Electricity sector participants and
other interested parties

Promoting choice and value for all customers

Your Ref:
Our Ref: NET ETP GEN 05
Direct Dial: 020 7901 7009
Email: Stuart.Cook@ofgem.gov.uk

7 November 2008

Dear colleague,

Long-Term Electricity Network Scenarios (LENS) – final report

This letter accompanies the final report of our academic partners, the Institute for Energy and Environment (InstEE) of the University of Strathclyde and King's College London, on 2050 electricity network scenarios for Great Britain.

The **final report**[1] sets out five plausible electricity network scenarios, developed by our academic partners in light of extensive stakeholder consultation and with oversight and input from Ofgem. It also contains their views on the scenarios' implications[2] for networks.

The Ofgem foreword to the final report summarises our views on the final electricity network scenarios, and on the role we think they can play in furthering debate about longer term network issues. We intend to develop further our views on the scenarios' implications (see below).

The remainder of this letter provides an update on the project following our consultation on the LENS **draft scenarios report**[3]. It starts by setting out the wider context and objectives of the project, provides a progress update and finally describes our proposed next steps.

Context and background

In our response to the Government's Energy Review[4] of May 2006, Ofgem offered to play a role in developing reports that would set out a longer term perspective on the networks sector. Our proposal was incorporated in the Energy White Paper[5].

Project objectives and recipient group

As explained in our letter of 29 August 2008 and earlier communications, the **main objective** of the LENS project is to facilitate the development of a range of plausible electricity network scenarios for Great Britain for 2050, around which industry participants, Government, Ofgem and other stakeholders can discuss longer term network issues.

[1] Technical appendices to the final report will be published in due course.
[2] As defined in our letter of 29 August 2008 on the LENS project (Ref. No. 127/08).
[3] Graham Ault, Damien Frame, Nick Hughes (August 2008), Ofgem LENS project, Draft Scenarios Report. Attached to our letter of 29 August 2008 (Ref. No. 127/08).
[4] Ofgem (8 May 2006), 'Our Energy Challenge': Ofgem's response.
[5] Department of Trade and Industry (May 2007), Meeting the Energy Challenge, A White Paper on Energy, pp141-142.

Based on our initial scoping[6] letter, the project team (consisting of Ofgem and its academic partners) has also set out to:

- quantify the scenarios (through energy system modelling)
- develop a consistent set of 'way-markers' for 2025, and
- establish views on the scenarios' implications for networks and their regulation.

The project team has investigated plausible outcomes for GB electricity networks in 2050 and aimed to develop a set of scenarios that, between them, span a suitably wide range of such outcomes. The value of this exercise lies in providing an opportunity for discussion and debate by and amongst stakeholders about longer term network issues. Such discussion can then inform ongoing strategy development by stakeholders in various areas. For example, the scenarios could be used by stakeholders to develop their views on what needs to be done, in relation to electricity networks and the wider electricity (and energy) sector, in order to keep (or not keep) certain options open. One objective in this context could be to avoid inadvertently closing-off options that, from today's perspective, may appear inefficient or unpromising but which could in fact turn out to be more efficient than presently anticipated because of unforeseen developments, such as technological breakthroughs.

The recipient group for the network scenarios was defined in the project methodology[7] as parties with the most direct stake in GB electricity networks, including electricity consumers (and organisations that represent them), network companies, power generators, suppliers, Government and Ofgem. These parties are therefore amongst the key stakeholders for the LENS project.

Key project caveats

The aim of the LENS exercise has not been to assess, forecast or predict the cost, desirability or likelihood of particular outcomes, as has been explained previously. For related reasons, no cost benefit analysis has been carried out on the 2050 scenarios. We would question the value of undertaking such analysis given the high levels of uncertainty that would be involved in an exercise of this nature.

Although the scenarios have been quantified by means of an energy system model, the model output does not constitute predictions or forecasts of the future, as we explained in our letter of 29 August.

Overview of scenario development process

The final report follows the consultation on our academic partners' draft scenarios report[8], which we issued with our letter of 29 August. This was the fourth and final consultation for the LENS project. The **draft scenarios report** contained our academic partners' updated scenarios for 2050, enhanced by qualitative refinements, the addition of draft 2025 way-markers, and a scenario quantification exercise, in light of stakeholder feedback from our third workshop and consultation on the LENS interim report[9]. The **interim report** contained an initial set of scenarios for 2050, expressed purely in qualitative terms. The initial scenarios were derived from considering the interactions between a set of 'themes' reflecting key driving forces for electricity networks, namely 'environmental concern', 'consumer participation', and 'institutional governance'. The interim report, in turn,

[6] Ofgem (15 June 2007), Long Term Electricity Network Scenarios – Initial thoughts and workshop invitation (Ref. No. 146/07).
[7] Ofgem (12 November 2007), Long-Term electricity Network Scenarios (LENS) – methodology, general project update and second workshop (Ref. No. 273/07).
[8] See footnote .
[9] Ofgem (14 May 2008), Long-Term Electricity Network Scenarios (LENS) – interim report and consultation (Ref. No. 63/08).

The Office of Gas and Electricity Markets
9 Millbank London SW1P 3GE **Tel** 020 7901 7000 **Fax** 020 7901 7066 **www.ofgem.gov.uk**

followed our academic partners' **report on scenarios inputs**[10], which contained an initial proposed set of 'themes' and 'inputs' for the scenarios, that were subsequently revised in light of stakeholder feedback and the project team's ongoing analysis. The full scenario development process has been based on a **project methodology**[11] that we published in November last year. Stakeholder consultation has been vital throughout the process, and in total there have been four formal consultations and three all-day workshops. The outcomes of these consultations and workshops are reflected (as appropriate) in our academic partners' reports.

The scenarios have now reached their final form, which concludes the scenario development phase of the project. What remains is for Ofgem to publish its views on the scenarios' implications for networks and their regulation, as discussed further below.

Project update

Incorporating final stakeholder feedback

Our final consultation on the draft scenarios report closed on 26 September 2008. We received seven (non-confidential) responses which can be found on the LENS page[12] of Ofgem's website. The appendix to this letter gives a summary of these responses, and of our views. Respondents generally supported the scenarios, and confirmed again that they found them to be plausible and covering a suitably wide range of outcomes. They raised some further questions and concerns, for example about particular features of certain scenarios and about the extent to which the scenarios incorporate more recent policy and market developments.

In light of this feedback and comments from other reviewers, our academic partners have further enhanced, from a qualitative perspective, the scenario storylines. Also, further explanations of modelling features and issues have been added to the report.

Final stakeholder feedback on scenario implications has been taken into consideration by our academic partners to finalise their own views on scenario implications.

Scenario quantification through Markal modelling & caveats

As explained in our earlier letters, the Markal modelling is intended to add a quantitative dimension to the scenario narratives and to shed further light on scenario plausibility and internal consistency.

Since Markal is an energy system model and not a network planning tool, it does not provide a detailed quantification of the electricity network-specific aspects of the scenarios, such as data on network expansion/contraction and location of generation plant at different voltage levels[13]. Instead, the model has been used primarily to quantify broader aspects of the scenarios, including energy and electricity demand, generation capacity and output profiles, and carbon reductions. It has also allowed for analysis of the interactions between the electricity sector and related sectors (including transport and heat); understanding such interactions is of particular importance because of the long-term time horizons underpinning the LENS project.

[10] Ofgem (5 December 2007), Long-Term Electricity Network Scenarios (LENS) – report on scenarios inputs and second consultation (Ref. No. 287/07).
[11] Ofgem (12 November 2007), Long-Term Electricity Network Scenarios (LENS) – methodology, general project update and second workshop (Ref. No. 273/07).
[12] See http://www.ofgem.gov.uk/Networks/Trans/ElecTransPolicy/lens/Pages/lens.aspx
[13] Although the model distinguishes between large scale and small scale electricity generation, the mid scale electricity generation component of the model is not as refined.

The Office of Gas and Electricity Markets
9 Millbank London SW1P 3GE **Tel** 020 7901 7000 **Fax** 020 7901 7066 **www.ofgem.gov.uk**

Some respondents and other parties identified potential limitations in the Markal modelling[14]. However, all modelling exercises have limitations and it is important to remember that the scenario narratives drove the modelling/quantification exercise and not vice versa. The added value in quantifying the scenarios lies, rather, in adding a further layer of detail and insights to the scenario narratives, and in testing at a high level their plausibility and internal consistency.

Our academic partners have not considered it appropriate to make further substantive adjustments to the model runs, in light of stakeholder feedback or the qualitative enhancements to the scenarios storylines described above. The model runs that formed the basis of the quantification of the scenario narratives presented in the draft scenarios report have therefore been retained for the final report. [15]

We refer to our letter of 29 August for further information about the quantification of the LENS scenarios. The role of the Markal model and its relationship with the scenario narratives is also explained in more detail in the final report (including its appendices).

Final 2025 'way-markers' for 2050 scenarios

Our academic partners have included a final set of 2025 'way-markers' for each of the scenarios in the report, in light of their ongoing analysis and stakeholder feedback. These way-markers describe what would need to happen (or could happen) by 2025 as a pre-cursor to the 2050 end-points. One possible use of the 2025 way-markers is to monitor progress against them in light of new developments, which may result in certain scenario(s) being perceived as more or less plausible as time progresses.

Our academic partners' final views on scenario implications

Our academic partners have also set out their final views on scenario implications in the report. Their views will form a key input into Ofgem's own work on assessing scenario implications.

Further developing Ofgem's views on scenario implications

We have continued developing our views on scenario implications for networks and their regulation. In our previous letter of 29 August, we summarised our conceptual framework for assessing 'scenario implications', defined what we meant by this term, and indicated that we are distinguishing between implications for networks and implications for the regulation of networks. We also made it clear that identifying scenario implications differs from the development of *strategy* by individual stakeholders. Strategy development is a potential next phase of work that lies outside the scope of the LENS project. Final steps for developing our views on scenario implications are discussed below.

We presented an update on the LENS project to Ofgem's Environmental Advisory Group (EAG) on 22 October.[16] Comments received at the meeting will feed into Ofgem's process of finalising its views on scenario implications and possible next steps (after the LENS project is concluded).

DPCR5 and RPI-X@20 projects

[14] Limitations include those described in more detail in our academic partners' final report. The UK Markal model also does not have a fully fledged European energy system component, which restricts the insights the model can provide into interconnection issues. Other limitations of the Markal model were pointed out in Dieter Helm (2003), *Energy, the State, and the Market, British Energy Policy since 1979*, pp401-4, pp407-8 (for example, in relation to the system and security costs imposed by renewables and energy efficiency being downplayed in the model).
[15] Our academic partners have included revised figures for carbon reductions from 2000 in the final report. The carbon reduction figures quoted in the draft scenarios report were taken from an out of date 'off line' calculation, which was based on an earlier trial run of the model. Our academic partners had not yet updated this calculation at the time the draft scenarios report was published.
[16] See http://www.ofgem.gov.uk/Sustainability/Environmnt/Policy/EnvAdvGrp/Pages/EAG.aspx

The Office of Gas and Electricity Markets
9 Millbank London SW1P 3GE **Tel** 020 7901 7000 **Fax** 020 7901 7066 **www.ofgem.gov.uk**

Our view on the linkages between the LENS project and the DPCR5 and RPI-X@20 projects, respectively, remains as stated in our 29 August letter. We envisage that any revisions of regulatory policy in light of the final scenarios and the implications they raise are likely to be considered as part of the RPI-X@20 review (or other relevant Ofgem projects).

Next steps

The remaining work programme for the project remains largely as stated in our 29 August letter.

Scenario implications – finalising Ofgem's views

We intend to publish our final views on scenario implications in light of: stakeholder feedback received through the third consultation and workshop and the final consultation; the updated views of our academic partners on scenario implications set out in their final report; input from our academic peer reviewers; and any other relevant information. This publication is likely to be in the form of an Ofgem open letter, which we now expect to issue early in the New Year.

Final stakeholder workshop

We intend to offer a **final stakeholder workshop** at the close of the project, to present its main findings. This will also be an opportunity to debate further the implications raised by the scenarios and discuss ideas for possible next steps that could be taken by the stakeholder community. The date of the workshop is yet to be confirmed, but is likely to be soon after we issue our open letter on scenario implications. Details on how to register will be sent out nearer the time.

Any other questions about the project or this letter can, in the first instance, be directed to Erik Sleutjes on 020 7901 7329 or Erik.Sleutjes@ofgem.gov.uk.

Yours sincerely,

Stuart Cook
Director, Transmission

The Office of Gas and Electricity Markets
9 Millbank London SW1P 3GE **Tel** 020 7901 7000 **Fax** 020 7901 7066 **www.ofgem.gov.uk**

Appendix: Stakeholder responses to final consultation and Ofgem's views

Our fourth and final consultation for the LENS project published on 29 August 2008 (Ref. No. 127/08) invited stakeholder views on a number of questions about the accompanying draft scenarios report.

We received seven (non-confidential) responses to the final consultation, from:

- Orchard Partners London
- EDF Energy Networks
- E.ON Central Networks
- SP Energy Networks
- Electricity North West
- National Grid, and
- Scottish and Southern Energy.

This appendix repeats the questions posed in the final consultation, summarises the responses we received and sets out our views. It starts with a summary of general comments about the LENS project made by stakeholders, before considering their responses to the specific questions we had posed.

General comments

Respondents were generally supportive of the LENS project and welcomed the opportunity to comment on its development and the draft scenarios report.

One respondent believed that the scenarios could benefit from further consideration of energy substitution resulting from the adoption of electric vehicles and construction of heat networks. The same respondent thought that merging the previous 'energy' and 'network' scenarios (from the interim report) into a small number of consistent themes ran the risk of confusing the reader.

One respondent had expected a more detailed development of the scenario implications section of the report, so that it covered issues such as industry organization and structure, contractual and trading arrangements, and transitional issues to 2025.

One respondent noted that the scenarios and the MARKAL model outputs appeared to be broadly supporting the findings of their own energy scenario modelling work. Another respondent suggested running a scenario that captures the effect of installing 500kW combined heat and power (CHP) units at local transformers on the networks, arguing that this option has various potential benefits including improved security of supply, reduced dependency on gas, voltage and power factor control, back up for wind generation, and faster local load following.

Ofgem's views

The project team has carefully considered respondents' general comments for the purpose of producing the final report. The scenario implications section of the report contains only our academic partners' views on scenario implications, which have now been finalised in light of respondents' feedback. We intend to publish our own views on scenario implications in due course, as set out elsewhere in this letter.

Our academic partners did not consider it advisable or appropriate to undertake an extra model run on the installation of CHP units at local transformers, as suggested by one respondent. As explained in our 29 August letter, although alternative sets of model input assumptions could have been chosen by our academic partners for any given scenario, they considered the adopted sets to be the *most* appropriate for the purpose of quantifying the scenarios, and they have not changed their views in this respect. Moreover, the Markal model may not be particularly well placed to run a sensitivity of this kind because of the way in which it handles CHP plant. Finally, as already explained in our 14 May letter,

The Office of Gas and Electricity Markets
9 Millbank London SW1P 3GE **Tel** 020 7901 7000 **Fax** 020 7901 7066 **www.ofgem.gov.uk**

although a larger number of network scenarios could in theory have been developed, our academic partners (who are experts in this field) advised that it is generally desirable to keep the total number of scenarios, in a scenario exercise of this kind, restricted to a relatively small figure, and the analysis has converged to a total of five final scenarios. One of the objectives of the LENS exercise has been to demonstrate that these five scenarios span a suitably wide range of possible outcomes, which the project team considers has been achieved. For example, in relation to the potential role of CHP highlighted by this respondent, several of the scenario narratives incorporate a significant contribution from large scale, medium scale, and/or small scale forms of CHP plant, even if the modelling results do not reflect this in quite the same way (for reasons set out in the final report).

Question 1

Do you have any further comments on the draft electricity network scenarios for Great Britain set out in section 4 of the report, or the method used to derive them, in light of (i) the scenario merger and quantification exercise, (ii) the addition of 2025 way-markers, and (iii) the additional refinements made in light of stakeholder feedback? In particular:

1a) Do you agree that all five scenarios are plausible? If not, please explain why you think that one or more of the scenarios are implausible.

Respondents generally considered all five scenarios to be plausible, with the exception of one respondent who expressed some continued concern about the Microgrids scenario. This respondent felt that for the Microgrids scenario to be considered plausible, the challenges it poses, as expressed in the scenario implications section of the draft scenarios report, should be addressed and seen to be 'overcome' in the scenario narrative.

Another respondent expressed the view that the ESCOs, DSOs, and Microgrids scenarios would appear to be less plausible, due to significant changes to current energy policy and the advances in technology that would be required to meet the 2025 way-markers.

The same respondent felt that the 2025 way markers were not necessarily consistent with current developments in the UK electricity generation portfolio or the path that current UK energy policy is pursuing, for example in relation to the Government's Renewable Energy Strategy (RES).

1b) Do you agree that the draft scenarios report demonstrates that the five scenarios, between them, span a suitably wide range of (plausible) outcomes for GB electricity networks in 2050? If not, what essential features (if any) do you think are missing and could these potentially be accommodated within the existing scenarios?

Although the respondents generally agreed that the five scenarios span a suitably wide range of plausible outcomes, some specific concerns were raised.

Two respondents highlighted the possible implications of the RES and the development of offshore wind for the LENS scenarios. One of these respondents considered that this may call into question the quantification of some of the scenarios. The same respondent pointed at the possibility that the RES might give rise to scenarios falling outside the currently captured range. Finally, the respondent argued that different hybrids of the scenarios may emerge across specific regions of the country.

Another respondent felt that no consideration has been given to the possibility of a fall in environmental concern from its current level, and that issues of energy security are still underplayed in the scenarios. A further respondent found that scenarios making best use of existing assets are likely to be "much more probable" than the Microgrids scenario.

Another respondent commented that the scenarios appear to show a set of very specific outcomes for a specific set of inputs, and recommended placing less confidence on the modelling tool outcomes while accentuating the importance of the earlier qualitative

The Office of Gas and Electricity Markets
9 Millbank London SW1P 3GE **Tel** 020 7901 7000 **Fax** 020 7901 7066 **www.ofgem.gov.uk**

analysis. The same respondent had three more specific comments. First, they believed that electric vehicles are likely to emerge on a significant scale as a viable and implementable transport solution and should feature more strongly in the DSOs scenario. Second, they found it difficult to predict the relative impacts of changes to key inputs in the MARKAL model, since it tends to deal with transmission and distribution infrastructure as a single entity. The respondent further stressed the risk that the scenarios' outcomes may not sufficiently recognise the relative impacts on the two distinct infrastructures. Third, they urged caution with the Big Transmission & Distribution (T&D) scenario, not believing it plausible that public environmental concern will diminish from today's level.

Another respondent noted that some of the assumptions relating to the Big T&D scenario are already being overtaken by current events. With regards to the DSOs scenario, this respondent thought that it should probably include a "more electric" economy rather than focusing on the hydrogen economy.

Ofgem's views

Our academic partners have carefully considered these comments and amended the scenarios accordingly, as they best saw fit, following discussion with Ofgem and also taking account of comments from the project's peer reviewers.

We observe that respondents generally continued to agree that the five scenarios are plausible. Regarding one respondent's comments about the Microgrids scenario, our academic partners have made additional refinements to the scenario narrative that further demonstrate its plausibility alongside the other scenarios. Regarding more recent policy developments, such as the proposed RES, our academic partners have reflected these in part in the scenarios and the 2025 way-markers. However, they advised that because the scenarios take a longer term perspective, it is not necessarily appropriate for the most current policy developments to influence the scenarios directly, particularly when they are not yet completely 'firm'. Instead, consideration should focus on the *underlying drivers* of current developments and targets, which in the case of the RES proposals, for example, might point at an acceleration of 'environmental concern', with a specific focus on the role of renewable energy, or at a change along the 'institutional governance' axis.

We also observe that respondents broadly continued to agree that the five scenarios span a suitably wide range of outcomes, although some concerns were raised. Again, our academic partners have aimed to address these concerns (where appropriate) by enhancing the scenario narratives. Regarding a *fall* in environmental concern relative to today's levels, although this is indeed a *possibility*, our academic partners considered that, on balance, it was not appropriate for this to be reflected in the scenarios, given currently observed underlying trends in public attitudes towards the environment. They also confirmed that the Big T&D scenario does not in fact imply that public environmental concern will "diminish" from today's level, as read by one respondent – rather, it will stay broadly similar to today. The project team acknowledges the limitations of the Markal model[17] in distinguishing relative impacts on transmission versus distribution network architectures; however, such distinctions do feature strongly in the scenario narratives. The project team does not consider that the scenarios over-emphasise the modelling, as implied by one respondent; fundamentally, as explained in this letter and in our previous letter of 29 August, the scenario narratives have driven the quantification exercise and not vice versa. Finally, the project team does not consider that the Big T&D scenario (or other scenarios) have been 'overtaken' by events, although we do agree that some recent developments, if they proceeded along currently envisaged lines, may 'rule in' certain scenarios (such as the Big T&D scenario) in future and 'rule out' others. One outcome of the LENS project is that it demonstrates that *other* plausible outcomes exist (e.g. other than the Big T&D or Multi Purpose Networks scenarios), depending on how policy, markets and other relevant drivers develop over the coming months and years. There are of course many other possible outcomes too, but the project team considers that the five LENS

[17] As explained previously, Markal is an energy system model and not a network planning tool.

The Office of Gas and Electricity Markets
9 Millbank London SW1P 3GE **Tel** 020 7901 7000 **Fax** 020 7901 7066 **www.ofgem.gov.uk**

scenarios span a suitably wide range, based on all the materials and information reviewed by the project team and in light of stakeholder feedback.

Question 2

What are your final views on the scenario implications for networks, as defined elsewhere in this letter, in light of the draft electricity network scenarios for Great Britain set out in section 4 of the report?

One respondent highlighted the need to develop a flexible network architecture that is adaptable to a wide range of future energy scenarios. This view was echoed by another respondent, who also believed that the final report should develop further the possible implications in each scenario in relation to factors such as industry organisation and structure, and possible regulatory/trading regimes.

Another respondent thought that, against the background of significant large-scale renewables investment, questions of incentive schemes for generators and network operators, adequacy of investment, evolution of the offshore network, and society's motivation to consent to construction of the infrastructure need to be addressed within the scenario narrative.

One respondent considered the issue of whether incremental change or a "revolution" in infrastructure provision is required to be of critical importance, as assets being installed now are likely to have to "endure" the market, consumer and physical environment of 2050 and beyond. They argued that, therefore, a view on the level of network "future-proofing" that is viable to undertake now may be appropriate.

The same respondent noted that all the scenarios forecast a significant and enduring role for a local distributor but vary in the pace at which a network operator changes into an active system operator. They also identified some "apparent anomalies" in the quantitative modelling of the Big T&D and Microgrids scenarios.

Ofgem's views

Respondents' comments on scenario implications for networks have been considered by our academic partners and influenced their final views on scenario implications as expressed in the final report. The same comments are also feeding into Ofgem's own work on this aspect of the project, as explained elsewhere in this letter.

We agree with one of the respondents that the question of whether incremental or radical (or "revolutionary") change in infrastructure provision will be required is an important one. We hope and envisage that the LENS scenarios will now stimulate further debate between relevant stakeholders on this topic, and we also intend to consider this question further ourselves while we develop our own views on scenario implications.

Regarding any "apparent anomalies" in the Markal modelling output, our academic partners have confirmed to us that these can be explained, which they have done in the final report (including the appendices), and do not point at any substantive issues.

Question 3

What are your final views on the scenario implications for the regulation of networks, as defined elsewhere in this letter, in light of the draft electricity network scenarios for Great Britain set out in section 4 of the report?

Overall, respondents stressed the importance of flexibility and adaptability of the future regulatory framework. They considered that a flexible and adaptable regulatory regime was needed to accommodate the potential variability that the scenarios suggest, ensure the delivery of some of the envisaged scenarios, and provide incentives for appropriate investments.

The Office of Gas and Electricity Markets
9 Millbank London SW1P 3GE **Tel** 020 7901 7000 **Fax** 020 7901 7066 **www.ofgem.gov.uk**

One respondent emphasised the leadership role of Ofgem in bringing forward change as a critical factor in ensuring that the electricity networks continue to be fit for purpose. Another respondent noted that it would be useful to bring out the possible need for and nature of regulation in each scenario in more detail in the final report.

While agreeing that, within the Big T&D scenario, consideration must be given to funding and pricing the expansion of the assets, one respondent considered that the issue of maintaining the existing assets had not been adequately addressed. They also noted that funding sophisticated ICT (information and communications technology) and the retention of skilled engineers is not just an issue in the DSOs scenario, but also in the Big T&D scenario. Finally, the same respondent welcomed the attention given to the issue of stranded investment in the Multi Purpose Networks scenario, as this raises the point that long-term and stable regulation is important if the networks are to continue to attract investment capital.

Ofgem's views

As set out for the previous question, respondents' comments have been considered by our academic partners and are also feeding into Ofgem's own work on this aspect of the project. Ofgem will now be taking forward the work-stream on scenario implications following the publication of the final report. We intend to publish our views on scenario implications separately, as explained elsewhere in this letter.

Our initial view is that we agree with respondents' comments about the importance of flexibility and adaptability of the future regulatory framework. We also consider that the implications of the scenarios are not just for Ofgem to manage, but also for other stakeholders (including, for example, the Government and network companies). However, on certain aspects relating to implications for the regulation of networks, we agree that Ofgem should take a leading role, in light of its statutory duties. We intend to expand on these issues when we publish our views on scenario implications.

Question 4

Is there follow-on work that, in your opinion, Ofgem and the Authority (or other relevant stakeholders) should consider undertaking in light of the draft electricity network scenarios for Great Britain set out in section 4 of the report, after the close of the LENS project?

Respondents commented on the link with Ofgem's DPCR5 and RPI-X@20 projects. One respondent also considered that there was a potential to link the LENS scenarios with the upcoming UK Climate Impacts Programme (UKCIP) climate change forecasts for the UK.

One respondent emphasised the importance of maintaining "ongoing frameworks" that would enable: continued contribution from relevant stakeholders to the development of future network scenarios; the necessary "direction" to be given to development of future network strategies (including key areas for research & development and deployment of new technologies); and identification and removal of regulatory and/or market barriers.

Another respondent suggested that an area for further exploration is that of accessibility to finance and the potential impact of changes in the "attractiveness of infrastructure financing vis-à-vis the retail market".

Finally, one respondent considered that "econometric modelling" may have underestimated in some cases the amount of renewable and low carbon energy needed to meet the Government's ambitions. They also suggested that the scenarios be prioritised against the probability of each scenario occurring, and that further attention be invested in creating a network topology against a plausible generation and demand pattern.

The Office of Gas and Electricity Markets
9 Millbank London SW1P 3GE **Tel** 020 7901 7000 **Fax** 020 7901 7066 **www.ofgem.gov.uk**

Ofgem's views

On the relationship between the LENS project outcomes and the DPCR5 and RPI-X@20 projects, our current views are set out elsewhere in this letter.

Regarding the comments of one respondent about meeting the Government's ambitions, we note that, the LENS scenarios have not been explicitly designed to meet the Government's targets, as some other scenario studies have done. Rather they have been constructed to capture the longer term drivers underlying such targets, for example increasing environmental concern. Moreover, and again as explained elsewhere in this letter, the model outcomes should not be seen as predictions or forecasts, and hence it is probably not appropriate to think of them as "underestimating" what might be required.

Finally, and as explained elsewhere in this letter, the aim of the LENS exercise has not been to assess the likelihood/probability or desirability of particular outcomes. Therefore, we do not consider it appropriate to attach probabilities to certain outcomes; the value of the LENS scenarios lies, rather, in the opportunity they provide for stakeholders to consider the implications of a *range* of possible outcomes, all of which are generally regarded as plausible at this time. The intention behind this is to encourage stakeholders and other interested parties to 'think outside the box' and to challenge pre-conceived notions and assumptions. That is a prime reason for undertaking this kind of scenario exercise in the first place. Our academic partners have advised, as explained at the LENS stakeholder workshops, that this is one of the most valuable uses of scenarios.

Question 5

Do you have any other comments or views about the LENS project that you wish to raise at this final stage of the scenario development process?

Several respondents welcomed Ofgem's plans to use the findings of the LENS project to inform discussion on DPCR5. Some also noted that the findings should feed into the RPI-X@20 review. One respondent noted that the long term implications of the Government's emerging RES should be considered explicitly as an input to the project, and incorporated into the final report.

Most respondents expressed an interest in participating in the final stakeholder workshop.

Ofgem's views

We set out our views on these issues above. We look forward to discussing with other stakeholders the LENS project's findings, their implications and possible next steps at the upcoming final stakeholder workshop and other suitable events.

The Office of Gas and Electricity Markets
9 Millbank London SW1P 3GE **Tel** 020 7901 7000 **Fax** 020 7901 7066 **www.ofgem.gov.uk**