a timed exercise and the group was

given guidance by facilitators where necessary, but otherwise given freedom in how to order change proposals by priority. Importantly the group was asked to seek 'consent not consensus' i.e. not all participants needed to agree, but had to reach a prioritisation of proposals within the timed session, with which they could agree to move forward with. The prioritisation consented to is shown in figure 7.

It was observed that there was one overriding issue in the policy and regulatory discussion - the protection of the consumer. The value pools and business models identified were thought to generate risks and opportunities. One participant summed up a discussion on where consumer protection was placed in the prioritisation process:

"However, no matter what is being done or trialled, the consumer protections need to be first. It is not negotiable."

There was a strong focus to ensure that consumers are not harmed by innovation. There was a debate on the suitability of current consumer protection law in other sectors:

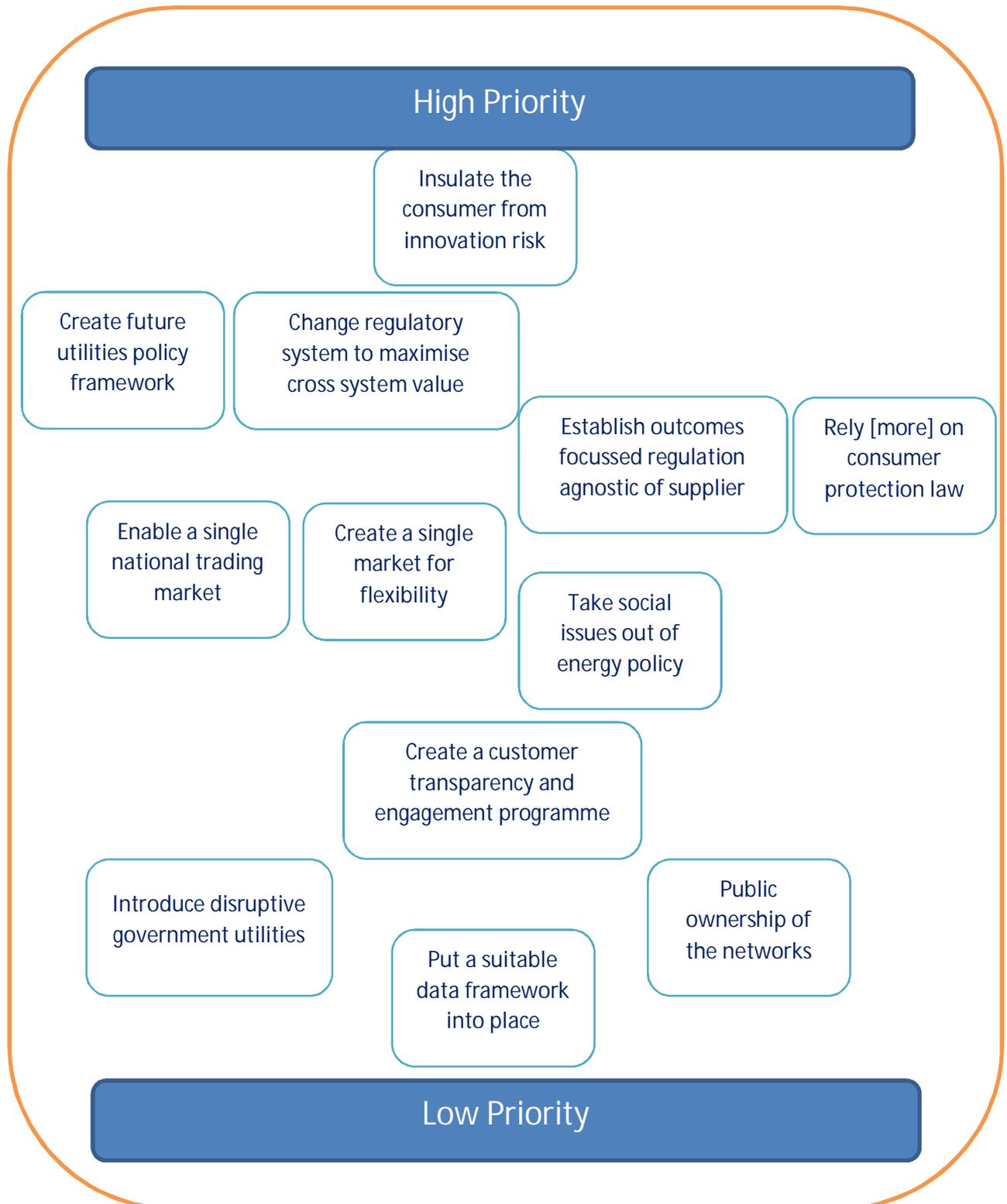
"There are already other types of regulation that are doing that more than sufficiently"

This revealed a problem of ceding control of energy consumer protection. This then led to debate around the outcomes of regulation and how principles of consumer protection could be enshrined in a regulatory settlement which also allowed for innovation. In this way the principles based regulation which received a high ranking was still subordinate to the suggestion for a specific consumer protection mechanism. This, it was thought would allow for experimentation either regulation but in the knowledge that no consumer would be disproportionately disadvantaged.

The creation of system flexibility, data protection, market competition etc were subsequently ranked by the exercise as second order issues.

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Figure 7: Prioritisation of stage 3 change proposals.

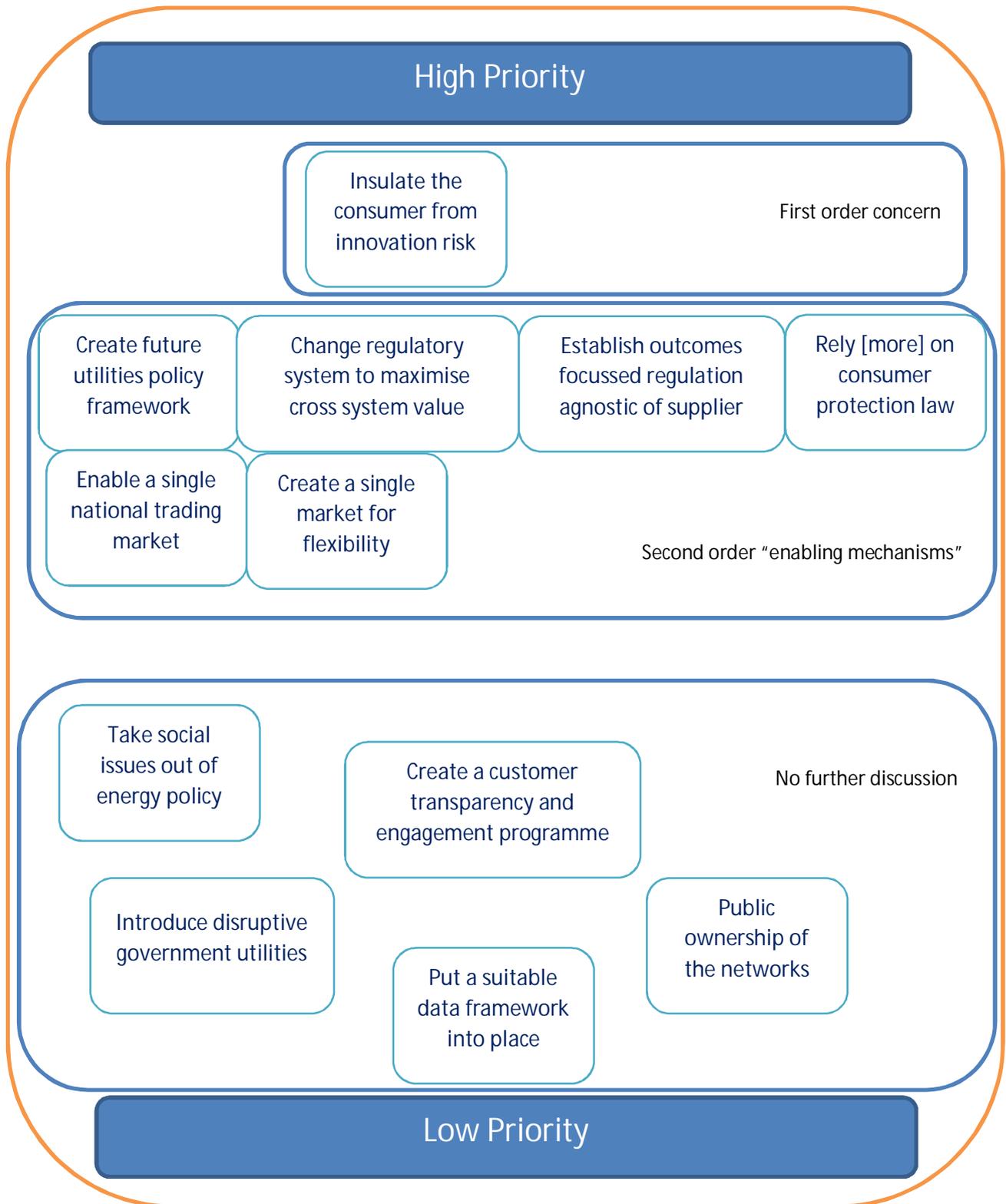


Stage 4 took the prioritised list of ‘system architect’ changes and asked the policy and regulatory stakeholders to consider the other communities involved in delivering the UK energy transition, namely present utilities, investors, and consumers. This exercise aimed to take a list of actions entirely aimed at allowing utilities to access new financial value pools and reflect them against the known constraints of markets, consumers, energy politics, and the goals of system regulation. This was also a timed ‘consent not consensus’ exercise. The agreed re-prioritisation led to a rationalisation of change proposals, a clearer division between consumer, regulatory, and strategic concerns and a removal of the ‘middle ground’ which participants felt would present a clearer set of priorities.

In the preceding present utilities decision theatre this led to a substantial re-prioritisation of changes, however in the policy and regulatory decision theatre consumer protection has been the first order concern from the beginning. This meant that the re-prioritisation exercise was short lived, the participants felt little needed to change in response to the introduction of other communities into the prioritisation spectrum. What happened was a reinforcement of consumer protection as a first order principal and a re-casting of the second order changes as what one stakeholder referred to “enabling changes or mechanisms to make this work”

[intentional blank Figure 8 overleaf]

Figure 8: Re-prioritisation of change proposals taking account of all system stakeholders.



Stage 5 took the re-prioritised list and finalised the decision process by taking the six highest priority change proposals and re-writing these as concrete actions that could be undertaken by different system stakeholders. This final stage was introduced by facilitators by explaining that these were the changes that the research team would take to future decision theatres with other system stakeholders in the Utility 2050 project, namely the international community.

This process resulted in some instructive debate around the particularities of the energy system and the uniqueness of electricity as a commodity. Firstly while “Rely [more] on consumer protection law” was a change proposal that met with substantial approval and consent as a change with high potential to enable system innovation and business model experimentation, stakeholders felt it would be hugely difficult operationalise because:

“There is a difference between consumer protection law covering products, and regulating a system to manage risks of legal but regressive trends”.

The following discussion made the distinction between a scenario in which consumer that had signed up to a tariff they didn’t understand and got penalised for using energy during peak times, and one in which that tariff was found to be working but benefits were not being shared with customers and the supplier was in breach of contract. This led to the consumer protection law suggestion to be parked not because it wasn’t important to the stakeholder, but because it was difficult to formulate into a specific change to the system.

Similarly, the proposal to “Enable a single national trading market” needed to be unpacked again because the rationale had become unclear through the prioritisation process. The discussion around this recommendation centred on the expansion of services in the market to customers the DNO to DSO transition and flexibility services. The issue was that, within the current system it was unclear to participants who was contracting for what and whether different system subsidies were complementary or contradictory. The system of bi lateral contracting was referred to as a:

“...dark market which we can’t see at all...”

and the proposal was for a central trading platform for which carbon, supply security and network management signals could be incorporated. However, this change recommendation was seen as too complex to characterise as a single programme and the group instead tended towards the same open market approach but for flexibility services only, reflected in the finalised change decisions below.

The issues that a ‘single national trading market’ and ‘consumer protection law’ were proposed to address were partially and imperfectly subsumed by the “Create a single market for flexibility” and “Establish outcomes focussed regulation agnostic of supplier” respectively. However, this is a function of the decision theatre process, which in this iteration, forces stakeholders into consent over the *most important* changes.

Following this discussion the group settled on four change priorities. These were:

“CUSTOMERS SHOULD BE PROTECTED FROM INNOVATION BY A FALL-BACK MECHANISM.”

Utility 2050 Policy and Regulation Decision Theatre, UK 2017

This was the first order concern agreed upon across the DT participants. The mechanism proposed was one which allowed consumers to trial new supplier business models including contract length, service bundling, degree of automation etc. As no market participant is clear on the viability of these models until they enter the market, and the failure risk to consumers is high, an insurance mechanism was proposed to protect customers in instances where business models failed and left the consumer exposed. It is important to note the character and impact of some of these failures may be unforeseeable and therefore a general insurance fund as opposed to specific regulation was favoured.



**“OFGEM MOVES TO PRINCIPLES BASED REGULATION ACROSS
THE SUPPLY CHAIN”**

Utility 2050 Policy and Regulation Decision Theatre, UK 2017

This change proposal recognises the overly prescriptive nature of current system regulation, at the consumer interface and beyond. The move to principles based regulation is proposed to allow innovation which fits with the desired outcomes of systems regulation, but is currently disabled by regulatory complexity. Systems regulation would be principles-based from generation, through transmission, distribution, supply and flexibility.



**“CREATE MARKETS, INCLUDING FOR FLEXIBILITY, THAT ARE
ACCESSIBLE, COST REFLECTIVE, TRANSPARENT AND
TECHNOLOGY/BUSINESS MODEL AGNOSTIC”**

Utility 2050 Policy and Regulation Decision Theatre, UK 2017

The creation of a market for flexibility goes beyond what the system operator needs. The DNO-DSO transition, the benefit to suppliers of flexible customers, and the potential for local balancing mean that new markets will emerge. Integrating these flexibility and other services into transparent markets, which can incorporate diverse technologies and business models would both allow for innovation and prevent contracted services contradicting each other for different parties.



“DEVELOP LONG TERM INFRASTRUCTURE POLICY FRAMEWORK,
RECOGNISING INTERDEPENDENCIES BETWEEN SECTORS”

Utility 2050 Policy and Regulation Decision Theatre, UK 2017

The final change priority was to recognise the interdependencies between transport, heat, electricity and other infrastructural policy such as housing. Long term infrastructure strategy in areas such as heat electrification, EV charging, and smart device integration must progress together to understand the effect, and maximise the benefits, of system decarbonisation on systems beyond electricity.

5.0 Summary and next steps

Section 1 of this report introduced the decision theatre framing and the Utility 2050 project. Section 2 presented the data produced for decision theatre participants. Section 3 summarised the decision theatre method. Section 4 detailed the results of the five-stage decision theatre process and the distillation of the four most important changes needed to enable utilities to access new markets in the energy transition.

The next step for the utility 2050 project is to undertake two further decision theatres for international actors and produce similar empirical reports for each before undertaking analytical synthesis due in Q3 2018. The aim of the subsequent synthesis will be to produce a set of priorities around which UK electricity system stakeholders can find common ground advancing the low carbon agenda.

Appendix A: Consent to take part in Utility 2050 research
[example for reporting purposes only]



UNIVERSITY OF LEEDS

Add your initials next to the statements you agree with

I confirm that I have read and understand the information sheet/ letter dated 16 th May 2017 explaining the above research project and I have had the opportunity to ask questions about the project.	
I agree for the data collected from me to be stored and used in relevant future research in an anonymised form.	
I understand that relevant sections of the data collected during the study, may be looked at by auditors from the University of Leeds or from regulatory authorities where it is relevant to my taking part in this research. I give permission for these individuals to have access to my records.	
I agree to take part in the above research project and will inform the lead researcher should my contact details change during the project and, if necessary, afterwards.	

Name of participant	
Participant's signature	
Date	
Name of lead researcher	
Signature	
Date*	

*To be signed and dated in the presence of the participant.