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making consultation work

UK Power Networks
Engagement on Planning Scenarios

Integrated Report on three Workshops and Online Feedback

London, 76 Portland Place	**28th June 2011**
Gatwick, Arora Hotel	**29th June 2011**
Cambridge, Homerton Conference Centre	**5th July 2011**
Online feedback on scenarios	**1st July to 12th August 2011**

Report prepared by Dialogue by Design
September 2011

Email: info@dialoguebydesign.com
Website: www.dialoguebydesign.net

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1. Summary

As part of UK Power Networks' review of their investment plans to be presented to Ofgem in 2013, they have undertaken some scenario planning. This process aims to explore possible futures for the UK's energy requirements in the context of a low carbon economy. UK Power Networks recognised that this process would be a critical early phase of their business planning cycle, and wanted to give a number of key stakeholders across their regions the opportunity to review the scenario work and give feedback so that it could be refined and improved on. To this end, UK Power networks held three workshops in June and July. At these events the business planning process was explained, the scenarios that had been developed up to that point were presented, and attendees were given the opportunity to review, discuss and challenge the scenarios. In addition, UK Power Networks provided information on the scenarios on the engagement website http://yourviews.ukpowernetworks.co.uk/, along with an online form allowing people to provide feedback on the planning scenarios.

This report includes the full report from each of the workshops and also the comments made via the online form. This summary provides a brief overview of the issues that were raised across all these events. The summary and the full reports have been prepared by Dialogue by Design (independent facilitators). The report simply provides an account of the feedback that was received and does not seek to offer recommendations.

1.1 Overview of issues raised around the scenarios

In the workshops and in the online feedback forms submitted, a number of issues were raised generally about the scenarios or came up repeatedly when discussing specific scenarios. A frequently expressed view was that business and domestic users might respond differently within each scenario, and that there would be some value in exploring likely experiences for the two sectors within each scenario.

A number of technologies came up repeatedly: wind power both offshore and onshore was frequently questioned in the scenarios where significant increases in this technology were suggested – the general view being that the public oppose many (onshore) wind developments and this is likely to continue. It was also felt that other technologies that may well have a significant impact in the future did not receive sufficient attention in the scenarios, including Combined Heat and Power (CHP) and energy from waste.

The potential role for more flexible working in the future was also felt to be insufficiently addressed in the scenarios in view of its potential impacts on both vehicle usage (and electric vehicle uptake) and domestic energy consumption.

The following section takes each scenario in turn and provides a summary of views expressed on their viability.

1.2 Scenario 1 – Economic Concern

This scenario is regarded by many as viable – indeed some comments suggested that it is more the current state than a scenario, and that the question is more what type of economic cycle it will evolve into. However, others regarded the scenario as overly pessimistic, stating that they feel that the UK is well positioned to come out of the economic slump in the short to medium term. The UK Power Networks region is felt to be better equipped to emerge strongly from recession than many others. A number of challenges were made to the viability of this scenario. These included a sense that:

- It is not viable in London, where measures would be put into place to protect the financial sector and this is turn will keep the economy buoyant.
- Wind power will continue to have low uptake due to public opposition

- Increases in fuel prices will drive efficiencies, and demand side management will have higher uptake than is anticipated by this scenario.

1.3 Scenario 2 – Engaged Green

While some saw this scenario as viable in the longer term, the phrase most readily used for it is 'overly optimistic'. People challenge the likely rates of economic recovery that would be required for this scenario, as well as the likely speed of uptake of new green technologies. Some go so far as to suggest that the move towards a low carbon economy may need to be put on hold in order to retain UK economic competitiveness. There were quite a number of challenges to this scenario, including a sense that many of the expectations are too ambitious to be realised. These included the uptake of electric vehicles and the shift that would be needed towards public acceptance of wind power. There were other challenges to this scenario, including:

- The Renewable Heat Incentive being far more short term in impact than is suggested.
- That the market may be more influential than is suggested, with technology such as smart metering influencing this.
- Questioning why carbon capture and storage is not regarded as having a significant impact

There was a strong sense that for this scenario, incentives for take-up would need to be highly significant – i.e. people would be motivated by cost savings only when they were really noticeable in relation to household income.

1.4 Scenario 3 – Green Stimulus

Across all the workshops and the online feedback this scenario is regarded as viable, highly likely and realistic, although a few voices suggest that it is overly pessimistic. People comment that its viability is in part because it is very close to the current situation. There is a sense that in some ways this scenario is a stop-gap that could flip to something akin to the Economic Concern scenario or the Engaged Green scenario. Even though this scenario was considered highly viable, a number of challenges were made including a sense that:

- It is a lot to expect consumers to spend on new technologies with an eye on making savings in the future when cash is limited.
- Feed-in tariffs may well change, with incentives lowered.

As with the other scenarios, some things were felt to be missing that could have a significant impact. These include likely increases in embedded generation; the potential role of CHP, micro-hydro; other vehicle technologies such as hydrogen; and the role of energy storage.

1.5 Scenario 4 – Green Technology Revolution

Views were split on this scenario, with some seeing it as not at all likely or viable, while others regarded this as the most likely scenario. A number of people felt its viability was hampered because the likelihood of the economic growth to achieve it would not materialise, while others felt that it was economically viable but that the challenge in achieving behaviour change as well as technology uptake was not likely to be met. One person suggested that early technology adopters would not see any benefits without behaviour change, and thus this scenario would be unlikely to be achieved.

A number of people recognised that this scenario would require a large amount of new infrastructure which may be difficult to achieve; and in common with other scenarios, people questioned the likely acceptability of more wind power generation as well as the uptake of electric vehicles.

2. Introduction to workshop reports

As part of UK Power Networks' review of their investment plans to be presented to Ofgem in 2013, three workshops were held to review possible future scenarios and the planning assumptions that went with them. The Scenarios were based around the UK's shift to a low carbon economy, and its potential impact on infrastructure requirements.

Each of the three workshops represented one of the networks for which UK Power Networks is responsible, London, East of England and South East England. The aims and agenda for each workshop were identical and are detailed below.

Each workshop followed the same structure. In this report contextual information about the day is outlined within a grey box. All presentation slides are outlined Annex 1.

2.1 Structure of each workshop

Welcome and introductions

James Martin Jones from Dialogue by Design who was the facilitator for the day welcomed participants. James took participants through housekeeping arrangements, introductions, ground rules and the agenda.

Aims of workshop

These workshops aim to give an opportunity for key stakeholders:

- To review the draft scenarios, and provide an opportunity to sense-check and comment on their viability, logic and consistency.
- To test whether participants agree with the underlying assumptions, and if there are any that are missing.

Agenda

9.00: Coffee & registration

9.30: Start - Introduction

9.45 Two short presentations on the UKPN Business Planning Cycle and the scenarios

10.15: Review of the scenarios

12.15: Next steps and wrap up

12.30: End and Lunch

Working agreements

The following ground-rules for the meetings were agreed at the outset

- Comments will be non-attributable
- Try and use plain English
- Accepting that there may be difference of opinions
- Phones/pagers off

3. Workshop 1 – London

Session 1 - Two short presentations on the UKPN Business Planning Cycle and the scenarios

Dave Openshaw from UK Power Networks gave a short presentation (see Annex 1) on UK Power Networks' business planning cycle, the engagement process and how the scenarios and the planning assumptions fit in to this.

Colin Nicholl from UK Power Networks gave a short presentation (see Annex 1) on the process of developing the 4 scenarios and the baseline scenario, and gave brief explanations of each.

James then invited questions and/or points of clarification from participants, the transcript of which is presented below.

Q: Have you calibrated DECC's planning assumptions in terms of creating the scenarios?
A: Yes, we have used wind generation profiles.

Q: Is you intention to test the plans to see the robustness against these?
A: This is one of the key things and why we discarded some scenarios. The process today is on these scenarios. The process should help us decide what the sensitivities are in these in plans, what are the inherent risks and what kinds of mechanisms are needed in terms of the price framework?

Q: You mentioned long term planning but this process is focused on your next price control process. Can you talk about how this fits in with the process today?
A: The plans are looking 50 years ahead; the thing we have to demonstrate is how this price control planning process fits into the next 50 years.
A: We are not just looking at outputs; the long term objective is decarbonisation. This is what we need to be doing in the price control process. Up to now we have been thinking about the next five years – now OFGEM want us to look further forward.

Q: We need to have an eye on Europe and legislation. How are these taken into account in this process?
A: We are looking at the targets we have signed up to; this is such a dynamic area – things change very quickly, and we need to think about the sensitivities around that.

Session 2 - Review of Scenarios

Four stations, one for each scenario, were set up; with a facilitator and scribe to record comments on flip chart paper. Participants were then asked to split into four groups. Each group visited each station in turn for about 25 minutes. They were asked to consider 3 questions in relation to the scenario:

1. To what extent is this scenario viable, logical and consistent?

2. Do the assumptions make sense?

3. Are there any missing?

After reviewing materials relevant to that particular scenario, using the Business as Usual Scenario as a baseline, and reviewing the comments left behind by previous groups, participants were asked for their comments.

Presented below is a transcript of the comments that were made for each scenario, split into relevant themes.

Engaged Green Society

Economic Growth

- Strong economic growth unlikely.
- Economic assumptions very ambitious.
- The whole low CO2 energy enterprise might be unsustainable in terms of retaining the competitiveness of UK economy.

Development/Housing Growth

- Housing developments likely to be piecemeal (not centrally driven) so makes planning for utilities difficult.

Technology Deployment

- The technology deployment assumptions are reasonable for this scenario, except for health check on RHI.
- Assumptions in the narrative - 2nd to last paragraph: IDSOs – no evidence currently. Currently all ESCO driven - all dependent on how they raise capital.
- This scenario is predicated on energy prices going up substantially.
- It assumes Green Deal Works.
- Research indicates that energy prices have to go really high to motivate people to do insulation. Incentives are key – market driven, socially or financially driven. It needs to be outrageously expensive at certain times for people to change their behaviour.
- Resources and skill set gap.
- RHI budget is £800m for five years. Treasury funding may not be renewed after this; therefore heat pump target unlikely to be met, as RHI not fit for purpose. Another view was that treasury funding was for the lifetime of the kit installed, at least for the first take up
- What about landlord incentives? Why not mandate insulation as Govt. is mandating smart meters?
- Is bond finance sustainable? £200bn estimated needed for energy supply. £32bn for energy networks. Paradigm shift needed. These concerns are also relevant for asset replacement. Requires equity injection at some point. Also requires homeowner funding.
- For this scenario, must assume that all technical fixes are rolled out.
- The reality is that people will have to spend more money under this scenario than BAU, as Off/Onshore wind/PV etc. more expensive.
- Energy cost needs major funding – not clear where it is coming from?

Electric Vehicles/Transport

- Assumes sharper uptake of EVs after 2020 - bit optimistic early on. Why wait if you are engaged?
- Interplay between moving e.g. to EV as opposed to changing mode of transport altogether.

Wind Generation

- Exciting scenario but not realistic, e.g. people won't accept on-shore wind etc. But alternatively might there not be a shift in view? However nimbyism is not going to go away - at least not in the short term.

Market Mechanisms/Behavioural Change

- Market mechanisms may play a more significant role than this scenario suggests - smart energy management could really work through third party who can deliver the efficiency that is needed – all around smart meters, smart homes. Maybe existing suppliers or new players and ESCOs etc need to provide a broad range of services.
- The other thing that attracts value is flexibility. Flexibility will have more significance in terms of costs and savings. Aggregators are active at the commercial level at present. Technology in the home needs to reflect this. ESCOs can then manage their demand - never have to suffer imbalanced contracts, so in theory lower costs can be achieved. This could be brought in through Green Deal.
- Not clear that Ofgem would be okay about customers being made "sticky" i.e. not having the freedom to move suppliers. DECC might not care about this if it saves CO2, plus not many customers are moving between suppliers now.
- Once you have all the players in place, the challenge is how you leverage the efficiencies available. Perhaps the industry has to mandate new players to help bring everything together.
- Very ambitious and very unproved, so therefore risky. Level of customer engagement not known. Yes to passive engagement; but active engagement unlikely, so automated measures are best route.
- The scenario assumes customers will engage, but we need to recognise that they will not spend much time researching, tweaking, and managing their energy. First have to have consumer confidence including data confidence.
- What is driving people to engage? Price signals will be there. Somehow need to convey to people that the extent of the increased costs for infrastructure that they will have to foot unless they manage their energy better makes engagement worthwhile.

Missing Assumptions

- No mention of decentralised energy at the district wide level, CHP etc. Make sure there is a focus on this, seen as key to meeting targets by boroughs. Need solutions to risks of fault levels at local level in context of CDP at district level. Needs a technical solution based on fault finding – current limitations of decoupled generation. (Target 25% of London's energy by 2025 through localised generation).
- CHP district heating: scope limited by difficulty of getting pipes through roads (congestion of services under the surface). Therefore very expensive to connect. Hence CHP works best in new developments. Comment: this is a perceived barrier – may just need to work harder. Finance is a

hurdle rather than a brick wall. Locally many of these things should get finance, but not clear who will kick-start the process.

- Should put more emphasis on micro-CDP – there is rather a bias in favour of heat pumps in this scenario at the moment. Or combine heat pumps with CDP - note also impact on generation including nuclear.
- Loading of system unpredictable, but CDP could help even out unpredictability of renewable technologies. ESCO would have spot price and network dynamic price, and aim to balance to continually optimise; plus thermal storage option. Some of this is beginning to happen.
- Water consumption not mentioned. Likely to increase in water stressed area – complex logistics.
- The scenario does not mention smart meters. Roll out will be needed to make this work. (This is mandated to happen - it is a government red line; and in this scenario people are willing to open their homes for smart meters).
- Waste to energy - this might also help achieve CO2 reduction targets if done in a large scale.

Other Comments

- There are big issues about social equity - what are the assumptions about poverty in this scenario? It assumes that positive action/funding available to tackle fuel poverty. This has to be done somehow.

Green Tech Revolution

Viability

- Viable in short term but less in long term.
- Unviable scenario, technology won't change things on its own.
- Unrealistic scenario.
- 6 or 7 out of 10 on likeliness scale (assuming electricity prices).
- If early adopters of technology do not also change their behaviour they will see no benefit and take-up will not spread. We are then back at the business as usual scenario.
- If people won't respond to demand incentives, they won't respond to technology incentives; however there is value in considering this scenario due to the inherent risks.
- Risk: lots of investment but no benefit, leading to economic downturn/crisis, "brownouts" etc.
- Self disruptive scenario: people will stop investing in tech if they do not see any benefit from it.

Development/Housing Growth

- Subsidies also aimed at home production.
- Limited growth in social housing.

Technology Deployment

- There is an element of the market that will need market mechanisms (different for low income) to take up green tech, there will [needs to] be an exponential take up.
- Consumers not prepared to pay for new tech through energy prices.

- Council estate residents have less control over installed tech.
- Are there qualified people to install the tech. Skills shortage?
- With changes in Government policy, uncertainty may be introduced that dissuades the take up of technology.
- High fuel prices will drive material costs higher.
- Can the incentives stay in place for the required length of time?
- Affluence doesn't lead to spending on green technology.

Electric Vehicles and Electric Heating

- Agree with Electric Vehicles and Electric heating.
- Higher income could lead to higher uptake of petrol vehicles not electric, as people are prepared to put up with higher fuel prices.
- Timing system needed for charging cars.

Heat Pumps

- Required uptake of heat pumps unlikely in time frame (by 2020).
- Higher incomes will not lead to heat pumps.

Market Mechanisms/Behavioural change

- There will be change in behaviour tied to fuel prices.
- Unlikely to have low enough electricity prices to happen.
- Consumer behaviour is changing - driven by cost saving.
- Businesses are already on TOU – for London this will have a higher impact i.e. higher take up.
- There is no system in place for consumers to change their behaviour - it is too early to judge.
- Behaviour change is progressive - different age groups are more/less sensitive.

Missing Assumptions

- There are no assumptions based on storage - gas, domestic, electrical, electric vehicles, LPG.
- CHP
- Thermal storage, gives flexibility, different fuels/heat sources - Alternative to heat pumps in urban environment.
- Gas can give quick returns needed in a short time frame.
- Working patterns/behaviour. In North America lots of people work at home or have no fixed office - flexible working hours.
- Urban planning/design - more homes per capita, "inverted cities", how to reflect reality in housing targets.
- Climate change will drive behaviour change, hotter summers etc.
- Compressed air technology.

- Fly Wheels.
- There should be all the possible technologies in the scenario [one person feels there is a lot missing]
- Next new technology sensitivity.
- Correlation between fuel prices/use and household wealth.

Other Comments

- Assumes electricity prices will be low.
- Change names of scenarios and include descriptive tables in packs.
- Fuel poverty/Social Equity – need to be considered.
- Non-financial barriers are very important – customer assurance needed.
- Cooling needed for data centres.
- More of a technology push will lead to less engagement with market mechanisms.

Green Stimulus

Viability

- This scenario seems viable; it is more realistic than engaged green. It is not far from where we are. It is the most realistic, reasonable and balanced, feels like the most likely.
- But when the economy is in the doldrums, is it viable to expect green investment? If it means people have to find cash.
- This scenario feels like a stop gap, short term and would either flip to economic concern or emerged green society.

Economic Growth

- Look at the difference between fuel price and the economic situation.
- Is it reasonable to say that low economic growth will result in high investment in the long run? Will fuel costs do this? (Will costs rise enough?)
- Is 2-2.5% really low economic growth?
- How does this scenario bridge the gap from economically austere to willingness to invest-demand side?
- Local authorities are working on incentives and supporting local energy reduction partnerships, quite low cost.

Technology Deployment

- Energy efficiency of appliances may become more of a feature.
- Does this scenario include the assumption that smart metering will be rolled out? This future is hard to contemplate without smart metering within the technology assumptions.

- Feed in tariffs – don't assume they will stay the same as they are now; they are very likely to reduce?
- Where is increased embedded generation in this scenario? Impact on UKPN stability?
- The RHI will not stretch out to 2030. It will be a lump sum of £800 million to be spent in four years. It won't have an impact beyond 2014. [But others felt that other incentives will kick in as priorities change.]

Electric Vehicles/Transport

- Why is there a significant step up in uptake of EV in 2014?
- Demand low for EV?
- Electric cars – look at projections for company cars. Maybe early uptake then plateaus quite early.

Heat Pumps

- Heat pumps graph is not clear.

Wind Farms

- Be clear on the impact of large amounts of onshore and offshore wind.

Market Mechanisms/Behavioural change

- How many people will really carry out a tariff review on a regular basis?
- Split out the impact of demand-side management between businesses and domestic users because there is potentially so much more impact that can be made with large businesses - This is a point to pick up across all the scenarios.
- Read these assumptions with a business focus – it is important to separate out business and domestic for London. But they are also linked, because business staff are domestic users too and if they change their behaviour at home they expect change in the work place.
- Don't underestimate the power of branding and marketing.
- City may be quite unresponsive, but industry will be more responsive.
- Split between business and domestic usage.
- Banks pay for more energy than they will use to retain headroom. This will need to be rationalised since it is not sustainable.
- Business in London is likely to be very responsive to changing economic drivers. [This was challenged by another group, who felt that many businesses would not regard electricity prices as a key area for them.]

Missing Assumptions

- Where is micro hydro?
- Energy from waste should be included in assumptions, food waste, biomass (heat and electricity).
- Does this scenario support meeting UK CO2 targets? We will need to create large CHP networks to meet targets. There are lots of developers looking into over 1MW schemes.

- Build in a statement on the impact of weather and climate change – impact of super hot or super cold. Resilience to a changing climate is for a later control period, at the moment we are seeing short term peaks only.
- Provide context for meeting nuclear targets.
- Should you include wholesale costs in scenarios? If this is increasing significantly, it would have an impact on behaviour. Is there anything in the scenarios on fuel prices?

Any other comments

- Do you present the drivers in a table so that they can be compared across scenarios?
- Put this information in the context of targets and assumptions.
- Within all the scenarios, build in how these will be funded. ESCOs or private developers?

Economic Concern

Viability

- Potential for short term view - how will it move from BAU?
- Potential to be more expensive.
- Viable - as there is a real possibility for stagnation as in this scenario, spanning long term. Compounded by oil prices.

Economic Growth

- Not viable in London - financial stimulus through wealthy individuals and services. Political environment would not accept risk.
- Would drive economic efficiency.
- If there is no money, why is there investment in network infrastructure and operations?
- Cost of not taking action to carrying out scenario.
- Influence of economies outside UK.

Technology Deployment

- Investment - will it likely be householders investing in PV?
- PV cell technology - take up vs. roof space to number of dwellings – limitation.
- Borough adoption - improving efficiencies through retrofitting housing stock. Connecting to private networks. District level adoption.
- Impact of commodity and fuel prices.
- Generation different - gas instead of nuclear.
- Nuclear assumption - instead gas.

Electric Vehicles/Transport

- Car stock - business as usual level. Is it an oil price that drives the adoption of EVs.

- Investment plan (Reference to EV technology) - Do you invest in infrastructure or in tariffs and demand side management?
- Car stock - will it increase, or increase at all?
- Risk of no/low take up of EV. May depend on economies of scale in EV manufacture. Individuals may continue to use their existing conventional cars - change in adoption could be dependent on fuel prices.
- Fuel prices are key to driving commuters who use cars as a means of transport to look at alternatives. Pattern currently is that fuel price hikes are moving car commuters to take less car journeys (2/3 metres).
- EV - plateau?
- Longevity of EV tariffs.
- Tax on EV, the fuel levy.
- Availability of car parks would influence EV uptake as currently limited charge points. Reduced accessibility (in the case of new flats, reduced number of car spaces).
- Drivers differ between business and domestic e.g. the likes of CSR for business.
- Human behaviour - no transition between EV tariffs if individual monitoring smart meter. Long term view. Willingness to be flexible between tariffs, generation and export, if smart meter carries this out.
- Not meeting/investing in renewable - Govt, DECC, TfL could review transport tariffs to rescope and balance industry to meet low carbon targets.

Market Mechanisms/Behavioural Change

- Variability of tariff is low, how will time-of-use tariff encourage the penetration assumed?
- Over peak demand - market prices, would they be suppressed?
- The underlying cost of electricity drives individuals' sensitivity in adopting time-of-use tariff.
- The sector a business sits within will influence how it will engage in the time-of-use tariffs, as some require electricity at a rate that will not be able to adopt into variant time slots for use.
- Split and identify tariff response between business and residential.

Missing Assumptions

- Micro CHP - individuals would be encouraged to buy into this technology due to economic drivers (electricity and gas price increases) and through the time-of-use tariff.
- Storage - gas and electrical.
- Interconnectors - if increasing import to UK.

Other Comments

- UK position within Europe - is it viable to consider UK as "Stand alone"? Should we consider UK in wider context?
- Economic concern - realise return in green technology in shorter term.

- Assumes maintenance, high health indices are kept under review and in check - BAU carried out.
- Will people be willing to accept a lower service, in return for decreased electricity prices, more faults on the network etc? Trade off.
- Would resilience be compromised due to economic concern? Impact of decreasing resilience in London would not be acceptable (High impact/Low probability)

James then closed the session by asking participants for final thoughts and comments on the scenarios. The transcript of which is presented below.

The different viewpoints put forward were really useful for us at UK Power Networks; every group had really good comments to add.

Absence of micro-CHP in all scenarios, particularly for London with high gas penetration, was a key observation.

EV demands were generally low.

On heat pumps, it is strange for it to tail off; this is not viable unless people are having them installed and then removed. Maybe this is just a quirk of the model.

The Green Tech Revolution has inbuilt inconsistencies, it may be worth having some more dialogue on this scenario.

CHP and district heating in London is not considered in these scenarios. This is likely to be the same in other inner cities.

There are difficulties in installing district heating. There is a relative costs issue.

- It is coming out as economically viable in our assessments.

Q: In the last stakeholder engagement, the response was very disappointing because the document was 40-50 questions – it was not focused enough. How are you going to make sure you engage with everyone?
[Participants were directed to the website where they or there colleagues would be able to participate in the engagement process.]

A: This is a fair point and the last engagement was limited in nature, it was a minor part of the price control process. Under the new framework it is much more central. We have to have price versus service debate. We will do lots more in terms of events, some general and some targeted; particularly around environmental performance. There will be lots of opportunity for people to bring their own expertise.

There was very little mention of climate change in the scenarios. What happens in terms of hotter summers with extra air conditioning installed?

As we do decarbonise, electric heating will make a comeback. How do we plan for that?

Water companies and other utilities should share scenarios and assumptions.

Session 3 - Next Steps and Wrap Up

Dave Openshaw concluded the workshop by briefly describing the next steps in the engagement process, and directing participants to the engagement website where they and their colleagues would be able to add further comments on the scenarios.

4. Workshop 2 – South East England

Session 1 - Two short presentations on the UKPN Business Planning Cycle and the scenarios

Dave Openshaw from UK Power Networks gave a short presentation (see Annex 1) on UK Power Networks' business planning cycle, the engagement process and how the scenarios and the planning assumptions fit in to this.

Colin Nicholl from UK Power Networks gave a short presentation (see Annex 1) on the process of developing the 4 scenarios and the baseline scenario, and gave brief explanations of each.

James then invited questions and/or points of clarification from participants. The transcript of which is presented below.

Q: Any thoughts on why people aren't participating in the South East Region?

A: With the current financial conditions, there are constraints. You need to justify why you are going to meetings – you need to clearly express the importance, and make sure it gets to the right people.

A: You will find with local authorities that people are panicked about costs, but we are being told to be more efficient. I think local authorities haven't got on the train of efficiency yet. In the private sector we have had the ability for a long time to turn all our light switches off automatically. In the public sector they decided to instead have light switches and get people to go around the offices and turn the lights off. Of course this is much less efficient. You really need to focus on energy efficiency, and if you focus on energy efficiency I think you will get more take up. The cost of getting here is also relevant.

A: I though there would be more developers, I wonder what publicity you have given to developers. At the end of the day, they are affected whether they want to build new housing developments or a new power station.

Session 2 - Review of Scenarios

Four stations, one for each scenario, were set up with a facilitator and scribe to record comments on flip chart paper. Participants were then asked to split into four groups. Each group visited each station in turn for about 25 minutes. They were asked to consider 3 questions in relation to the scenario:

1. To what extent is this scenario viable, logical and consistent?

2. Do the assumptions make sense?

3. Are there any missing?

After reviewing materials relevant to that particular scenario, using the Business as Usual Scenario as a baseline, and reviewing the comments left behind by previous groups, participants were asked for their comments.

Presented below is a transcript of the comments that were left for each scenario, split into relevant themes.

Engaged Green Society

Viability

- Feels most viable of the scenarios.

Economic Growth

- Economic growth assumption looks over-optimistic.

Technology Deployment

- Thermal efficiency assumptions look over-optimistic - how do you make a period property efficient?
- Heat pump uptake depends on RHI and the Green Deal.

Electric Vehicles/Transport

- Traffic congestion will continue to grow - as road capacity is unlikely to increase. (Canterbury decided not to increase capacity in the city and developed park and ride from the outskirts).
- Trying to get more passengers onto rail network - price will be a key driver for this.
- Be explicit about variables such as efficiency of batteries for EV's - may make a big difference to uptake.

Wind Generation

- Not convinced people want onshore wind farms - body of opinion hostile - but maybe wind corridors may lead to clusters of onshore wind farms.
- Large onshore wind - 'accelerate' unlikely because opportunities limited and opposition likely to be vociferous and well organised; and there are physical constraints in this region. People more knowledgeable, but not necessarily more supportive.

- *Market Mechanisms/Behavioural change*
- Making energy 'visible' through meters likely to be helpful in reducing consumption.
- Consumption analysis - domestic consumption stays broadly the same throughout the period - would expect this to decline.
- Incentives needed for people.
- Most people will need efficiencies to be taken care of automatically.
- A lot depends on trends in home-working and the overall impacts of this on energy demand.
- Unlikely to be reduction in energy use up to 2016.

Other Comments

- What percentage of the population can be expected to be green-minded as time goes forward? - need to assess this for each scenario based on where people are now.
- People like to think they are green, but actual choices may well be different.

- Engaged green society likely to be driven by initially small groups/communities engaged and following localism agenda - these likely to be drivers for developing model for change and engage wider support.
- Parkway stations are coming onto the agenda.
- The scenarios need to be developed based on Government policy.
- Other utilities will be developing their own green agendas - need to factor this in.

Green Tech Revolution

Viability

- More realistic than Engaged Green Society (which may be too optimistic).

Economic Growth

- Can growth this high sustain itself over a 10 year average?

Economic expansion unlikely.

- 3.5% is a realistic assumption of growth.

Development/Housing Growth

- Caution/uncertainty in development - due to uncertain policy framework.
- Capacity in building industry not there due to previous economic downturn.
- Developers are currently minimising risks - small developments, infilling.
- Agreement that population influx due to econ growth could lead to housing 'crisis'.
- Will be low growth in floor space.

Technology Deployment

- A big change from today would need a large infrastructure expansion.
- Resources and skills not available.
- Realistic assumption - 'smart' appliances.
- People will buy appliances, but not invest in property. 'Invisible improvements' not desirable.
- Smart meters that display current usage are a large incentive to reduce use of electrical appliances.
- Energy efficiency will come before technology.
- People may become disillusioned if early adopters find tech doesn't meet their expectations.
- Interface with technology must be made as easy and convenient as possible e.g. 'electric car charging' and 'smart meters'.
- Greater manufacturing and distribution to meet increase in tech/appliances/ consumables will need to be powered.
- Affordability of appliances important in decision-making of consumers.

Wind Generation

- Don't believe onshore wind expansions can be as high - local opposition.

Market Mechanisms/Behavioural change

- Reasonable to assume people's behaviour won't change.
- Market structure doesn't help.
- Yearly census of smart metering may be more useful.
- Reasonable assumption that people's behaviour won't change in terms of when they want power. Would take very large incentive to change this.
- People will change on the basis of cost.
- Price change incentives will influence people's behaviour.
- Smart metering/time-of-use tariffs not a physical restraint but a fiscal restraint.
- Appliances will need to change to include timers as standard.
- Flexible working will be necessary.
- Consumers/people want consistent pricing over 1-2 years.
- Lower increase in energy demand.
- Working pattern change will continue - financial constraints are driving flexible working patterns.

Other Comments

- Improving efficiency of transmission.

Green Stimulus

Viability

- Pessimistic scenario - no reason to believe growth will be low for an extended time.
- Very viable scenario.

Development/Housing Growth

- No assumption that good housing targets will be met. Population growth may be higher.
- Sufficient growth in population in some areas.
- Fewer large households, single person households.

Technology Deployment

- Chicken and egg situation, need to understand what the consumer wants before installing technology.
- There is a challenge to promote technologies and tariffs to individual households.
- Local authorities cannot influence private home owners, only council tenants and lettings.
- Insulation/home modification driven by regulation, not by long term costs.
- Thermal efficiency surveys - important.

- People are interested in the future selling price of their house rather than its running costs.
- Large part of society won't look into/consider household efficiency.
- Would expect thermal efficiency would be much higher due to high fuel prices and the low cost of improvements higher than EGS and EC.
- Longer product life cycles may lead to less opportunity to re-invest; less opportunity for maintenance may lead to lower efficiency.
- Inappropriate tech installed due to 'trends' e.g. wind turbines on roof.
- There has to be infrastructure and availability.

Electric Vehicles/Transport

- Employers will play a large important role e.g. charging stations in workplace, shopping centres, supermarkets.
- Too much emphasis on EVs – hybrids much more likely tech.
- EVs may be more prevalent in business.
- Consistent proportion of different vehicles across scenarios. New battery tech may introduce variation.

Heat Pumps

- A good thing that there is large variation in heat pumps across the scenarios.

Wind Generation

- More on-shore wind needed in this scenario – higher than EC and EGS.
- Offshore wind growth may be too high.

Market Mechanisms/Behavioural change

- Large bulk of people are ambivalent about the drive to a low carbon economy. Waiting to be driven by Government.
- People will only move if driven by cost savings – more so in hard economic times.

Missing assumptions

- Hydrogen vehicles, other forms of powering transport.
- Flexible working arrangements.
- Electricity storage.
- Renewable heat incentives

Other Comments

- The likely future will be a combination of the scenarios.
- The behaviour of UKPN can modify/influence people's behaviour and influence other suppliers
- Penalise suppliers for bringing in the 'wrong' type of customers.

Economic Concern

Economic Growth

- Those economic targets are too pessimistic - however if economy stays so stagnant, then those targets/scenarios are correct.

Development/Housing Growth

- Uncertainty in level of economic growth – hence difficulties in planning.
- Current economic climate makes people move around, which has an impact on planning and investment in current areas.

Electric Vehicles/Transport

- Making EV charging points more visible so people become more interested in hybrids; high visibility.
- Targets are more short-term, in individuals' eyes and that's their preference.
- Investing to save is not what people are thinking of.

Heat Pumps

- Some assumptions are not an interest locally (heat pumps are not really used in certain districts).

Wind Generation

- It is expected that the current position on targets and disruption will remain unchanged i.e. if wind farms are not popular now, they will remain unpopular.
- Likely that on-shore wind will always be low, as there is an assumption that people will always object it.

Market Mechanisms/Behavioural change

- Network companies dealing directly with customers.
- Education for the future i.e. school kids about investment in future – to teach thinking about the future.
- Manage electricity demand by price to make people more efficient.

- *Other Comments*
- Share infrastructure networks e.g.. digging and laying ducts.
- Moving services from roads to pavements to reduce road maintenance costs.
- Capturing roles with different industries. Make it more visible (our scenarios), make it more relevant to other people.
- Contradiction on what the money is really spent on – i.e. is it nuclear or electricity bill etc.
- Not enough evidence that targets are met (pavement targets).

- Focus more on electricity. Keep doing what you're doing. Efficiency takes priority. Use existing sources to make them more efficient.

James then closed the session by asking participants for final thoughts and comments on the scenarios. The transcript of which is presented below.

Building partnerships is important. On the cost of winter road repairs and installing capacity for decentralised networks – is this investment looking at these scenarios? Can we use public money that is being used for this to invest in the decentralised network?

What's likely to happen to the housing market? Energy efficiency in existing homes - this should be UK Power Networks' responsibility: leading the government in terms of subsidy and development.

Councils have no control over private housing stock. Ownership of this agenda will be an important role.

On sustainable urban drainage: we will be looking at installing over urban areas corridors for capturing water runoff. Maybe there is an opportunity for discussing with the water industry in digging up space used for drainage rather than roads. Can we use our combined investment power?

On free user information: understanding that we have had 15 to 20 years of people engaged with green issues who have probably made most of the changes they are going to make. There are also people that do not operate in this way. How can we help these people make money through making energy from their homes? We should be providing people with the information, in conjunction with suppliers, to help them in doing this.

On how to get people to these events - I didn't expect it to be like this today. I thought it would be on planning development. It was more about sustainability than this. You should have made this clearer. There are people interested in sustainability that would have come. There are sustainability officers who may be more interested. I also didn't know who UK Power Networks were.

Session 3 - Next Steps and Wrap Up

Dave concluded the workshop by briefly describing the next steps in the engagement process, and directing participants to the engagement website where they and their colleagues would be able to add further comments on the scenarios.

5. Workshop 3 – East of England

Session 1 - Two short presentations on the UKPN Business Planning Cycle and the scenarios

Keith Hutton from UK Power Networks gave a short presentation (see Annex 1) on UK Power Networks' business planning cycle, the engagement process and how the scenarios and the planning assumptions fit in to this.

Colin Nicholl from UK Power Networks gave a short presentation (see Annex 1) on the process of developing the 4 scenarios and the baseline scenario, and gave brief explanations of each.

James then invited questions and/or points of clarification from participants. The transcript of which is presented below.

Q: Are we considering the difference between electricity and gas, are you a provider of both?

A: Only Electricity.

Session 2 - Review of Scenarios

Four stations, one for each scenario, were set up with a facilitator and scribe to record comments on flip chart paper. Participants were then asked to split into four groups. Each group visited each station in turn for about 25 minutes. They were asked to consider 3 questions in relation to the scenario:

1. To what extent is this scenario viable, logical and consistent?

2. Do the assumptions make sense?

3. Are there any missing?

After reviewing materials relevant to that particular scenario, using the Business as Usual Scenario as a baseline, and reviewing the comments left behind by previous groups, participants were asked for their comments.

Presented below is a transcript of the comments that were left for each scenario, split into relevant themes.

Engaged Green Society

Viability

- Logical and consistent, but a very rose-tinted view. Great if it happens, but tough to achieve.
- Nice to start planning it, but will it fall into place in such a short period?
- It needs to be cheap for this to happen – crucial success factor.
- But for it to happen, it needs to tie in to something that is aspirational.
- Not clear how this shift will happen.
- Sustainability overkill - can almost hear people groan when they hear the word, because it makes everyone feel guilty.

Economic Growth

- Economic assumptions - population growth: what is the 9 year average – which 9 years?
- Economic growth (high): this seems high – makes sense for the scenario, but actually seems ambitious. However, if anywhere will bounce back, it will be the Eastern region (which can also piggy-back on London as well as the growth it generates for itself).
- People have other things on their minds, especially paying off debt – many are scared and exposed by the credit crunch.

Technology Deployment

- The scenario is ambitious - recognise that this is the nature of this scenario.
- People, especially men, like gadgetry. Investment in green technology is a good investment while interest rates stay low, but depends on how long people stay in their homes.
- Renewable generation is very ambitious.
- Selling tariffs to customers is very, very difficult.
- But Government is apparently relaxing the Code on Sustainable Homes.
- Presumption in this scenario that there will be a shift in mind sets but not sure the logic follows from people having enough money to buy/invest in green lifestyle. This applies to all four scenarios.
- Don't agree that nuclear will be delayed as much as this scenario suggests. Not the Japanese tsunami that will cause slippage – more the general lack of confidence, and that the industry is holding fire for the most favourable places for it to go internationally.
- Need more information on how large-scale renewables growth can achieve this scenario.
- It is not clear how 2nd-to-last paragraph of narrative is driven by this scenario.
- Carbon capture and storage - all scenarios seem to conclude it will be a damp squib, but it is not clear why this assumption has been made.

Electric Vehicles/Transport

- EVs: this scenario should be more ambitious on this.
- Rate of growth of car ownership - this scenario may not be ambitious enough in terms of moving to other transport modes, even if EV grows rapidly – this depends on level of change in public transport.

Heat Pumps

- Question mark over heat pumps and wind power as major delivery measure for this scenario - agree, real question mark. Never get 4 million heat pumps. Other forms, e.g. geothermal: e.g. Southampton and Newcastle are possible – may be possible to scale up?

Wind Generation

- By and large this is very unlikely: most people object to onshore wind farms unless communities benefit from revenues of generation.
- If offshore wind comes on-stream in a big way, that could benefit East of England.

Market Mechanisms/Behavioural change

- Good idea but highly unlikely – e.g. people generally want to fly and consume more. That is not going to go away. Does EGS have more people in it?
- Philosophy is that consumption will go down, but not seeing much reduction in demand.
- People more motivated by cost, so need to focus on how to influence behaviour through cost. People won't come easily; bigger concern is the economic recovery. Will I change my electricity use patterns for a 5p change in tariff at peak time? Probably not unless the cost differential is very significant.
- Consumption graph - potentially credible, but seems difficult to see happening. More home workers in EGS, maybe people will use cars less as time goes by.

Missing Assumptions

- CHP missing.
- The cost of carbon is not included explicitly in the scenario. This could make a big difference, notably CO2 reductions through Climate Change Act.
- Energy from waste plants - lots planned around the country including Suffolk, not mentioned in these scenarios.

Other Comments

- Not much about grid management at the generation end e.g. storage at wind power end.
- European Super Grid not addressed in the scenario.
- This is the policy pathway that we are going to follow; problem is whether consumers are going to come along. Consumers are the biggest challenge, but businesses and consumers influenced by cost, rather than by policy.
- We will achieve something like this scenario eventually, but by then the horse will have bolted.
- No investment numbers in here; this would allow us to see how realistic the level of investment required actually is.
- The clue is in the title: this scenario assumes that society is or will be engaged, but it is not.
- Cost is a huge factor.

Green Tech Revolution

Viability

- Yes - a viable future.
- Requires mind set change - is this likely?
- Most realistic scenario.

Economic Growth

- Long term a viable scenario, not in short term, as economic growth will be too low. Realistic - growth could return this Parliament.

Development/Housing Growth

- Government fast-tracking planning process to get more houses built.
- Why 9 year period used for growth of households? Should it be longer?

Technology Deployment

- Assumes everyone will have capital to invest - loans available, however some people will find it too complicated.
- No one solution fits all.
- Investment may be deterred by companies with low penetration / track record. Uncertainty over companies' future existence.
- People generally have much higher discount rates, don't like investing for very long-term gain.
- By default, replacement appliances are more efficient.
- Cost associated with fast technological change. Appliances don't meet their estimated life.
- Technology will need to be in place to be "smart" on consumers' behalf. Consumers unlikely to change usage. People happy paying more, see value in peak usage.
- Increase in use of technology in society; however substitutes, can only use one thing at a time.
- May be improvements in battery technology.
- >50kW PV now not incentivised under FIT.
- Model doesn't include large users such as data centres.
- Domestic appliance assumptions reasonable.
- Block/district developments harder with multiplicity of home ownership.
- Energy prices increasing will incentivise investment.
- Major investments e.g. wind are dependent on international economy/negotiations.

Electric Vehicles/Transport

- Electric vehicles more likely than heat pumps, payback on EV much quicker, immediate saving compared to fuel price at pump (hybrid).
- Will be reasonable amount of EV.
- EV will come in – driven by higher fuel prices. But infrastructure needs to be in place first – and the technology needs to improve - "mile anxiety".
- People need to change at work.
- Family usage of cars may influence behaviour - timers needed, charge at night.
- 2030 assumption ~30% EV take-up should be much higher for this scenario. Range could expand a lot.
- 2050 assumption for EV too low for this scenario - fuel price could be very high by this point.

Heat Pumps

- Heat pumps need bigger incentive.
- Heat pumps will come forward with RHI tariff.
- Retro-fitting of heat pumps will be very low, PV more likely. Retro-fitting heat pumps is too expensive to be realistic. Smaller and smaller plot sizes: is there space? Finite amount of thermal efficiency in old housing, hard task getting thermal efficiency high enough for heat pumps even in new houses. Retro-fitting is a problem: cost, disruption - don't want garden ripped up – but boreholes are also available.

Wind Generation

- Public still negative towards onshore and offshore wind.
- If Government wants wind generation to happen, it will.
- Wind farms proposed in Cambridgeshire much lower than proposed targets.
- Offshore wind is likely to be high. Too much opposition to onshore.
- Low reliability of wind - how much impact on UK PV network? Doesn't match demand in output.
- Disagreement over whether opposition to onshore will change in time.
- Developers will push for wind turbines to meet targets on renewables (onsite generation).
- Large onshore wind: lots of opposition - requires mind set change - Kings Lynn - West Norfolk.

Thermal/Energy Efficiency

- 30% on private properties may be difficult to achieve e.g. solid wall insulation will change the property visually. Concern over impact on property prices, every house bespoke to each family's needs.
- Could be possible with new build – harder with retrofitting.
- There will always be people who aren't motivated to change even when cost-effective, e.g. loft insulation.
- Energy efficiency / thermal efficiency targets may be too optimistic - historically not very strong.
- People generally more mindful of energy efficiency now – but it has increased from a very low baseline.
- Energy efficiency a low priority - token efforts generally. Very disruptive to household. Concern over house prices if rooms made smaller through insulation.

Market Mechanisms/Behavioural Change

- Fuel prices are high now, yet no change in behaviour. Is it likely to change in future?
- There will be an increase in load/demand.
- Consumer faces lots of hidden costs – DNO, supplier, generator.
- East of England is a services-based economy. People need power while they are awake. Less industry to influence usage.

- People will have to adapt to usage change. New generations will change - cost of electricity important - cost of carbon.
- Information barrier.
- Working week changes, e.g. Japan: government incentives for companies.
- Up to 2020, electricity use projection: 2% growth in East of England Energy Efficiency Study (DECC).
- Business will be incentivised by tax relief - green business is a selling point - easier to move premises.
- If costs were more visible (DNO/supplier etc) this may make a difference to people's behaviour.
- Commuting patterns likely to change.

Missing Assumptions

- European Super Grid.
- Biomass - lots of opportunities – this may have impact on network.
- District heating possible in market towns - CHP.
- Increased air-conditioning demand, resulting from climate change.
- Carbon price could be major factor.
- Wood burners becoming more popular.
- Domestic storage - batteries charged at night.
- Large energy storage - tidal.
- Carbon capture and storage not captured in any scenarios, only BAU. Scenarios should capture variability in CES.

Other Comments

- Would expect bigger variation in all assumptions/scenarios, given narratives.
- More money to be saved by using less energy rather than CRC.
- Targets for carbon reduction could be missed.
- Conditional connections contracts - technology must be installed to be connected.
- Energy is too cheap (high carbon price needed) - however, big lag in response to energy price.
- Energy suppliers need to be more engaged.
- UKPN needs to pass on tariff to suppliers.
- Collaboration between DNOs - similar regions at boundaries.

Green Stimulus

Viability

- Sounds realistic - the scenario we're in: enough government stimulus, lots of new aspects coming through green investment bank. Packages will be there, but will there be consumer take-up?
- Seems to be the most likely scenario.

Economic Growth

- Economic assessments - are they realistic? (3-3.5 and 2-2.5) 1% reasonably well-recognised.

Development/Housing Growth

- Developers are being expected to take on a lot of the cost – they are taking a hit.
- Designing for lifestyle first, developers want it both ways (modern house and low energy bills). They want to ensure customers can get what they want (therefore huge amount of energy).

Population Growth

- Where is justification for slow population growth? Agree, can't control population.

Technology Deployment

- Smart meter roll-out - look at loads and tariffs.
- PV - fear of new technology; many people like old technology.
- EfW and CHP: projects are coming up.
- Look at demand, charge times regarding technologies, i.e. electric vehicles.
- PV makes sense - good return as a result of FITs. Why would this change? Investment front.
- Consider domestic homes built unlikely (agree) to retrofit a heat pump. Offset heat pumps with PV – need in combination.
- Condition of asset? How does this come into play? Similar to gas and its roll-out. (Consider load and non-load growth). Optimise investment profiles.
- Investment in households - does this scenario allow for this (i.e. recoup of costs)? Yes, mortgage against property rather than network, good idea, different way of thinking, could be tax deductible?
- Timescale (2030/2050) - how does it work with older properties, how long will it last and who funds it? How does this relate back to customer?
- Will wind turbines and heat pumps be the answer? Demand will continue to rise. Need a package of all kinds of production.
- Cost exercise; look at retrofitting rather than new build (respond on piecemeal basis).
- Drag - is it realistic for these scenarios to be achieved? Are there the skills, etc?
- Will Government incentivise? Unlikely to be a large investment, doing by regulation.
- Decentralisation of energy sources. How do you plan networks and influence where reinforcements are located?

- Costly to deliver zero-carbon homes on site, community energy funds key.
- Government feed-in tariff, want benefit for individuals. How will renewables generate impact? 1000 PVs vs. 1 turbine. Need to work through local level, understand cost with guiding hand.
- Agree that rolling out all technology at once is ideal.
- People focus on easy wins. Bigger investments are the challenge for these scenarios.
- Micro-generation (is there an additional cost?). Big debate regarding local vs. central generation. What would local generation consist of? Local wind farms, domestic generation. Wholesale basis could be cheaper than central.

Electric Vehicles/Transport

- EV - will government invest in infrastructure? Sophisticated scenarios and arguments already exist. This is just additional evidence. How do you switch thinking? Costly - substantial part of future when you look at fossil fuels. More urbanised. How do you get power to older builds? Street vehicle charge points on roadside.
- EV appropriate for dense urban areas, but not countryside/rural. Based on how far you can drive vehicle, charged battery life (swap). Charge points at railway station / supermarket. Charge using credit cards. Certainly to begin with, hybrid more likely.
- EV - potential for more demand of power, large demand (charge at work not just at home).
- Take-up urban vs. regional. Certainly a factor, range better, price of fuel a factor re EV, often seen as second car rather than replacement/only (= this scenario) - range and infrastructure key.

Heat Pumps

- Heat pumps ramps up quite significantly according to graph – is the industry geared up for this? (Not at the moment). Not a zero-carbon technology. Large developments, but maybe not suitable for individuals.
- Barrier = up-front cost, need to be able to tick all the boxes for regulations, etc.
- Heat pumps - too aggressive, difficult to predict, require cultural change – are they going to be a big thing? Scenario starts from a low base.

Wind Generation

- How much contribution will off-shore wind have? A lot is already being built.

Behavioural Change

- Is the pattern of where people work an important factor? Capacity for people to work from home could change scenarios. Flexible working would also affect fuel bills i.e. household bills increases, transport decrease, demand flattened?
- How will you make it so that consumers will do it?

Market Mechanisms/Behaviour Change

- Can look at load shift patterns in relation to tariffs - difficult shift to enable changes.
- If we're wrong? Need to get middle ground. Increase of 5/6p per unit is quite high for customers.

- Incentivise off-peak charging (slow trickle charge).
- Tests under market mechanisms (peak load).
- Lop peak and flatten load wherever possible.
- Matrix (electricity market reform): are there other assumptions that aren't outlined in model? Model is simplistic around responsiveness to price. What legislative change is realistic/required? Take out this factor and you end up with two scenarios that are effectively the same.
- Need everyone working together. Want to minimise investment and spread it out to minimise peak load.
- Change BST, save energy need - simple step for Government.

Missing Assumptions

- Energy storage key – smoothing out peaks; encourage people to charge overnight.
- Managing storage, blue sky thinking.

Other Comments

- Joint utility work "pie in the sky". Practical point of view. Little difference to man on street.
- Excellent aspiration. But where will money come from?
- Seems more achievable than Engaged Green Society.
- Lack of incentives. Emphasis on incentives; however there is the outlay.
- People are reducing debt, and society is moving towards a more sustainable economy.
- Timing issue: when does it filter through (how to convince)?
- Is demography factored into scenario? To some extent (built into base profile).
- Can you do joint work with cabling for broadband? Two technologies complement each other.
- Impact on customers and the bills. Government unlikely to fund.
- Scenario is just for East.
- Netting off within scenario.
- Context of scenarios as painted in relation to cost. Different emphasis according to each scenario - balance. if no intervention, cost of energy will be sky high..
- Implementation impact?
- General assumption that energy will cost more.
- Regeneration projects look at future-proofing.
- Can get some utilities to work together if, say, covering a road, don't want to dig up multiple times, trench sharing doesn't work. Be good to see them compelled to work together (telecoms do it) - quality of job done important.
- Text final paragraph - interesting to know how this has been put together (further detail useful) - relationship to ESCOs.
- Data is inhibitor to ensuring technology works, and how consumers are responding.

- Rise of independent, distinct subsets. Different pockets of investment need to ensure investments are optimal.
- Would business be targeted in same way? Yes, probably more so.
- Consumption stays consistent, balanced.
- Need to know if there's support for legislative change.
- Needs to be shaped in right way - large scale vs. small scale.
- Acceptability of local supply needs to have local benefit.
- Community/industry/commercial solutions.
- Local take-up driven by legislation. How does it change what you need to provide?
- Urban greening - don't want to constantly dig up roads.

Economic Concern

Viability

- Likely; government spending. Highlight economic status of Greece and Ireland.
- Now to the next 5 years. Real for now and next 3 years, then transition from 3-5 years.
- Situation now, not long-term. Will transition to another economic cycle.
- EPN area less affected than UK as a whole.

Economic Growth

- Economic growth rate - conservative value.
- Regional growth will differ – is this considered?
- UK's position within the wider global economy - external influences.

Housing Development

- House building projections to increase 14/15 in line with scenario. Vary in region. Region level consideration in scenario? Yes
- Housing more likely in public domain vs. private. Influence type of generation connected and impact.
- Household target - currently at the stated value that has been assumed.
- Household assumption low - set as minimum. Differs between regions. More like 80%. 50% more like 09/10, 10/11 figures.
- Households predominantly private - housing association funding drying up.

Technology Deployment

- Government commitment to stimulate green technology uptake to transition out of this scenario.
- RHI (Renewable Heat Incentive), PV and solar/water could turn out to have a large uptake.
- Long-term return. Willingness of customers to come round to that thinking.

- Variance between urban and rural in types of generation, e.g. gas.
- Government policy will drive the type of technology that will be invested in. impact if policy changes? ROC, banding of renewables.
- Oil price - influence on take-up of gas heating and EVs.
- Consumer appetite will be a contributing factor.
- Will consumers pick and choose technology/incentives to ensure to carry on traditional behaviour, e.g. cars (traditional) still used even if prices for fuel are high?
- Green deal - Q4 2011 - built in? Will determine level of funding available e.g. to households.
- Community opinions base varies. Will influence investment in technology and impact on network.

Electric Vehicles/Transport

- Would Government intervene to alter car/EV uptakes?
- Outline the note on Government intervening in influencing EV uptake through limiting conventional car options.

Heat Pumps

- Heat pumps heavily prevalent in scenario assumption. This is an expensive technology. Is it sensible to assume for "economic concern" that this is a technology that would realise heavy uptake? Green Deal will remove the up-front cost?
- Heat pumps - none. Economies of scale only at large scale development, expensive, no/low return.
- Specify type of heat pump, i.e. ground/air. Ground: sensible for new builds as cost for re-fit. Air: cheap how effective and efficient is debatable.
- Heat pump reversed operation - cooling.

Wind Generation

- Wind generation - view differs council to council. Technology will struggle for uptake (view from council areas).

Thermal Efficiency

- Baseline consumption of 30% homes treated by 2050 optimistic.

Smart Meters

- Consumer way of thinking: smart meters carry out operations/choices dependent on incentives.
- Don't see consumers taking an active approach in reviewing smart meter, instead meter itself carries out "smartness".

Market Mechanisms/Behavioural Change

- Less peak load and load growth. Easier for planning.

Missing Assumptions

- Biomass - considerably notable in areas of agriculture, e.g. Bedfordshire.

- Price of carbon - how it drives the influence of technology that will be invested in and implemented.
- Cooling - particularly in the individual area, could become more prevalent down to domestic level.
- CRC commitment? Is this missing?
- Climate change - effect of changing temperature, factor in and analyse effect of variance.

Other Comments

- Customer behaviour/attitude to green generation driven by money.
- Demographic of consumers will influence load and technology.
- Scenario application at regional level.

James then closed the session by asking participants for final thoughts and comments on the scenarios. The transcript of which is presented below.

It is quite difficult to put numbers into models reflecting the words – some of the numbers look similar, but there are big differences between the scenario narratives.

Q: Has this workshop shown anything different to the other two?
A: It varies from group to group with in the workshops. This workshop thought the deployment of technology would be high, EV for example. Heat pumps were more plausible in the previous workshops and less here.
A: I was interested to see the difference in rural and urban impact, however I found that there is not as much of a marked difference as I expected there to be.
A: Engaged Green Society - there has been a different take on this scenario but similar issues came up in all the workshops.

Q: Where were the other workshops?

A: London and Crawley. There were lower numbers in Crawley (that was the main difference), although we went through the same process.

Q: Ofgem has asked you to put together the investment plan. Why would UKPN want to invest, what do your Chinese stakeholders expect?
A: We are allowed to charge an interest rate on the investments we make.

Q: Are you going to ask us to participate on outputs, will you email the details to us?
A: Yes, we will put it up on the website, and we will also email you to inform you.

Session 3 - Next Steps and Wrap Up

Keith concluded the workshop by briefly describing the next steps in the engagement process, and directing participants to the engagement website where they and their colleagues would be able to add further comments on the scenarios.

6. Online Feedback

From 1 July to 12 August 2011, the engagement website http://yourviews.ukpowernetworks.co.uk/ hosted an online form which gave people an opportunity to provide feedback on the scenarios and the business as usual baseline. The scenario materials that were available to people who attended the workshops were also made available. Over 50 people visited the site with 11 people offered feedback to one or more of the scenarios.

In the following, the comments received are listed by scenario/ consultation question.

Economic Concern

1. To what extent is this scenario viable, logical and consistent?

UserID: 7

Some of the assumed timelines extend to 2050. The austerity measures undertaken by the public, and to an extent by the public services infrastructure, should have filtered through and the economy become stronger. Measures should have been introduced to ensure a collapse of banking cannot happen to the same extent, therefore growth and investment in renewable energy and energy efficiencies may be higher than assumed. Fuel prices will increase significantly over this time however, which means that commercial, industrial and public sector will be required to make necessary energy efficiency improvements to obtain best value for money and competitiveness.

Heat pump uptake assumption based on average of last 20 years is unrealistic, especially as air source heat pumps become more widely known about in the general public. Should be based on average of the previous 5 years.

Policy to limit growth in number of cars will be highly unpopular in the general public and unlikely to get through a parliament although it is likely to be an EC intervention, so ability to stop will be reduced. Suggest this may be an intervention to limit cars (and other vehicles) operating with fossil fuels, but that other types will have more options (EV, fuel cell, biogas etc). Such intervention is likely to ensure car makers change operations to mass produce these vehicles as opposed to making them special cases as is currently the case.

Time of use tariffs will only work if a smart grid is operating to allow effective 2-way decision making, simple smart meters giving information on consumption only will not be enough.

UserID: 8

Agree with scenario as medium to high viability but would comment on its described impact:
Micro Generation is a consequence of changes in Government legislation and to become more common place even under economic depression with legislation and Building control restrictions already in place. Electric vehicles will form part of a number of alternatives for some time. In the long term Electric vehicles may provide a popular and viable solution for City use when considered with Nuclear power station role out and rising fuel costs which is a given. The grid system will have to accommodate this with upgrades and consider an increase in residential demand as the focus switches to home life.
Infrastructure capacity requests for capacity to new developments will not change from micro and energy centre generation. The grid will need to cope with the unpredictable load as inevitable fuel price increases make energy centre and micro generation as viable and cheaper alternatives.

UserID: 16
This scenario seems viable in that is it likely to happen and assumptions are logical and consistent with the picture of the economy as described.
Our interest is how this scene affects UK Power Networks and what you estimate the effect of this scenario is on your power distribution network.
You give heat pumps too much priority. The cost of retro-fitting them is prohibitive. PV is a much more likely and easier to retrofitted and this energy saves more carbon.

UserID: 32
I don't this scenario is likely.

People are mostly optimistic. I don't even open my credit card statements. At least I don't know how much credit I have left. I'm sure the UK administration acts a bit like that.

UserID: 34
Under this scenario, the UK economy struggles to recover from the credit crunch, Government investment is limited by the drive for debt reduction and low tax revenues, and private sector investment in new energy technologies tends to Asia and Far Eastern Markets, and general household expenditure continues to be suppressed.

This seems to be an unduly pessimistic outlook. While the economic recovery may be slower than originally forecast, the period from 2013/14 onwards should see a return to growth, led by the financial sector. New job creation in this sector will raise the demand for new office space, in turn providing a much need stimulus to the construction industry. Government borrowing will decrease with lowering unemployment and increasing tax revenues. The Government will continue to support investment in low carbon and green initiatives, partly to meet its international carbon reduction commitments and partly because of the political pressure from a public increasingly concerned about global warming and climate change. More incentives are likely to come forward for private sector and individual home owners to increase energy efficiency and install renewable energy systems. Energy generation will become more wide spread and there will need to be investment in system management cope with this.

UserID: 36
This is a logical and believable scenario.

UserID: 44
Cost is a bigger concern especially taking into account the growing ageing population both within the Borough and the country. Although the allowances within the ageing population is present the rising costs affect all sections of the community not just the older end. This reduces the amount of disposable income where priorities are set very highly into the food, heat, light and warmth categories. Power is moving into the luxury category from the essential. The power industry is seen as greedy and not a British Industry even though a number of initiatives that could be introduced are not being adopted because of they become the expensive option. Electric cars cost more energy to produce than they actually save this seems to be the reluctance to enter into that field.

UserID: 56
This scenario seems a little pessimistic in terms of the potential for economic recovery and the role of the energy sector. It seems unlikely that solely incentivising new nuclear operators will be politically palatable. I wasn't aware that the future for large-scale off-shore installations in the UK was so bleak.

The point about the public no investing in green measures without financial support sounds right. Probably more a case of being unable (through constrained financial circumstances, job insecurity, rising costs etc) rather than "unwilling". The interest in demand side management therefore follows and sounds plausible.

UserID: 61
Appears to be logical. The area to be queried would be the household supply growth at 50% of the local government target. In Great Yarmouth the delivery has been relatively consistent to date (300 units per annum) & future delivery should be the same as a 5 year supply of housing land is currently available.

UserID: 63
The UK economy is experiencing slow growth and is on the cusp of another recession. The economic austerity measures in the European Union are adding to local economic pressures. However in relative terms, the UK economy is well positioned for growth and the government believes growth is fundamental to realising their commitment to a low carbon economy.

UK Power Networks enjoys a regional footprint that uniquely positions the business at the forefront of the next generation energy market. London, the East and South East of England is a key demographic for the provision of innovation technology that will entice the 'curious consumer'.

Active consumer engagement can be delivered through measures such as:
- the introduction of demand accuracy
- closing the timing gap between the retail and wholesale markets
- voluntary demand response to enable peak load shifting
- emerging consumer interface with energy management companies

Investment in technology will be focused on factors such as:
- Extending life of existing generation, transmission and distribution assets.
- Dynamic network management
- Energy storage

The challenge will be to introduce investment that balances mid term and long term business returns. To enable this, market mechanisms should be introduced to provide investment certainty in for finance houses, technology providers and energy management companies. In addition to this, lowering barriers to entry will enable business evolution of existing stakeholders while encouraging new entrants and partnering opportunities.

GE Energy, in conjunction with other GE businesses, have a rich heritage in all aspects of the energy value chain. Our solutions are designed to leverage expertise across our business portfolio. We design, build and take to market solutions that address market challenges faced by the full range of stakeholders.

Engaged Green Society

2. To what extent is this scenario viable, logical and consistent?

UserID: 7
unlikely that 60% of homes will receive thermal efficiency improvement by 2020, but 100% by 2050 may be possible.

Appliances per household may increase 0.1%, but these are likely to be more energy efficient than predecessors and represent replacement of some old tech with new gadgets.

Commercial, industrial and public sector energy efficiency will also extend to leased properties. Landlords will see increasing pressure from tenants to have invested in the latest cleantech to reduce carbon footprint. Many are likely to fall under CRC themselves.

Large onshore wind unlikely to be high, but more likely to be medium.

Time of use tariffs as per previous questions - need smart grids to enable fully.

UserID: 8
Strong growth is not likely to return as a viable option. Central and surrounding London may still grow quicker and against the trend of the remainder of the country.
Micro Generation and a greater understanding of green requirements will make the average home more aware and will take advantage of green technologies especially where they provide value.
Electric Tesla will be far more fashionable than a petrol Ferrari.
Growth in alternative generation will still be slow.
Nuclear will still provide a solution and continue to be developed, Japanese tsunami will not impact the planned role out.
Power station on every street will not be seen as viable and reality will be that solving the problem at major stations will be the best way forward.
A low carbon economy will slowly start to emerge.

UserID: 16
This scenario seems viable in that is it likely to happen and assumptions are logical and consistent with the picture of the economy as described.
Our interest is how this scene affects UK Power Networks and what you estimate the effect of this scenario is on your power distribution network.
You give heat pumps too much priority. The cost of retro-fitting them is prohibitive. PV is a much more likely and easier to retrofitted and this energy saves more carbon.

UserID: 34
This scenario postulates that the economy recovers rapidly with the South East leading the way. Significantly higher tax revenues allow the Government to invest in infrastructure, while individuals embrace green technologies, with solar panels, mini wind turbines, and electric vehicles becoming a common sight on unban streets. Commercial scale wind farms are a regular feature of the countryside as public attitudes change.

In contrast to the previous scenario, this one seems unduly optimistic in respect of both the rate of economic recovery and the speed of embracing green technologies. As noted above the economic recovery is likely to be more measured, and public perceptions of green technologies will take some time yet to achieve a “critical mass” that will lead to a step change in attitudes. The so called “NIMBY” factor is still very much alive, as is currently being seen in the opposition to the proposed new High Speed rail line (HS2) from London to Birmingham. There is likely to be a steady growth in the distributed energy generation market, with new players getting involved in CHP schemes with low or zero carbon fuel sources, thus contributing to de-carbonising the electricity grid. Significant investment will be needed by UKPN to manage the proliferation of new connections and non traditional power flows.

UserID: 44
Although a green environment and practices would be welcome the restrictive cost would mean that only the affluence of families and individuals will drive through the adoption of green practices. Competition can drive down prices where choice is one means of doing this however you do create a 'have' and 'have not' society with benefits subsidising the 'have nots' and choice subsidising the 'haves'. From an emergency perspective the generation of power by too many companies can lead to a reduction is safety elements and a higher risk of incidents linked to mass production of energy.
UserID: 52
This scenario need to reflect the proportion of demand consumed by business users rather than domestic users as it is understood that business consumption is more prevalent than domestic consumption in the London Region

UserID: 56
This sound plausible about 20-30 years down the line. I'm not an economist, but it would appear that the economy will recover eventually after quite a prolonged period of inactivity. The points about new nuclear and carbon capture and storage sound about right, given technological and political difficulties. I think that the more affluent households, of which there are still many, will in time take to micro-generation, green gadgets and electric vehicles. There is probably a latent appetite for this and I can well imagine these items becoming part of 'conspicuous consumption' for those wishing to show off their green credentials. The speed at which take-up occurs will depend in part of the level and availability of government grants and incentives. This in turn will affect the contribution that 'green industries' can make to the speed of the economic recovery.

UserID: 61
Take up of electric vehicles & small scale energy generation ambitious. Softening of initial views on wind farms also queried. An ambitious scenario, but tough targets need to be set.

UserID: 63
In light of economic issues in the United States and Europe, this scenario appears to be overly optimistic in the next 5 years. The UK economy has significant challenges ahead, and the government has more on its agenda than driving a low carbon economy. The gap between the UK's wealthy and deprived has reached unprecedented levels, and there is now wide-ranging values and morals that underpin society. The government must refocus its top priorities and one questions how committed they will be to delivering a low carbon economy.

The UK energy sector provides key national infrastructure. Electricity is a basis human need, and under this scenario all efforts will be centred on ensuring security of supply. The government has committed to Nuclear and Renewables, but there is growing appreciation that fossil fuel will be required to meet midterm demand. The integration of distributed generation across the distribution network will increase power flow complexity and challenge distribution businesses in the management of their networks. Consumers will need to be incentivised to change their behaviour.

UK Power Networks has an opportunity to position itself as the leader in next generation energy distribution business. The key business priorities will be to:
1. Invest in network strengthening programmes that focus on deploying flexible and agile technology to overcome new network management challenges such as the demands of two way power flows, embedded generation and peak load shifting.

2. Realign existing business assets to drive efficiencies in physical network assets, business systems and active network management solutions.
3. Extend the consumer interface to offer targeted and flexible solutions via a range of consumer engagement models.
4. Diversify business services that embrace community level generation by supporting energy aggregation initiatives. More meaningful generation levels will streamline the integration into business operations.

Green Stimulus

3. To what extent is this scenario viable, logical and consistent?

UserID: 7
Seems the most likely scenario so far.

Limiting car numbers unlikely, but a wholesale change away from fossil fuel powered cars may be likely.

ToU tariff require smart grid. Electricity should be available as short term contracts or purchases, much the same way as petrol is purchased for vehicles. A supplier/energy services company (ESC) advertises prices and the customer selects how much of their energy they want and where they want to buy it from. This can be done as an individual or by tasking an ESC. The consumer is therefore able to shop around for the best deal and have it delivered directly to their meter (or internal storage).

UserID: 8
Agree with scenarios with high viability being likely and realistic.

UserID: 16
This scenario seems viable in that is it likely to happen and assumptions are logical and consistent with the picture of the economy as described.
Our interest is how this scene affects UK Power Networks and what you estimate the effect of this scenario is on your power distribution network.
You give heat pumps too much priority. The cost of retro-fitting them is prohibitive. PV is a much more likely and easier to retrofitted and this energy saves more carbon.

UserID: 34
This scenario is similar to “Economic Concern” in that it foresees a prolonged period of slow growth. Household incomes remain constrained and the emphasis is more on saving energy to mitigate the soaring costs of energy bills. Targeted Government incentives encourage people and businesses to adopt energy efficiency measures, but also to install green energy solutions. This spawns a range of small technology companies who have the flexibility to offer new energy tariffs, structured to individual needs. On a commercial scale on shore and off shore wind farms continue to be built to fill the supply gap created by the delays in getting new nuclear power on stream.

As with the first scenario, this one seems overly pessimistic. However, the public and private sector response to a slow growing economy does raise some interesting choices and opportunities. There is likely to be growth in small high technology companies that can offer new products and services to mitigate rising energy prices. The emphasis on saving money will lead to people being open to new tariff structures for their energy – ones that better suit their lifestyle and are more flexible than traditional contracts. And if there are stronger Government incentives, people will invest in green technologies. UKPN distribution networks

will have to be more responsive to widely distributed generation and demand management. This will require significant investment.

UserID: 44
The society of the noughties is producing a substantial number of individuals within the community that consider more what to spend on and when to spend irrespective of the 'bargain' principle. Necessity will always be the mother of invention and it is this that drives through the adoption of savings and prudence within the home. The more that unemployment increases the more reliance on power and energy so resulting in the minority paying for the majority.

UserID: 52
It is less likely that domestic users will be able to afford to spend today to save tomorrow as they will have little money to 'spend today'. The initiatives referred to will be of considerable initial expense which most domestic customers could not afford. Businesses would be more likely to be able to spend today to save tomorrow due to their ability to write off against tax and the larger cash flows of an organisation as opposed to an individual

UserID: 56
At this point in time, there appears to be no mood/willingness in government in increase spending on incentivising or investing in green energy. However, a change of government might change this. If this sort of government investment does take place, the scenario sounds plausible. The switch to green technologies could be quicker and more widespread. However, I don't agree with the description of subdued growth in London and the South East. These areas are still buoyant overall, albeit with some groups severely affected, particularly those employed in the public sector and potentially in retail.

I can imagine that there is scope, as described, for many small entrepreneurial companies to enter the energy market. I would imagine that there is a strong public appetite to find alternatives to the dominance of the major energy providers, given escalating energy costs to households and businesses. Many would welcome more competition in the sector.

UserID: 61
This is the more realistic scenario to date.

UserID: 63
The Green Stimulus scenario is a highly viable, logical and consistent snapshot of the UK economy, innovative low carbon technologies and a government that is active in the development of the next generation energy market. There is an appreciation that the fragmentation of the energy market has some challenges in securing technology investment in an uncertain economic climate, made more difficult when benefits may be largely realised by other stakeholders in the energy value chain.

UK Power Networks has an opportunity to position itself as the leader in next generation energy distribution business. The key business priorities will be to:
- Realign existing business assets to drive efficiencies in physical network assets, business systems and active network management solutions.
- Grow the understanding of the consumer requirements and develop energy service solutions that ensure regulated obligations are continued to be improved.
- Invest in network strengthening programmes that focus on deploying flexible and agile technology to overcome new network management challenges such as the demands of two way power flows, embedded generation and peak load shifting.

Business success will be founded on the knowledge gained from data. UK Power Networks will need to invest in data analytics technology that draws together new data sets that give insight into active network management, and dynamic network design. This will protect UK Power Networks regulated obligations but may also offer business expansion opportunities in energy management services. GE Energy would be delighted to further these discussions with UK Power Networks.

Green Tech Revolution

4. To what extent is this scenario viable, logical and consistent?

UserID: 7
People happy with their current energy suppliers is more likely to be a case of apathy and lack of opportunity for alternatives, rather than 'trust' in the existing companies. Unsurprising that a low ToU response would result. Continued investment in property efficiency is highly likely as energy prices continue to be hiked and inbuilt RES and energy efficiencies start to become reflected in the property price. At what point is parity expected between energy prices and prices from renewable sources?

Cars at 50m more likely than any cap, however, efficiencies by 2050 likely to have been improved. CO2 producing vehicles unlikely to be mainstream by 2050 (look at the change over 50 years from 1960 to 2000). Other tech such as car trains and auto driving should be approaching reality at this stage and will allow more vehicles safely on the road.

UserID: 8
Agree with the underlying principles of this option but the growth of the economy will hinder the extent and deployment of the scenarios.
Alternative 'green' technologies will become popular but role out will be hampered with lack of money to invest.
Feed in tariffs may suffer further as the government has to economise. Alternative technologies will be driven more through energy price increases.
Effective use of the infrastructure will be maximised through smart metering and ToU tariffs will still factor high.

UserID: 16
This scenario seems viable in that is it likely to happen and assumptions are logical and consistent with the picture of the economy as described.
Our interest is how this scene affects UK Power Networks and what you estimate the effect of this scenario is on your power distribution network.
You give heat pumps too much priority. The cost of retro-fitting them is prohibitive. PV is a much more likely and easier to retrofitted and this energy saves more carbon.

UserID: 32
Michael Heseltine said that the way to regeneration was infrastructure.

Putting in place mechanisms to allow households and businesses to buy and sell electricity at spot prices will be the fastest way to encourage renewed economic activity.

Electric cars will be driving around with a quarter of a megawatt hour of stored energy most of the time and the owners (or their agents) will be able to sell that back at peak times.

Organisations will make money out of arbitrage.

The networks must become completely inverted. It's not about micro-generation, it's about bottom-up networks with smart billing using the internet to communicate.

The last bit is wrong. People are not actually conservative when it comes to new technology. The cost savings resulting from new technology are taught socially. Go and sit in a pub.

UserID: 34
This scenario suggests that the Government will lead the drive to hit the carbon reduction targets that it has signed up to, but that this will be done in a well balanced and growing economy. In parallel the public has accepted that “green” is the way to go and is prepared both to invest in energy saving measures and adopt green energy solutions on a local as well as national scale. However, this scenario also postulates that this does not stimulate the emergence of new high tech energy service companies, and that people remain content to stick with electricity contracts with the traditional suppliers.

This scenario suggests an interesting combination of events, which on the face of it, seem unlikely to materialise. If there is a Green Tech Revolution, then it seems inevitable that new green energy supply and service companies will emerge to service this need. Therefore the traditional relationship with the electricity supply companies will be challenged strongly. This will also be encouraged by a growing economy and ever high energy prices

I
UserID: 44
Reliability and trust are two of the most important issues to the community and it is with these in mind that the community will continue until a viable option is produced or they themselves can believe in alternative solutions. Structure and order seems to be the British way and acceptance of new fangled ways and technology will need a proving ground before it is accepted. Word of mouth and recommendations can drive change but only where the initial reliability and trust exist.

UserID: 52
This scenario need to reflect the proportion of demand consumed by business users rather than domestic users as it is understood that business consumption is more prevalent than domestic consumption in the London Region

UserID: 56
I don't think that the coalition government considers investment in green or low carbon technologies to be an early priority. However, this aside, most of the scenario sounds plausible. I would be a bit more optimistic about the future of ESCos and energy aggregators though. But time will tell and I don't have extensive experience in that area.

UserID: 61
It would appear to be a sound scenario.

UserID: 63
Relative to the international community, the UK is a key country to rebuild global economic prosperity. This scenario is economically viable. However challenges lie with consumer behaviour and underlying issues

with the energy market. A proportion of consumers are energy aware, are strong supporters of energy efficiency and curious about low carbon technology. It is not appropriate to assume economic prosperity to all members of society, nor is it appropriate to assume that affluence will lead to greater spending on green technology.

The consumer experience must be enhanced. If early adopters become disenfranchised by not receiving substantive cost savings, then market mechanisms will be required to ensure low carbon technologies succeed. Technology is an enabler to unlocking greater value across the energy value chain. However to ensure long term viability, investment and benefits realisation will need to be apportioned across the fragmented value chain. Energy market regulation has a role to play. We are seeing efforts being made to simplify the energy market and refocus the consumer experience (Smart Energy Code). New business models will succeed if lower barriers to entry exist.

GE Energy believes that UK Power Networks is well positioned to be the leader in next generation energy distribution business. The key business priorities will be to:
• Invest in network strengthening programmes that focus on deploying flexible and agile technology to overcome new network management challenges such as the intermittency of renewable generation and the demands of electric vehicle charging infrastructure.
• Lobby and influence market regulators to design appropriate market mechanisms that will secure long term investment and benefits realisation across the energy value chain.
• Development of sophisticated consumer level energy incentives and associated education programme that would encourage peak load shifting at the consumer level.

Business As Usual

5. To what extent is this scenario viable, logical and consistent?

UserID: 7
No mention of how actual climate change might be starting to affect people at this stage. It is likely to lead to more disruption in electricity networks due to increasing number and strength of storms, and of summer heat, or possibly winter cold (CCC scenario dependent) which will affect how the public react. Gas and other fuel prices likely to be very high by 2050 - at what point do renewables acheive price parity?

Lack of government resolve and commitment over successive governments likely to continue and lead to sporadic uptake of cleantech, especially if feed in tariffs reduced further.

Adoption of 'smart' tech for the grid system would require re-education of the public on how to manage the system, or the increase of service companies. The current power supply company tariff's are already too confusing and do not allow easy comparison. Since this is supposed to be being addressed, it is likely that any future scenario will also ensure direct comparison of costs, assuming OFGEM is still in a regulating role.

UserID: 8
Agree the economy will gradually find its feet again. But the scenario is unlikely and unrealistic
The man on the street will become more aware and his focus and values will change.
The cost of fossil fuels rising will force green solutions to evolve as value added alternatives; as a consequence Smart Grids will still be required to provide the support.

UserID: 16

This scenario seems viable in that is it likely to happen and assumptions are logical and consistent with the picture of the economy as described.
Our interest is how this scene affects UK Power Networks and what you estimate the effect of this scenario is on your power distribution network.
You give heat pumps too much priority. The cost of retro-fitting them is prohibitive. PV is a much more likely and easier to retrofitted and this energy saves more carbon.

UserID: 34
In Summary

The most probable future scenario is likely to be a combination of some of the aspects of all the scenarios mentioned above. The following are thought to be the most likely trends;

1. A slow economic recovery in the short term, followed by a period of measured, rather than strong growth
2. Continued Government incentives to invest in low carbon energy technologies
3. A steadily growing public awareness of the need to move to greener energy, and therefore increasing acceptance of solar panel, local wind turbines and electric vehicles
4. Commercial scale wind turbine farms will continue to be resisted in and near to urban areas, and areas considered environmentally important for other reasons.
5. Distributed generation will continue to be installed, and is likely to grow at an accelerated pace, driven by carbon reduction targets and planning regulations. The largest generators will be CHP plants, many of which will increasingly use bio fuel inputs
6. The public and commercial business will be ever more conscious of saving energy, driven by rapidly increasing energy prices. This will lead to the adoption of new technologies including smart metering
7. UKPN will need to invest significantly in upgrading their network and managing complex power flows resulting from multiple distributed generation capacity
8. Small, high technology companies will emerge to offer new products and services to the market

UserID: 56
This sounds all too likely! Extensive and widespread change is going to require a concerted approach from government and there is presently no evidence of that - the political will, or belief in the potential for green technologies to contribute to economic recovery, do not appear to be there. The characterisation of London and the South East sounds about right.

UserID: 61
A pessimistic but potentially realistic scenario. Let's hope it does not come to this.

UserID: 63
This scenario does not provide a long term sustainable approach to the UK's energy infrastructure. It is unlikely that economic growth will be extensive in coming years, and the government recognises that to reach low carbon economy commitments, investment in smart grid technology is a key enabler. This commitment to applying ICT over the physical energy infrastructure is seen as a viable approach to extending the life of existing energy assets rather than investing in additional physical infrastructure. We have evidence that government understands these challenges, having invested in a range of innovation stimuli across the energy value chain.

The consumer will not lead behavioural changes required to realise the benefits of low carbon technology. This is the biggest challenge facing energy stakeholders, including government. There is limited evidence

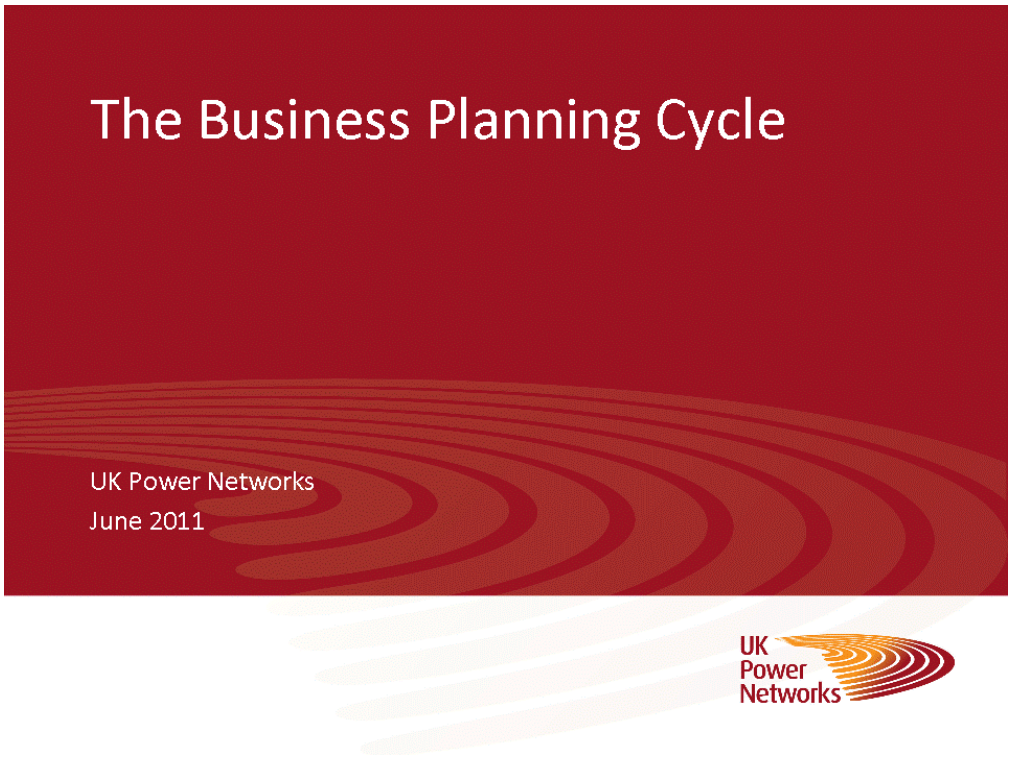
on the characteristics displayed by an engaged energy consumer. For instance, what demographic is likely to investment in electric vehicles, demand response programmes, etc. It is this uncertainty that will require energy stakeholders to be flexible in the generation, distribution & supply of energy.

UK Power Networks has an opportunity to position itself as the leader in next generation energy distribution business. The key business priorities will be to:

- Realign existing business assets to drive efficiencies in physical network assets, business systems & active network management solutions.
- Improve consumer understanding and develop energy service solutions that ensure regulated obligations are continued to be improved.
- Invest in network strengthening programmes that focus on deploying flexible and agile technology to overcome new network management challenges, e.g. the demands of two way power flows, embedded generation & peak load shifting.

GE Energy is a strategic leader in smart grids and is a founding member of the Global Smart Grid Federation. The structure of the GB energy market gives rise to unique challenges. We are a founding member of Smart Grid GB and Smart Grid Ireland. GE Energy is committed to providing cleaner, smarter, more efficient solutions.

Annex 1 – Presentation Slides



Introduction

- Ofgem is trying to encourage the energy industry to facilitate the development of a low-carbon economy, which will require the investment of approx. £32 billion in the electricity and gas networks.
- Network companies will have to double the amount of investment they have made over the past 20 years. Investment on this scale will require considerable certainty in the regulatory environment.
- Ofgem has reviewed the regulation of networks companies in detail and introduced the RIIO regulatory framework.

RIIO – "The well-justified business plan"

- Whilst the RIIO framework consists of many features, the heart is the so-called "well-justified business plan".

- Features of the business plan:
  - Focus on **output delivery**
  - Orientation to a **Low Carbon Future**
  - Consideration of **secondary deliverables**
  - A **clear and well evidenced** case for their proposals
  - An open minded consideration of available options
  - Link between **costs & primary outputs**
  - A consideration of the **longer term**
  - **Value for money**
  - Effective **engagement with** a range of **stakeholders**
  - Working with others

RIIO – A crucial role for stakeholders

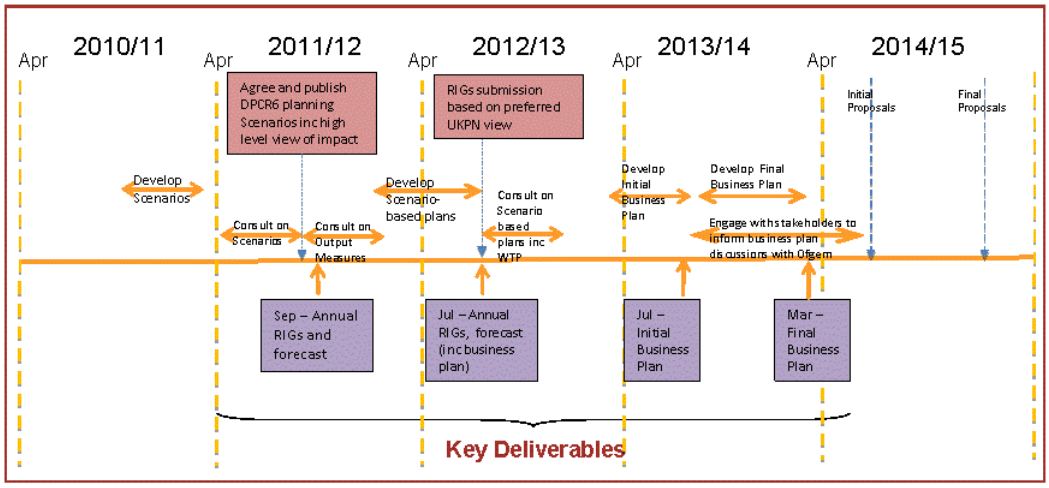
- One of the key tests of our "well-justified business plan" will be the extent to which customer, networks users and other stakeholders have been involved in its development.

- We need to be pro-active in seeking input at every stage, e.g.:
  - What should our basic planning assumptions be?
  - What services should we provide?
  - What outputs are required and what targets/service levels should be applied?
  - Where options are available which would be selected
  - Are customers willing to pay for the options or service levels that can be provided?

- We will need to demonstrate how the input has fed through our planning processes and ultimately how decisions have been arrived at.

- This can not be a box-ticking exercise, and we are not asking you to rubberstamp the answer we have already thought of!

High level Business Planning timetable



We currently envisage four main stakeholder touch points in our business planning process:

- Development of business planning scenarios;
- Consultation on potential output measures;
- Review of impact of scenario based plans including willingness to pay (WTP) for service improvements;
- Revisions to initial business plan for final submission as part of price control.

5

Planning Scenarios

UK Power Networks

June 2011

UK Power Networks

Introduction

- The future is uncertain but we know that the transition to a low-carbon economy will impose significant demands on our networks.
- Our regions are the most economically active in the UK which places further and perhaps contradictory demands on our networks.
- Our view is that the greatest level of uncertainty concerns the required capacity in future years. This will drive how much we need to spend on reinforcing our network.

Scenario development work to date

- There have been a number of external studies looking at future energy scenarios
- None have focused specifically on electricity distribution or disaggregated regionally
- Our working hypothesis was that the diverse nature of our networks means we need regionally specific scenarios

External drivers

- Our initial view is that there are three main drivers which will influence the required capacity of our networks:
  1. Rate of economic growth
  2. Impact of deployment of low-carbon technologies
  3. Impact of changes in electricity market mechanisms (e.g. increase in Demand-side response or changes to tariffs)

- Economic growth has always been a key driver for our networks, but we believe that it will be influenced by the other two drivers

- Whilst low carbon technologies and market mechanisms are closely linked, we see different impacts on our network.

Potential Scenarios

- There are eight possible permutations of the drivers, but we have eliminated three as being implausible views of the future
- The five remaining scenarios have been described and the impacts identified

	Rate of economic growth	Impact of low carbon technologies	Impact of electricity market reform
Engaged Green Society	High	High	High
Green Tech Revolution	High	High	Low
Green Stimulus	Low	High	High
Business As Usual	High	Low	Low
Economic Concern	Low	Low	High

Developing the planning assumptions

- Having identified potential future scenarios, we need to understand what the impact of these would be on our network:

- Our approach to this is as follows:
  - Identify the implications of each driver e.g. high economic growth will be characterised by strong consumer demand for electronic devices, high residential and employment growth
  - Hence each scenario can be expanded to include a set of plausible and mutually consistent planning assumptions
  - These assumptions can then be converted into impacts on the network.

- We have commissioned an expert third-party, Element Energy, to assist us with modelling the impact of these assumptions.

Today's activity

UK Power Networks
June 2011

Introduction

- Each table hold details of one scenario
- You will have 20 minutes at each table to answer a number of questions
- Each table will have a facilitator and scribe
- Discussion will be captured on flip charts. Successive groups will add to (or disagree with) previous comments
- At the end of the workshop, facilitators will review the contents of the flipcharts and feedback

Key Questions

- For each scenario:

1. To what extent is this scenario viable, logical and consistent?
2. Do the assumptions makes sense?
3. Are there any missing assumptions?
4. Any other observations?

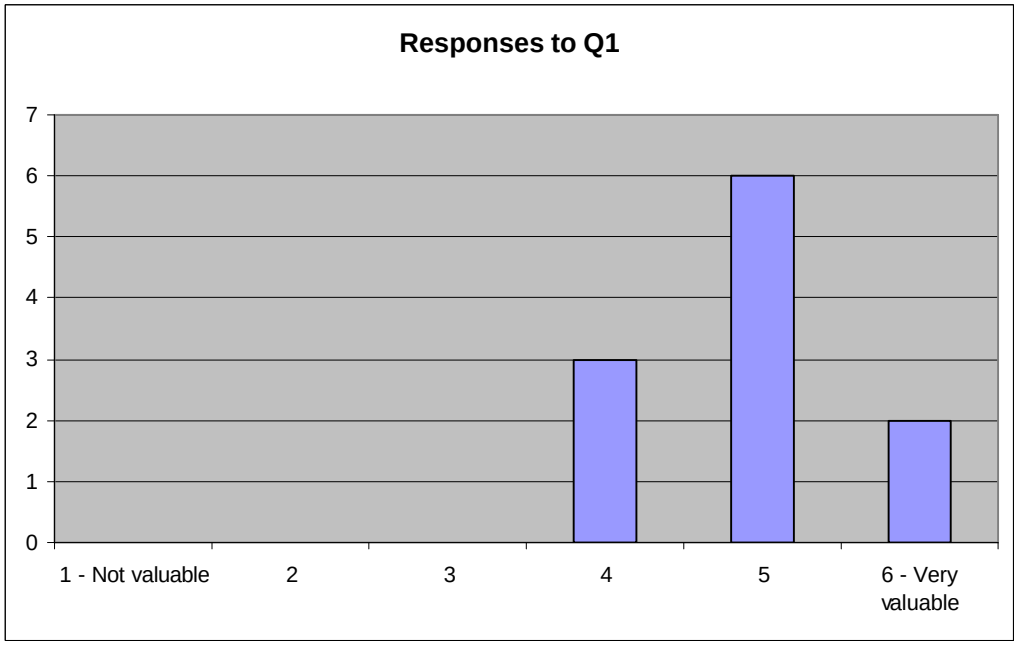
Annex 2 – Evaluation reports London

Workshop 1

Overview
13 people attended the event, 11 evaluation forms were received back.

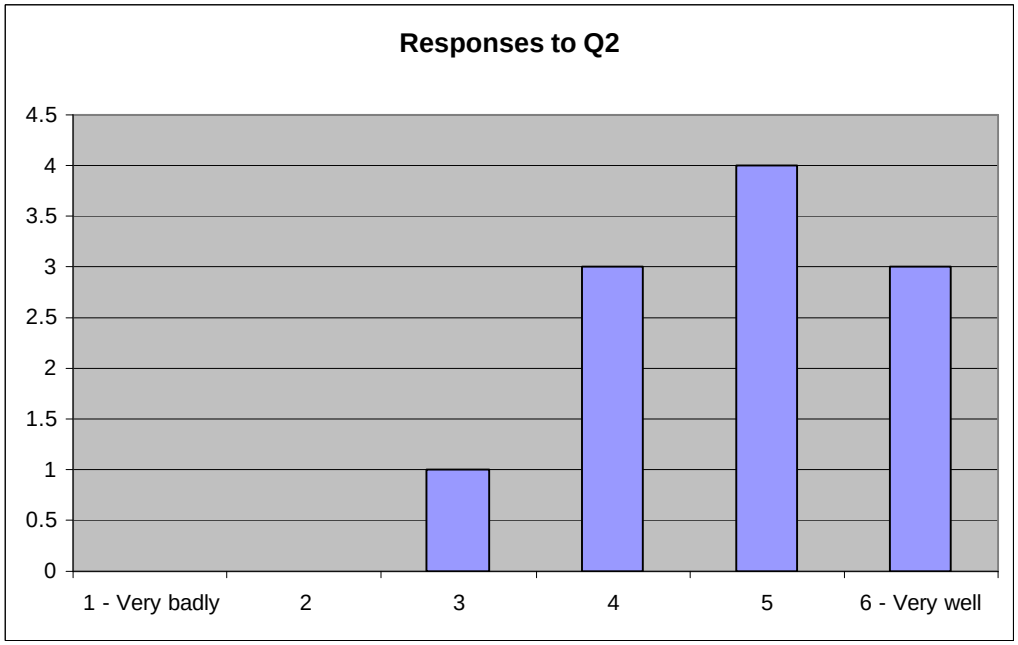
For questions 1-4, numbers in parenthesis at the beginning of each comment indicate the accompanying score on a scale of 1-6 given by the respondent. If people circled two numbers, the lower number has been recorded.

How valuable overall did you find this event?



Comments
- Very early in the process and sometimes difficult to comment without further information.
- Interesting insight into UKPN direction.

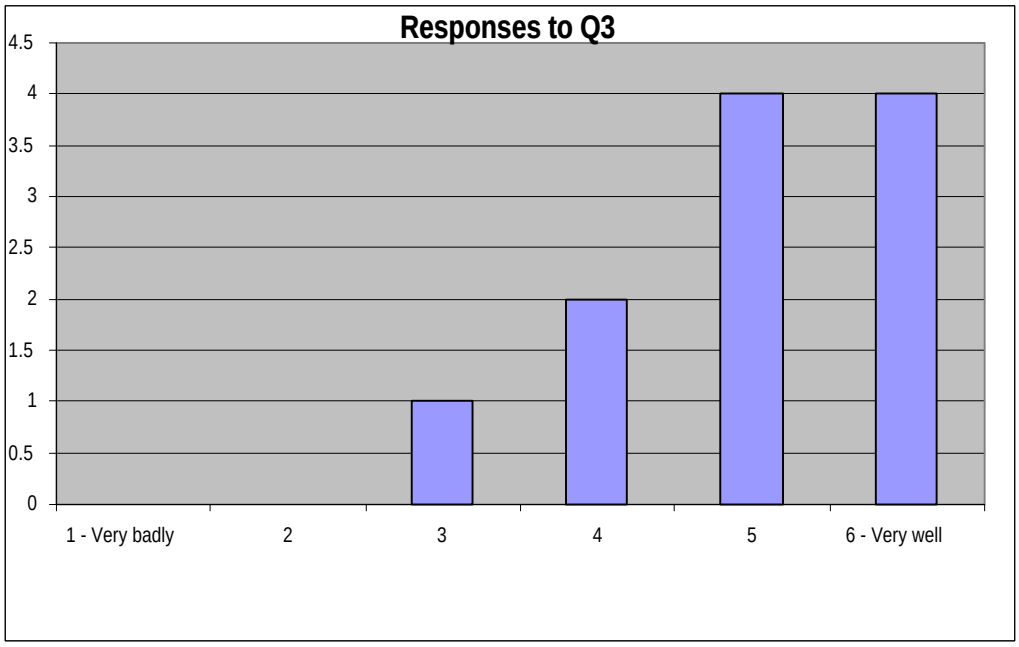
If you had questions during the workshop, how well were they answered?



Comments

- Not bad – team finding their feet in first workshop

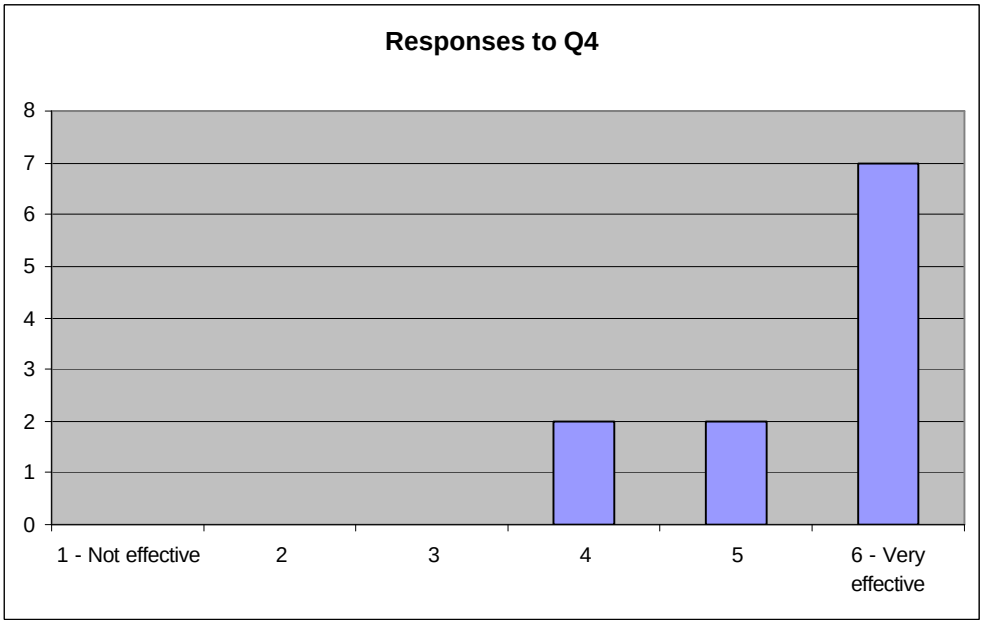
How well did the workshop format enable you to address the issues?



Comments

- Well – encouraged debate. A comparison of the key elements of the scenarios would aid understanding.

How effective were the facilitators?



Comments
-

What would you have liked more time for?
Comments
- Well balanced event with opportunities to discuss issues and get an understanding of your developing planning baselines.
- Bit of background on what demand is on the network and what drives it. E.g. domestic vs. non domestic
- Debate wider technology; more background on the modelling
- Some more background on the various scenarios and how they have been created.
- Timings were good
- More time per scenario
- Debate on scenarios, discussion of business as usual – no option to discuss it and if it really is BAU
- Timing very good
- I think distribution of time was good. Didn't feel rushed and conversely didn't drag

What would you have liked to spend less time on?
Comments
- Upfront presentation
- All scenarios focussed on the same key themes and more varied discussion in each area would be useful.
- None

Any other comments?
Comments
- Small attendance worked very well
- Handouts to participants to be able to brief colleagues at the office
- Time flew
- Thank you for sharing info with us and taking our input into consideration

Workshop 2 - South East England

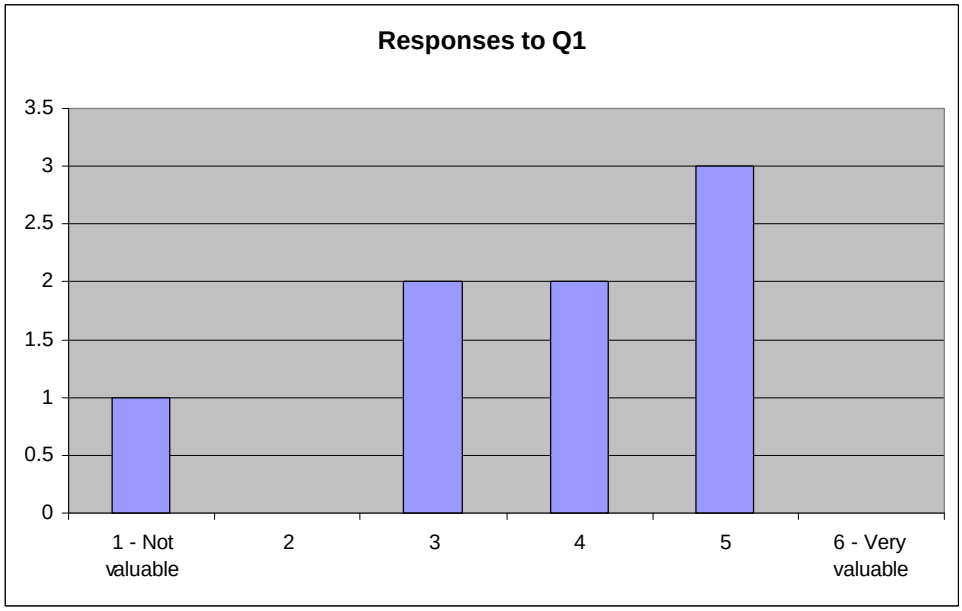
Overview

8 people attended the event, 8 evaluation forms were received back.

This document gives a summary of the evaluation results.

For questions 1-4, numbers in parenthesis at the beginning of each comment indicate the accompanying score on a scale of 1-6 given by the respondent.

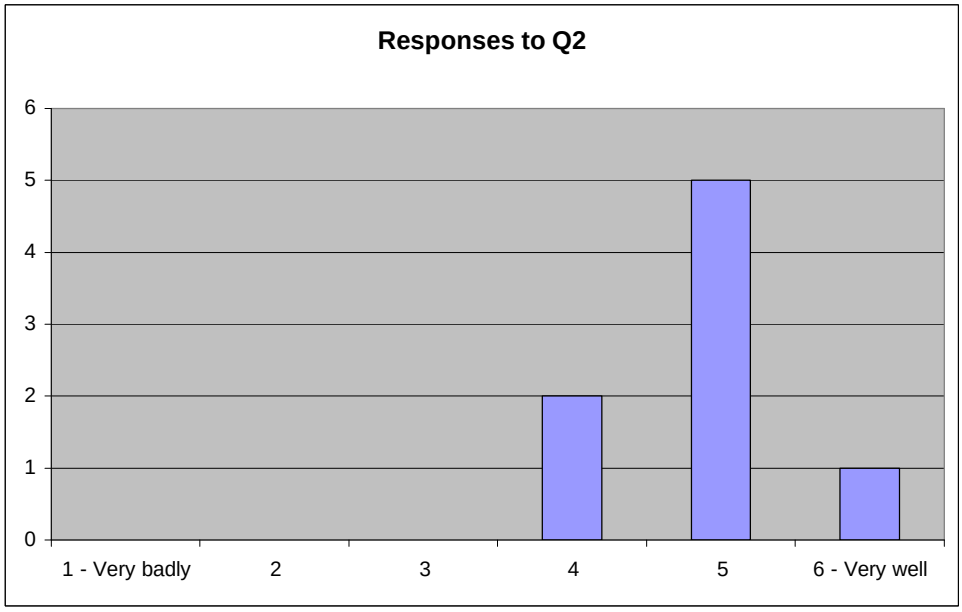
1. How valuable overall did you find this event?



Comments

- (3) Perhaps more information on the effect of the options on UKPN and thus customers
- (5) Personally learnt quite a bit from how companies such as UKPN are looking at how they are to invest in the future. Perhaps could have gained more if other areas of LG and developers had been present
- (4) Valuable in respect of greater understanding of the industry's considerations, but less so in terms of relevance to our "local" planning to enable delivery of step change
- (3) Interesting as background to where industry is looking but a bit outside my normal business area
- (1) Appreciate this seminar for the benefit of UKPN forward planning, but it does not benefit me or my authority in forward planning
- (5) Very interesting event, useful to understand how UK Power Networks plan for the future

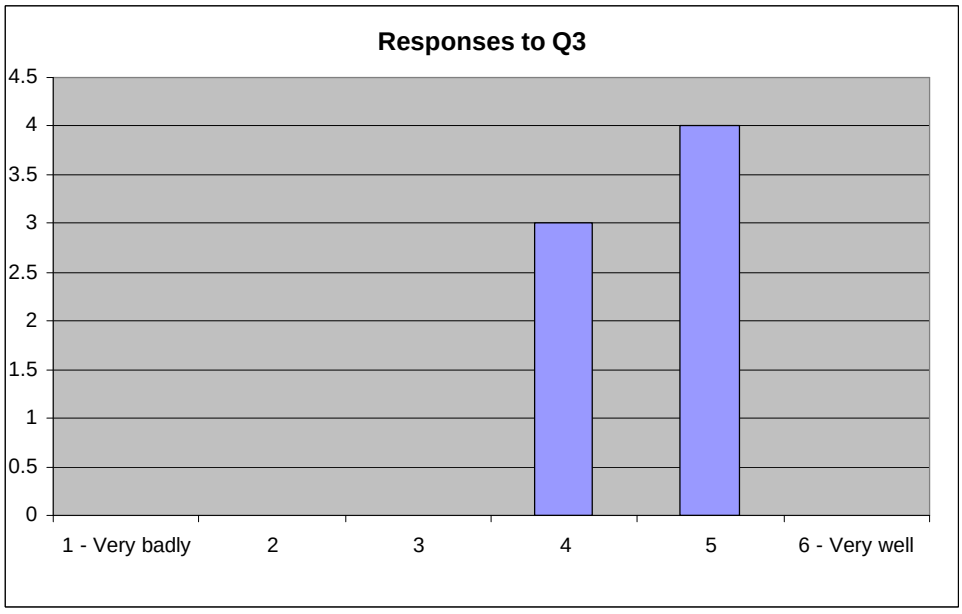
2. If you had questions during the workshop, how well were they answered?



Comments

- (5) Knowledge base good!

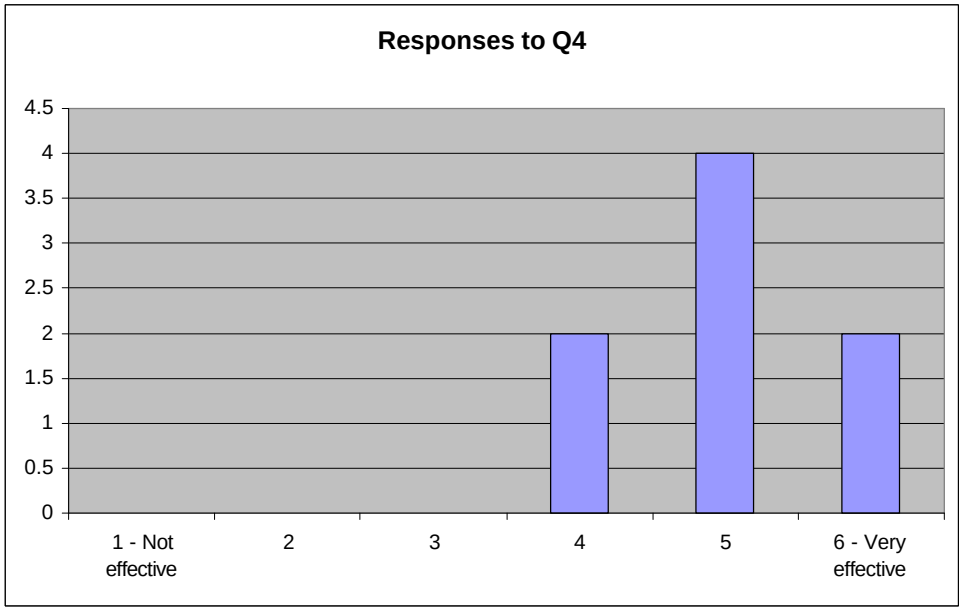
3. How well did the workshop format enable you to address the issues?



Comments

- (4) Format great to achieve UKPN objectives and issues, but not right for the user issues, and being open to conversations, and local issues
- (5) Well, although I felt more facilitation on comparison of the scenarios was needed

4. How effective were the facilitators?



Comments

- (5) Insured everyone was involved. Find it helpful when facilitators summarised scenarios and assumptions in English as this area is not one that I have a great understanding of. I came with a very planning perspective.

5. What would you have liked more time for?

Comments

- "Bottom-up" i.e. conversations about local issues and challenges as insights to the matters most valued
- An understanding of what the network business infrastructure enables.
- Perhaps the summary - highlighting the points (of agreement/disagreement) for each scenario at the end.
- More time on some of the founding assumptions for the models
- UK Power Networks forecasts on uptake of renewable power generation in SE; and likely changes to infrastructure in servicing this change - useful to wider planning of development and public services
- Engaged Green Society
- Understanding the scenarios - reading them and getting behind the graphs

6. What would you have liked to spend less time on?

Comments

- Repeating the scenario analysis without having an initial "get it on the table" session to explore the assumptions about energy efficiency, electric vehicles, domestic consumption…etc
- No comment - thought it was well balanced

7. Any other comments?

Comments

- I was originally booked to attend London event on the 28th, but was sent through the info for 29th event and have therefore ended up having to change plans (meetings) at last minute to attend and incurred additional cost for the council in terms of travel expenses.
- I would have liked to see more mention of the environment in the South East. Incorporation of plans for removal of lines in AONB or National Parks etc.
- When sending out invites making the aims and objectives clearer and identifying who would maybe benefit from the workshop

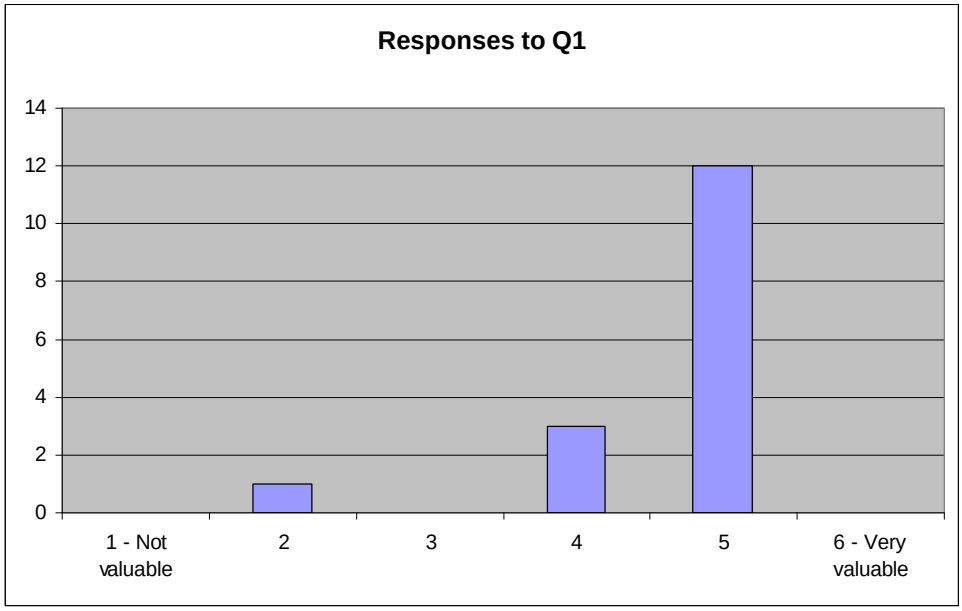
- Very interested in the way forward and the impact the infrastructure changes will have
- UKPN already have access to data profile for commercial customers. They could provide green based tariffs for suppliers who will assist/encourage or promote more green use.

Workshop 3 - East of England

Overview
18 people attended the event, 16 evaluation forms were received back.
This document gives a summary of the evaluation results.

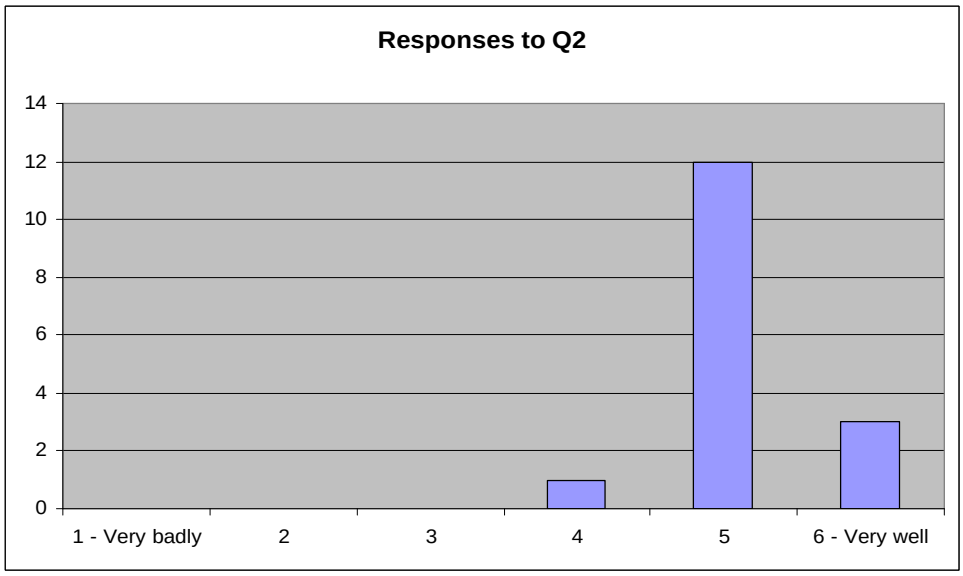
For questions 1-4, numbers in parenthesis at the beginning of each comment indicate the accompanying score on a scale of 1-6 given by the respondent.

1. How valuable overall did you find this event?



Comments
- (5) I hope to be introduced to others in UK power by those present

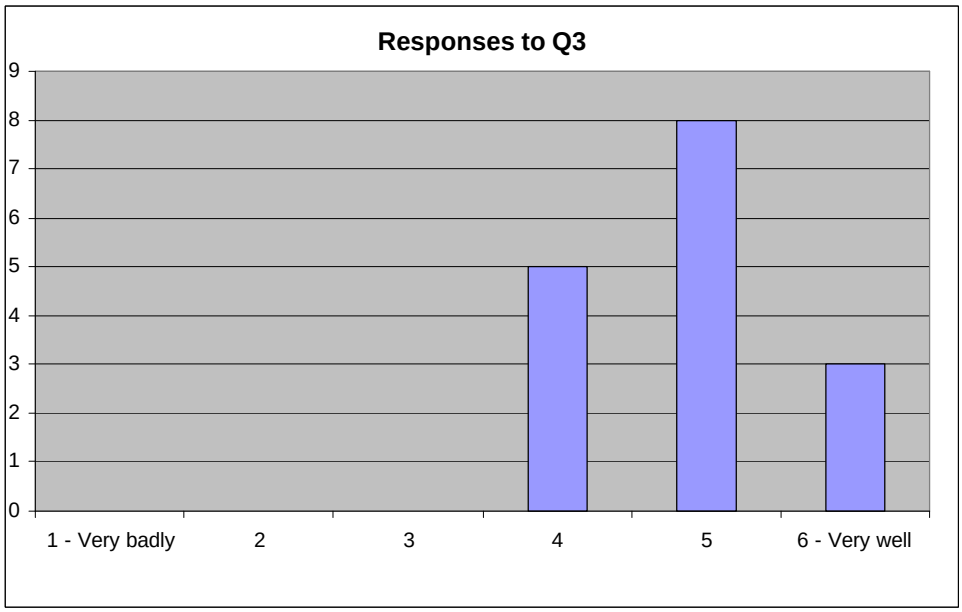
2. If you had questions during the workshop, how well were they answered?



Comments

- (6) I would have liked to see a more operational presence but I appreciate the event was "high level"

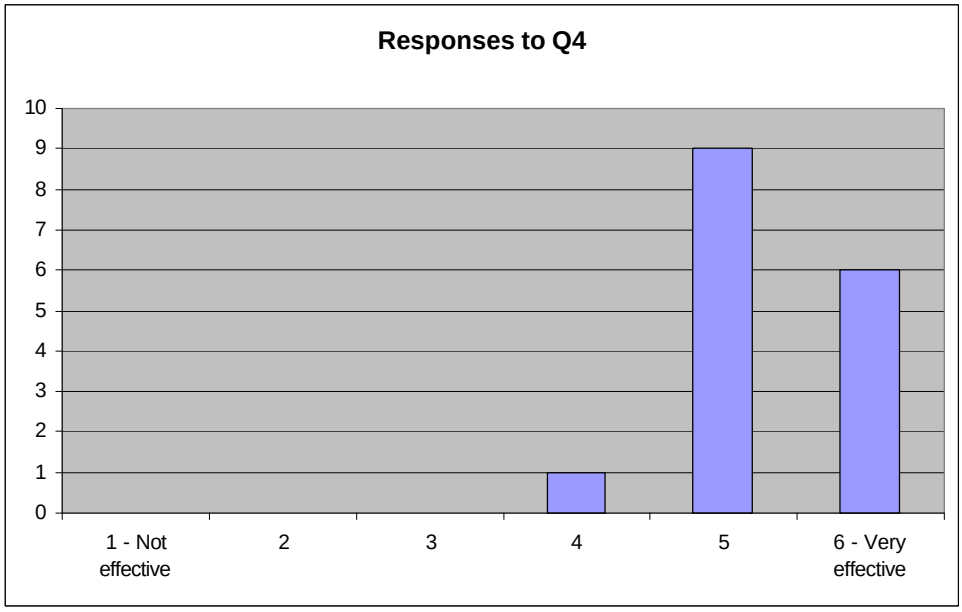
3. How well did the workshop format enable you to address the issues?



Comments

- (6) Good group work
- (4) Good mix of teams/individuals

4. How effective were the facilitators?



Comments

- (5) They all seemed well versed in a complex subject
- (5) OK
- (4) UKPN people more useful and able to answer questions than other facilitators - one for each scenario would have been good
- (5) UKPN knowledge of current assets/grid layout and low capacity areas

5. What would you have liked more time for?

Comments

- Detailed questions about local distribution
- Overview of work leading to scenarios
- Received a lot of information early on with little time to digest. Possibly more info before the day.
- Global context of the energy market. More about predicted demand scenarios?
- Initial clarification of some of the differences between scenarios. Some seemed similar or had subtle differences. Important to understand at the outset
- Nothing
- Discussion could have been 5-10 mins longer - couple of the stations were felt rushed
- Felt time on each topic was just right
- The time scales were adequate
- Context setting. Needed a bit more time to absorb handouts
- Timing was about right
- I think timings were good

6. What would you have liked to spend less time on?

Comments

- Time was well used
- None
- None, very good
- Nothing, not enough time to cover all issues
- Timing was about right
- I think timings were good

7. Any other comments?

Comments

- Excellent that UK Power Networks made effort to organise an event
- As we moved from group to group it would have been better to start each scenario with a "blank" piece of paper. Seeing previous groups comments tended to steer responses to what had already been stated/fed back
- Would like to keep in touch and learn more about the business planning process for this investment
- A stimulating morning!
- Release some of the material with joining pack - would have saved time on the day
- Some more clarification how UK Power Networks links to N Grid, Ofgem etc.