ofgem Promoting choice and value
for all gas and electricity customers

2010/11 Electricity System Operator Review - Preliminary Conclusions following Phase 1

Document type: Report

Ref: 80/10

Date of publication: 5 July 2010

Target audience: System Operators, Transmission and Transportation System Owners, Generators, Shippers, Suppliers, Customers and Other Interested Parties

Overview:

National Grid Electricity Transmission (NGET) is the System Operator (SO) for the electricity system in Great Britain (GB). In recent years, the Authority has expressed its intention to improve the approach to the setting of incentives on NGET in its role as SO. As part of implementing the current year's incentive scheme, the Authority established an SO review, which aims to develop a more effective electricity SO incentive scheme covering two or more years.

This review consists of three phases. This document sets out our preliminary conclusions following phase 1 of the review. NGET, under phase 2 of the review, will now consider how best it can develop proposals for a scheme covering two or more relevant years on the basis of these preliminary conclusions. In phase 3, Ofgem will review the methodology put forward by NGET in phase 2 and set out its conclusions of the review.

Whilst there are no specific questions posed in this document, we welcome any comments that you may wish to make.

Contact name and details: Giuseppina Squicciarini, Head of Regulatory Economics

Tel: 020 7901 7366

Email: gb.markets@ofgem.gov.uk

Team: GB Markets

Context

These preliminary conclusions form part of our work to regulate monopolies effectively. We consider that it is important for the electricity market that the role of the system operator is correctly identified and that the system operator has the appropriate tools available to it to undertake this role. Any interventions in the market by the system operator can lead to costs being incurred, both directly by the system operator and more widely by the market as a whole. Since customers ultimately bear these costs it is important to keep them as low as possible. Based on our experience over the past years, we remain of the view that the best way to achieve the lowest costs to customers is to provide the system operator with financial incentives whereby they share some of the gains (or losses) from cost reductions (or increases). However, in recent years we have had a number of concerns that the incentive scheme being set, in particular due to the annual nature of the scheme, may not be the most appropriate. Also, during the setting of the 2010/11 incentive scheme we had concerns regarding NGET's models and its modelling methodology. We therefore established this review to consider possible improvements to the electricity SO incentive scheme.

Our key objective of the review is to facilitate the development of an appropriate incentive scheme to apply over more than one year, through parallel work in reviewing the design of the incentive scheme and the models and modelling approach used to inform the specification and parameters of a given scheme. At this stage a key focus is the development of a workable approach for application from April 2011, however our review is intended to provide a solid basis for the development of future schemes.

Associated Documents

- "National Grid Electricity Transmission System Operator Incentives from 1 April 2010:Final Proposals Consultation", Ofgem, March 2010
- "National Grid Electricity Transmission System Operator (SO) Incentives for 1 April 2010:Initial Proposals Consultation Report", National Grid, January 2010
- "Ofgem's initial comments on National Grid System Operator Incentives from April 2010", Ofgem, November 2009
- "National Grid Electricity Transmission System Operator (SO) Incentives for 1 April 2010:Inittal Proposals Consultation Document", National Grid, November 2009
- "National Grid System Operator Incentives from April 2010", Ofgem, May 2009

Table of Contents

Summary

In this document we set out our preliminary conclusions following phase 1 of the electricity SO incentives review. We have reached these following work undertaken by Frontier Economics (Frontier) who were jointly appointed by the Authority and NGET to examine NGET's models and its modelling approach in respect of the development of multi year SO incentive schemes.

Frontier's findings

Frontier's main recommendation is that NGET should be insulated from unpredictable external factors that affect NGET's costs and which are beyond NGET's control. Frontier puts forward two options for this: to continue to use the existing methodology with an increased use of ad hoc adjusters; or to use the models after the event to adjust for the actual values of external factors where they are unpredictable and outside NGET's control.

In respect of NGET's models, Frontier concludes that there are a number of improvements that can be made to the energy model and that there is merit in adopting an alternative modelling approach to that currently used in respect of constraints.

Preliminary conclusions

Our key preliminary conclusion, in the light of the findings of Frontier's report, is that, while developing and implementing a multi year incentive scheme is inherently difficult, significant improvements can be made to NGET's methodology (including its models and modelling approach) in order to develop a scheme that can be set for multiple years and provides incremental benefits that can be passed on to consumers.

Incentives methodology

In its role as System Operator NGET will take a number of actions to balance the system. The objective of the SO incentive scheme is to incentivise NGET to undertake its actions such that its total costs are at an efficient level both in the short term and over the longer term. However, a number of external factors affecting these costs are difficult to predict and could have considerable impact on the efficient level of costs. Such an impact is likely to be even greater if the incentive scheme runs over a longer period.

Our proposed methodology (based on the second of Frontier's options) takes into account the impact of unpredictable and uncontrollable external factors affecting NGET's cost base by adjusting the incentive target at the end of the scheme period for these factors. This methodology ensures that NGET's performance is measured by how efficiently it carried out its actions taking into account the actual external factors it faced.

Such a process should result in NGET being less exposed to windfall gains or losses as a result of changes to factors that are outside of its control and difficult to predict. This should allow for strengthened incentives on NGET, for example, reducing the need for a deadband (within which NGET is not incentivised) and increasing the level of payments to/from NGET.

Implications on modelling and use of models

NGET should undertake a number of improvements to its energy models including how the inputs into the models are forecast and the relationships, within the models, between the drivers of NGET's costs and the costs themselves. NGET should also replace its current suite of constraints models with a single fundamental model that considers the GB-wide system as a whole.

We propose that the incentive scheme should continue to be based around a bundled target of costs, with NGET sharing some of the gains (or losses) from cost reductions (or increases). However, whilst the models to create this target and some of the inputs will be agreed prior to the start of the scheme, some of the model inputs (where these are volatile and difficult to predict external factors falling outside NGET's control) would be based on actual outturn numbers.

In previous SO incentive schemes the potential impact of unpredictable external factors has been dealt with through specific adjustment mechanisms, isolating the impact of specific cost drivers on SO total costs. Recognising that there may be more unpredictable external factors that need to be dealt with in order to move to a longer term scheme, our proposed approach is to use the models themselves to adjust for uncontrollable uncertainties.

Key issues going forward

There are a number of risks and uncertainties with the development of such a scheme. Most importantly, our proposed approach requires NGET to develop or obtain a new model for forecasting constraints costs. We recognise that this is a significant piece of work, but consider it is key to the development of SO incentives and also more widely as it will increase transparency in relation to future costs of constraints. As well as the constraints model, there is also a requirement for NGET to undertake considerable work to develop and improve its modelling with regard to energy costs. Further, a key component of phase 2 of the review will be the development by NGET of the methodology to calculate the inputs that would go into these models.

The other key uncertainty with this proposed way forward is in the control and governance of the new approach in particular, in terms of who will have ownership of the models; which model inputs will be based on actual outturns and how these will be considered within the modelling framework and the setting of the scheme. We expect NGET to address these issues along with other issues raised in Frontier's report during phase 2 of the review.

1. Introduction

Chapter Summary

This chapter provides a short background on the review, the objectives of it, the process so far and the proposed way forward.

Background

1.1. National Grid Electricity Transmission (NGET) is the system operator (SO) for the high voltage electricity transmission system in Great Britain (GB), with responsibility for making sure that electricity supply and demand stay in balance and the system remains within safe technical and operating limits. The transmission licence of NGET requires it to act in an efficient, economic and co-ordinated manner in performing its role. In addition to its licence requirement we also look to incentivise NGET financially to operate the electricity system in the most economic and efficient manner.

1.2. NGET in its role as an SO incurs costs which can broadly be split into two categories. The first category includes energy related costs such as margin, frequency response, energy imbalance, footroom, reactive power and other costs.[1] The second category includes constraint costs incurred in different areas of the GB system in Scotland, across the Cheviot boundary and in England and Wales.

1.3. Some form of incentive mechanism has applied to electricity SO costs since the 1990s (with the exception of 2006/07). Since the introduction of NETA in 2001 the schemes have been set on an annual basis. In addition, they have been bundled schemes, i.e. they have taken the form of an agreed target for the sum of NGET's incentivised SO costs. Furthermore, the schemes apply sharing factors, whereby NGET and the users of the network share the profit/loss for any outturn costs below/above this target. Finally, a cap/floor is set to limit the payments to/from NGET and a deadband can be put in place around the target to recognise that SO costs can be uncertain.

1.4. In recent years, and particularly since the introduction of BETTA in 2005, electricity SO costs have generally risen and become more volatile. As a result it has become increasingly difficult to set an appropriate target and parameters for the SO incentive scheme. At the same time it has become ever more important to provide appropriate incentives on NGET to manage SO costs efficiently in the face of new challenges giving rise to potentially higher and more volatile SO costs. In undertaking this role it is important for NGET to understand the drivers of its costs

[1] A glossary including explanations of the terms is included as Appendix 5 of this document.

and to take a forward looking view in considering how those costs might change in the longer term and taking appropriate action to manage such impacts.

1.5. Following the implementation of SO incentives to apply from April 2009, in May 2009 Ofgem issued an open letter (May Open Letter) in respect of the development of SO incentives to apply from April 2010.

1.6. In the May Open Letter we outlined that over the last few years Ofgem has indicated that the adoption of longer term SO incentive schemes (potentially aligned with transmission price controls) would be in the interests of consumers.

1.7. We considered that continuing to develop annual incentive schemes was sub optimal as such arrangements do not incentivise NGET to take a longer term view of SO costs. In particular, we considered longer term incentives would provide the following advantages:

- **Longer term action:** longer term incentive schemes would incentivise NGET to consider actions that may have higher upfront costs which will be paid back over a longer period (e.g. investment in frequency response or reactive power technologies with longer pay back periods). It would also enable NGET to take a more strategic view of its operation of the electricity system over a longer period.
- **Information transparency:** a longer incentive period should lead to increased information discovery on costs which will enable the incentive schemes to become more targeted over time.
- **Administrative burden reduction:** we would expect to see a reduction in resources required to develop and implement the SO incentive schemes across Ofgem, NGET and interested parties as a new scheme would not be set on an annual basis.

1.8. We also considered that there could be potential benefits arising from the ability of NGET to make SO decisions based on compatible incentives provided by the Transmission Owner (TO) price controls. By the TO and SO incentives being developed along the same timeframe there could be a greater ability to ensure that the overall incentive package is correctly aligned.

1.9. We recognised that some industry participants have previously raised concerns regarding the level of uncertainty regarding SO costs, particularly over the longer term and therefore questioned how SO incentive schemes could be set over a longer period. However, we considered that such risks could be mitigated through appropriate design of the scheme and that the benefits of longer term schemes to consumers should outweigh any such risks.

1.10. However, given transitional arrangements at the start of NETA, delays to the introduction of BETTA and other delays associated with key periods of change in the market (including the delayed implementation of transmission access reform and fluctuating electricity prices and market length at a time when the impact of these on

SO costs was not well understood), robust proposals for such an incentive scheme had not yet been produced on the electricity side.[2]

1.11. Whilst recognising the work undertaken by NGET in improving its consultation process during the setting of the 2010/11 incentive schemes and its regular reporting of its costs to Ofgem, we still had a number of concerns regarding the analysis and modelling work undertaken by NGET especially in relation to their suitability for setting a multi year incentive scheme.

1.12. As a result of these concerns we were not in a position to propose a multi year scheme to apply from 1 April 2010 and remained concerned as to how a multi year scheme may be developed going forward in electricity on this basis.

1.13. Given these concerns we therefore announced our intention, with the assistance of technical and economic consultants, to carry out a thorough review of NGET's methodology and work with NGET in the immediate future to establish an appropriate methodology for future years and to enable multi year electricity schemes to be established. We also proposed to introduce a new licence condition on NGET[3] to require it to support the work that we proposed to undertake.[4]

Objectives of the review

1.14. The review has three objectives:

- In terms of the **methodology**: to develop an appropriate methodology for an SO incentive scheme suitable for application to multiple years.
- In terms of the **modelling**: to develop NGET's modelling tools to provide reliable analysis to support setting scheme parameters for the given methodology.
- In terms of the **application of these preliminary conclusions**: to develop a workable approach for the application to an SO incentive scheme for implementation on 1 April 2011.

1.15. The key issue for the review regarding the methodology is establishing a methodology that can be used for developing a multi year scheme. In particular, the review is considering the following issues: to what extent the existing methodology can be further developed to meet the multi year objective; what alternative approaches to incentivise the SO would better meet the multi year objective; and what additional information and analysis is required to inform the setting of scheme parameters in practice for a given methodology.

[2] We note that some longer term incentives are now being implemented on the gas side.
[3] NGET subsequently consented to the introduction of this licence condition.
[4] The text of the licence condition is set out in Appendix 2.

1.16. Dependent on the assessment of an appropriate methodology, NGET's modelling tools need to be reviewed in order to consider their usage and fitness for purpose. Areas to consider include: the modelling approach; assumptions; input of data and the reliability of outputs. Consideration will also need to be given to the modelling approach in the wider context of market and network developments when considering a multi year methodology.

1.17. The actual development of a multi year scheme then requires the integration of both the methodology and the modelling tools. The minimum requirement of the review is to develop practical proposals which can be implemented in setting an incentive scheme from April 2011. The new methodology and models should also be used as a basis for developing future schemes.

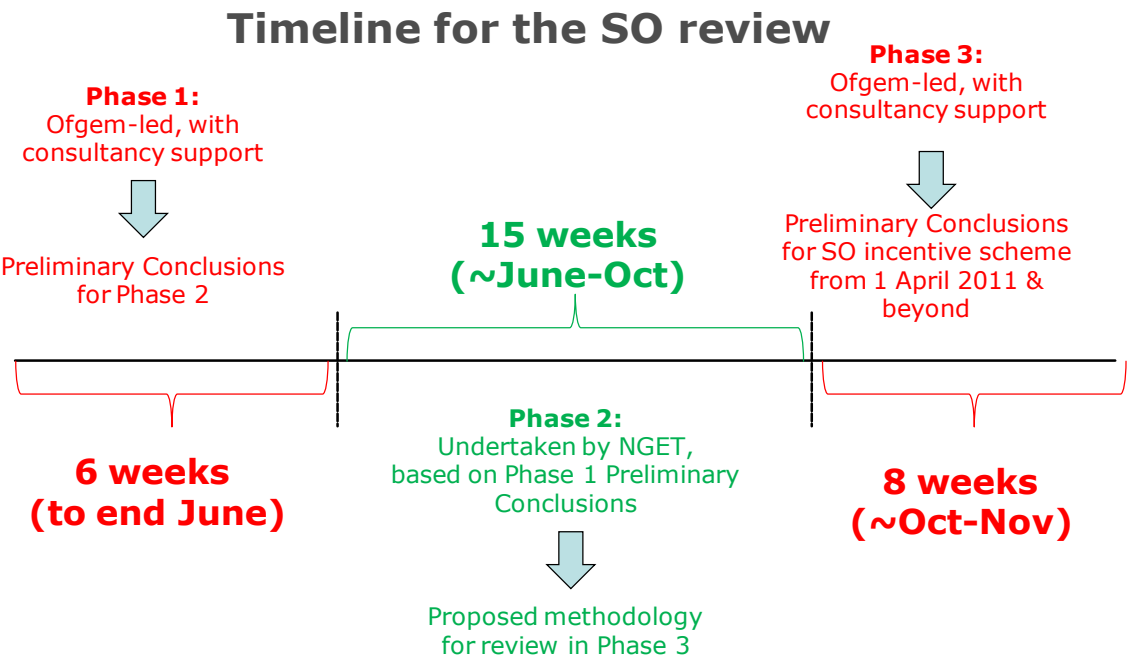
Process

1.18. As set out in the licence condition, this review is being undertaken in three phases.

- **Phase 1:** relates to the examination of NGET's current methodology, including its models and modelling approach, to put forward preliminary conclusions for the development of an SO incentive scheme covering at least two years.
- **Phase 2:** undertaken by NGET in the light of the preliminary conclusions from Phase 1, this phase relates to the production of NGET's proposed methodology, including its models and modelling approach, for the development and implementation of an SO incentive scheme covering at least two years.
- **Phase 3:** relates to the examination of NGET's proposed methodology produced in phase 2, including its models and modelling approach, to determine its appropriateness for application to an SO incentive scheme covering at least two years.

1.19. The timescales for, and interactions between, the three phases is illustrated in Figure 1.1. Frontier Economics Ltd (Frontier) was appointed jointly by Ofgem and NGET to undertake consultancy work to support phase 1 of the review. Attached to this document is Frontier's report setting out its findings in relation to phase 1 of the review. Frontier's findings are discussed in Chapter 3 of this document in the context of setting out Ofgem's preliminary conclusions from phase 1, which will inform NGET's work in phase 2.

Figure 1.1 Phases of the review



Way forward

1.20. Given the preliminary conclusions set out in Chapter 3 of this document we expect NGET to undertake phase 2 of this review and develop its methodology and models based on our preliminary conclusions for implementation from April 2011.

1.21. In particular we expect NGET to include the following areas of work in phase 2:

- **NGET's energy models:** to undertake a number of improvements, including: updating the inputs and calculations within its models; consideration of relationships within its models, e.g. the allocation of margin actions between technologies and the associated prices.
- **NGET's constraints models:** to replace the current suite of constraints models with a GB-wide fundamental model which will enable an unconstrained and constrained schedule based on the merit order across GB to be derived on an internally consistent basis.
- **Use of ex post data:** to use a number of model inputs on an ex post basis. Those inputs to be included as ex post actuals will be those that NGET does not have any control over (e.g. market length) and which are difficult to predict. As part of phase 2 NGET should provide criteria by which to assess which inputs should be considered on an ex ante basis and which on an ex post basis.
- **Improved methodology for developing model inputs:** Under phase 2, NGET will need to set out an improved methodology for calculating model inputs as discussed by Frontier. This methodology should include criteria on the extent to

which and how historical data should be used to address issues relating to the extension of the forecast horizon of the ex ante inputs and the modelling of the relationships between these inputs and the relevant cost drivers.

- **Multi year schemes:** As noted above, we expect NGET to develop proposals for a two year scheme for implementation from April 2011. NGET should also put forward its ideas (including a workplan) as to how it intends to manage the transition from two years to a longer period. It should be noted that we will consider the appropriate length of any future multi year scheme alongside the conclusions of RPI-X@20 and the work under Transmission Price Control Review 5 (TPCR5).
- **SO/TO interactions:** An additional key area that NGET should take forward is in respect of the interactions between the SO and the three Transmission Owners (TOs). Currently, the TOs have incentives only to minimise their respective OPEX and CAPEX costs, and thus do not take into account potential constraints costs when planning outages. Therefore, we are looking at NGET to consider ways in which outage planning can be improved under the auspices of the STC (System Operator – Transmission Owner Code). It should be noted that through our RPI-X@20 project we are considering changes to the transmission regulatory framework to encourage TOs to act in this way. For example, as discussed in our Emerging Thinking consultation and in work recently commissioned from Frontier Economics,[5] we are looking at how to include in an output led regime an output on TOs that links to constraint management. We are also considering how best to encourage TOs to focus on long term requirements and to identify the solutions for delivery of a sustainable energy sector that are long term value for money.[6] We recognise that all of this is unlikely to be resolved in phase 2. However, we expect NGET to consider these issues and, to the extent they cannot be addressed in phase 2, to set out how it proposes to resolve these going forward.

1.22. The methodology that NGET puts forward under phase 2 will subsequently be reviewed by Ofgem under phase 3.

1.23. As in previous years, we then expect NGET to put forward its initial proposals for an electricity SO incentive scheme to be implemented from April 2011. Following which we expect to publish our final proposals in February 2011, such that, subject to NGET's consent,[7] a scheme can be in place from April 2011.

[5] RPI-X@20: Output measures in the future regulatory framework, Frontier Economics, http://www.ofgem.gov.uk/Networks/rpix20/forum/do/Documents1/rpt-outputs.pdf
[6] We will consult on our recommendations on the future regulatory framework for TOs in summer 2010 with a view to making a decision in autumn. The new regulatory framework would be implemented for the first time in TPCR5 and GDPCR2.
[7] If NGET does not consent, Ofgem can refer the matter to the Competition Commission.

2. Current arrangements and key concerns

Chapter Summary

This chapter outlines the current arrangements and sets out our key concerns which have led to this review being undertaken.

Current incentive scheme

Process for setting current incentive scheme

2.1. In recent years, NGET has been responsible for developing initial proposals for SO incentive schemes, including forecasts of its SO costs. Following consultation with industry participants, Ofgem has then developed its final proposals, which following consultation and the consent of NGET have then been implemented as SO incentive schemes.

2.2. In respect of the current year's incentive scheme, following the publication of our May Open Letter, during summer 2009 NGET published a series of mini consultation documents in relation to various aspects of its SO costs. In November 2009 it published its Initial Proposals Consultation which included its forecast of all costs for 2010/11 and a forecast of energy costs for 2011/12. In December 2009, following a request from the Authority, NGET published an addendum to its Initial Proposals Consultation which included a forecast of constraint costs for 2011/12. In January 2010, NGET published its Initial Proposals Consultation Report in which it included revised forecasts. NGET also provided the Authority with additional and updated information regarding its forecasts of costs.

2.3. The Authority then published its Final Proposals in March 2010, which were subsequently implemented following NGET's consent.

Summary of the current scheme

2.4. The current scheme sets a target for bundled energy and constraint SO costs. NGET will receive no payment when outturn costs are within the deadband. When outturn costs are below (above) the deadband then NGET will receive (pay) 15% of the difference, subject to a maximum of £15m.

2.5. The 2010/11 incentive scheme is summarised in Table 2.1 and in the following section.[8]

Table 2.1 Summary of the current scheme

Target	Deadband	Upside Sharing Factor	Downside sharing factor	Cap/Floor
£577.5m	£550m-£605m	15%	15%	£15m

2.6. NGET is also incentivised to minimise the volume of transmission losses. The target volume for 2010/11 is 6.0TWh, with a deadband between 5.8 and 6.2 TWh and a reference price of £39/MWh.

2.7. In setting the scheme we acknowledged that there are areas of uncertainty, in particular, affecting constraint costs which NGET has no control over. We therefore included two automatic adjusters in the scheme, whereby the target will be automatically adjusted downwards in the event that volumes related to two specific events are lower than anticipated.[9] These events are:

- The volume of renewable generation that is likely to connect which has a fundamental effect on the volume of constraints in Scotland; and
- The volume of expected exports across the IFA with reference to its impact on the volume of constraints during the Littlebrook - Tilbury 1 circuit outage (part of the Thames Estuary outage period).

Concerns with the current methodology of setting the incentive

2.8. In this section we outline our concerns regarding whether the current approach to setting a scheme provides appropriate incentives on NGET to act efficiently and take a longer term view.

2.9. The purpose of setting a target is to set incentives on NGET, it is not to provide an accurate forecast of its costs, although we recognise that market participants place value on the accuracy of NGET's Balancing Services Use of System (BSUoS) charges forecast. One specific concern in this area is that a significant proportion of NGET's costs are based on contract costs, which are either input into the models as a given or based on the previous year's contract costs. Whilst considering existing

[8] Please see "National Grid Electricity Transmission System Operator Incentives from 1 April 2010", Ofgem March 2010, for more information.
[9] In addition, under special condition AA5A of NGET's transmission licence both NGET and industry participants are able to raise Income Adjusting Events (IAEs) should an event or circumstance result in an increase or decrease in IBC by more than £2m.

contracts in the model may increase accuracy of NGET's forecasts of costs, there may be little incentive on NGET to contract efficiently, as the scheme effectively allows for the pass through of many of these costs.

2.10. Given NGET's heavy reliance on historical data and rolling forecasts, the current models and modelling approach result in significant volatility in NGET's forecast, e.g. a few more data points of actuals can significantly shift NGET's forecast of costs. This makes the timing of setting an incentive scheme key, as was seen this year.[10] We also have concerns with respect to the volatility of NGET's cost forecasts and that the focus of the incentive scheme is on "the number" rather than the behaviour of NGET that is being incentivised. Our level of concerns regarding the volatility of NGET's forecast meant that we were not in a position to use this forecast to develop a target for 2010/11 but rather used the latest forecast of 2009/10 outturn costs as our starting point. We then took a view on a number of areas to assess the potential changes in NGET's costs compared to the outturn costs for 2009/10.

2.11. We also have concerns that the current methodology used for developing the incentive scheme may result in too much exposure to windfall gains and losses associated with factors outside NGET's control. Our current view is that the models do not identify fully NGET's costs that are dependent on drivers outside of its control (as all the drivers are not identified and/or modelled) and therefore NGET's actual costs may, for example, be lower than forecast as a result of a change in a driver that has not been identified within the model and therefore results in a windfall gain to NGET.

2.12. All the above result in schemes being of an annual duration and with weakened incentives on NGET (through deadbands and low sharing factors), which may be suboptimal. One year schemes and low sharing factors do not incentivise NGET to take longer term actions to reduce costs.

Models and modelling approach

2.13. The current incentive scheme groups SO costs into a number of cost components corresponding to the range of actions the SO takes. NGET has developed a number of models for forecasting individual SO cost components. Currently, NGET uses one model to forecast a range of energy related cost components, with constraint costs forecast using a separate suite of bespoke models. The energy model also combines the outputs with separate forecasts in relation to black start and transmission losses to provide an overall forecast of Incentivised Balancing Costs (IBC) for each month of the year, broken down by cost component.

[10] For example, NGET's forecast of its energy costs reduced by £96m from its original forecast as a result of the updating of its "rolling assumptions", i.e. NGET incorporating more recent data.

2.14. NGET's current models and the SO cost components to which they relate are described at a high level below so as to set the background to our key concerns (see next section). A more detailed description of NGET's current models and SO costs can be found in Frontier's report, annexed to this document, and in documents available on NGET's website.

Energy model

2.15. In terms of energy related SO costs there are seven main cost components. These are energy imbalance, margin, footroom, response, fast reserve, reactive power and black start. Transmission losses are also included in the SO incentive but these are modelled separately.

2.16. For the energy related costs NGET uses estimates of volumes and prices in order to calculate forecasts of costs. These estimates are based on a combination of historic evidence and future expectations. Examples of inputs into the model include: Historic distribution of Net Imbalance Volume (NIV i.e. market length); future expectations of NIV; forward prices of power and gas; historical relationships between prices on the power exchanges and prices paid by NGET for actions; expectation of prices to be paid by NGET for balancing services (based mainly on historical data), historical breakdowns of actions by fuel type, and the level of wind generation on the generation system.

Constraints model

2.17. Regarding the models used to forecast constraint costs, NGET has to date developed five different models, which refer to different regions and/or outages. The five models are the Scottish, the Grendon-Staythorpe, the Cottam-Staythorpe, the Thames-Estuary, and the background England and Wales models.

2.18. The models firstly calculate the expected volume of constraints. To do so they make several assumptions about key variables such as local demand, conventional, new and wind generation output, and transmission outages details (e.g. duration of outages and resultant boundary transfer limits). The values of these variables are based on historical averages (e.g. local demand, conventional generation output), NGET's judgement (e.g. boundary transfer limit) and some forward looking data available at the time of the forecast such as OC2 submissions, the TEC register, and outage plans (e.g. plant availability, wind connected, duration of outages).

2.19. Subsequently, the models calculate the cost of resolving the constraints by multiplying the expected volume of constraints with the expected price of resolving the relevant constraints. As such, NGET models make assumptions about the Balancing Mechanism bid and offer prices, margin prices long term contracts and intertrip prices that NGET has with several generators. These prices are based on forward looking data such as the forward price for electricity, but also on NGET's judgement for future market conditions, especially so for contract and intertrip prices.

Usage of models

2.20. The models are used to provide a forecast of costs which form the basis of an ex ante target. They have also been used as the basis for ex post adjustments to the target, resulting from the outturn of specific key variables.

Concerns with NGET's current approach to modelling and usage of current models

2.21. During 2009/10 NGET provided us with the models which it has developed in order to forecast its costs. Consideration by Ofgem of these models reinforced our concerns that NGET was not considering the wider drivers of its costs, but was far more focused on historic data and resultant numbers. Ofgem is particularly concerned that the current modelling methodology makes the extension of the annual incentives to multi year incentives difficult and as such NGET is not incentivised to take a long term view of its role.

2.22. Our Final Proposals for the 2010/11 SO incentive scheme set out further detail of our concerns that have led to this review. In discussions with NGET and Frontier in the course of phase 1 we have also highlighted the following concerns with the current models to be taken into account in the review:

- The current approach adopted in the models means that they are very detailed and essentially a "black box".
- The outputs of the energy and constraint models are very sensitive to the inclusion of a few additional historic values.
- The calculations within the models (e.g. fast reserve volumes and volume of margin actions) do not give sufficient consideration to the underlying relationships in the data and the extent to which this may be particular to prevailing market conditions or the extent to which the underlying drivers might change going forward.
- The limited way in which NGET takes account of uncertainties in the key input data on which the models rely, despite recognition that certain inputs, such as outage plans, may be subject to significant change in the course of developing and finalising the proposals for the incentive scheme.

2.23. Given the concerns we have with the modelling approach these lead us to have limited confidence in how the models are currently used in the development of the incentive schemes, in particular in respect of the setting of the target, any adjusters and the scheme parameters.

- The current models are used to derive a forecast to set the target of the scheme. In this context the latest available input data (including the most recent available historical data) are used to pursue the most "accurate" forecast for the given period based on central assumptions reflecting its prevailing best view. This

results in very volatile forecasts, reducing confidence in the target which makes the timing of setting an incentive scheme key (a few more data points might significantly shift NGET's forecast of costs).

- The models are also used to set any ad hoc adjusters that are considered necessary for a scheme in a particular year. In setting these adjusters it is key that there is a level of confidence in how the relationship between the costs and the driver that is relevant to the adjuster is modelled.

- The parameters (e.g. sharing factors, caps and floors) of a scheme should also reflect the distribution of expected costs under a range of plausible scenarios. Again, in order for these to be set as a result of the models it is necessary to have sufficient confidence in the outputs of the models.

3. Phase 1 Preliminary Conclusions

Chapter Summary

This chapter outlines our preliminary conclusions with respect to phase 1 of the review, with reference to the findings of Frontier's report. It also sets out work to be undertaken in phase 2 and in the future.

Introduction

3.1. A key purpose in undertaking the SO review is to enable us to reach a view on the suitability of NGET's current methodology to develop multi year incentive schemes. Our key preliminary conclusion from phase 1, in the light of the findings of Frontier's report, is that while developing and implementing a multi year incentive scheme is inherently difficult, there is considerable scope for improvement to NGET's current methodology, including its modelling approach, to facilitate this objective.

3.2. In line with the three key objectives for the review as set out in chapter 1, this chapter sets out our preliminary conclusions on the appropriate **methodology** to adopt for a multi year incentive scheme and the development of reliable **modelling** tools to underpin such a scheme. In terms of practical **application**, it also sets out work which allows for the associated improvements to be developed in phase 2 with a view to considering their potential implementation within a two year incentive scheme from April 2011. We also identify issues to be considered as part of further work to inform development of future schemes, including the transition from two years to a longer period. We expect NGET to address these issues along with other issues raised in the Frontier report during phase 2 of the review.

Overall framework

3.3. We are currently of the view that multi year incentive schemes can be achieved without significantly altering the basic format of the SO incentive scheme which has been used since the introduction of NETA in 2001. Pending our final conclusions of the SO review, we continue to reserve our position on whether more fundamental changes may be appropriate to deliver an effective multi year SO incentive scheme.

3.4. In the context of the current format of the SO incentive scheme the scope for improvement particularly applies in relation to NGET's ability to develop more effective and reliable methodology and modelling tools on which to base incentives which are not overly sensitive to highly volatile and difficult to predict external factors falling outside NGET's control.

3.5. Frontier recommended that NGET should be insulated from such external factors and has put forward two options for this. Option 1 is to continue to use the existing methodology with an increased use of ad hoc adjusters; Option 2 proposes to use

the models after the event to adjust for the actual values of external factors where they are unpredictable and outside NGET's control.

3.6. In Option 1, as in previous SO incentive schemes, the potential impact of unpredictable external factors is dealt with through specific adjustment mechanisms, isolating the impact of specific cost drivers on SO total costs.

3.7. Option 2 suggests using the models themselves to adjust for uncontrollable uncertainties. Given that there may be more unpredictable external factors that need to be dealt with in order to move to a longer term scheme, we consider it more appropriate to use the models themselves to adjust the target than to use a series of separate adjusters. Our preliminary conclusion is therefore to adopt Frontier's Option 2.

3.8. Such a process should result in NGET being less exposed to uncontrollable risks and therefore reduce the possibility of windfall gains or losses as a result of changes to variables that are outside of its control. It should be noted that NGET will remain incentivised to manage the impact of such factors on its overall costs to the best of its capability, to the ultimate benefit of consumers.

Preliminary conclusions with respect to incentives methodology

3.9. In this section we set out our preliminary conclusions with regard to the appropriate **methodology** to adopt for a multiyear incentive scheme, including the format of the scheme. We also set out supporting rationale including consideration of the expected benefits of our proposed approach. In a later section of this chapter we set out a number of work areas that we expect NGET to undertake under phase 2 of this review such that a two year incentive scheme can be introduced from April 2011.

Format of the SO Incentive Scheme

3.10. The current SO incentive scheme is a bundled scheme, where a single target covering NGET's total costs as SO is specified with a "deadband", i.e. an area within which NGET is neutral to different outturns of costs. The scheme includes sharing factors which determine the sharing of the outperformance and underperformance between NGET and system users. In addition, the scheme has a cap and a floor, which limit the level of profit or loss that NGET is exposed to.

3.11. Ofgem's preliminary conclusion is that the scheme to be put in place from April 2011 should be of a similar format to the previous schemes. Changes to the specification of the parameters will be necessary to allow for multi year incentives to

be set. In particular, we currently envisage the new scheme to have the following features:

(i) to be a bundled scheme, incentivising NGET on energy and constraints costs;[11]

(ii) to include a target level of external SO costs against which NGET's performance would be measured. We consider that this target should be based on an ex ante forecast, which will be adjusted into an ex post target through use of modelling tools agreed at the beginning of the scheme, some ex ante agreed inputs, and outturn values for external, volatile factors falling outside NGET's control;

(iii) to include risk setting parameters (e.g. upside and downside sharing factors, a cap and a floor). Our current expectation is that our proposed approach should reduce the level of risk on NGET and therefore reduce the need for a deadband. We also expect to be in a position to increase the magnitude of the sharing factors and the caps and floors, thereby increasing the incentive on NGET as SO.

3.12. We discuss each of the above features in turn.

Bundled scheme

3.13. At this stage of the review, we consider it preferable to incentivise NGET on a single incentive target covering all cost categories. Several NGET SO activities affect, to some extent, several cost categories and can be a substitute for one another. A bundled scheme provides NGET with perspective across its SO activities to enable it to create additional benefits that can be passed on to consumers. Further, as noted by Frontier, it encourages NGET to consider trade-offs between its activities appropriately. At this stage we see no reason to move to an unbundled scheme, which Frontier considers could introduce perverse incentives.

Incentives methodology

3.14. In its role as SO, NGET will take a number of actions to balance the system. The objective of the SO incentive scheme is to incentivise NGET to undertake its actions such that its total costs are at the efficient level both in the short term and over the longer term. However, a number of the external factors affecting costs are difficult to predict and could have considerable impact on the efficient level of costs. Such an impact is likely to be greater if the incentive scheme

[11] The scheme should continue to also include black start costs and transmission losses.

runs over a longer period. NGET's ability to predict and control SO costs varies across cost categories.

3.15. In the existing one year scheme, NGET's exposure to uncontrollable and unpredictable external factors is mitigated by automatic ex post adjusters. As some categories of SO costs become less controllable and (or) more difficult to predict over longer timeframes, the proposed incentive methodology for a multi year scheme should provide more protection against unanticipated and uncontrollable changes of external factors having an impact on SO costs.

3.16. As set out above, our preliminary conclusion is that the approach set out by Frontier in its report as Option 2 would provide a suitable balance between the benefits of multi year schemes and the degree of risk that NGET is likely to face over longer durations.

3.17. Our proposed approach consists of the following elements:

(i) **a forecast of overall SO costs to be developed by NGET when setting the scheme;**

(ii) a target level of external SO costs against which NGET performance would be measured at the end of the scheme;

(iii) an energy model, a constraints model and a set of inputs to these models agreed prior to the start of the scheme (ex ante agreed models and inputs); and

(iv) a set of inputs (volatile unpredictable cost drivers outside of NGET's control) to be updated post event (ex post inputs) to adjust the forecast of costs into a target.

3.18. The use of pre agreed models with ex post inputs for unpredictable and uncontrollable cost drivers removes the need to define ad hoc ex post adjusters to deal with uncertainties as the models themselves are used to adjust the initial forecast into a post event target. However, for this approach to deal effectively with uncertainties, attention is needed to model the link between the cost drivers and the costs. Also, the set of ex ante inputs need to be adequately forecast and the set of ex post inputs adequately specified. These issues are further discussed in the later section which discusses the usage of models in the proposed approach.

3.19. Such a process incentivises NGET on cost drivers that it can control and predict. As a result, NGET would be less exposed to uncontrollable risks and therefore less exposed to windfall gains or losses as a consequence of changes to external factors that are outside of its control. It should be noted that NGET will remain incentivised to manage the impact of such factors on its overall costs to the best of its capability.

Risk setting parameters

3.20. Under the proposed approach the level of risk on NGET should be lower. Our current expectation is that, as a consequence, the need for a deadband (which has been used in recent years to take into account some of the uncertainty surrounding NGET's forecast) will be reduced. We also expect the proposed approach to allow for higher sharing factors, caps and floors, thereby increasing the incentive on NGET as SO. As set out by Frontier, this should ensure that NGET has a meaningful payoff to actions which increase efficiency, and has some incentive in relation to the impact of its actions beyond the first year of the incentive scheme.

3.21. Another preliminary conclusion is that the strength of the incentive from April 2011 should be equal across the two years, i.e. scheme parameters should be equal across the two years of the scheme, as risks arising in the second year should not be materially higher (or lower) than those in the first year.

Benefits from the proposed approach

3.22. Ofgem's preliminary conclusion is that the proposed methodology should bring a number of benefits. These benefits broadly fall into two categories:

(i) stronger incentives; and
(ii) benefits associated with the possibility to introduce a longer term scheme.

3.23. We discuss each of the above in turn.

Stronger incentives on controllable and predictable costs

3.24. Under the proposed approach NGET will face a reduced risk of windfall gains or losses because of the ex post adjustment of the target with respect to uncontrollable and unpredictable external factors affecting its costs. We consider that this approach should strengthen NGET's incentives in respect of those costs that it does have a level of control over as the impact of NGET's actions on the target will be less polluted by uncontrollable uncertainty.

3.25. Also, the possibility of increasing sharing factors, caps and floors, means that NGET will receive more of the pay off for its actions and, thus, NGET will have stronger incentives to increase its effort to reduce the overall SO external costs. These savings should be passed to consumers via reduced charges to system users.

Benefits associated with longer term schemes

3.26. Ofgem's preliminary conclusion is that multi year incentives scheme can be put in place by adopting the methodology described above. By setting a multi year scheme, benefits will arise, including in the following areas:

(i) contract costs;
(ii) longer term actions;
(iii) information revelation; and
(iv) administrative costs

Contract costs

3.27. NGET enters into contracts to procure balancing services such as reactive power, fast reserve, STOR, as well as balancing services contracts to manage system issues (e.g. constraints).[12]

3.28. The length of these contracts is often less than one year, but can vary from one month to multiple years. Under the current annual scheme some of these contracts may be tendered or signed before the SO incentives target is established. That results in those contracts being included in the annual target and hence being passed through thereby weakening NGET's incentive to contract efficiently.

3.29. A longer term scheme should set stronger incentives on NGET with regard to its contracting strategy. For contracts with a duration of less than the two year incentive scheme, NGET may have a strong incentive for those contracts to be less expensive when renegotiated as their costs will not be included in the target and NGET will benefit from the savings made until the next incentive period starts.

Longer term actions

3.30. In addition, there may be cases where NGET could take actions with regard to SO costs that have longer term payoffs. Such actions may involve capital or operating expenditure.

3.31. The current SO incentive scheme, however, being limited to a year's duration, may not allow NGET to recover the costs of these actions or make reasonable returns as NGET captures the benefit of only one year.

3.32. By setting a two year scheme, NGET will be able to capture the benefits of these actions over more than one year. Thus, the two year scheme and the future development of longer term schemes should incentivise NGET to explore such options.

[12] More information can be found on http://www.nationalgrid.com/uk/Electricity/Balancing/services/

Information revelation

3.33. Information asymmetry between the regulator and the SO is a well known problem. The SO will always be in a better place compared to the regulator to judge the efficient level of costs.

3.34. Following the discussion above, Ofgem considers that a multi year scheme sets a better framework for dynamic revelation of information. The SO has stronger incentives to reduce its costs as it is rewarded more for the cost savings actions it takes. The reduction in costs then reveals valuable information about the efficient level of costs. Subsequently, the regulator will pass on those efficiencies to the ultimate benefit of consumers in the next incentive period by setting a lower target.

3.35. However, this holds true only where costs are relatively stable and past information is useful for setting future schemes. Our preliminary conclusion is that the methodology proposed in this document supports revelation of information in the context of setting SO incentives by taking into account the impact of uncertainties into the process.

Administrative costs

3.36. Currently, Ofgem, NGET and the industry apply significant effort on an annual basis to develop the incentive scheme. For example, in 2009 NGET issued three mini consultations and the initial proposals that several industry participants responded to. Subsequently, after significant discussions between Ofgem and NGET, Ofgem issued final proposals on the incentive schemes from 1 April 2010.

3.37. Putting in place a multi year scheme means that the burden of the above procedure will be reduced and therefore resources can be used elsewhere or saved altogether.

Preliminary conclusions with respect to modelling

3.38. In this section we set out our preliminary conclusions with regard to the development of NGET's modelling, both in terms of its actual models and the use of the models, in order that this can underpin an incentive scheme based on the methodology set out in the previous section.

Model specification

3.39. Following phase 1 of the review we have reached the following preliminary conclusions in relation to the specification of the models:

(i) **NGET's energy model: to be adapted for application in the context of a multi year scheme, with a number of improvements to be made; and**

(ii) NGET's constraint model: the current suite of bespoke constraints models to be replaced by a single GB wide fundamentals model.

3.40. Our rationale for this view, and specific proposals for model development, is set out below.

Energy model

3.41. There are a number of areas within NGET's energy model that require improvements such that it can be used for the future development of SO incentive schemes. These reflect both the areas of our concerns that we have highlighted in the previous chapter and also those discussed in Frontier's report.

3.42. The areas for improvement include the relationships within the model between the drivers of NGET's costs and the costs themselves, for example, the relationship between NIV and margin volumes and hence margin costs. Further consideration should also be given to how the inputs into the model are forecast, for example, the allocation of margin actions between technologies and the associated prices. We also consider that NGET should look to streamline the model, in particular, where as a result of its development over a number of years sections of the model may have become redundant.

3.43. As identified by Frontier, we propose that NGET takes forward specific improvements to components of the energy model relating to margin costs, in relation to the allocation (and prices) of margin actions to technologies. We also expect NGET to take forward work on ensuring that there is a robust methodology for estimating the level of free margin available as a result of the length of the market (i.e. the extent to which the market is long or short). We consider that these improvements to the margin component are necessary to improve the reliability of the modelling and to provide a more solid foundation for the adoption of our new framework.

3.44. Further, these improvements, together with work to streamline the model and update calculations, should be seen as prerequisite for the adoption of any ex post inputs to the energy model. It will also be necessary to consider the appropriate granularity for calculations, particularly those which use a combination of ex post and ex ante input variables.

3.45. It will also be necessary for NGET to address issues relating to the extension of the modelling horizon. This includes reviewing input specifications, regression equations and probability distributions, and ensuring that assumptions used in the models reflect a forward looking approach. We consider that these issues are all relevant to the appropriate usage of the models for the purposes of providing reliable analysis on which to base a multi year incentive scheme.

Constraints models

3.46. With respect to the modelling of constraints, as per Frontier's report, our proposal is for NGET to develop a new GB-wide fundamentals model, in which a fully functioning despatch model is used to schedule plant according to marginal costs. We consider that this approach will enable an unconstrained and constrained schedule across GB to be derived on an internally consistent basis. We further note that such a model will increase transparency on constraint costs thereby informing future work in other areas, such as the impact on constraints costs of, for example, the connection of generation under connect and manage arrangements for transmission access. We have asked NGET to take forward work on a new constraints model as a matter of urgency, and identify below some specific areas that NGET should consider in taking this forward.

3.47. We expect the new constraints model to consider the expected costs of resolving any constraints, taking into account the options available to NGET including bids and offers in the BM, contractual arrangements and intertrip agreements. The revised modelling approach should ensure that the incentive remains on NGET as SO to resolve constraints in the most economic and efficient manner.

3.48. During phase 1 of this review, NGET has expressed concerns that existing contract arrangements mean that NGET will not receive the benefit through the incentive scheme of signing such contracts, as they will already have been taken into account when setting the incentive scheme. We recognise that for some contracts, NGET may have paid a premium to ensure certainty, compared to waiting to resolve constraints in the BM. Such a premium may also include the optionality value to the generator. Therefore, when modelling the constrained schedule, consideration will need to be given as to whether such contract premium should be taken into account as part of the cost of resolving the specific constraint. By being in a position to take the contract premium into account when setting the incentive, this will ensure that NGET is incentivised to resolve the constraint in a more economic and efficient manner than was previously the case.

3.49. We also expect NGET to specify this model such that changes to the generation background and developments to the transmission network can be accommodated in a robust and transparent way. For example, we expect the model to facilitate analysis of the extent to which the forecast volume of constraints costs may vary according to decisions at the TO/SO interface regarding the level of available transmission capacity across key transmission boundaries.

3.50. We note that there may be scope to further develop NGET’s models so as to provide improved modelling of wind generation. We recognise Frontier’s view that this is desirable but difficult to achieve in the timescales for this review as a result of limited availability of data. However, we expect that as part of ongoing work, NGET should be undertaking appropriate monitoring and analysis of SO costs in respect of their relationship with wind generation so as to gain a better understanding of the relationship.

Usage of models

3.51. As set out in the incentives methodology section of this chapter, following phase 1 of the review we have reached the conclusion that NGET's modelling framework should include:

- **an energy model and a constraints model agreed prior to the start of the scheme;**
- **a set of inputs agreed prior to the start of the scheme; and**
- **a set of inputs (in respect of volatile cost drivers that are outside of NGET's control) to be updated post event to adjust the forecast of costs into a target.**

3.52. This new framework for the use of the models will require the development and application of appropriate criteria to determine which input variables might be appropriate for updating post event. It will be important to ensure that variables chosen for this approach indeed reflect cost drivers which are unpredictable and subject to volatility over which NGET has no control, and that the incentive scheme design retains incentives for NGET to manage the impact of such drivers efficiently.

3.53. Our initial view, as proposed by Frontier, is that this approach may be best suited to variables which are subject to short term volatility, such as electricity prices,[13] and that it will also be necessary, particularly in the context of a longer term scheme, to consider how to deal with uncertainties in other variables outside NGET control, which may potentially vary over longer timescales but within the period of the scheme (e.g. generation background, transmission capacity).

Translating preliminary conclusions into a practical approach

3.54. Under phase 2, NGET should be able to take forward our preliminary conclusions to develop its methodology and models. As a result NGET should be in a position to put forward initial proposals for practical application to a two year incentive scheme from April 2011. This section identifies a number of work areas that we expect NGET to undertake under phase 2 to facilitate this objective. We also identify issues to be considered as part of further work to inform the development of future schemes, including the transition from two years to a longer period. It should be noted that in respect of the appropriate length of any future multi year scheme we will take into account the conclusions of RPI-X@20 and the work under TPCR5.

3.55. Ofgem realises that extending the duration of the SO incentive scheme to more than two years will be challenging. Thus, we expect NGET to set out a plan of how it

[13] This approach should also remove the need for the NIA adjuster and hence remove any concerns there may be regarding whether it operates correctly.

will be addressing the challenges involved in order to successfully manage the transition to a longer than two year scheme.

Model development

3.56. We note that our proposals require NGET to develop or obtain a new model for forecasting constraints costs. We recognise that this is a significant piece of work, but consider it key to the development of SO incentives and also more widely as it will increase transparency in relation to the future costs of constraints. As well as the constraints model, there is also a requirement for NGET to undertake considerable work to develop and improve its modelling with regard to energy costs.

3.57. This work on model development will be a key component for the success of the review, and a prerequisite to the introduction of ex post inputs as set out below.

Use of ex post data

3.58. As set out above, our proposal is to use a number of model inputs on an ex post basis. The inputs to be included as ex post actuals will be those that NGET does not have any control over and are unpredictable (e.g. market length). As set out above, there is further work required in phase 2 to develop and apply an appropriate framework for this approach.

3.59. As part of its phase 2 work we expect NGET to develop criteria for determining which variables should be treated on an ex post basis within the SO incentive scheme and to apply these criteria in justifying any recommendations it makes as to which specific variables should be subject to this treatment. In developing its criteria, NGET will need to consider to what extent it is necessary for this to be dynamic. For example, to what extent is it likely that during the term of the incentive scheme will it gain some control over cost drivers that it previously considered it had no control over.

3.60. One area that Frontier highlighted in respect of a possible ex post input is the level of wind generation. We would like to note that in considering how to address the volatility of wind output we expect NGET to consider whether the appropriate input should relate to changes in the total capacity of connected wind generation across the period of the incentive scheme or the variability of output of the connected wind generation in operational timescales.

Methodology for developing model inputs

3.61. Frontier's review has focussed on the specification of the models for given inputs and the identification and treatment of uncontrollable cost drivers. Under phase 2 NGET will need to work to address issues relating to the extension of the forecast horizon of the ex ante inputs. This will also require NGET to model the relationships between these inputs and the relevant cost drivers.

3.62. We also expect NGET to develop criteria for deciding how a given variable should be treated in the model. This includes consideration of: available granularity of input data vs required granularity of forecast data; whether to specify input directly and if so what data sources to use (recognising that current sources may only cover up to the year ahead); whether to model uncertainty using multiple scenarios and/or Monte Carlo simulation and in the latter case what is the basis for the probability distribution and central values used in this; whether to calculate the input indirectly from modelled relationships and what the basis for those calculations should be, including the role of historical and forward looking information in formulating or applying such relationships.

3.63. We also expect NGET's phase 2 work to continue to consider potential improvements to its current monitoring and reporting of SO cost components against trends in cost drivers and to set out how it may apply such analysis in developing an improved understanding of the relationship between input variables and cost drivers which can then be consistently applied in its forecast models going forward. We note that such an approach is particularly relevant to gaining an understanding of the impact of wind generation, but it may also be usefully applied to other drivers of SO costs.

3.64. Finally, we expect NGET to apply the modelling improvements set out above in developing a two year forecast of SO costs to inform the development of a two year incentive scheme to apply from April 2011.

Further consideration of scheme parameters

3.65. Our preliminary conclusions state that sharing factors, the cap and the floor, and the deadband should reflect a stronger incentive scheme than the current annual scheme. We expect NGET to put forward proposals regarding the magnitude of these parameters.

3.66. In addition, we expect NGET to address the issue of equal scheme parameters when SO outturn costs are lower than the incentive target (upside) and when SO outturn costs are higher than the target (downside).

3.67. For example, different sharing factors may be justified if Ofgem was to incentivise NGET towards more risky and possibly higher pay off activities. Assuming that NGET can put in place an innovative scheme that has a high probability of being costly, but there is some low probability of having a very high positive pay off. The expected value of this innovative scheme would be negative if the sharing factors were equal on the upside and downside and NGET is unlikely to have chosen to take such action. However, if the upside sharing factor is higher than the downside, NGET will share more of the upside risk with the industry and thus is incentivised towards taking such an action.

SO/TO interactions and generator outage plans

3.68. As constraint costs have started to increase in recent years, one area of concern has been the interactions between the SO and the TOs. In particular, in respect of the extent to which these interactions seek to reduce the level of these costs. In this section we set out some of the ways that we expect NGET under phase 2 of the review, and beyond, to look at these interactions and the incentives on the relevant parties to minimise the levels of constraints.

3.69. Under the current arrangements of the STC the SO coordinates the development of the transmission outage plans in collaboration with TOs and generators.[14] A "Final Outage Plan" (FOP) is agreed in week 49 in the current year for the next financial year.

3.70. For the networks in Scotland, there are arrangements in place through the STC to allow NGET to request changes to the agreed FOP. Any changes to the FOP requested by the SO allow the TOs to recover reasonably incurred costs from the SO at cost reflective rates. An allowance of £1m[15] is currently available to the SO to make outage change payments to the TOs. The SO recovers these costs via BSUoS charges.[16] For England and Wales, there is no allowance for recovery of outage change costs, as it is assumed that NGET's benefits can be derived through the Balancing Services Incentive Scheme (BSIS) to outweigh the costs.

3.71. Finally, the STC provides for liaison between NGET and TOs in relation to the identification of potential capital schemes that either reduce constraint costs or mitigate the risk of constraints happening. Such capital projects will not be part of the TO's baseline CAPEX allowances agreed at TPCR4, and thus the TO will have to seek additional CAPEX funding from the Authority. Further, all TOs currently have incentives through their transmission price control to minimise OPEX and CAPEX costs. Thus, TOs do not take into account constraint costs that are finally borne by customers. In addition, although NGET and the TOs try to optimise the outage plan before it becomes the FOP, it is highlighted that outage change costs incurred prior to the development of the FOP are not currently compensated.

3.72. In addition, for activities that are deemed "TO", NGET faces sharing factors of 100% as under TPCR4 a target allowance was set and NGET is fully exposed to OPEX

[14] The process is outlined in the STC for STOs and in the Grid Code for generators.
[15] In 2004/05 prices.
[16] If the actual costs differ from £1m allowance by more that £300k, it must notify the Authority of this 'outage cost adjusting event'. This notification triggers the process for the full cost pass through and removes any financial risk/benefit to NGET if the outage change costs are in excess of £1.3m or less than £0.7m. If the actual costs are within the range £0.7m-£1.3m, NGET recovers the £1m allowance regardless of the actual level of costs incurred within this range. The discontinuity in the incentive potentially it may create perverse incentives.

increases/decreases around this allowance. The presence of different sharing factors with regard to TO OPEX and SO OPEX and Balancing Costs may therefore have distortionary effects.

3.73. Further in the past few years the outage change costs paid for outage changes have been significantly lower than the £1m allowance. Reasons for such underutilisation of the available funds may be insufficient lead time from the request to allow optimal rescheduling of the outages within the plan year and the inability to accommodate the change as a result of the lack of skilled resource.

3.74. Under phase 2 of the review we will be looking at NGET to consider ways in which outage planning can be improved under the auspices of the STC. Such improvements would be beneficial to both the SO and TOs, and the consumers as potential savings would be passed on to them in the subsequent incentive periods. NGET also needs to consider whether similar efficiencies can also be achieved as a result of better coordination between NGET and generators of the generators' outage plans.

Next steps

3.75. We consider that NGET should be able to develop its methodology and modelling tools, based on the preliminary conclusions as set out in this chapter, under phase 2 of the review such that it can put forward initial proposals for a two year incentive scheme to be implemented from April 2011. The methodology that NGET puts forward under phase 2 will subsequently be reviewed by Ofgem under phase 3 of the review.

3.76. We also expect NGET at the end of phase 2 to set out further plans for future work in this area.

Appendices

Index

Appendix 1 - Responses to the document

1.1. Although we have not asked any specific questions in this document, Ofgem would like to hear the views of interested parties in relation to any of the issues set out in this document. These should be sent to Giuseppina Squicciarini (details below).

1.2. Unless marked confidential, any correspondence will be published by placing them in Ofgem's library and on its website www.ofgem.gov.uk. Respondents may request that their response is kept confidential. Ofgem shall respect this request, subject to any obligations to disclose information, for example, under the Freedom of Information Act 2000 or the Environmental Information Regulations 2004.

1.3. Respondents who wish to have their responses remain confidential should clearly mark the document/s to that effect and include the reasons for confidentiality. It would be helpful if responses could be submitted both electronically and in writing. Respondents are asked to put any confidential material in the appendices to their responses.

1.4. Any questions on this document should, in the first instance, be directed to:

Giuseppina Squicciarini
Head of Regulatory Economics
GB Markets
Ofgem
9 Millbank
London
SW1P 3GE

020 7901 7366
giuseppina.squicciarini@ofgem.gov.uk

Appendix 2 - Review licence condition

"Special Condition AA5I: Review of methodology and requirement to develop a balancing services activity revenue restriction on external costs covering two or more relevant years

1. The licensee shall cooperate with and assist the Authority and any Consultants appointed to undertake Phase 1 of the Review for the purpose of producing preliminary conclusions by the Authority on or around 31 May 2010.

2. Unless the Authority directs otherwise, the licensee shall undertake Phase 2 of the Review based on the preliminary conclusions of the Authority produced in Phase 1 of the Review, within 15 calendar weeks of the receipt of the preliminary conclusions or such timescale as the Authority may reasonably direct.

3. Unless the Authority directs otherwise, the licensee shall cooperate with and assist the Authority and any Consultants appointed to undertake Phase 3 of the Review in or around eight calendar weeks of the completion of Phase 2 of the Review.

4. The licensee shall cooperate with and assist the Authority in selecting and appointing Consultants for the purpose of conducting the Review. The scope and content of any contract in respect of work to be undertaken during the Review by any Consultants shall be:

    a) proposed by the Authority;

    b) reviewed by the licensee;
    c) approved by the Authority, subject to any modification (if any) as it may reasonably require, having taken into account any representations by the licensee.

5. Any contract between the Authority, the licensee and any Consultants shall make provision for payment by the licensee in respect of any work undertaken by the Consultants during the Review.

6. The licensee shall comply with all the requirements of this condition in a timely fashion and in good faith.

7. For the purposes of this condition:

    "Consultants" means any persons appointed jointly by the Authority and the licensee for the purpose of conducting the Review in accordance with this condition.

    "The Review" means any work undertaken in respect of Phase 1 of the Review, Phase 2 of the Review and Phase 3 of the Review.

    "Phase 1 of the Review" means the examination of the licensee's current methodology, including its models and modelling approach, to determine its appropriateness for the development of a balancing services activity revenue restriction on external costs covering two or more relevant years.

    "Phase 2 of the Review" means the preparation and submission to the Authority by the licensee of the licensee's proposed methodology, including its models and modelling approach, for the development and implementation of a balancing services activity revenue restriction on external costs covering two or more relevant years.

    "Phase 3 of the Review" means the examination of the licensee's proposed methodology, including its models and modelling approach, to determine its appropriateness for the development of a balancing services activity revenue restriction on external costs covering two or more relevant years."

Appendix 3 - Frontier Economics report

Please see separate document.

Appendix 4 - The Authority'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 (such as the Gas Act 1986, the Electricity Act 1989, the Utilities Act 2000, the Competition Act 1998, the Enterprise Act 2002 and the Energy Acts of 2004, 2008 and 2010) as well as arising from directly effective European Community legislation.

1.3. References to the Gas Act and the Electricity Act in this appendix are to Part 1 of those Acts.[17] 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.[18]

1.4. The Authority's principal objective is to protect the interests of existing and future consumers in relation to gas conveyed through pipes and electricity conveyed by distribution or transmission systems. The interests of such consumers are their interests taken as a whole, including their interests in the reduction of greenhouse gases and in the security of the supply of gas and electricity to them.

1.5. The Authority is generally required to carry out its functions in the manner it considers is best calculated to further the principal objective, wherever appropriate by promoting effective competition between persons engaged in, or commercial activities connected with,

- the shipping, transportation or supply of gas conveyed through pipes;
- the generation, transmission, distribution or supply of electricity;
- the provision or use of electricity interconnectors.

1.6. Before deciding to carry out its functions in a particular manner with a view to promoting competition, the Authority will have to consider the extent to which the interests of consumers would be protected by that manner of carrying out those functions and whether there is any other manner (whether or not it would promote competition) in which the Authority could carry out those functions which would better protect those interests.

[17] Entitled "Gas Supply" and "Electricity Supply" respectively.
[18] 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.

1.7. In performing these duties, the Authority must 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[19]; and
- the need to contribute to the achievement of sustainable development.

1.8. In performing these duties, the Authority must have regard to the interests of individuals who are disabled or chronically sick, of pensionable age, with low incomes, or residing in rural areas.[20]

1.9. 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[21] under the relevant Act and the efficient use of gas conveyed through pipes and electricity conveyed by distribution systems or transmission systems;
- 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,
- and shall, in carrying out those functions, have regard to the effect on the environment.

1.10. In carrying out these functions the Authority must also have regard to:

- 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.

1.11. The Authority may, in carrying out a function under the Gas Act and the Electricity Act, have regard to any interests of consumers in relation to communications services and electronic communications apparatus or to water or

[19] 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 Acts in the case of Electricity Act functions.
[20] The Authority may have regard to other descriptions of consumers.
[21] Or persons authorised by exemptions to carry on any activity.

sewerage services (within the meaning of the Water Industry Act 1991), which are affected by the carrying out of that function.

1.12. 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 Regulation[22] 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.

[22] Council Regulation (EC) 1/2003.

Appendix 5 - Glossary

A

Ancillary Services

Mandatory, necessary or commercial services used by the electricity System Operator to manage the system and to meet their license obligations.

B

Balancing and Settlement Code (BSC)

Sets out the rules for governing the operation of the Balancing Mechanism and the Imbalance Settlement process and also sets out the relationships and responsibilities of all electricity market participants.

Balancing Mechanism (BM)

The mechanism by which the electricity System Operator procures commercial services (Balancing Services) from generators and suppliers post gate closure, in accordance with the relevant provisions of the Balancing and Settlement Code (BSC) and the Grid Code.

Balancing Services

The services that electricity System Operator needs to procure in order to balance the transmission system.

Balancing Services Incentive Scheme (BSIS)

The scheme aims to deliver financial benefits to the industry and consumers from reductions in the costs or minimising risk associated with operating with electricity transmission network.

Balancing Services Use of System charges (BSUoS)

The daily charge, levied by the System Operator on users of the transmission system, in order to recover the costs of operating the transmission system and procuring and utilising Balancing Services.

Black Start

The ability to start a generating plant without external power supplies.

C

Cash out arrangements

The arrangements whereby generators and suppliers pay or are paid for imbalances (shortages and surpluses of power relative to their contracted commitments).

Connection and Use of System Code (CUSC)

Constitutes the contractual framework for connection to, and use of, National Grid's high voltage transmission system.

E

Energy Imbalance

Costs incurred by NGET to correct for differences between the generation supplied by the market and the actual demand on the system.

F

Fast Reserve

The fast provision of reliable power via increased generation or reduction in demand which can be provided within 2 minutes, at a delivery rate of less than or equal to 25MW/minute. The reserve needs to be sustainable for 15 minutes.

Fast Start

The ability of a genset to ramp from standstill to its maximum rated output within five minutes of initiating a low frequency relay, or within seven minutes of a manual instruction.

Footroom

This refers to the negative margin that allows for space to decrease generation if required and allows for High Frequency responses to be carried out.

Frequency Response

The electricity SO has a statutory obligation to maintain system frequency between +/- 1% of 50 hertz. The immediate second-by-second balancing to meet this requirement is provided by continuously modulating output through the procurement and utilization of mandatory and commercial frequency response.

I

Incentivised Balance Costs (IBC)

This refers to the external Balancing Services Incentive Scheme costs that incurred by NGET to balance the electricity system.

Income Adjusting Event (IAE)

An event defined under the transmission licence that allows for an adjustment to be made to the relevant incentive scheme.

Intertrip

Allows for the automatic removal of a generating unit from the system usually as a result of a transmission system fault. Intertrips are required to strategically manage power flows on the system, and remove at short notice potentially vulnerable circuits.

M

Margin

The margin refers to the need for NGET to synchronise additional units into the system in order to ensure that the Short Term Operating Reserve Requirement is met. The margin is made up of contingency reserve and operating reserve.

N

Net Imbalance Adjustment (NIA)

An adjuster designed to mitigate the effects on part of NGETs operating costs of two of the main external drivers, power price and market length.

Net Imbalance Volume (NIV)

The net imbalance volume is the aggregate imbalance across all participants. Each imbalance is defined as a difference between sold/bought and produced/consumed energy volumes.

O

Operating Code 2 (OC2)

Refers to operating code No.2, which is concerned with the operational planning, providing the system operator with information about generators planned construction, repair and maintenance. This is provided up to 2 years in advance.

Operating Margin (OM)

A requirement to ensure that the system security can be properly managed across Power Exchange and Balancing Mechanism timescales, i.e. 'up to' and 'at real time'.

R

Reactive Power

Power generation creates background energy which absorbs or generates reactive energy as a result of the creation of magnetic and electric fields. Reactive power needs to be provided to assist in balancing the system and retaining its integrity.

S

Sharing factors

Describe the percentage of profit or loss which the System Operator will be subjected to if the relevant incentive performance measure falls below or exceeds the relevant incentive target.

Sliding Scale

Used to describe incentive schemes which involve profit (and loss) sharing around a fixed target cost.

Single Price Net Imbalance Volume Reference Price (SPNIRP)

The single price net imbalance volume reference price is the weighted price of the United Kingdom Power Exchange (UKPX) and Automated Power Exchange (UKAPX).

System Operator (SO)

The entity charged with operating either the GB electricity or gas transmission system. NGET is the SO of the high voltage electricity transmission system for GB. NGG is the SO of the gas NTS for GB.

Short Term Operating Reserve Requirement (STORR)

A service for the provision of additional active power from generation and/or demand reduction. This is calculated so that the probability of demand not being met is only a total of one day in every 365 days.

T

Transmission losses

Electricity lost on the GB transmission system through the physical process of transporting electricity across the network. The treatment of transmission losses is set out in the BSC.

Transmission Owners

Electricity transmission assets are owned and maintained by regional Transmission Owners (TOs) being NGET for England, Scottish Power Transmission Limited (SPTL) for southern Scotland, and Scottish Hydro-Electric Transmission Limited (SHETL) for northern Scotland.

Appendix 6 - Feedback Questionnaire

1.1. Ofgem considers that consultation is at the heart of good policy development. We are keen to consider any comments or complaints about the manner in which this consultation has been conducted. In any case we would be keen to get your answers to the following questions:

1. Do you have any comments about the overall process, which was adopted for this consultation?
2. Do you have any comments about the overall tone and content of the report?
3. Was the report easy to read and understand, could it have been better written?
4. To what extent did the report's conclusions provide a balanced view?
5. To what extent did the report make reasoned recommendations for improvement?
6. Please add any further comments?

1.2. Please send your comments to:

Andrew MacFaul
Consultation Co-ordinator
Ofgem
9 Millbank
London
SW1P 3GE
andrew.macfaul@ofgem.gov.uk