Regulating energy networks for the future: RPI-X@20

Working Paper 3

Delivering desired outcomes: who decides what energy networks of the future look like?

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Summary

Delivering a more sustainable, low carbon energy sector is a high priority. Energy networks, and hence the regulatory framework, have a key role to play in facilitating and delivering this. The networks have the potential to be leading facilitators of the timely delivery of a more sustainable energy sector. But there is also a risk that they could be a constraint on effective and timely delivery.

There is significant uncertainty as to the best path or paths for the sector, and hence networks, to take to meet security of supply, environmental and social objectives. It is unclear which paths will ensure targets are met, which paths will provide value for money for existing and future consumers, and which paths will deliver both. This uncertainty is particularly significant for the period beyond 2020.

Given the scale of the challenge, a number of organisations have suggested that the current regulatory framework needs to change. Some have suggested that central government should map out a path that networks follow to deliver the low carbon economy. Others have suggested that industry should be responsible for mapping out what networks need to do, with any plan endorsed by Ofgem and government. Others have argued that there is a real risk that if a plan is mapped out now and followed it will turn out not to be the best route to delivering a sustainable energy sector. Building on this point is a suggestion that what is needed to address the concerns is an adapted framework that encourages innovation (including trials) and learning, and takes account of the value of keeping options open in the regulatory framework.

In this paper we explain how decisions relating to delivery of a sustainable energy sector whilst trying to maintain value for money are currently taken. We summarise our understanding of the concerns that have been raised about the present arrangements. We then present three alternative models for the future, building on ideas presented to us about how responsibility for core decisions on the way networks should look might be taken. We assess each of these models relative to the desired outcomes of our future regulatory framework, as mapped out in our June working paper.

We welcome views on our current assessment of the models. We are presenting this work at an early stage consistent with the review's guiding principles of transparency and "no surprises" and to spur debate. The ideas may be subject to change as our thinking in the visionary phase of the project develops. Further clarification will be provided in our winter 'Emerging Thinking' consultation paper.

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1. Introduction

1.1. RPI-X@20 is a "root and branch" review of the RPI-X framework that has been used successfully to regulate Britain's transmission and distribution gas and electricity networks for the past 20 years. We published our first "Principles, Process and Issues" consultation document in February[1]. We remain in the "visionary" phase of the project, which will culminate in our "Emerging Thinking" consultation paper in the winter. We will provide our recommendations to our governing Board, the Gas and Electricity Markets Authority (GEMA), in summer 2010.

1.2. We have actively engaged with a range of stakeholders in the early stages of the review; an approach we will continue to take when developing and progressing our ideas. As part of this engagement we intend to publish working papers on our web forum, from time to time, outlining our current thinking on key issues. We hope that the industry working groups and other interested parties will also submit papers to the web forum.

1.3. Our first working paper described the outcomes that we think a regulatory framework should deliver[2]. We emphasised that the regulatory framework should encourage energy networks to facilitate delivery of a sustainable energy sector and deliver value for money for existing and future consumers. This is consistent with the Government's view presented in its recent low carbon strategy paper, where it was emphasised that protection of the interests of existing and future consumers involves ensuring security of supply and tackling climate change[3].

1.4. We recognise, as emphasised in our February consultation paper, that networks and the regulatory framework face new and significant challenges when delivering these outcomes. The level of uncertainty about the future role and direction of networks is unprecedented, at least in the period since privatisation.

1.5. A number of organisations have suggested that, because of the significant uncertainty, a decision (or set of decisions) needs to be made about what the energy networks of the future look like and what role energy networks play in delivering a sustainable energy sector (in particular a low carbon electricity sector). Some organisations have suggested that government should map out what energy networks of the future should look like. This might, for instance, be consistent with the strategic role of government in parallel to dynamic markets that the Secretary of State envisaged in his December 2008 speech[4]. Others have suggested that industry (networks and other industry players) should determine what is needed and that any 'plan' should be endorsed by Ofgem and Government. Such approaches have been given a number of different names including 'guiding mind', 'guiding hand' and 'directing mind'.

1.6. On the other side of the debate, a number of organisations have emphasised that moving to a framework with a centralised plan, from government or industry, is likely to have a detrimental impact on delivering value for money for existing and future consumers.

[1] Available here: http://www.ofgem.gov.uk/Networks/rpix20/publications/CD/Documents1/Principles%20Processes%20and%20Issues%20con%20doc_final%20-%20270209.pdf

[2] http://www.ofgem.gov.uk/NETWORKS/RPIX20/FORUM/Documents1/RPI-X20%20Working%20Paper%20-%20What%20should%20a%20future%20energy%20regulatory%20framework%20deliver%20-%20Final.pdf

[3] Available here: http://www.decc.gov.uk/en/content/cms/publications/lc_trans_plan/lc_trans_plan.aspx

[4] Speech by Rt Hon Ed Miliband MP, Secretary of State for Energy and Climate Change, 'The rise and fall and rise again of a Department for Energy, at Imperial College, 9 December 2008. This is available on DECC's website at http://www.decc.gov.uk/en/content/cms/news/rise_fall/rise_fall.aspx.

This is because nobody currently knows what the most efficient route is for delivering a sustainable energy sector and there needs to be a process of learning and innovation to find the 'best' options. Related to this point is a concern that regulatory frameworks with Government led plans will create networks that are passive and that will not look to develop their own ideas or to learn over time. In this context, some have suggested that an alternative regulatory framework should be designed to encourage keeping innovation, learning and options open.

1.7. This debate has arisen from a number of concerns with the current arrangements for making decisions about the role of energy networks in facilitating delivery of a sustainable energy sector. We have reviewed the ongoing debate and have observed that there appears to be no consensus on what the problem is with the current arrangements or on precisely what the best way forward is. We are considering a number of options and think it is important to consider the merits and risks of these alternatives.

1.8. In this paper we describe the current regulatory framework, explaining how decisions relating to delivery of a sustainable energy sector and delivery of value for money are made. We summarise the concerns that have been raised about the decision-making in the current regulatory framework. We then consider three alternative models that change the way in which decisions about the future of energy networks are made. We describe each model and assess each relative to the desired outcomes of the future regulatory framework discussed in our first working paper. These models are not necessarily mutually exclusive and could overlap with each other depending on the level of decisions made under each.

1.9. The three alternative models that we consider are:

a. A **central government led model** in which government makes decisions about the future role of networks and maps out a plan of how energy networks would facilitate delivery of a sustainable energy sector. The economic regulatory framework is focused on ensuring that the plan is delivered efficiently.

b. A **joint industry led model** in which networks (distribution and transmission) jointly make proposals about the future direction of energy networks, in collaboration and in consultation with other industry parties including network users (suppliers, shippers, generators) and consumers. These proposals would be endorsed by Ofgem and government. The economic regulatory framework is focused on ensuring that the plan is delivered efficiently.

c. An **adapted regulatory framework**, focused on delivering the low carbon economy, consumers and security of supply. Networks are given clear outcomes related to these that they must deliver, but there is no specific centralised plan for delivering them. Networks are therefore incentivised to find the best way to deliver the outcomes rather than to deliver a specific plan efficiently. In particular, networks are provided with strong incentives to ensure outcomes are delivered and to undertake required network enhancement in a timely manner. In recognition of the uncertainty about what the best option for delivering a sustainable energy sector is over time, the focus of the regulatory framework is on the long term and the need to innovate, learn and adapt. Networks and Ofgem would consider the value of keeping options open for the future, without creating unnecessary delays in delivery.

1.10. The three models represent those that have been discussed with us in the context of the RPI-X@20 review. There are a number of variations of each model that could be considered. There may also be other models that could help to inform the policy debate. Respondents are invited to consider whether there are any other models they would like to be considered during the visionary phase of the project.

1.11. We recognise that it might not be our decision whether to introduce the central government model. In this context we note that the Government is proposing to develop a road map to 2050 for delivery of the low carbon economy[5]. This road map could be an example of the first model, if it provides a detailed plan on the future size, shape and technologies of future energy networks. Alternatively, if the road map is high-level policy guidance it might be used to inform decisions taken by the joint industry group in the second model or by networks directly in the third model. When further details are available on what the road map will look like, we will consider the implications of this for the design of the regulatory framework.

1.12. It is also feasible that the joint industry model could evolve without Ofgem taking particular actions and we need to consider further how this might sit in a regulatory framework of the future. We also need to consider the extent to which these models are consistent with developments in EU energy policy. For example, we need to consider whether the central government model and the joint industry model would be consistent with the legal requirement in the Third Package , when it enters into force[6], for an independent regulator and independent regulation of energy networks.

1.13. We are presenting this work at an early stage consistent with the principles guiding the review of transparency and "no surprises" and to spur debate. The ideas are subject to change as our thinking in the visionary phase of the project develops. We will provide further clarification in our winter 'Emerging Thinking' consultation paper.

2. Decision making in the current regulatory framework

2.1. Before discussing alternative models for the regulatory framework in more detail, we think it is important to understand how decisions are made in the current framework. This will enable us to discuss the concerns that have been raised with the current framework and to identify the specific areas where change may be needed.

Current arrangements

2.2. Figure 1 below describes the parties that currently make key decisions in the regulatory framework. This is clearly a high-level summary. Where there are differences between gas and electricity, or between transmission and distribution, these are highlighted. The overview of current arrangements shows that we, through the regulatory framework and consistent with our legal powers and duties, play a central role in determining how energy networks deliver value for money and facilitate delivery of the sustainable energy sector. The energy networks themselves also lead decisions, particularly in determining what needs to be done and when. Both Ofgem and networks are affected by decisions made by other organisations, particularly government.

[5] HMG, *The UK Low Carbon Transition Plan: National Strategy for Climate and Energy*, July 2009

[6] Further information on the third package is available on the European Commission's website (http://ec.europa.eu/energy/gas_electricity/third_legislative_package_en.htm) & the European Parliament's website (http://www.europarl.europa.eu/news/public/focus_page/051-31738-168-06-25-909-20080616FCS31737-16-06-2008-2008/default_en.htm)

Figure 1: Decision making in the current regulatory framework

Decision area	Responsibility for decisions
Environmental targets (e.g. CO_2 and GHG)	• EU and national government set overall targets • Climate Change Committee makes recommendations
Energy sector policy (e.g. feed-in tariffs, CCS)	• EU and national government set policy, including specific environmental targets for the energy sector • Secretary of State guidance to the Authority on environmental and social matters, issued pursuant to s3B of the Electricity Act 1989 and s4AB of the Gas Act 1986 • Ofgem responsible for some administration (e.g. ROCs, CERT) • Ofgem and networks interpret implications of energy policy for networks, taking account of government guidance where appropriate
View on role of networks in delivering sustainable energy sector (e.g. should DNOs have a system operator role)	• 'The market' determines required role of networks to meet security of supply and environmental objectives • government policy defines boundaries of role for networks in some areas, for example social policy, with details specified in licence conditions • Ofgem introduces general or specific incentives to encourage networks to deliver particular outcomes or adopt particular behaviours (e.g. developing incentives in DPCR5) • Ofgem can introduce obligations to require licence modifications where sufficient agreement from companies • Networks respond to government policy development and consider role for networks (e.g. smart meter roll-out) • Networks make own commercial choices
What networks have to deliver (i.e. outputs and deliverables)	• Networks consider implications of government environmental policy when developing business plans, but do not set specific environmental targets. • Ofgem considers implications of government environmental policy when assessing business plans, but does not set specific environmental targets. • Ofgem sets quality of service and other related outputs (e.g. losses, shrinkage). • Networks have duty to deliver security of supply. Networks identify what is needed to deliver security of supply. Ofgem incentives delivery of resilient networks through regulatory framework. • Ofgem signals preference for particular types of network behaviour and output delivery through design of specific incentives: e.g. connection of DG, registered power zones • HSE sets safety standards for networks.

Decision area	Responsibility for decisions
How to deliver the outputs (e.g. size of networks, shape of networks, technology choice)	• Networks identify preferred way of delivering required outputs. This forms the basis of the business plan submitted to Ofgem. • Ofgem provides indication, through wider policy, of the outcomes or deliverables it wants networks to deliver. Ofgem does not form view on best way for these outcomes to be delivered. Ofgem assesses business plan as part of the price review process to ensure proposed approach is efficient and delivers value for money for consumers. • HSE identifies path for delivering identified safety targets in gas networks.
Set revenue allowance to deliver plan	• Regulatory framework establishes mechanism for setting revenue allowance that reflects efficient cost of delivering outputs/outcomes. • Ofgem assesses efficiency of proposed plan (e.g. unit costs). • Ofgem provides incentives to encourage improved efficiency over period. • Ofgem sets allowed return to reflect risk that network is bearing. • Ofgem identifies rewards and penalties for delivery, or non-delivery, of specific outputs. • Network has choice to accept or reject proposed revenue allowance, with rejection most likely resulting in appeal to Competition Commission.
Delivery of plan and updating	• Networks responsible for delivering network plans. • Ofgem monitors investment and delivery of outputs over time. • Various procedures are in place to deal with new investment arising during the period or to review underinvestment or non-delivery of outputs during the regulatory period.

Decision making in the future

2.3. The government has committed Great Britain to a number of legally-binding targets including:

- 80% reduction in UK carbon emissions (1990 – 2050);
- 26% (at least) reduction in UK carbon emissions (1990 – 2020);
- 34% reduction in UK carbon emissions (by 2018 – 2022 budget period) and
- 15% of gross final energy consumption from renewables by 2020 (UK contribution to EU wide target).

2.4. In its recent strategy for a transition to a low carbon economy, the government set out how it intended to attain the above targets, including:

- 40% of electricity from low carbon sources by 2020; and
- 30% of electricity from renewables by 2020,

2.5. The energy sector has a central role to play in enabling these targets to be met. In particular, the first report produced by the Committee on Climate Change (CCC)[7] sets out a clear view that to achieve the Government's 2050 carbon reduction targets, the electricity sector needs to be de-carbonised by 2030. The 2009 Budget confirmed the first carbon budgets for the UK requiring a 34% reduction in carbon emissions by 2020. These carbon budgets will *'require the UK to generate energy in lower-carbon ways -like wind-power - and use energy more efficiently - by insulating homes and developing cleaner cars. In this way carbon budgets will drive the transition to a lower-carbon economy and put the UK on track to meet the 2050 target of cutting emissions by 80 per cent'* required by the Climate Change Act[8]. The government's strategy for transition to a low carbon economy confirms these ambitions and the role of the energy sector. Developing government policy, for example relating to smart meters, renewable energy strategy, heat incentive, provides further confirmation that the energy sector is central to meeting these targets.

2.6. The energy sector will have a central role to play in delivering these targets. There also appears to be a general consensus that the energy networks have a key facilitating role to play and that this may imply a transformation in the energy networks. However, as outlined earlier, there is uncertainty about what the role, shape and scale of networks required for the future is, particularly beyond 2020.

Potential concerns with the current arrangements

2.7. A number of network companies argued in their responses to our February consultation paper that, in light of the uncertainty they face, decisions need to be made about what energy networks of the future might look like. Examples of such responses are provided in Annex 1. The idea has also been discussed at our workshops and at Ofgem's April 2009 Powering the Energy Debate[9], and it has been raised in wider discussions on the future of energy regulation. There are mixed opinions on which organisation should make the decisions. Organisations suggested include DECC, Ofgem, a new independent government Energy Agency, a joint industry body, or individual networks. There are also mixed opinions on whether a fixed decision needs to be made now for the future or whether there is a need for decisions to be made and updated over time, as part of a regular review process.

2.8. A common theme across the discussions is a concern that key decisions are not being made, or are not being made in a timely manner, within the current regulatory framework. However, a number of organisations have stressed that they are not looking for a centrally planned or centrally managed network system.

2.9. This idea does not have unanimous support. Concerns have been raised that because of the uncertainty it is too difficult to identify now what the most efficient path for the energy networks to take for the future is. It has been suggested that there is a real risk that the long-term costs to existing and future consumers of focusing on a specific plan will be higher than the long-term costs associated with delivering what is necessary efficiently

[7] Committee on Climate Change, Building a low carbon economy, December 2008. This is on the CCC website at http://www.theccc.org.uk/pdf/TSO-ClimateChange.pdf.
[8] http://www.hm-treasury.gov.uk/d/Budget2009/bud09_carbon_budgets_736.pdf
[9] http://www.ofgem.gov.uk/About%20us/PwringEnergyDeb/Pages/PwringEnergyDeb.aspx

and, where there are options, keeping them open, trialling potential new options and learning over time. There are also concerns that focusing on a specific plan may stifle innovation, for example if resources are transferred from potentially viable trials to delivery of the specified future path. A number of organisations have also emphasised that there are concerns with the role of government in decision making in other sectors (e.g. rail).

2.10. Based on our discussions to date, we think the following summarises the main comments that have been made about how decisions relating to delivery of a sustainable energy sectors are made in the current regulatory framework.

- The RPI-X framework is focused on encouraging operating efficiencies. The current framework was not designed to encourage networks to facilitate delivery of a sustainable energy sector.

- Networks do not know what needs to be done to facilitate delivery of a sustainable energy sector. They need to be told what to do clearly and then they will deliver.

- Networks, and the regulatory framework, are not responding sufficiently quickly to the need for change and there is a risk that the 2020 targets will not be met on time. A central plan is needed to 2020, and beyond.

- Given the uncertainty, there is a risk that network investment decisions today may result in assets that are underutilised in the future. Networks may be reluctant to invest on this basis because of a concern that the costs of financing the investment will not be recovered through the regulatory framework.

- Networks are not thinking in a consistent way about how to respond to changes along the energy supply chain (e.g. smart metering) and in other sectors (e.g. electric vehicles). There needs to be a common response from networks.

2.11. All of these arguments ultimately relate back to uncertainty about what energy networks have to do to facilitate delivery of the sustainable energy sector. In many cases they may reflect perceptions about how the current regulatory framework works rather than actual barriers to delivery of value for money and a sustainable energy sector. However, we recognise that perceptions affect how networks and others behave and it is important that steps are taken to change them, particularly if they are sufficiently strong to constrain progress in delivery of the desired outcomes. In this context, the models assessed, which vary the decisions that are made and by who, provide a basis for further debate on options for addressing these concerns, whether perceptions or real, in a future regulatory framework.

3. Three models of decision making in the regulatory framework

3.1. The energy networks are facing new and significant challenges, particularly relating to delivery of a sustainable energy sector (with specific ambitions for 2020, 2030 and 2050). The level of uncertainty about the future role and direction of networks needed to meet these challenges efficiently is unprecedented, at least in the period since privatisation. The scale of the challenges, and the uncertainty surrounding how to meet them, may mean that change to the regulatory framework is needed.

3.2. In this context we consider here three potential models that have been discussed in our stakeholder engagement, which relate to changes in the way in which decisions about

the future of energy networks are made. These represent points on a spectrum of options that could be considered. There are a number of different variations in the detail of each of these models, which warrant further consideration. We also welcome views on whether there are other models that we should consider in the context of this debate.

3.3. We describe each of the models here and assess them relative to the desired outcomes below. In Annex 2 we illustrate how key decisions might be made under each model.

3.4. There are a number of aspects of the regulatory framework that are common across the three models:

- The government sets national, and potentially sectoral, environmental and social objectives, implementing where relevant EU and global agreements.
- The government determines energy policy, and Ofgem and the networks consider the implications of this policy for the networks and hence for the setting of regulated allowed revenues.
- The Secretary of State provides guidance to Ofgem on environmental and social matters, as allowed for under s3B of the Electricity Act 1989 and s4AB of the Gas Act 1986.
- Individual networks are responsible for meeting their licence obligations, determining their own company-specific business plan and for delivering on that plan.
- The economic regulatory framework is needed to ensure that a plan is costed at an efficient level and is delivered efficiently. Where there is a centralised plan that specifies how targets are to be met, the incentives and assessment of network business plans will be primarily focused on the costs of delivery. Where there is no centralised plan, the focus of incentives and assessment of plans will be broader and include consideration of how to deliver value for money for existing and future consumers whilst ensuring security of supply and helping to tackle climate change.

Central government led model

3.5. In this model a central government body would make decisions about the future role of energy networks. The central government body would establish a plan of how energy networks would facilitate delivery of agreed environmental, security of supply and social objectives or targets. Networks would be responsible for delivering on this plan. This would include responsibility for project scoping, initiation and delivery up to design and implementation of company programmes. Ofgem, through the regulatory framework, would be responsible for ensuring the plan was delivered as efficiently as possible, including ensuring that the networks' obligations were financeable.

3.6. The central government body could be a government department (e.g. DECC), Ofgem or a distinct independent agency with a remit for delivering the sustainable energy sector. In our assessment of the model we comment on whether the merits and risks vary depending on which organisation is used. We note that it will be important to consider which of these options are most consistent with legal requirements for an independent regulator under the Third Package.

3.7. The model could involve decisions that vary in terms of level of detail. As indicated by the examples in Figure 2, the central government body could impact on network size, shape and/or utilisation, and it could include decisions about new technologies and decisions around major changes in supply/demand. For example, the central government body could signal that energy networks should become 'smart grids' and the networks would be responsible for determining how this should be done and over what time scale. If the central government body were to specify a plan at a more detailed level, it could map out exactly what smart grids look like and how and when they were to be rolled out across energy networks.

Figure 2: Levels of decision a central government body might make

Determine the size of different networks (Transmission (T) and Distribution (D) networks might have different instructions), e.g. focus on increasing the size of the network more than other objectives, favouring investment with less focus on ensuring efficiency
Determine the shape of different networks (T + D might have different instructions), e.g. for the distribution networks to prioritise support to particular DG developments
Choose to go with particular technologies/approaches, e.g. whether energy networks should introduce smart grid technology and over what timescale
Define role of networks in relation to specific energy efficiency changes like the use of heat networks or responses to new electricity demand such as that from electric vehicles
Define required outputs from the different types of networks, e.g. network availability, level of losses, performance against quality of supply measures

3.8. The scope of the central government body could be wide or narrow. It could focus on the future of energy networks only or it could have a broader remit to consider the future of the energy sector and the role of networks as part of this. Alternatively, there could be a focus on the gas sector only or on the electricity sector only.

3.9. In 'The UK Low Carbon Transition Plan: National Strategy for climate and energy' the government has said that it plans to publish a road map for delivering a low carbon economy by 2050, including the role of a smart grid. This plan could potentially result in this central government model emerging if it provides detailed direction on what networks have to do. If, however, the road map is at a high level, requiring industry or individual networks to determine the best way to implement policy, it may be part of the joint industry or adapted regulatory framework models.

Examples from other sectors

3.10. There are examples, in the rail and water sectors, of the government having a formal role in the regulatory framework. In rail, the government sets high-level outputs for Network Rail and provides a significant part of the funding for delivery of these outcomes. Network Rail is responsible for determining how to deliver the objectives, in discussions with the industry. The economic regulator (the Office of Rail Regulation) sets the price control.

3.11. In water, the Secretary of State provides guidance on what water companies are expected to deliver during a price control period. The guidance generally relates to EU and national legislation. Water companies are responsible for determining how best to deliver. A quadripartite process, involving the economic regulator (Ofwat), the environmental

regulators (the Drinking Water Inspectorate and the Environment Agency) and government, exists within the price review process to finalise the details of the government guidance and to assess company plans relative to the guidance. Water companies are responsible for delivery and Ofwat is responsible for setting the price control.

3.12. The role for central government being discussed in the central government led model would be different to the current approach in water and rail. In particular, the central government body might make decisions about what the outcomes or outputs the energy networks need to deliver and determine how the energy networks should deliver these outputs (e.g. if the objective is to meet a renewables target, the central government body could determine the investment path for transmission and distribution to ensure the target is met). In water and rail the decision on the investment path rests with the regulated companies in the main (although there are exceptions in Scotland where rail guidance has tended to be focused on individual projects), and the government bodies involved are focused on establishing high-level outputs or outcomes to be delivered. This may reflect a difference in the extent to which there is uncertainty about how to compare choices available for delivering policy guidance.

3.13. Furthermore, as noted by Cambridge Economic Policy Associates (CEPA)[10] in a paper commissioned by us, the water and rail sectors are not precisely comparable with energy. Care therefore needs to be taken when assessing the models of government involvement found in these sectors and replicating them in some form in the energy sector.

Joint industry led model

3.14. In this model a joint industry body would make decisions about the future role of energy networks. The joint industry body would map out a plan of how energy networks would facilitate delivery of agreed environmental, security of supply and social objectives or targets. The plan would be endorsed by Ofgem and DECC, providing a form of commitment to delivery and efficient funding of the plan through energy policy and the regulatory framework. Individual networks would be responsible for delivering on this plan. This would include responsibility for project scoping, initiation and delivery up to design and implementation of company programmes. Ofgem, through the regulatory framework, would be responsible for ensuring the plan was delivered as efficiently as possible, including ensuring that the networks' obligations were financeable.

3.15. A number of models of this type could be considered, with variation in the make-up of the joint industry body. For example, the body could incorporate electricity network companies only (TOs and DNOs) or it could include all players in the energy sector (suppliers, shippers, generators). Consumer representatives could also potentially be included. There is also a question of whether DECC and Ofgem should be members.

3.16. As with the central government led model, there could be variation in the level of detail at which decisions are made by the joint industry body and those that are left for individual networks to make themselves. The joint industry body could also be for the electricity only, gas only or an energy sector wide body.

[10] Available at: http://www.ofgem.gov.uk/Networks/rpix20/publications/CD/Documents1/CEPA%20Final%20Ofgem%20report%20270209.pdf

Adapted regulatory framework

3.17. The two models above assume that a centralised plan is needed to ensure that networks facilitate delivery of a sustainable energy sector. There is significant uncertainty about what the efficient option or options are for networks. There is therefore a real risk that any centralised plan will not result in outcomes that are consistent with delivering value for money for existing and future consumers, ensuring security of supply and tackling climate change.

3.18. The third model we consider addresses the challenges that the networks face, and the uncertainty around how best to meet these challenges, through an adapted regulatory framework. We intend to discuss in other papers what the options for an adapted regulatory framework might be[11]. Here we focus on the general characteristics of the framework; with the emphasis on the need for it to respond to the uncertainty about what is the 'best' way forward by allowing learning, innovation and adaptation over time. At the same time, as emphasised in our first working paper, the framework must ensure that the desired outcomes of security of supply, environmental targets and network-related social objectives are delivered.

3.19. Decision making on what networks need to do would continue to rest with networks and Ofgem (through the regulatory framework), taking account of Government targets and energy policy at EU and national level. Individual networks would be responsible for delivering on their plans. This would include responsibility for project scoping, initiation and delivery up to design and implementation of company programmes. Ofgem, through the regulatory framework, would be responsible for ensuring that network plans, and delivery of them, were in the interests of existing and future consumers, including ensuring security of supply and tackling climate change.

3.20. This model would not preclude networks from working on ideas jointly or on communicating more widely with others in the industry (introducing some elements of the joint industry led model). It would also not preclude government, Ofgem and industry working closely on identifying what outcomes the energy sector, and networks, might be expected to deliver. Ofgem, government and industry would also be able to learn together, and from each other, under this framework. These are potentially desirable properties of an adapted regulatory framework and we need to consider what the implication for decision-making might be in more detail.

3.21. We intend to discuss what such a regulatory framework might look like in more detail in further working papers and in our winter 'Emerging Thinking' consultation paper. At a high level, our current thinking is that an enhanced regulatory framework is likely to involve:

- A focus on outputs (widely defined to reflect all key delivery measures) and efficient delivery of these outputs over the long term.

- A change in mindset and culture, by both networks and Ofgem, when putting together and assessing business plans for delivery of these outputs.

[11] We intend to publish our current thinking on three models that are not necessarily mutually exclusive: (1) An alternative ex-ante incentive regime; (2) an ex-post regime and (3) a regime that introduces competitive pressures where feasible. In our winter 'Emerging Thinking' we will provide a further assessment of these models, relative to each other and relative to the current RPI-X framework.

- A focus on alternative ways of delivering outputs, and an assessment of the value of different options and the value of keeping potential options open for the future.

- Encouraging potentially riskier investments, and providing enhanced returns (along the lines of the enhanced incentives being developed for Transmission Access Review).

- Learning and adaptation by networks and Ofgem in response to lessons learned.

- Innovation, particularly trialling (building on proposals in the distribution price control review to provide funding for large-scale network trials of new technologies and commercial arrangements).

3.22. As with the other models, there are a number of different variants of this model that could be considered. The form of the regulatory framework could be ex ante (where the control is set in advance) or ex post (where the review is carried out as a result of some past company performance compared to some form of up front rules). A number of different tools could be considered for incentivising desired behaviour. Similarly, the outputs that networks are expected to deliver could be set at different levels of detail (e.g. general requirement to facilitate delivery of low carbon economy or specific low carbon targets on the networks). These options will be considered in our ongoing work on the design of the regulatory framework.

3.23. As with the other models, we will need to consider whether the regulatory framework should focus on the network industries separately or whether there is a case for aligning incentives across the sectors.

Scope and timing of decision making

3.24. There are a number of common issues to consider across these three models.

3.25. We recognise that the extent to which there is uncertainty about the future of energy networks may be different depending on whether we are considering the period up to 2020 or further into the future (e.g. 2030 or 2050). Arguably, there is some clarity that the existing transmission and distribution networks need to expand in order to meet the 2020 targets. There are, however, alternative paths still available, e.g. in electricity distribution where intelligent ways of using existing capacity could still be the route to follow. This is reflected through current transmission policy (TAR) and the current distribution price control review (DPCR5). There is debate about the required level of efficient investment and the types of technologies that might be deployed. It may be the case that there is sufficient clarity for industry to develop proposals for 2020, as the Energy Networks Strategy Group (ENSG) has already done, and that Ofgem, through a changed regulatory framework, will be in a position to review them.

3.26. However, as LENS[12] suggests, there is significant uncertainty as to how the networks will develop beyond 2020 in terms of size and shape. The uncertainty beyond 2020 is significant and fundamentally affects investment choices that networks make today. It also affects the potential benefits and risks associated with having a plan set by a central government body or industry group now, as discussed in more detail below. Decisions made from now will impact on the options considered for 2020 and beyond. It is

[12]Further details on Ofgem's Long Term Electricity Network Scenarios (LENS)Project are available at the following link: http://www.ofgem.gov.uk/Networks/Trans/ElecTransPolicy/lens/Pages/lens.aspx

therefore important that we consider the most appropriate way for these decisions to be made.

3.27. Related to this point is the question of whether a decision on the future of energy networks should be made once (soon) or whether there is a need for an ongoing decision process over time. There are a number of significant uncertainties involved in changes in the energy sector. We therefore think that a one-off decision is unlikely to be feasible or effective. Instead any changes to how decisions are made in the regulatory framework will need to involve a process for updating and adapting decisions over time. This applies to the three models we assess below.

3.28. The concerns with decision making in the current regulatory framework have been particularly discussed in the context of electricity networks and delivery of a low carbon energy sector. It is not clear whether there are reasons also to consider a need for alternative decision making for gas networks. Arguably there is similar uncertainty about the required future scale and scope of gas networks, given potential changes in demand, storage, biogas, and in the use of gas networks for alternative uses, including supporting the development of local generation. For example, the gas distribution networks are currently implementing a thirty years mains replacement programme, as required by Health and Safety Executive (HSE) and there is a question as to whether this decision would need to be reviewed if the low carbon economy significantly reduced the use of the gas distribution networks. If changes in how and when decisions are made are considered necessary to manage the uncertainty relating to the future of electricity networks, similar reasons could be put forward for the gas networks. Importantly, similar reasons could also be put forward for decisions that relate to the energy networks as a whole, taking account of interactions between gas and electricity. We do not discuss these issues in detail in this paper but welcome views on the extent to which the models discussed are more or less relevant for gas and electricity, and for distribution and transmission.

4. Assessment of the three models relative to current framework

4.1. We assess each of the three decision making models described above, and the current regulatory framework, relative to the desired outcomes identified in our first working paper. Details of the assessment are provided in Annex 3 and key messages are presented here. The assessment reflects our current thinking and will be updated during the visionary phase of the project. Further clarification will be provided in our winter 'Emerging Thinking' consultation paper.

4.2. We compare the models by considering the extent to which they are expected to:

- deliver a sustainable energy sector – security of supply, environmental targets and network-related social objectives;
- deliver value for money for existing and future consumers - this involves delivering long-term efficiency and stimulating innovation, providing choice to consumers and delivering quality of supply;
- encourage desirable behaviour by networks and Ofgem, including a focus on existing and future consumers, financeability of networks, and forward thinking and adaptability;
- be consistent with better regulation principles;

- be feasible; and
- impact on regulatory burden and transaction costs.

4.3. Annex 3 illustrates our assessment of each model relative to our desired outcomes. The key points arising from our current assessment are summarised here.

- There are genuine concerns that the objectives of facilitating delivery of a sustainable energy sector and delivery of value for money are unlikely to be met effectively within the existing regulatory framework (status quo).
- Whatever decision making model is in place, Ofgem, through the regulatory framework, would continue to be responsible for ensuring that delivery of any plan was efficient and that networks were able to finance delivery of the plan.
- The risks that networks face will vary in each model, and this will have implications for the allowed return in any underlying regulatory framework. For example, if investment is to some extent agreed to or endorsed by Ofgem, the volume risk associated with delivery will be reduced. The implication for the allowed return will depend on the extent of that volume risk under the current framework.
- The central government model is potentially the one that could put a plan for meeting environmental targets in place most quickly.
- There are concerns that the central government model will not deliver outcomes that provide value for money for existing and future consumers. Related to this, there are concerns that there will be insufficient focus on the need for innovation and on the long-term implication of different choices. It is also possible that the model may fail to deliver the outcomes while still costing more than other approaches. Such an example would be where it instructed direct actions to support electric vehicles at the expense of intelligent development to facilitate distributed generation (DG). Then, for whatever reason, there is no take up on electric vehicles and much demand for DG.
- There may be particular risks with a ministerial department (or similar body) making decisions as these may well be influenced by short-term political considerations. An independent government body may also be influenced by political cycles but the risks may be lower than with ministerial body making decisions.
- The autonomy and independence of any government body making decisions relating to the regulatory framework will be important. This is consistent with the Third Directive which when it enters into force enshrines in law the need for independent regulators.
- The adapted regulatory framework model is potentially the most likely to ensure value for money for existing and future consumers over time.
- A joint industry group, by bringing industry knowledge and expertise to the assessment of options for delivering the outcomes, may improve the efficiency of decision-making. It is possible for these benefits to be captured within the adapted regulatory model.
- There is a concern that limitations on who would be in the joint industry group (e.g. excluding potential energy service companies) could stifle innovation. This could particularly be through a limited focus on network solutions rather than considering

other options, e.g. through telecoms innovation. There is also a risk that networks will not take appropriate account of the outcomes that they are expected to deliver (i.e. that they will miss something).

- It may not be necessary to have a decision making body that determines what the energy networks of the future might look like. An adapted regulatory framework, if appropriately designed, could ensure that networks facilitate delivery of a sustainable energy sector and ensure value for money for existing and future consumers. Given the scale of the challenges involved, and the significant uncertainty about how to meet these challenges, this adapted regulatory framework would allow experimentation, options to be considered, and learning.

4.4. Any regulatory framework of the future will need to take account of how decisions are made about the future of energy networks. As we will discuss in other working papers, and in our Winter 'Emerging Thinking' document, it will be important to design a framework that can adapt if the decision-making roles change over time. We expect that the adapted regulatory framework model discussed here would be a base case model that could then have elements 'shut down' if a central government or joint industry model of decision-making was in place at some point.

5. Conclusions and next steps

5.1. In this paper we have focused our attention on understanding why and how decision making responsibilities could change in a future regulatory framework. The drivers of the potential need for change are the scale of the challenges that the networks face and the uncertainty about how to facilitate delivery of a sustainable energy sector and provide value for money to existing and future consumers.

5.2. Each of the models has advantages and disadvantages. Our current thinking, based on the assessment presented here, is that there is merit in exploring further how far an adapted regulatory framework can deliver on the desired outcomes. Experience would suggest that the regulatory frameworks have been effective in ensuring not just delivery but also value for money for existing and future consumers. If appropriately designed, and implemented in a timely manner, this model has potentially significant advantages. This is particularly in relation to ensuring value for money for existing and future consumers. We will assess this option in more detail and also consider further how it compares to the central government and joint industry models. We will also consider further implications of the government's low carbon transition plan.

5.3. We welcome views on our assessment of the options in this paper and ideas on any alternative models that should be considered in the context of decision-making in the regulatory framework. Updated thinking will be provided in our winter 'Emerging Thinking' consultation. In the meantime, we intend to publish working papers on different aspects of the future regulatory framework to provide further ideas on how a changed framework may encourage networks to efficiently deliver the desired outcomes of a sustainable energy sector and value for money.

Annex 1: Comments on a guiding mind received in response to our February 2009 Principles, Process and Issues paper

Respondent	Comment on guiding mind
BWEA (British Wind Energy Association)	'**Guiding mind**: in other sectors, the economic regulator and the regulated business is provided with guidance on what the policy objectives are and, in some cases, what needs to be done to deliver them. There is a fundamental question as to whether guidance of this type should be provided or whether these decisions should rest with the market.'
CE Networks	'The changes in the energy network sector now being envisaged make it more like the post-privatisation water sector and there may therefore be merit in establishing a body that would act as a guiding mind. This could be Ofgem, but it might be preferable to enhance its legitimacy by giving DECC a pre-eminent role.'
Electricity North West (ENW)	'The key question for the future is whether the longer-term security and climate change goals can be achieved purely through market forces via the current structural model, or whether an element of central planning is required? There needs to be a decision made on the broad generation mix and strategic direction to achieving the 2020 targets as a stepping stone towards the 2050 targets.' 'We can determine what investment is required in the distribution network in the North West to achieve a certain approach to the required targets, and all other network owners will be able to do the same for their networks, identifying initially the "least regrets" things to do, once the "guiding mind" specifies the broad direction.'
Energy Network Association	'Against this background, it is not surprising that there have been suggestions of the need for a 'guiding mind' to spell out the high-level outputs that networks are required to deliver. The ENA supports this proposal'.
National Grid	'The mechanisms by which changes to the broader energy supply chain are effected will have important implications for network regulation. If these continue to be led by decisions taken by individual players operating in a market context, then energy network regulation will take one course; if, as many commentators expect, future governments takes a much firmer guiding hand in ensuring energy policy outcomes are met, then network regulation is likely to take a different course.'
Northern Gas Networks	'**Guiding mind.** We agree that a "guiding mind" approach would be helpful with clear guidance on objectives from Government or Government bodies to enable Ofgem and networks to appropriately target incentives and focus resources. This has worked well in gas distribution for the repex programme whereby the HSE has set the overall target and Ofgem worked with gas distribution to determine the costing, the remuneration process and the incentives for over and under performance.'

Annex 2: Models for decision-making in a future regulatory framework

Decision area	Central government led model	Joint industry model	Adapted regulatory framework
Environmental targets (e.g. CO_2 and GHG)	• EU and national government set • Climate Change Committee makes recommendations		
Energy sector policy (e.g. feed-in tariffs, CCS)	• EU and national government • Secretary of State guidance to Ofgem on environmental and social matters. • Ofgem responsible for some administration (e.g. ROCs, CERT,) • Ofgem and networks interpret implications of energy policy for networks, taking account of government guidance where appropriate		
View on role of networks in delivering sustainable energy sector (e.g. should DNOs have a system operator role)	• Central government body decides on role of networks to deliver security of supply, environmental targets and social objectives • Specified in legal framework • Regulatory framework adapts to reflect changes in role and duties of networks	• Joint industry body decides on role of networks to deliver security of supply, environmental targets and social objectives • Ofgem and DECC 'sign off' on determined role • Regulatory framework adapts to reflect changes in role and duties of networks	• Regulatory framework aligns incentives between networks, and along supply chain, to ensure efficient choices made about roles of different organisations in industry. • Ofgem ensures that regulatory framework is not a constraint on emergence of new roles. This could involve more than Ofgem, e.g. some form of consumer challenge group. • Ofgem identifies areas where change may be needed in role of networks and works with industry and government to identify best way forward. • Where government makes decision on role of networks in specific areas (e.g. smart metering), regulatory framework adapted to incorporate new role.

Decision area	Central government led model	Joint industry model	Adapted regulatory framework
What networks have to deliver (i.e. outputs and deliverables)	• Central government body identifies security of supply and environmental-related deliverables. • Deliverables could be high level, in which case Ofgem and industry may need to interpret what related outputs are. • Alternatively, the central government body could set detailed network-specific targets, in which case the regulatory framework would adapt to ensure delivery by networks. • Ofgem, or industry, set quality of service and other related outputs. • Central government body sets social-related outputs. • HSE sets safety standards for gas or the central government body sets overall outputs for gas networks.	• Joint industry guiding mind interprets national targets and sectoral policy and defines network specific outputs on security of supply and environment. • Joint industry guiding mind defines network outputs on quality of service, security of supply (resilience) and other areas. • Central government sets social-related outputs and Ofgem incorporates into licence conditions. • HSE may set safety standards of gas or this could also sit with the joint industry group (implementing guidance from HSE). • Joint industry group consults with consumers (network users and end consumers) on the outputs. • Ofgem and DECC 'sign-off' outputs	• Network deliverables clarified in regulatory framework. • The deliverables might be kept at a high level (e.g. facilitate delivery of low carbon energy sector) or more detailed network-specific outputs could be developed. • Security of supply, environmental, social and/or quality of service outputs could be set either by Ofgem, by industry, by government or through collaboration by all organisations. • Central government sets social-related outputs and Ofgem incorporates into licence conditions • Ofgem defines network outputs on quality of service, security of supply (resilience) and other areas. • Ofgem works with HSE to set safety standards for gas networks. • Ofgem consults with industry and consumers (network users and end consumers) on the outputs.

Decision area	Central government led model	Joint industry model	Adapted regulatory framework
How to deliver the outputs (e.g. size of networks, shape of networks, technology choice)	• Central government body chooses a path for delivering the environmental and security of supply targets (e.g. build big transmission (T) and distribution (D)networks. • Proposed path could be at national, regional or local level (e.g. micro-grids in London). • HSE identifies path for delivering identified safety targets, either as part of central government body or separately. • Central government body decides how social targets are to be delivered. • Networks and Ofgem take central government body plan as given. • Networks develop own company plan consistent with plan of central government body.	• Joint industry guiding mind identify options for delivering environmental targets and security of supply and choose a path for delivering. • Proposed path could be at national, regional or local level (e.g. Big D in Scotland, micro-grids in London). • Joint industry guiding mind identify options for delivering security of supply, quality of service, social and safety targets and choose a path for delivering. • Ofgem and DECC 'sign-off' on chosen path. HSE sign-off on plan for delivering safety standards. • Networks develop own company plan consistent with joint industry plan. There may be a need for adjustment to reflect local circumstances.	• Networks determine how to deliver the outputs. This could be done at individual network level or joint industry working groups (e.g. ENSG) could consider options for delivering across networks. • Networks develop own company plan for delivering outputs. • Incentive regime designed to encourage efficient decision-making; assessment of costs and benefits of options; adaptation and updating over time to reflect learning; and innovation. • Incentives may encourage networks to consider scope for more joint industry working, or improved communication along the supply chain.

Decision area	Central government led model	Joint industry model	Adapted regulatory framework
Set revenue allowance to deliver plan	• Regulatory framework sets revenue allowance consistent with efficient cost of delivering the plan. • Ofgem agrees that potentially stranded assets will be remunerated by consumers (i.e. risk will not be borne by networks). • Ofgem sets allowed return to reflect risk that network is bearing. . • Ofgem agrees process for dealing with investment that arises mid-period as a result of changes in central government plan. • Ofgem identifies rewards and penalties for delivery, or non-delivery, of outputs. • Possible appeal to Competition Commission (CC) on costs triggered by networks or third party.	• Regulatory framework sets revenue allowance consistent with efficient cost of delivering the plan. • Ofgem agrees that potentially stranded assets will be remunerated by consumers (i.e. risk will not be borne by networks). • Ofgem identifies risk sharing arrangements. Allowed return is set to reflect risk that the network is bearing. • Ofgem agrees process for dealing with investment that arises mid-period as a result of changes in joint industry plan. • Ofgem agrees plan for dealing with potentially stranded assets, reflecting decisions on appropriate risk sharing. • Ofgem identifies rewards and penalties for delivery, or non-delivery, of outputs. • Possible appeal to CC on costs triggered by networks or third party potentially.	• Allowed revenue set to ensure networks can recover efficient costs of delivering the agreed outcomes or outputs. • Ofgem assesses efficiency of network's proposed plan, focusing on the set of delivery options considered, the efficient costs of these options, evidence of learning over time, and the extent to which networks have considered the case for keeping options open for the future. • Ofgem designs incentives to encourage focus on long-term efficiency, and innovation. • Ofgem identifies risk sharing arrangements. Allowed return is set to reflect risk that the network is bearing. • Ofgem agrees process for dealing with investment that arises mid-period as a result of joint industry guiding mind plan changing. • Ofgem agrees plan for dealing with potentially stranded assets, reflecting decisions on appropriate risk sharing. (hopefully with edits above bullet below will fit on page) • Ofgem identifies rewards and penalties for delivery, or non-delivery, of outputs. • Possible appeal to CC triggered by networks or potentially third parties.

Decision area	Central government led model	Joint industry model	Adapted regulatory framework
Delivery of plan and updating	• Networks responsible for delivering central government plan and individual network plans. • Central government body responsible for 'learning' and updating central plan over time. Networks adapt own plans accordingly.	• Networks responsible for delivering joint industry plan and individual network plans. • Joint industry group responsible for 'learning' and updating plan over time. Networks adapt own plans accordingly.	• Networks responsible for delivering individual network plans, with checks and balances on delivery in place through regulatory framework. • Regulatory framework identifies areas where delivery should be opened up to contestable pressures (e.g. tendering). • Potential role of other organisations to use networks to deliver outputs (e.g. energy service companies); resulting in competition on the fringe. • Networks and Ofgem responsible for 'learning' and updating plan over time.

Annex 3: Assessment of decision-making models and the current framework

Outcome	Current regulatory framework	Central government led model	Joint industry model	Adapted regulatory framework
	Value for money			
Long term efficiency	Decisions based on best available information and expert analysis (recognising that no one has perfect foresight)			
	Networks using own company information and limited information from other parts of the supply chain. Ofgem using comparative information where feasible. Limited expertise to review alternative options. Asymmetric information problems remain, with industry having better knowledge than Ofgem.	The central government body does not necessarily have access to information available to industry. An independent 'Agency' may collect better information over time. Central government body may well be focused on short- to medium-term political interests rather than the long-term. This may be less of an issue with an independent government body rather than a ministerial body. Short-term cycles may still be a problem with an independent body, particularly if decision-makers are appointed for fixed periods.	Combined effort by industry players (networks, suppliers, generators, shippers, etc) is likely to provide access to good information. Potential concern that new or innovative ideas will be outside core of energy industry (e.g. Energy Service Companies).	Accept asymmetric information problem and incentivise networks to make best use of available information. Allow other organisations to influence developments, through innovation and potentially competition in delivery.

Outcome	Current regulatory framework	Central government led model	Joint industry model	Adapted regulatory framework
	Choices for delivery of plan considered on basis of impact on costs to existing and future consumers			
	Review of network company total costs for next five years only. Limited information on cost to consumers today and over time.	Risk that central government body focused on delivery of outputs rather than assessment of costs and benefits, particularly if government not financing the costs. The extent to which wider political factors affect the central government decision will depend on whether the body involved is independent and the extent to which it has stand-alone decision-making powers. Ofgem scrutinises costs of delivering plan but not how choices about plan are made.	Industry will consider relative costs to the point that is necessary for regulatory framework. Focus will be on what is expected to deliver best value for shareholders. Expectation that consumers will ultimately pay for choices. Ofgem scrutinises costs of delivering plan but not how choices about plan are made.	Ofgem incentivises networks to consider impact of decisions, and assessment of options, on existing and future consumers. Ofgem has final say on whether costs are considered acceptable relative to what is being delivered.

Outcome	Current regulatory framework	Central government led model	Joint industry model	Adapted regulatory framework
	Learning over time			
	Networks and Ofgem learn from one review to the next. No clear process to capture benefits of learning.	As long as targets are being met, central government body may not have incentive to update plan to reflect learning about best options for delivery. As noted earlier, central government may work on short- to medium-term political cycles, limiting the extent to which there will be learning over time. This issue may be lessened with an independent government body rather than a ministerial body.	As long as targets are being met, joint industry body will only have to update plan to reflect learning about best options for delivery if networks specifically incentivised to do this.	Regulatory framework specifically designed to encourage and enable learning by networks and Ofgem.

Outcome	Current regulatory framework	Central government led model	Joint industry model	Adapted regulatory framework
	Aligned incentives along supply chain			
	Concerns have been raised that incentives along supply chain not appropriately aligned	Central government body could design plan for networks that reflects broader view of what is needed across supply chain. Would impose joined-up plan for sector.	Assuming key players are involved, joint industry group can encourage better communication along supply chain and identify areas where more aligned incentives or better coordination are needed.	Regulatory framework designed to encourage better communication along supply chain. Incentives along supply chain aligned where feasible.
Innovation	Specific schemes in place to stimulate innovation. Concerns over effectiveness of schemes considered in another working paper.	Once a plan is chosen by central government body there is no incentive for networks to innovate about how to deliver it. Assuming incentives are in place in regulatory framework, networks may still innovate to reduce costs of delivering the plan.	Risk that group that only includes existing networks, and existing industry players, will consider 'standard' modes of delivering required outcomes. Additional stimulus may be needed through regulatory framework to stimulate innovation.	As discussed in a separate working paper, framework can be designed to stimulate innovation.
Choice of energy service provider	Currently no explicit provision for enabling choice of energy service provider. There are potentially barriers in the framework which prevent energy service companies developing.	Central government body may include role for 'new players' in delivery of energy service providers. This depends on focus of government policy at the time.	Joint industry group will not consider options for delivering outcomes that enables other organisations to provide services to consumers.	Option of introducing choice of energy service provider.

Outcome	Current regulatory framework	Central government led model	Joint industry model	Adapted regulatory framework
Quality of supply	Quality of supply improving – no significant concerns presented to review to-date	Risk that central government plan will prioritise environment and security of supply ahead of consumer quality of supply targets. Quality of service may get less attention in regulatory framework.	Risk that joint industry plan will prioritise environment and security of supply ahead of consumer quality of supply targets. Quality of service may get less attention in regulatory framework.	Regulatory framework designed to ensure that multiple outcomes are delivered efficiently. Care needed over output definition – potential risk that the outputs that are easiest to measure e.g. on quality of service may be favoured.

Outcome	Current regulatory framework	Central government led model	Joint industry model	Adapted regulatory framework
	Sustainability			
Security of supply	No significant concerns with impact of regulatory framework on security of supply raised in review to-date. Further issues may be raised by Project Discovery.	Any potential areas of concern would be addressed directly in plan.	Risk the coordinated decision-making would not consider all relevant security of supply issues; depending on sectoral and timing focus of the joint industry body.	Delivery of security of supply directly incentivised through regulatory framework. May involve specific targets or an overarching view on approach networks are expected to take (e.g. best practice approach to resilience).

Outcome	Current regulatory framework	Central government led model	Joint industry model	Adapted regulatory framework
Environment	Perception that networks, and regulatory framework, not sufficiently proactive to ensure delivery on time. Role of networks open to interpretation and concern that no emerging view on what change, if any, is needed	May deliver decarbonisation and renewables targets in shortest timeframe. Clarity provided by central government on role of networks.	Coordinated decision-making likely to take time. Potential for mixed views on best way forward may delay action by joint industry group. Joint industry group will make choices on role of networks. Risk that not consistent with expectations of government policy or intended impact of regulatory incentives.	Clear view on deliverables and role of networks, and associated incentives need to be appropriately designed, and put in place in timely manner, to ensure delivery of targets. Ofgem provides clarity on expectations of role of networks. Incentives allow networks to determine best way forward and to signal where constraints are. Potential for more coordination between Ofgem and government allows for open dialogue on issues relating to role of networks and potential solutions.
Social	Required social objectives being delivered through regulatory framework. Potential concerns about how government policy determines what role of networks is.	Potentially more clarity and joined-up thinking by government on what is needed than now.	Risk that joint industry group will not consider social objectives. Opportunity to retain current approach to social issues to manage this risk.	Clarity on what networks are required to do, through Ofgem-government joint working on deliverables. Regulatory frameworks ensure efficient delivery of legal requirements on networks is financeable.

Outcome	Current regulatory framework	Central government led model	Joint industry model	Adapted regulatory framework
	Desirable network behaviour			
Focus on consumers	Range of approaches adopted by Ofgem to understand consumer needs. Number of concerns raised about extent to which Ofgem and networks are focused on consumers.	No direct involvement of consumers in central government model. , but Members of Parliament have an electoral mandate from the public.	Potential for joint industry group to incorporate role for consumers.	Regulatory framework designed to include role for consumers.
Financeability	Consistent with Ofgem duties, regulatory framework ensures efficient delivery of any plan is financeable.	Consistent with Ofgem duties, regulatory framework ensures efficient delivery of any plan is financeable. Any volume risk associated with investment may be reduced or removed, potentially reducing allowed return.	Consistent with Ofgem duties, regulatory framework ensures efficient delivery of any plan is financeable. Any volume risk associated with investment may be reduced or removed, potentially reducing allowed return.	Consistent with Ofgem duties, regulatory framework ensures efficient delivery of any plan is financeable. Return reflects risk that the network bears.

Outcome	Current regulatory framework	Central government led model	Joint industry model	Adapted regulatory framework
Forward thinking and adaptable	Networks and Ofgem focus on five-year regulatory cycles. Provisions in place to change control mid-period or at next review. Frameworks updated from review to review. Concern that updating results in complexity and disjointed overarching framework.	Risk the central government body influenced by political cycles. Less of an issue with independent Agency potentially. Onus on central government body to adapt plan over time. Incentives for such updating are unclear.	Networks may focus on long-term, may need to be incentivised to do this. Similarly, networks may require specific incentives to update and adapt plan over time.	Regulatory framework encourages focus on long-term. Regulatory framework designed with specific provisions to ensure adaptation over time.

Outcome	Current regulatory framework	Central government led model	Joint industry model	Adapted regulatory framework
	Characteristics of the regulatory framework			
Better regulation	Regulatory framework underlying each model can be designed to ensure consistency with better regulation principles.			
Feasibility	All models are potentially feasible. Government and/or Ofgem need to make clear policy statement to ensure that central government or joint industry models are established effectively. Legislative change may be required to establish a Central Government led model and / or to clarify decision-making roles. Need to ensure that whatever model is adopted is consistent with Third Package requirement for an independent regulator.			
Regulatory burden/transaction costs	Some argue that complexity in the regime and information requirements result in high regulatory burden for Ofgem and networks	Set-up and ongoing costs for central government body to take on new role. Burden on central government body to determine plan. Once central plan agreed, potentially less of a regulatory burden for Ofgem and networks to agree required efficient costs for delivery of plan.	Transaction costs for industry to ensure effective joint working. Increased costs for Ofgem and DECC to engage with joint industry group and individual networks.	Upfront costs to changing regulatory framework and ensuring Ofgem and networks able to adapt. Once regime in place, regulatory framework designed to limit regulatory burden for Ofgem, networks and other parties are far as possible.

Annex 4: GEMA's Powers and Duties

1.1 Ofgem is the Office of Gas and Electricity Markets which supports the Gas and Electricity Markets Authority ("the Authority"), the regulator of the gas and electricity industries in Great Britain. This Appendix summarises the primary powers and duties of the Authority. It is not comprehensive and is not a substitute to reference to the relevant legal instruments (including, but not limited to, those referred to below).

1.2 The Authority's powers and duties are largely provided for in statute, principally the Gas Act 1986, the Electricity Act 1989, the Utilities Act 2000, the Competition Act 1998, the Enterprise Act 2002 and the Energy Act 2004, as well as arising from directly effective European Community legislation. References to the Gas Act and the Electricity Act in this Appendix are to Part 1 of each of those Acts.[13]

1.3 Duties and functions relating to gas are set out in the Gas Act and those relating to electricity are set out in the Electricity Act. This Appendix must be read accordingly[14].

1.4 The Authority's principal objective when carrying out certain of its functions under each of the Gas Act and the Electricity Act is to protect the interests of existing and future consumers, wherever appropriate by promoting effective competition between persons engaged in, or in commercial activities connected with, the shipping, transportation or supply of gas conveyed through pipes, and the generation, transmission, distribution or supply of electricity or the provision or use of electricity interconnectors.

1.5 The Authority must when carrying out those functions have regard to:

- the need to secure that, so far as it is economical to meet them, all reasonable demands in Great Britain for gas conveyed through pipes are met;
- the need to secure that all reasonable demands for electricity are met;
- the need to secure that licence holders are able to finance the activities which are the subject of obligations on them[15];
- the need to contribute to the achievement of sustainable development; and
- the interests of individuals who are disabled or chronically sick, of pensionable age, with low incomes, or residing in rural areas.[16]

1.6 Subject to the above, the Authority is required to carry out the functions referred to in the manner which it considers is best calculated to:

- promote efficiency and economy on the part of those licensed[17] under the relevant Act and the efficient use of gas conveyed through pipes and electricity conveyed by distribution systems or transmission systems;

[13] Entitled "Gas Supply" and "Electricity Supply" respectively.
[14] However, in exercising a function under the Electricity Act the Authority may have regard to the interests of consumers in relation to gas conveyed through pipes and vice versa in the case of it exercising a function under the Gas Act.
[15] under the Gas Act and the Utilities Act, in the case of Gas Act functions, or the Electricity Act, the Utilities Act and certain parts of the Energy Act in the case of Electricity Act functions.
[16] The Authority may have regard to other descriptions of consumers.
[17] or persons authorised by exemptions to carry on any activity.

- protect the public from dangers arising from the conveyance of gas through pipes or the use of gas conveyed through pipes and from the generation, transmission, distribution or supply of electricity; and

- secure a diverse and viable long-term energy supply.

1.7 In carrying out the functions referred to, the Authority must also have regard to:

- the effect on the environment of activities connected with the conveyance of gas through pipes or with the generation, transmission, distribution or supply of electricity;

- the principles under which regulatory activities should be transparent, accountable, proportionate, consistent and targeted only at cases in which action is needed and any other principles that appear to it to represent the best regulatory practice; and

- certain statutory guidance on social and environmental matters issued by the Secretary of State.

1.8 The Authority has powers under the Competition Act to investigate suspected anti-competitive activity and take action for breaches of the prohibitions in the legislation in respect of the gas and electricity sectors in Great Britain and is a designated National Competition Authority under the EC Modernisation Regulation18 and therefore part of the European Competition Network. The Authority also has concurrent powers with the Office of Fair Trading in respect of market investigation references to the Competition Commission.

[18] Council Regulation (EC) 1/2003

Annex 5: Glossary

A

The Authority/ Ofgem

Ofgem is the Office of the Gas and Electricity Markets, which supports the Gas and Electricity Markets Authority (GEMA), the body established by section 1 of the Utilities Act 2000 to regulate the gas and electricity markets in GB.

C

Capital expenditure (capex)

Expenditure on investment in long-lived distribution assets, such as underground cables, overhead electricity lines and substations.

Carbon Capture and Storage (CCS)

Removal of CO2 from fossil fuels either before or after combustion. In the latter the CO2 is extracted from the fluegas.

Carbon Emissions Reduction Target (CERT)

The CERT programme replaced the Energy Efficiency Commitment 2005-2008 as the government's domestic efficiency obligation on energy suppliers. It sets an obligation of energy suppliers to reduce CO2 emissions, by promoting energy efficiency and micro renewables to domestic energy users.

D

Department of Energy and Climate Change (DECC)

Distributed generation (DG)

Distributed generation is also known as embedded or dispersed generation. It is an electricity generating plant connected to a distribution network rather than the transmission network.

Distribution Network Operators (DNOs)

A DNO is a company which operates the electricity distribution network which includes all parts of the network from 132kV down to 230V in England and Wales. In Scotland 132kV is considered to be a part of transmission rather than distribution so their operation is not included in the DNOs' activities.

There are 14 DNOs in the UK which are owned by seven different groups.

Distribution Price Control Review 5 (DPCR5)

The price control to be applied to the electricity distribution network operators. This price control is expected to run from 1 April 2010 until 31 March 2015.

E

Electricity Networks Strategy Group (ENSG)

Industry focus group for network issues. The aim of the ENSG is to identify, and co-ordinate work to address the technical, commercial, regulatory and other issues that affect the transition of electricity transmission and distribution networks to a low-carbon future.

F

Feed-In Tariffs

Guaranteed prices for electricity generated using small-scale low carbon technologies up to a maximum limit of 5 megawatts (MW) capacity. The Energy Act 2008 provides broad enabling powers for the introduction of the feed-in tariffs, which will be introduced through changes to electricity distribution and supply licences.

Financeability

Financial models are used to determine whether the regulated energy network is financeable under the proposed price control. Financeability is assessed using a range of different financial ratios.

G

Gas distribution networks (GDNs)

GDNs transport gas from the National Transmission System to final consumers and to connected system exit points. There are currently eight GDNs in Great Britain which comprise twelve local distribution zones.

H

Health and safety executive (HSE)

L

Long-term Energy Network Scenarios (LENS)

Study which looks at a range of future scenarios for electricity networks that could arise as a consequence of market and policy developments.

N

National Grid Gas (NGG)

The gas transporter (GT) licence holder for the North West, West Midlands, East England and London GDNs. NGG also hold the GT licence for the gas transmission system.

National Grid Electricity Transmission (NGET)

NGET owns and maintains the high-voltage electricity transmission system in England and Wales.

National Transmission System (NTS)

The high pressure gas transmission system covering Great Britain, owned and operated by National Grid.

O

Operating expenditure (Opex)

Expenditure on operating and maintaining the network, e.g. fault repair, tree cutting, inspection and maintenance, engineering and business support costs.

R

Renewables Obligation Certificates (ROCs)

A transferable certificate received by eligible renewable generators for each MWh of electricity generated. ROCs are traded separately from power and are used by suppliers to fulfil their Renewables Obligations under the Utilities Act 2000.

RPI-X

The form of price control currently applied to network monopolies. Each company is given a revenue allowance in the first year of the control period. The price control then specifies that in each subsequent year the allowance will move by 'X' per cent in real terms.

Registered Power Zones (RPZ)

RPZ is a mechanism to encourage DNOs to develop and demonstrate new and more cost effective technologies for connecting and operating generation on their distribution.

S

Shrinkage

Shrinkage is a term used to describe gas either consumed within or lost from a transporter's system. For example shrinkage can result from gas transmission companies using gas within their transportation systems to fuel gas compressors. Gas leaks from distribution mains are vented by certain types of equipment and shrinkage also occurs when gas is stolen or not charged for in error.

SmartGrid

SmartGrid is an electricity network that can intelligently integrate the actions of all the users connected to it - generators, consumers and those that do both - in order to efficiently deliver sustainable, economic and secure electricity supplies.

Smart Meter

Advanced gas and electricity metering technology that offers customers more information about, and control over, their energy use (such as providing information on total energy consumption in terms if value, not only volume), or allows automated and remote measurement.

Sustainable development

Refers to economic development which meets the needs of the present without compromising the ability of future generations to meet their own needs.

Sustainable energy sector

A sustainable energy sector as one which promotes security of supply over time; delivers a low carbon economy and associated environmental targets; and delivers related social objectives (e.g. fuel poverty targets).

System operator (SO)

The entity responsible for operating the GB transmission system and for entering into contracts with those who want to connect to and/or use the transmission system. National grid is the GB system operator.

T

'Third package'/ Third Internal Energy Market Package

The third package is a key step in implementation of internal EU energy market. It recognises the need for better co-ordination between European network operators and continuing co-ordination between regulators at that level. It continues many of the internal market principles identified above in relation to the earlier First and Second Packages.

Transmission Access Review (TAR)

Following the publication of the Energy White Paper 2007, Ofgem and BERR have convened a joint review of the current framework for access to the GB transmission system. The review will explore a range of issues associated with the technical, commercial and regulatory arrangements, with the chief aim being to better support the delivery of the government's aspiration of 20 percent of electricity supplied by renewable generation by 2020 and any targets that may be agreed at European Union level.

Transmission Owner (TO)

There are three separate high-voltage transmission Owners in Great Britain:

National Grid Electricity Transmission plc (NGET) - owns and maintains the high voltage electricity transmission system in England and Wales. They also have the role of system operator (SO) across the whole of Great Britain.
Scottish Hydro-Electric Transmission Limited (SHETL) - the electricity transmission licensee in northern Scotland.
Scottish Power Transmission Limited (SPT) - the electricity transmission licensee in southern Scotland.
National Grid Gas (NGG) is the gas Transmission Owner.

Transmission System

The system of high voltage electric lines providing for the bulk transfer of electricity across GB.

Transmission Price Control Review (TPCR)

The TPCR established the price controls for the transmission licensees which took effect in April 2007 for a 5-year period. The review applies to the three electricity transmission licensees, National Grid Electricity Transmission, Scottish Power Transmission Limited, Scottish Hydro-Electric Transmission Limited and to the licensed gas transporter responsible for the gas transmission system, NGG.