ofgem Promoting choice and value for all gas and electricity customers

BERR Department for Business Enterprise & Regulatory Reform

Transmission Access Review - Interim Report

Document type: **Report to the Secretary of State**

Ref: Ofgem (08/08), BERR (URN 08/609)
Date of publication: 31 January 2008

Target audience: Generators, transmission owners, distribution owners, suppliers, traders and developers

---

Overview:

In May 2007, the Government published its Energy White Paper 2007. The white paper announced a review, to be led jointly by Ofgem and the Department for Business, Enterprise and Regulatory Reform (BERR, formerly DTI), of the present technical, commercial and regulatory framework for the delivery of new transmission infrastructure and the management of the grid to ensure that they remain fit for purpose as the proportion of renewable generation on the system grows. Following publication of our Call for Evidence document, and further engagement with the industry, this document presents our interim report, and the process will culminate in a final recommendations document in May 2008.

Contact name and details:

David Hunt, Senior Manager - Electricity Transmission Policy,
Ofgem, 9 Millbank, London, SW1P 3GE

Phil Hicken, Assistant Director, Renewables Deployment Team,
BERR, 1 Victoria Street, London, SW1H 0ET

Please send responses by email to
transmissionaccessreview@ofgem.gov.uk and transmission-access-review@berr.gsi.gov.uk

Tel: David Hunt 020 7901 7429, Phil Hicken 020 7215 3936

Context

Energy is a vital part of continued economic prosperity in Great Britain. The Energy White Paper 2007 set out the Government's international and domestic energy strategy to meet the long-term challenges we face in addressing climate change and ensuring security of energy supplies.

Increasing the amount of renewable generation contributing to meet the electricity demand in GB is a critical part of achieving Government's energy policy goals. In the Energy White Paper, Government announced a review to be undertaken jointly between DTI (now BERR) and Ofgem of the framework for the delivery of new transmission infrastructure and the management of the grid to ensure that they remain fit for purpose as the proportion of renewable generation grows.

The need to consider changes to this framework is driven by the current delays that the large volume of renewable generation seeking connection to the transmission system is facing and the potential effects these delays will have on the Government's climate change targets.

Ofgem and BERR have produced an initial Call for Evidence consultation document, have chaired several seminars and held meetings with industry. This document constitutes our interim report, and will be followed by a further analytical paper in spring 2008 and final recommendations in May 2008.

There is already considerable work progressing in this area through current industry governance arrangements as well as the measures announced in the Planning and Energy White Papers. All this work will provide important context and support the delivery of the review.

Associated Documents

Transmission Access and Losses Under NETA. May 2001.
http://www.ofgem.gov.uk/Markets/WhlMkts/Archive/101-22may01.pdf

A framework for considering reforms to how generators gain access to the GB electricity transmission system - A report by the Access Reform Options Development Group. April 2006.
http://www.ofgem.gov.uk/Networks/Trans/PriceControls/TPCR4/ConsultationDecisionsResponses/Documents1/14044-8306b.pdf

Meeting the Energy Challenge - A White Paper on Energy. May 2007.
http://www.berr.gov.uk/files/file39387.pdf

Final Conclusions Report - GB Queue Management. July 2007.

http://www.nationalgrid.com/NR/rdonlyres/47B95865-0225-45C2-B3BE-F753821B1E1B/18039/FinalConclusionpaper.pdf

Transmission Access Review - A Call for Evidence for a Review of Transmission Access. August 2007.
http://www.ofgem.gov.uk/Networks/Trans/ElecTransPolicy/tar/Documents1/070816_Ex_TAR%20Call%20for%20Evidence_FINAL.pdf

Table of Contents

Summary

Executive Summary

Introduction

The Energy White Paper published in May 2007 announced a joint review by Ofgem and BERR of the electricity transmission access regime in Great Britain. The purpose of the review was to support more cost effective and faster connection of renewable generation. This is the interim report of the Transmission Access Review (TAR) to the Secretary of State and the Gas and Electricity Markets Authority (GEMA).

The Government has set a target that 10% of ***electricity*** supplied in the UK should come from renewable energy sources by 2010 and an aspiration that this should rise to 20% by 2020. The Government has said that the case for more renewable energy has increased given the urgency of tackling climate change and the need to maintain secure domestic energy supplies. The European Union has recently agreed that by 2020 one-fifth of all Europe's ***energy*** should come from renewable sources.

The UK Government has stated its firm commitment to meeting its share of this target. We do not know yet what the UK contribution will be. But it is clear that over the next ten to fifteen years the UK will need to deliver a significant increase in the proportion of our energy from renewable sources and we must start planning for this now. After a decision has been reached on each Member State's contribution to the EU agreement, the Government will bring forward appropriate measures beyond those set out in the 2007 Energy White Paper. The Government plans to consult on the delivery of the UK share of the EU 2020 targets during 2008, with further consultation in summer 2009.

This sets an unprecedented challenge for our electricity networks and highlights the urgent need to tackle any barriers to grid access for renewable generators. In the context of transmission access this may mean considering the longer term technical and regulatory challenges of high levels of renewable generation.

Against the backdrop of the Government's renewable energy targets, it is vital to ensure that users of the GB transmission system continue to benefit from high levels of reliability at reasonable costs based on efficient investment and network operating costs. As the independent energy regulator in GB, Ofgem's principal objective is to protect the interests of consumers by promoting competition and regulating network monopolies. Ofgem also has statutory duties with regards to the environment and sustainable development.

In undertaking this review, BERR and Ofgem recognise the ongoing difficulties that generators face in acquiring connections, and that the GB transmission licensees face in building the required connections to accommodate generation seeking transmission access both now, but also in the future.

This interim report outlines the progress that has already been made in removing barriers to grid access. It also highlights the strong need for a clear and coherent package of further measures to realise real benefits from more timely and efficient connection of new generation, and better use of existing transmission assets and capacity in support of the Government's renewables targets.

Background

The current GB transmission access regime has performed well historically, accommodating substantial new generation capacity - mostly the connection of large new gas fired power stations and the closure of older coal and oil fired power stations. However, with the introduction of GB wide electricity trading and transmission arrangements in 2005, and the strong financial incentives to build new renewable generation created under the Renewables Obligation, the access regime faces significant new challenges. A substantial proportion of the new generating capacity is renewable and not large-scale conventional generation. Renewable generators are often located in geographically remote locations further away from both the existing transmission system and places where energy demand is high. In many cases, they also have intermittent output[1].

These features call into question whether the current transmission access regime is best able to address the challenges that the energy market faces in achieving the Government's renewables targets for 2020 and other energy policy goals. The key questions are: how can we improve this regime so that it is fit for purpose to accommodate a fuel mix of considerably more than 20% of intermittent generation, and what are the fastest, most efficient ways of removing any barriers to connecting this level of generation by 2020?

National Grid currently has around 120 gigawatts (GW) of generation capacity that is either connected (c80GW), or is seeking connection by 2017 (c40GW), excluding any potential new nuclear generation. For example, there are currently 11GW of new, mainly renewable generation seeking connection to the transmission system in Scotland, over 9GW of new connections in Wales including a significant amount of renewables, plus, for offshore wind generation, current plans to develop 8GW in UK territorial waters and an objective of achieving up to an additional 25GW by 2020. Clearly, unless demand increases significantly, and noting that intermittent renewables cannot replace conventional generation on a one to one basis, the addition of new generation may be expected to result in the displacement of some existing, conventional plant. Some conventional plant will also close as it reaches the end of its operational life over this period.

Whilst the connection and access arrangements are being improved through recently introduced measures to help identify and prioritise the most viable renewable generation projects, there is still more generation wishing to connect than there is

[1] The output of generating stations such as wind power is both intermittent and variable. We have used 'intermittent' to describe these characteristics of these power stations.

capacity on the system based on existing transmission assets. Accommodating more generation will require substantial investment in new capacity and more efficient use of both existing and future transmission capacity.

Ofgem has recently approved unprecedented levels of investment (with flexibility for even more investment if demand for capacity increases further). Ofgem approved £560 million of investment through the Transmission Investment in Renewable Generation (TIRG) mechanism and a further £4 billion in the transmission price control review 2007-12[2]. However, as discussed below, there are barriers that may prevent or delay the transmission companies investing this money to increase network capacity.

Reasons for connection delays

While some progress has been made, the current transmission access regime is still causing delays for renewable and conventional generators wishing to connect. These delays have arisen for several reasons:

- Given the scale of demand for new generator connections, the current "queue" of projects seeking to connect does not reflect the likely order that projects will be ready to connect. The current first-come-first served approach taken by National Grid to connecting generation does not assess or reflect the status of generating projects in the queue. Resolving this issue is key in improving prospects for faster connection. In particular, new generators are often unable to get connection dates that match their project development timescales.

- Although construction times for new generation and transmission capacity are similar it can take years for planning permission to be granted to allow construction to begin on major transmission infrastructure. If enacted by Parliament, the Planning Reform Bill will help improve the planning process in England and Wales and reduce the time it takes to deliver new transmission capacity.

- Existing generators have limited incentives to release or sell transmission capacity in the short-term, given uncertainty over whether they will be able to acquire it again in the future. Generators are required to give only very limited notice of their intention to close and/or disconnect from the system making it harder for the system operator to reallocate capacity quickly to other generators.

[2] For more information please see the following documents: http://www.ofgem.gov.uk/Networks/Trans/PriceControls/TPCR4/ConsultationDecisionsResponses/Documents1/16342-20061201_TPCR%20Final%20Proposals_in_v71%206%20Final.pdf, and http://www.ofgem.gov.uk/Networks/Trans/PriceControls/TPCR4/ConsultationDecisionsResponses/Documents1/16342-20061201_TPCR%20Final%20Proposals_in_v71%206%20Final.pdf

- In addition to the practical problems of the existing regime in delivering new capacity there are some process difficulties that need addressing. Recent efforts by National Grid and the industry to amend the access arrangements through changes to the industry codes have been relatively slow. National Grid and industry need to make sure that any further proposals for reform are assessed and brought forward for decisions as quickly as possible without compromising proper assessment and consultation.

- A further problem we have identified is that the quality of information regarding infrastructure plans made available between transmission licensees and generators is limited, and may result in poor or costly decisions to locate plant on the system given limited knowledge of cost and timing implications resulting from transmission factors.

The Transmission Access Review

On 26 July 2007, we published an open letter setting out the terms of reference for the Transmission Access Review (TAR). In it we set out our focus on ensuring that access arrangements are fit for purpose for 2020 and beyond. To help facilitate discussion, we set out a range of potential models for access reform in our Call for Evidence document which was published in August 2007. We received a strong response from the industry to this document, and have published these on Ofgem's website at www.ofgem.gov.uk.

To date, the review has focussed on two key workstreams – Access Reform and Operating and Delivering Infrastructure. This report also addresses some of the issues associated with the implementation of any measures that may be recommended at the end of the review.

Access Reform

Our Call for Evidence sought views on key aspects of alternative access models. These have now been explored further and assessed against the criteria that were described in the Call for Evidence document. Our initial views are provided in this document, where we have narrowed the range of issues being considered, by taking a practical view of what is the most efficient suite of changes to address the aims of TAR. Following this publication, we intend to provide a more detailed analytical paper in spring 2008.

Our initial conclusions on access reform are:

- Funding is available for significant transmission investment but other problems with the arrangements (for example the uncertainty regarding the future need for transmission capacity) are preventing transmission companies making the necessary investment quickly.

- In the short-term, National Grid as GB system operator (SO) should make sure that available capacity is allocated to projects currently in the connection queue

that are able to use it. In practice, this means prioritising projects with consents and financing in place. This should be supported by appropriate information on generation projects wishing to connect so that decisions on where to connect can be taken in full knowledge of what the relevant issues are.

- Given the challenges associated with building new transmission infrastructure, we must look at how efficiently existing capacity is being used. Sharing transmission capacity will become increasingly important as we move towards 2020. The growth in intermittent generation should enable the SO to connect more generating capacity for a given amount of transmission capacity. In the longer term, a package of measures (some elements of which could be put in place relatively soon) is likely to provide a new and enduring access regime that allows sharing of capacity to enable more efficient use of transmission infrastructure.

- In the short to medium term, renewable projects need to have more confidence that, if they achieve planning consent, they will have a grid connection offer with appropriate defined and enforceable transmission rights that are reasonably consistent with their likely development programme. One way to achieve this is by putting stronger commercial incentives on the transmission companies to deliver on time firm connection dates to developers who have made appropriate financial commitment.

- In the next stages of the review we will consider how the components of access regimes may interact, with a view to bringing forward revised models supported by qualitative and quantitative analysis for further consultation in spring 2008.

Delivering and Operating Infrastructure

Ofgem established and chaired an advisory body to carry out a review of GB system operation with the cooperation of the three transmission licensees. Ofgem's Short Term Access Governance (STAG) report published in October 2007 identified measures that could potentially reduce constraint volumes and enhance operational efficiency.

Running in parallel to this work and extending into spring 2008, the GB Security and Quality of Supply Standards (GB SQSS) review group is currently considering whether the existing principles for accommodating intermittent generation are appropriate. A final report on this issue will be submitted to Ofgem in spring 2008.

Our initial conclusions on Delivering and Operating Infrastructure are:

- Ofgem has written to the licensees to initiate further work on enhancing system operation, and has requested responses by the end of spring 2008. Work to date has identified a range of relatively quick wins that can the transmission licensees can implement. These measures relate to enhancing the use of existing equipment rather than building additional infrastructure, such as by greater use of fair weather relaxations or closer to real time line ratings. Ofgem is also writing to the licensees to look at more fundamental aspects of the GB SQSS

(considering whether there is scope for better exploiting existing network capacity) and has asked for a response by the end of March 2008.

- The planning standards (GB SQSS) may need to be more closely tailored to ongoing generation and system requirements. The transmission asset owners (TOs) are currently looking at methodologies to incorporate wind generation in planning and published a consultation document on this issue on 9 January 2008, prior to producing a final conclusions document for Ofgem's decision by the end of March 2008.

- A user commitment approach with firmer delivery dates could provide appropriate incentives and better information for transmission companies to undertake pre-planning work in a timely manner. We will conduct further assessment and analysis and present further views in our spring 2008 document to explore how to deliver this.

Implementation

Implementation of the final conclusions of this review will depend on the extent and nature of any changes that are proposed. The appropriate implementation route will be influenced by the inter-dependency of the proposed changes, their proposed timing and the likely need to deliver a coherent and co-ordinated package of measures that may cut across several industry codes and the transmission licences.

We are not ruling out, at this stage, proposing legislation as a means of delivering co-ordinated change to transmission access arrangements. But any recommendation would need to take into account the time needed to enact relevant legislation compared with the use of existing industry governance arrangements that may be able to deliver the required changes relatively quickly.

However, the existing recent track record of the industry governance regime on these issues has been poor, specifically in relation to the Connection and Use of System Code ((CUSC), which is managed by National Grid)). Although Ofgem has recently announced a review of industry codes governance review we will need to consider whether this will deliver sufficiently quickly to give us confidence that the industry code modification process is the best route to make changes to the access regime.

Next Steps

We have had active engagement with the industry throughout the process and continue to welcome input. Throughout the review we have sought to engage industry, and have held several stakeholder events, plus ad hoc bilateral meetings. We will continue to engage with industry fora, publish our analysis and views, and host workshops, with the expectation that the review will conclude in May 2008.

Building on the assessment of the constituent building blocks set out in this report, the review will now develop transmission access model options based on those building blocks and undertake a comprehensive impact assessment of each against

the criteria set out in the July document. We will publish a further discussion document addressing those models in spring 2008.

1. Introduction

Energy White Paper and the Transmission Access Review

1.1. The Energy White Paper published in May 2007 announced a review, to be undertaken by Ofgem and BERR, of the transmission access arrangements in GB, in order to better support the timely and cost-effective connection of renewable generation.

1.2. The Government has a target of 10% that electricity supplied should come from renewable sources by 2010 and an aspiration to raise that to 20% by 2020. The European Union has agreed that by 2020 one-fifth of all Europe's energy should come from renewables sources. The UK is committed to meeting its share. We do not yet know what the UK contribution (including any increased contribution for renewable electricity) will be, but it is clear that over the next decade and beyond Britain will need to raise very significantly the proportion of our energy from renewable sources and we must start planning for this now. This sets an unprecedented challenge for our electricity networks and highlights the urgent need to tackle any barriers to grid access for renewable generators. Against the backdrop of the Government's renewable energy targets, it is vital to ensure that users of the GB transmission system continue to benefit from high levels of reliability, at an efficient cost.

1.3. The purpose of the Transmission Access Review is to consider the present regulatory, commercial and technical framework for transmission access and consider ways in which the framework can better support the connection of renewable generation.

1.4. This interim report to the Secretary of State and the Gas and Electricity Markets Authority (GEMA) sets out progress with the review and the questions that need to be addressed in order to make recommendations in the final report in May 2008.

1.5. The review is driven by three key factors:

- The pressing need to tackle climate change including delivering the Government's targets and aspirations for renewable electricity, at an efficient cost, without an unjustifiably detrimental effect on the security of supply.
- The time taken to deliver key infrastructure due to both planning and construction requirements, given the large amount of new generation of all types seeking to connect.
- The changing generation profile. With an increasing amount of variable generation (principally wind) and associated back up generation the system need to be built and used on the basis of better sharing amongst generation.

1.6. The Government's main objective for the transmission access review is to connect renewable generation to the transmission network so as to contribute to meeting targets for the proportion of electricity and ultimately energy supplied by renewable sources. This may mean that, once planning consent is given, a project has a grid connection offer, with appropriately defined and bankable transmission rights, reasonably consistent with its likely development programme. Such certainty will allow projects to seek relevant consents in the knowledge that grid access will become available.

1.7. The solution that best delivers this objective needs to support the delivery of the Government's targets and aspirations for renewable electricity at least cost to consumers, that recognises the value placed on system reliability, the physical limits of the transmission system, and works towards improving investor confidence.

Scope of the Transmission Access Review

1.8. The review will consider the arrangements for planning new grid infrastructure, the technical standards used to determine the need for reinforcements, the operational standards, the scope for innovation in grid operation and infrastructure and the commercial arrangements for access to the grid and system balancing. The review will recommend the overall framework that best delivers the connection of renewable generation taking into account the potential for reduced carbon emissions, cost to the consumer and the impact on security of supply.

1.9. We have excluded from the scope of the review:

- Short term GB generation queue issues - this issue was addressed in the STAG report;
- Planning - in the recently published Planning Bill, proposals were brought forward to reform the planning process. It is important that the outcomes from TAR are consistent with the revised planning regime, and
- Solutions to grid access currently under development in industry governance bodies.

Call for Evidence

1.10. Ofgem and BERR published its first full consultation document, *A Call for Evidence for a Review of Transmission Access*[3] on the Transmission Access Review in

[3] This document can be found at the following link: http://www.ofgem.gov.uk/Networks/Trans/ElecTransPolicy/tar/Documents1/070816_Ex_TAR%20Call%20for%20Evidence_FINAL.pdf.

August 2007. This document sought initial views on the issues to be considered over the course of the TAR project. The document was structured around three main chapters on:

- Models of access - concentrating on illustrating the scope of models of access form and their potential positives and negatives;
- Delivering and Operating Infrastructure - this chapter deals with approaches to developing and constructing physical assets and the way in which these assets are operated, and
- Incentivising efficient system operation - focussing on the incentives provided by the existing constraint management mechanism.

1.11. We received responses from thirty different parties, which are available from Ofgem's website. Following publication of the Call for Evidence we have hosted three open stakeholder events which have been well attended by industry, and have had a number of bilateral meetings with interested parties. Details of these seminars can also be found on Ofgem's website.

Transmission System Operation Review Group (TSORG) Report

1.12. As detailed in chapter 4, the TSORG working group was established and chaired by Ofgem, and was attended by all three transmission licensees to discuss a range of issues relating to how the transmission system is currently operated under existing planning and operating criteria. The purpose of the review was:

- To improve industry understanding of current framework, but also to assess the capability limits used when operating and planning the system;
- Identify transmission system capability limits used when operating and planning the GB transmission system;
- Establish the basis of transmission system capability limits;
- Understand the range of operational measures used by National Grid Electricity Transmission ltd (National Grid), and
- Evaluate scope for improving utilisation of the GB transmission system in terms of:
    - Effectiveness in releasing additional capacity.
    - Ease of implementation.
    - Commercial implications (for transmission licensees and other industry participants).

- Impact on security of supply.

1.13. TSORG has written and published its final report[4], which sets out a range of areas for further consideration and assessment. Further details of these areas and the process for taking this work forward are outlined in chapter 4.

Short Term Access Governance (STAG) report

1.14. In the Energy White Paper in May 2007, Ofgem was also asked to produce a report to the Secretary of State on the current status and progress of initiatives aimed at addressing the GB Queue. Ofgem published the STAG report to the Secretary of State in October 2007. In addition to serving as a progress report, the STAG report also provided Ofgem's views on further areas that could be explored. The areas described in this report include:

- GB Queue management initiatives, related to contractual arrangements between the GB system operator (GBSO) and users;
- Commercial framework development, relating primarily to work brought forward under the industry code processes;
- Review of system operation, which has the potential to identify alternative means of managing the system in operational timeframes to potentially free up capacity, and
- Review of the GB Security and Quality of Supply Standards (GB SQSS), which looks at whether the existing planning and operational criteria remain appropriate going forward.

1.15. We consider progress has been made in each of the above areas, but we have identified further questions which need to be explored and addressed, which can be found in the STAG Report on Ofgem's website[5]. We believe the work that has already been undertaken by National Grid could usefully go further to ensure that the information in relation to network capability, as well as generators in the GB Queue, is as accurate as possible and provides useful signals as to the investments needed to accommodate generation efficiently. We also feel that improvements in the accuracy of projects in the queue could help to flush out unviable projects that could potentially be delaying otherwise viable generators from connecting. However we

[4] Which is available from Ofgem's website at the following link: http://www.ofgem.gov.uk/Networks/Trans/ElecTransPolicy/tar/Documents1/071005%20TSORG%20Final%20Document.pdf

[5] At the following location: http://www.ofgem.gov.uk/Networks/Trans/ElecTransPolicy/tar/Documents1/KSTAG_071008.pdf

feel that more substantial changes may be achieved from exploring the planning and operational criteria.

1.16. With regards to system operation measures, we stated that whilst the remit of the Transmission System Operation Review Group (TSORG) has been fulfilled, there are some additional steps that could be taken. In particular we note that the group did not explicitly look at any of the system management tools from a cost-benefit analysis perspective. We feel that this is an important next step to help inform debates on transmission access, and identify the validity of some of the techniques that have been identified and discussed by the group. We have requested that the three TOs take forward further work on freeing up additional capacity under the existing planning and operational criteria and wrote to them in December 2007 to instigate the process.

1.17. The GB SQSS currently contains deterministic rules defining the minimum level of transmission capability required for a given generation and demand background. For a given transmission network and existing generation and demand, applying such rules would also determine the amount of new generation that can be accommodated at a certain location. Against the unprecedented growth in potential new generation, in particular intermittent generation, questions have been raised whether such rules are still fit for purpose. Work is being carried out in reviewing the treatment of intermittent generation in the GB SQSS, which is expected to establish more appropriate links between generation capacity and required transmission capability. There is potential for useful work to come out of this review process, and would welcome efforts to expedite the process.

Stakeholder engagement

1.18. Since publishing the Call for Evidence document, Ofgem and BERR have held three public seminars to discuss issues in relation to transmission access. The first seminar on 18 September 2007 was our first opportunity to set out the issues we presented in our Call for Evidence document, and specifically gave attendees the opportunity to ask questions and provide comments regarding the strawman models of access we included. It was also a useful opportunity to reiterate the scope of the access review.

1.19. The second stakeholder event on 5 November 2007 focused on access allocation models, including Connect and Manage and variants of capacity auctions. In addition, National Grid in its role as SO outlined its thoughts on an evolutionary approach to enhancing the arrangements. In this seminar we also first took the opportunity to set out our thoughts on a common assessment framework for models of access reform. We pointed out that models of access typically exhibit common key features or attributes, and that through exploring the nature of these features, and their interrelationship, it is possible to systematically identify and develop different potential access models that satisfy the our assessment criteria.

1.20. Our final industry seminar before the end of 2007 took place on 16 November 2007 and focused on the regime for delivering and operating transmission

infrastructure. All three transmission licensees took the opportunity to present their thoughts on the challenges they face under the current regime, and identified certain areas where incremental benefit could be achieved. The licensees all identified the planning system as a major difficulty in progressing transmission infrastructure in a timely fashion.

1.21. Continuing industry engagement is vital in ensuring that TAR progresses appropriately. We therefore intend to hold further seminars in early 2008. In addition, we have already met with several industry parties to discuss their issues and concerns with the existing arrangements, as well as potential future developments. We continue to welcome industry participants who wish to meet with us to discuss TAR, and would encourage engagement from consumer bodies.

2. Challenges for transmission access

Chapter summary

- ➔ In the coming decade or so the contracted generation capacity may grow by almost 50GW, however there is a general view that not all of this will materialise.
- ➔ The UK share of the EU renewable energy targets is likely to exacerbate the challenge of delivering timely and efficient grid connections.
- ➔ The funding mechanisms are in place to meet the transmission investment needs of all new generators.
- ➔ A higher degree of user commitment for new and existing users may support the transmission licensees in planning the network more efficiently.
- ➔ Achieving planning consent is a major barrier to the timely delivery of transmission and both transmission assts and new generation. This issue also affects a generator's ability to provide user commitment.

Background

2.1. Since 1990, some 25GW of new generation (mainly combined cycle gas turbine (CCGT)) has connected to and some 20GW has disconnected from the transmission system in GB. This has occurred successfully under the existing access regime, which was designed to ensure that all forms of new generating capacity were able to receive connections offers.

2.2. However, in recent years, Government's energy policy has altered the incentives on parties to develop projects, and therefore the nature of connection applications. To help achieve the Government's climate change goals, the Renewables Obligation Order (RO Order) and the Renewables Obligation (Scotland) were introduced in 2002, which required energy suppliers to source an annually increasing percentage of their needs from renewable sources or pay a buy-out price. This provided a strong incentive to invest in renewable generation. As a result, between 2002 and 2005 there was an increase in the amount of renewable generation seeking connection in Great Britain.

2.3. The British Electricity Trading and Transmission Arrangements (BETTA) which were introduced in 2005, provided greater market opportunities for selling power. whilst the transitional arrangements under BETTA were favourable for new generation connections in Scotland. The combination of the sharpened financial incentives on renewable generators and the transitional arrangements resulted in a further wave of renewable generation connection applications.

2.4. Scotland currently has considerably more generation than is needed within the country, and exports a large proportion of its electricity into England and Wales. Similarly, a large proportion of generators are sited in Northern England, although this pattern is expected to reduce over time. Because of this overall geographic disposition of generation and demand, with increasing volumes of generation being sited in the north and demand heavily concentrated in the south of England, the flow

of electricity is largely north to south. This profile means that connections in Scotland have the potential to trigger reinforcements of the network not only within Scotland but all the way down to the major supply hubs in southern England.

2.5. In December 2004, responding to the wave of new renewable generation connection applications in Scotland, Ofgem published its proposals for providing funding for investment in transmission capacity to meet this demand[6]. This provided funding for £560 million of investment to connect additional renewable generation in Scotland, and to reinforce the transmission system to accommodate flows from Scotland to England. More recently, Ofgem's Transmission Price Control Review (TPCR)[7] provided regulatory funding for an unprecedented £4 billion of investment in the transmission system in the period between 2007 and 2012 for connecting new generation as well as maintaining or replacing existing assets. The TPCR allowances also included a system of revenue drivers which provide flexible funding should more generation materialise than was assumed in the baseline allowances. The associated TPCR revenue allowances were accepted by transmission licensees who are now responsible for carrying out efficient investment on generation connections in the period between 2007 and 2012.

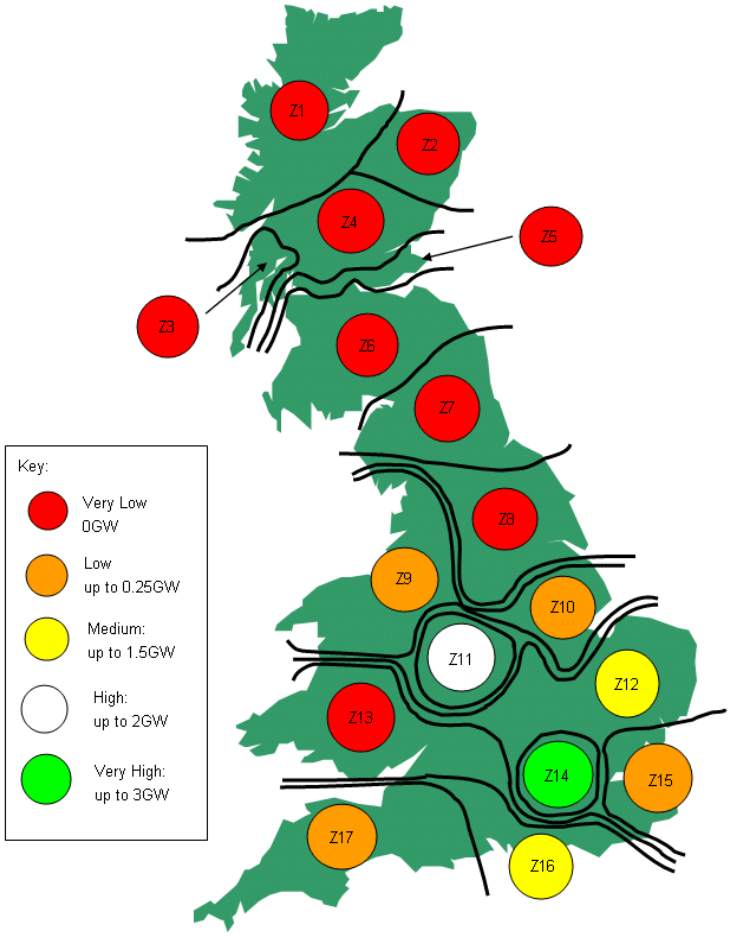
2.6. However, despite this high level of regulatory funding, which is sufficient for all efficient connections in the period between 2007 and 2012, the growth in generation capacity is exceeding the pace with which the necessary reinforcements can be built. As such, the current GB transmission system has very limited potential to accommodate new generation without further major system reinforcement, as represented by the zonal breakdown shown in the Seven Year Statement and reproduced in figure 1[8] below.

[6] Please see Ofgem's transmission Price Control Review Final Proposals document: http://www.ofgem.gov.uk/Networks/Trans/PriceControls/TPCR4/ConsultationDecisionsResponses/Documents1/16342-20061201_TPCR%20Final%20Proposals_in_v71%206%20Final.pdf

[7] Please see Ofgem's Transmission Investment for Renewable Generation Final Proposals document: http://www.ofgem.gov.uk/Networks/Trans/PriceControls/TPCR4/ConsultationDecisionsResponses/Documents1/9139-28804.pdf

[8] Figure 1 assumes existing generation remains open, and the existing planning and operational regime are unchanged.

Figure 1 – indication of the capacity of new generation that can be accepted on the GB transmission system without major reinforcements



Source: National Grid Seven Year Statement 2007-14

2.7. Any new generation seeking connection is likely to trigger further infrastructure work due to the combination of a lack of spare capacity (as well as a lack of freed up capacity) on the system and generators not being able to export without the wider system being secure. These works can be delayed for a number of reasons, simply because of the length of time to build, or because of the time needed to secure planning consent, as has been the case with the Beauly-Denny line. Following our recent stakeholder event on 16 November 2007, the three transmission licensees all cited problems in the planning process as one of, if not the, largest problem they face in connecting new generation. As a consequence, there are substantial queues of generation wishing to connect. The current size of the queue of generation wishing to connect and export in Scotland is around 11GW.

2.8. The problem of generation queues is not now restricted to Scotland. In Wales around 9GW of generation has applied for connection, and is dependent on wider transmission system reinforcements. The queue in Wales is comprised of a mixture

of gas-fired and renewable generation and presents a different challenge to that posed by the largely wind generation queue in Scotland. In addition to accommodating large volumes of generation onshore, in the near future there are significant challenges associated with the potential for large volumes of new gas and nuclear generation, large offshore connections, and links to the Scottish islands.

Offshore transmission and Scottish Islands connections

2.9. Ofgem and BERR are well advanced in developing the regulatory regime for offshore transmission networks, and have actively engaged industry via a range of consultations, seminars and expert groups[9]. These offshore transmission networks are required to enable connection of around 10GW of wind generation, based on current forecasts. Ofgem has also initiated a workstream to look at the issues associated with potential connections to the Scottish islands.

2.10. When the transmission price control for the period 2007 to 2012 was reviewed, there was insufficient financial commitment from generators to justify an allowance for building connections to the Scottish islands at that stage. However, recent developments now mean that there is a greater likelihood that infrastructure investment will become viable. Ofgem has therefore recently published an open letter consultation[10] on potential approaches for connecting the Scottish islands, and in August 2007 chaired an industry working group to discuss the issues going forward. We recognise that the challenges associated with offshore transmission development will have interactions with the onshore regime, and are developing policy on this basis.

Future location and type of generation

2.11. National Grid plans the system on the basis of the contracted generation background. The contracted background includes all generation that is connected to and has applied to join the system. The volume of generation projects that are likely to come forward out of the contracted background and use the system is uncertain because not all projects will connect and incumbent generators may disconnect with limited notice.

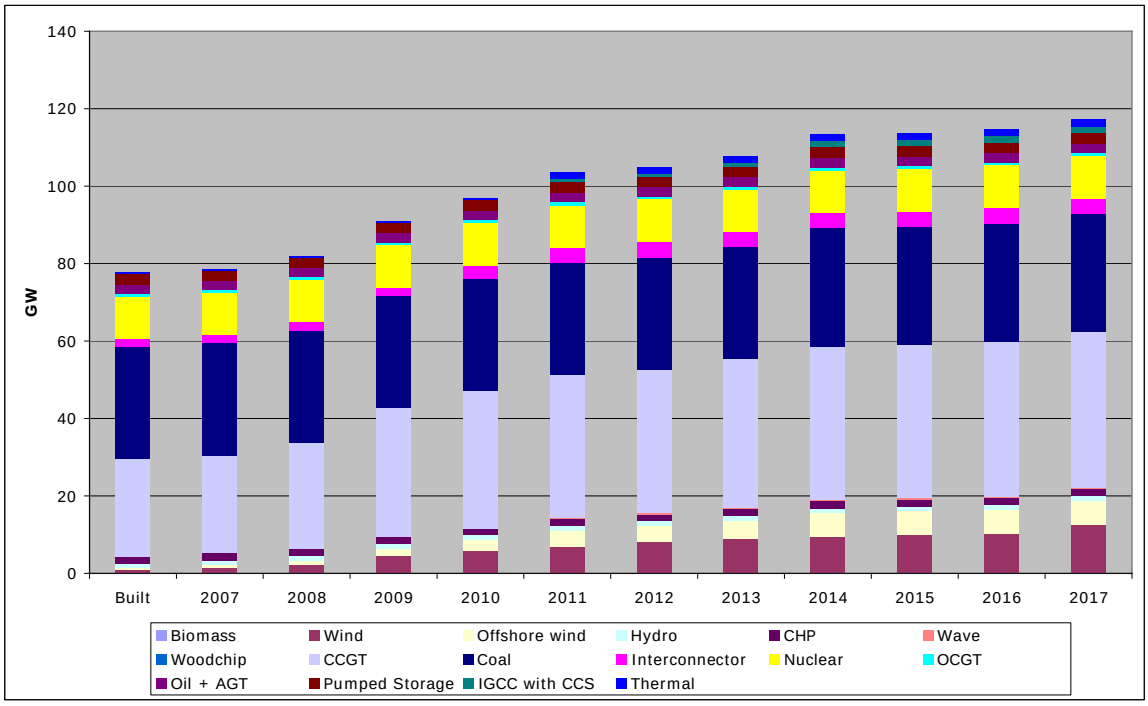
2.12. As we move forwards towards 2020, National Grid's contracted generation background as at October 2007, including offshore wind connections, indicates that

[9] Please see Ofgem's website for details of the work undertaken on offshore transmission: http://www.ofgem.gov.uk/Networks/Trans/Offshore/Pages/Offshore.aspx

[10] For more information of this open letter please see the section on Ofgem's website dedicated to linking the Scottish islands: http://www.ofgem.gov.uk/Networks/Trans/ScottishIslands/Pages/ScottishIslands.aspx

the total generation may be around 120GW in the coming decade[11] compared to 77GW at present, as shown in figure 2:

Figure 2 – National Grid generation contracted background



2.13. It is important to recognise that whilst there is a large volume of generation contracted to connect to the transmission system, it is difficult to assess the effect without a detailed understanding of the quantity and timing of generating capacity leaving the system - therefore the above chart overstates potential connected capacity. Under the current arrangements, information in relation to generators' intentions to leave the transmission system is inadequate, with users only needing to provide a minimum 5 days' notice to reduce their transmission entry capacity (TEC). This does not help in creating an accurate picture of the challenges that the transmission system is facing, and is potentially undermining attempts to address the problems of the GB Queue and transmission access more generally.

Intermittent generation and system balancing

2.14. By 2020 it is expected that a large proportion of installed capacity will be wind generation. Wind generation is intermittent in nature which means that its output profile is not constant and depends on meteorological factors, rather than fuel input

[11] National Grid's uses 2017 as a proxy for all projects after 2016.

price. Given the intermittency, wind generation requires back-up from other generators to ensure that if the wind speed goes outside the useable range and wind generators stop producing electricity, the security of the system will not be at risk. Currently this type of response is typically provided by thermal generation based on fossil fuel. Whilst the expectation is that commissioning large amounts of wind generation will result in the displacement of conventional generation, the intermittent nature of wind output will result in additional costs being incurred in terms of both providing additional levels of operational reserves and maintaining a higher plant margin. Back-up in the form of thermal generation or static devices may also be required to keep voltage and frequency levels stable.

Intermittent generation and transmission planning and operation

2.15. Potential changes in the nature of the generation mix may require a change to the framework for planning and operating the GB transmission system to maintain the current levels of reliability, whilst providing a more appropriate framework for connecting new generation. The GB SQSS details how the system is planned and operated to accommodate new generation (and demand) connections. The current queue of generation is largely the result of the need to build large reinforcements to retain the existing degree of redundancy in the transmission system and maintain the current level of supply security. However, the GB SQSS was developed against the background of a predictable, primarily thermal fuel mix, and not one with substantial volumes of intermittent generation. An important question for delivering and operating infrastructure is whether this approach to building new connections and reinforce the system, which can be delayed for several years in the planning process, remains fit for purpose in the future.

Challenges of the GB Queue

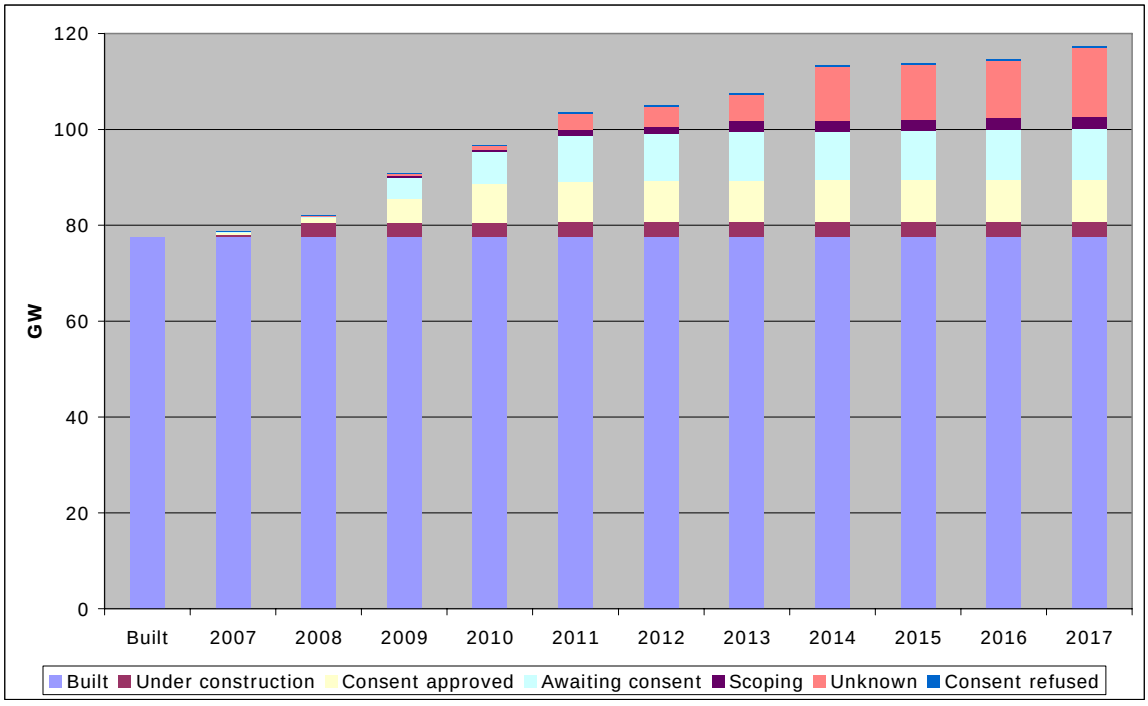
2.16. The challenge presented in building transmission for large volumes of new connections is substantial. As figure 2 above shows, the GB contracted background implies that the transmission system will need to accommodate around 120GW of generation capacity in the coming decade. The main difficulty with planning and building against the contracted background is that various assumptions need to be made because of the lack of information about future commitment to use the transmission system.

2.17. The three transmission licensees plan and build their transmission systems recognising that a proportion of the projects that have entered the connection application process will not proceed to completion. This is because at present there is no real commitment required from generators to use the system until their transmission construction works begin. The cost of an application for a connection agreement is low, and has arguably contributed to the large queue of generation on the system. This is why we consider that National Grid's queue management initiatives, including enhanced information provision, are an important part of the suite of proposals needed to address the deficiencies in the current transmission access arrangements. The transmission licensees also have to build and manage their transmission systems with almost no notice of closures. This creates a situation whereby either more transmission reinforcement than necessary could be built or

additional balancing actions need to be taken that could otherwise have been avoided.

2.18. To illustrate the size of the problem, the contracted background in Scotland is mostly comprised of projects that have not yet received consents, are in scoping or are unknown. Taking the case of 2009, figure 3 shows that there is around 1GW of new generation that is due to be built in that year which has not yet even received its consents. Given the time required between projects gaining planning consent and the completion of its construction works, it is likely that the majority of this 1GW of new generation will not be built on time, and therefore the infrastructure requirements would be different to that needed to accommodate the full amount of generation.

Figure 3 - existing and future developments in GB



2.19. Stronger user commitment may allow transmission infrastructure to be built more quickly and efficiently with less risk of asset stranding. It may also be the case that transmission reinforcements that under the existing approach are progressed sequentially by the licensees, could be built in parallel, thereby reducing the overall build time.

Planning

2.20. The planning regime is outside of scope for TAR, as developments are being progressed via dedicated areas of work. In England and Wales the Planning Bill published on 27 November 2007 will take forward proposals to modify the planning

regime, and in Scotland, the National Planning Framework provides guidance for the spatial development of Scotland up to 2025.

3. Access reform

Chapter summary

- ➔ We have set out three models of access reform in our Call for Evidence document. We feel that in taking analysis forward a more pragmatic approach is needed which recognises that each of the models can share certain features.
- ➔ Our qualitative assessment, as detailed in this document, assesses as far as possible individual access building blocks against summarised assessment criteria, and identifies gaps in the analysis and additional work.
- ➔ This chapter also sets out at a high level our background scenarios for our quantitative assessment work, which will be presented in a further discussion document in spring 2008.

Introduction

3.1. The key challenge in access reform is to bring together the need for the generators to gain timely and efficient access to the transmission system and the need for the transmission system to be developed and used in the most efficient manner. To meet the Government's renewable targets for 2020, an unprecedented volume of new renewable generation, much of which would have intermittent output characteristics, would need to be provided access to the GB transmission system. Given constraints in certain parts of the network and the time and costs needed to deliver new infrastructure, it is critical that there are clear signals of the generators' intentions to start and cease its use of the network, so that resources can be targeted at investment at the appropriate location, timing and quantity to match the needs of generators. It is equally important that the access arrangements provide both the certainty and the flexibility to match the generators' requirements in deciding on investment, operation and closure, and allow the maximum efficient utilisation by all users of the transmission capacity.

3.2. The Call for Evidence set out three high-level models of access reform to illustrate the spectrum of approaches that could be taken to the GB transmission access arrangements. It also set out the criteria for assessing potential models. Since the Call for Evidence was published, we have discussed with the industry through open seminars and bilateral meetings these models and any other feasible models for access reform.

3.3. The responses to the Call for Evidence and the discussions at the open seminars and bilateral meetings explored the relative advantages and disadvantages of these high-level models, as well as other models adopted in other parts of the world. Some of these advantages and disadvantages are common to certain components of each of these models. We have decided to assess options for the common key components of the access models and their interrelationship and to develop more detailed straw-man models based on this assessment. In recognition of the urgency of the need for change to remove immediate barriers for the achievement of the Government's renewable targets, we have paid special attention to short to medium

term measures that could be adopted to make a material positive difference in transition to a long term enduring access regime.

3.4. This chapter summarises the views expressed in the responses and subsequent discussions regarding potential high-level access models. It then describes the work carried out in assessing the options for common key components of the access models and the initial conclusions on how end-to-end more detailed access models could be developed.

Responses on high-level access models

3.5. The three high-level illustrative models set out in the Call for Evidence were:

- Model A - Incremental Change;
- Model B - Connect and Manage, and
- Model C - Auction Capacity.

3.6. Model A, Incremental Change, is essentially relying on the shorter-term work being undertaken by industry, as well as in the context of the STAG initiative and future proposals that may be possible within the current frameworks to amend the industry codes without giving further consideration to more fundamental reform. The changes would consequently be of an incremental nature, and could cover areas including:

- Risk-based connection dates;
- Clarification of access rights;
- Better alignment between planning consent and connection agreement;
- Clarification of commitment required for securing long term transmission capacity, and
- Development of trading of access rights, especially to improve flexibility in the short-term access, such as through overrun products and more incentives for SO to release more short-term products.

3.7. Model B, Connect and Manage, is based on the principle that generators are able to use the transmission network when local connection works have been completed irrespective of the whether required wider infrastructure reinforcement have been made. This generally would mean that the new generators begin to pay TNUoS charges and are entitled to constraints payments. The variants discussed in the Call for Evidence include more cost-reflective charging for constraints costs, and pricing constraints through an administered process instead of market mechanism. The Call for Evidence recognised that this model would only be effective in areas where there

is realistic scope for managing the network to allow renewable generation to export its output to the system.

3.8. Model C, Auction Capacity, would involve developing a range of defined, tradable access products which would be sold to the highest bidder. Variants discussed in the Call for Evidence included limiting the auction process to constrained zones only, either for all users, or for users requiring incremental capacity.

3.9. The change to allow overrun against access rights held with potential cost-reflective charges was discussed as a feature that could apply to all three models.

3.10. We received responses from thirty parties to the Call for Evidence. Following the publication of the Call for Evidence document, we also held three open stakeholder events which have been well attended by the industry, and have held several bilateral meetings with interested parties.

3.11. In general, the majority of respondents welcomed this review and supported the need for change in order to meet the Government and EU targets on climate change. However, there was a small minority who were comfortable with the existing arrangements. Respondents generally supported the list of assessment criteria, with some pointing out the need to consider appropriate trade-offs between individual items. In particular, there was a recognition that an appropriate balance must be struck between connecting more renewable generation and the costs of doing so. Although out of scope, points were made suggesting changes to Ofgem's primary duties to give more priority to renewable generation, raising issues with regard to transmission charging, and considering planning reform in tandem.

3.12. Most of the respondents recognised the limitations of using a model of Incremental Change under the current industry mechanisms. Many renewable generators considered the Connect and Manage model would maximise the utilisation of the network and provide strong signals for transmission investment. However, other respondents expressed concern about the high risk of increased constraints placing unacceptably higher costs on consumers, possible subsidy in favour of renewable generation, and the issue of discrimination between renewable and conventional generation. In terms of auction models, there were concerns expressed by most respondents regarding perceived potential complexity, implementation and administration costs, uncertainty for generators and lack of long term investment signals. However, there was some recognition that the scarce capacity on the system needs to be allocated in a more efficient way than at present.

3.13. In responses and further industry discussions, some parties also raised another high-level model, which is adopted elsewhere in the world, as worthy of potential consideration. The distinctive feature of this alternative model is the incorporation of transmission access within the electricity market, through locational marginal pricing (LMP) for electricity.

TASG and Access ' Evolution'

3.14. Since the publication of the Call for Evidence the Transmission Access Standing Group (TASG – a CUSC working group) has produced its report. National Grid subsequently presented, through the transmission access review stakeholder events, a package of proposals for discussion, drawing on the work of TASG. The proposals build on the incremental approach set out in the Call for Evidence, but could ultimately be quite far-reaching and can be described as “evolution”.

3.15. The elements of the model presented by National Grid include:

- More flexible short-term access arrangements including trading, overrun and incentives on the SO to release capacity in operational timescales;
- Finite, but long-term transmission rights supported by user commitment, that can be traded un-facilitated at 1:1 ratio within defined zones, and
- System reinforcement based on long-term capacity bookings and cost-benefit analysis.

3.16. National Grid believes that these changes would help maximise the use of the existing transmission system, by offering both long term and short term access products. Such an approach could be a useful option for both intermittent generation and generation with predicted low load factors. The improved flexibility of access products would enable generators to provide the level of commitment relevant to the type of access required. The user commitment in turn would strengthen the signal for the provision of long-term transmission capacity.

3.17. However, National Grid believes that by allowing a higher level of sharing use of the transmission system, the changes could also result in an increase in constraint costs as by and large a given unit of transmission capability will be more fully utilised.

3.18. Rather than continuing to use the existing deterministic criteria in the GBSQSS to assess the required reinforcements to the main interconnected transmission system, the model above assumes that signals for investment are provided by user commitment from generators in both the long and short term. Essentially this would move away from deterministic methods and more towards a cost-benefit approach to reinforcement.

Developing access models

3.19. Based on the discussions we have had with industry, and our own deliberations, it is clear that the way in which we assess models of access reform could benefit from a holistic approach that captures more than just a few indicative strawmen. We consider that amending our assessment approach and breaking down

transmission access into its constituent features would be a step forward when it comes to analysis.

3.20. Not only is this approach more practical, but the principal benefit of unbundling the access models into their various components is that it allows a more systematic and comprehensive method for assessing the potential for a given access model to address the issues at the heart of TAR. In the case of the three access models we identified in the Call for Evidence, by categorising each of these in a particular way may mean that we are missing viable and potentially optimal options. Therefore, by assessing the key components of models of transmission access in a 'bottom-up' manner, and identifying how they fit together, we consider we are more able to identify the best solution to meet the objectives of this review.

3.21. In identifying the key building blocks of transmission access models, we consider that they can be summarised in the following areas:

What is the nature of the access rights conferred?

3.22. Under the current access arrangements, each generator procures TEC for a particular point on the system, i.e. where it connects, and does not have rights to capacity at any other point on the system. Alternatively a generator may be allowed to swap its capacity with a generator in another location, but potentially within the same zone so as not to cause unnecessary costs to the system operator.

3.23. A further parameter in the nature of access rights is how long they are available for. As now a generator pays TNUoS for the forthcoming financial year, and can renew on a rolling basis each year. However, there may be explicit ways of purchasing capacity for a specific period of time that provide an alternative approach.

3.24. The firmness of the rights held by generators also provides an additional dimension to the consideration of different regimes. For example, as now there is the provision for fully firm financial rights, and also for non-firm connectees to be entitled to a lower level of charges as a consequence. However there is also the concept of non-firm access to the system which simply constitutes spilling energy. There are different ways in which a generator can assess the cost of doing so, but they mainly collapse down into whether it knows its likely exposure ahead of time or whether it does not, and makes an assessment of its ex-post exposure.

How are access rights allocated?

3.25. Under the current arrangements, the amount of transmission capacity that can be allocated in operational timescales is a function of the amount of capacity built in planning and the dynamic capability of the transmission assets. However, the transmission system itself is designed and built to accommodate all demands based on a combination of deterministic and probabilistic criteria. Alternative approaches may include the requirement to release a specific and defined amount of capacity at given times.

3.26. In terms of how existing rights are treated, given the ability to annually renew capacity, the current system could be argued to work in favour of incumbent generators. An alternative approach to the allocation of rights could therefore to do away with such an approach and allocate capacity to new and existing users on equal terms.

How are access rights priced?

3.27. The current approach of securing access by paying user of system charges attempts to proxy the Long Run Marginal Cost (LRMC) of access. Of course, there are nuances to the calculation that prevent TNUoS from being an exact proxy of LRMC. An alternative approach for example might be generators signal how much value they place on capacity, and bid for it accordingly. Under this approach, generators would not directly be pricing at LRMC, but based on their view of the value of the capacity, potentially above or below the LRMC.

3.28. Similarly, there are approaches that could price all access rights based on their shorter term impact on the system, or Short Run Marginal Cost (SRMC) approach.

Secondary trading of access rights

3.29. At present, the primary access product can potentially be traded permanently subject to an appropriate exchange rate being levied. In addition to this, there are shorter term, within-year capacity products, that can be acquired on the proviso it does not create or exacerbate a constraint. However as we have seen, trading of capacity rarely takes place, and permanent exchanges have not happened. An alternative option may be to introduce further capacity products in shorter timescales so that generators can access the system at short notice. This could potentially include daily or half-hourly products.

3.30. In terms of when trading can take place, any set of arrangements would essentially have the option of requiring trading to be completed before "Gate Closure" or continue trading after the event. There are several markets where ex-post trading can take place.

3.31. The geographical extent to which trading can take place is also an important consideration. At present the existing TEC exchange rules provide for an exchange rate to be calculated upon application for transfers of TEC between nodes or potentially zones. The alternative to such an approach would be to publish exchange rates in advance so that all parties were aware of the costs of moving capacity between points on the system. This approach could be considered to be more transparent.

Qualitative assessment of models of access reform

3.32. We consider that the above features broadly encompass the main parameters of any model of transmission access. Consequently we consider that a combination

of different approaches within these key features or building blocks has the potential to deliver an appropriate model of reform. To help identify what features would be beneficial, we are in the process of qualitatively assessing each individual parameter based on the above, and are identifying some high level combinations.

3.33. We have contracted the economic consultant firm Poyry Energy Consulting Ltd to assist in carrying out this analysis, by conducting an independent appraisal of the various access building blocks. A summary of their report is included in Appendix 1, whilst a further, more detailed report will feature in our spring 2008 analytical paper.

3.34. Work to initiate and/or complete the qualitative assessment work is being progressed as a priority. Progress and conclusions arising from this work will be the subject of the next TAR document, intended for publication in spring 2008. The aim of this work is to help us identify the most viable options for what the transmission access arrangements should look like in order for us to discharge the objectives of this review, and rule out elements that are mutually exclusive. Running in parallel to this work is a more detailed assessment of the quantitative aspects of transmission access models, the high level principles and assumptions of which are set out below.

3.35. In addition to the qualitative and quantitative assessment against the TAR assessment criteria[12] it is important to be practical about what this review is aiming to achieve. It is not an exercise in designing a fully developed set of trading and transmission arrangements. The major aim of this review is to remove the existing barriers to support the delivery of the Government's renewable energy targets. The mechanisms that we propose must be implemented in timetables that do not prohibit attainment of those targets.

Quantitative assessment of models of access reform – assumptions and scenarios

3.36. In order to assess quantitatively the impact of the options for transmission access arrangements on the operation of the transmission system, it is necessary to establish background assumptions against which the various options can be modelled. This will involve some detailed examination of certain aspects of the system operation as well as high-level analysis of system-wide impacts. We will request relevant information from National Grid as the system operator, and draw support from the Centre for Distributed Generation and Sustainable Energy who have developed a modelling approach.

[12] Which are repeated in Appendix 1 as part of the qualitative assessment framework and detailed in the Call for Evidence document at the following link: http://www.ofgem.gov.uk/Networks/Trans/ElecTransPolicy/tar/Documents1/070816_Ex_TAR%20Call%20for%20Evidence_FINAL.pdf

3.37. The scenario developed by the Centre runs from a baseline year of 2008 up to 2020 in three year increments, (i.e. five snapshots in total for 2008-2010, 2011-2013, 2014-2016, 2017-2019 and 2020 onwards). The parameters to be tested by sensitivity analysis include:

- Penetration of wind generation;
- Decommissioning of incumbent plant;
- Fuel prices;
- Cost of congestion, and
- Peak and energy demand growth.

3.38. It is assumed that sufficient generation will be available to satisfy historical levels of generation adequacy, i.e. a capacity margin of around 20% will be maintained. In maintaining generation adequacy, it is assumed that wind generation will replace conventional generating capacity on a 1:0.15 basis.

3.39. The central scenario assumes a growth in energy demand of 1.1% pa, i.e. a continuation of the energy growth rate seen in recent years. Energy demand seen at transmission level will be discounted by an average of 0.5% to account for energy supplied by distributed generation. To investigate the impact of variations in energy growth around the central scenario, net growth rates of 1.5% and 0.5%/ pa will be studied, equivalent to energy growth seen at the transmission level of 1.0% and 0% respectively.

3.40. Growth in peak demand over the period 2008 to 2020 for the central scenario is assumed to be 0.6%, in accordance with both National Grid Seven Year Statement (SYS) and the Energy White Paper (EWP) assumptions. The impact of both lower (0.4% per annum) and higher growth (1.0% per annum) in peak demand will be tested by sensitivity analysis.

3.41. The central scenario for wind penetration assumes an installed capacity of 16GW by 2020. A continuation of planning “lag” is assumed for onshore wind development up to 2016, with an accelerated connection rate to 2020, giving a total onshore installed capacity of 11 GW by 2020. Around 5 GW of Round 1 & 2 offshore capacity is assumed to be connected by 2016. We are also in the process of establishing a credible assumption for the penetration of offshore wind resulting from round 3. High and low growth wind development scenarios are developed, corresponding to total installed capacities of around 21GW and 11 GW by 2020 respectively. We may undertake further sensitivities on different target output levels of renewable generation, as well as utilising alternative load factors.

3.42. In terms of conventional generation, the central scenario assumes that some 12 GW of conventional capacity will decommission by 2016, i.e. that plant that has opted out of the LCPD. It is also assumed that 7.5GW of nuclear capacity will

decommission by 2020, in accordance with EWP and National Grid SYS assumptions. New conventional generation build of 24GW will be assumed in order to maintain historical levels of generation adequacy. This will consist of the 14GW of conventional generation included in National Grid's contracted background, deployment of wind as described above and additional CCGT plant located around England and Wales to ensure that an overall capacity margin of 20% is maintained. High and low scenarios have been developed to test the impact of increased decommissioning of existing conventional plant due to more stringent Large Combustion Plant Directive (LCPD) requirements and also further life extension to certain nuclear stations. We also intend to capture possible further growth in nuclear generation under the scenario sensitivities.

3.43. The EWP input fuel and carbon price assumptions will be used for the analysis. Marginal cost of generation will be dependent on technology using EWP assumptions for plant efficiency and will include the cost of carbon.

3.44. The central scenario and sensitivities to be used in assessing options for transmission access, together with the proposed modelling approach to be adopted, will be described in our spring 2008 analytical paper.

Initial conclusions and next steps

3.45. Changes to the current access regime are required in order to facilitate achievement of the Government's renewable generation targets. In particular, renewable generators having achieved planning consent should be confident of well defined and bankable transmission rights without undue delay.

3.46. Our long-term vision is that sharing of transmission capacity will become increasingly important as we move towards 2020. However, this does not obviate the clear need for ongoing investment to accommodate new generation. The growth in variable generation offers the opportunity to connect a higher proportion of generating capacity for a given amount of transmission capacity. In the longer term, a package of measures (some elements of which could be put in place relatively soon) is likely to provide a new and enduring access regime, which allows sharing of capacity to enable more efficient use of transmission infrastructure. However, the way in which this is achieved will need to recognise practical considerations, investment certainty and the costs of any approach. We note there are arguments relating to expectations of both existing and new generators to use the transmission system.

3.47. Based on the discussions we have had with industry, and our own deliberations, it is clear that the way in which we assess models of access reform could benefit from a holistic approach that captures more than just a few indicative strawmen. We consider that amending our assessment approach and breaking down transmission access into its constituent features would be a step forward when it comes to analysis.

3.48. Not only is this approach more practical, but the principal benefit of unbundling the access models into their various components is that it allows a more systematic and comprehensive method for assessing the potential for a given access model to address the issues at the heart of TAR. In the case of the three access models we identified in the Call for Evidence, by categorising each of these in a particular way may mean that we are missing viable and potentially optimal options. Therefore, by assessing the key components of models of transmission access in a 'bottom-up' manner, and identifying how they fit together, we consider we are more able to identify the best solution to meet the objectives of this review.

3.49. We will therefore carry out detailed qualitative and quantitative analysis of the key access building blocks and use that analysis to develop detailed straw-man models that we consider to be most likely to meet the objectives of this review in the medium and longer term. We will consult further early in 2008 on the assessment of these straw-man access models. We expect to issue a discussion document by the end of spring 2008 with further stakeholder events during March 2008.

3.50. Given the urgency of the need to remove immediate barriers to renewables gaining transmission access, there is a strong need to take a staged and consistent approach, to make quick wins where possible. In the short to medium term, renewable projects need to have confidence that, if they achieve planning consent, they will have a grid connection offer with appropriate defined and bankable transmission rights that are reasonably consistent with their likely development programme.

4. Delivering and operating infrastructure

Chapter summary

- ➔ This chapter provides a summary of the responses to the TSORG and STAG reports, and provides guidance in relation to further actions that could be taken to deliver improvements in the short term.
- ➔ We set out that assessing certain planning and system operation tools from a cost benefit analysis perspective should be undertaken.
- ➔ This chapter highlights that Ofgem has written to the licensees following publication of TSORG and STAG to initiate further work from the transmission licensees on a range of measures, for response by February 2008 for certain areas and March 2008 for others.

Introduction

4.1. The amount of transmission access that can be made available is limited by the physical transmission capacity of the network, i.e. the operational specification of the lines dictates the amount access that can be allocated to parties in planning. The Call for Evidence pointed out that making timely investments and maximising the use of infrastructure are crucial to connecting more renewable generation. It also set out measures that could be explored to enable more physical transmission capacity to be made available in a timely and efficient manner. The subsequent TSORG report and STAG report investigated in more detail, areas where there is scope for enhancing utilisation of the existing transmission system, particularly in shorter term operational timescales.

4.2. Ofgem has received written responses to the above reports, as well as comments at open stakeholder seminars and bilateral meetings with interested parties. On measures that have been identified as having the potential to increase transmission capacity, Ofgem gas written to the transmission licensees to further investigate their cost-effectiveness and to report on findings and potential implementation within a set timetable. Ofgem has also considered the scope for strengthening incentives for the transmission licensees to deliver and operate transmission in a manner that is in line with the need of renewable generation and other transmission users.

4.3. This chapter summarises the responses to the Call for Evidence, the TSORG and STAG reports, sets out areas where Ofgem has initiated further work, and provides thoughts on the initial conclusions we have reached so far.

Responses to Call for Evidence, STAG and TSORG reports

4.4. The responses we have received are generally supportive of the search for improvements in the process by which transmission infrastructure is delivered and operated. Many have pointed out the importance of delivering sufficient

transmission infrastructure and acknowledged that the current major challenge is the planning process. However, the majority of respondents also agreed that while the Government has brought forward proposals to remove barriers in the planning process, there is clear value in considering ways to make more capacity available through changes to how transmission investment and operation are carried out.

4.5. Measures put forward by respondents as worthy of further consideration include strategic investment ahead of firm connection demands from generators, more preparatory works including environmental scoping studies ahead of need and maximising the utilisation of existing transmission assets, for example by adopting dynamic ratings or better coordination of transmission outages.

4.6. There was also recognition in the responses that some aspects of the GB SQSS, which governs the planning and operation of the transmission system, should be reviewed in light of the challenge in facilitating the Government's renewables targets. For example, it was pointed out that the level of security to cater for the outage of any two pieces of primary transmission equipment, commonly termed as "N-2", may be over-conservative when used against a generation background consisting of a high proportion of wind generation. Instead, adopting "N-1" criteria in some circumstances may be appropriate in accommodating more generation with less transmission investment. The counter views expressed included that N-1 criteria could potentially lead to unacceptably high costs of transmission (such as losses) and/or risks of loss of supply.

Delivering infrastructure

4.7. The two key factors that dictate the delivery of new transmission infrastructure are the quantity and timing of additional transmission capacity. The quantity of transmission capacity required is governed by the GB SQSS planning criteria, which stipulates the minimum required transmission capacity on the basis of flows from given generation and demand patterns, under a prescribed set of contingencies (involving for example, fault outages of transmission equipments). The generation and demand patterns are largely based on peak demand conditions, with generation capacity scaled to match demand.

GBSQSS

4.8. Given the specific characteristics of wind generation, a review of the GB SQSS is under way to develop more appropriate provisions to accommodate its intermittency. The analyses that the transmission licensees have been undertaking seek to establish a more appropriate relationship between renewable generation capacity and required transmission capacity. On 9 January 2008, National Grid published a GB SQSS consultation document on the 'Review for Onshore Intermittent

Generation'[13]. The purpose of this review is to develop a methodology for determining the 'right' level of transmission infrastructure that appropriately takes into account the intermittency of generation against a background of increasing wind penetration in the GB transmission system.

4.9. The current approach to the treatment of wind generation in transmission planning was developed in response to significantly high wind project applications in Scotland. At the time it was developed, the transmission licensees recognised that wind generation was different from conventional generation and accordingly, had to be treated differently. The objective in developing the current approach was to ensure that the transmission licensees continued to provide an economic and efficient amount of transmission infrastructure.

4.10. The current review seeks to revisit several areas of the GB in view of the increasing wind penetration throughout the entire GB transmission system. The review has identified five alternative methodologies for determining transmission system capability, which are explained in more detail in the Review for Onshore Intermittent Generation paper on National Grid's website.

4.11. By the of end January to mid February 2008, National Grid expects to consolidate its conclusion on a single recommended way forward, and will initiate re-drafting of the GB SQSS accordingly. By end of March 2008, National Grid anticipates submitting its final recommendation to Ofgem for consideration.

4.12. The transmission companies and other interested parties have also identified other aspects of the GB SQSS that would benefit from further review. These include the type of contingencies to be secured, in particular the number of primary transmission equipments on outage, for example, moving from the current deterministic N-2 rules to N-1, or to a more cost-benefit basis. We note the potential for such changes to enable more generation to be accommodated on the system with less transmission infrastructure. However, we also note the potential for such changes to result in higher costs of transmission (for example by increasing the volume of transmission losses) and higher risks of loss of supply. We have asked the transmission companies to investigate in more detail the potential impact of such changes, in particular the likely scope of accommodating more renewable generation, any undesirable consequences and whether they can be mitigated.

Timely network investment

4.13. In addition to considering aspects of the GB SQSS, there are other key factors that are critical in determining the amount of required transmission infrastructure.

[13] This document can be found at the following link: http://www.nationalgrid.com/NR/rdonlyres/B6B8CABD-6D2C-4D1E-A48F-51789CA93484/22516/GBSQSS_Review_for_Onshore_Intermittent_Generation_.pdf

The three transmission licensees plan and build their transmission systems recognising that a proportion of the projects that have entered the connection application process will not proceed to completion. This is because at present there is no real commitment required from generators to use the system until their transmission construction works begin.

4.14. The cost of an application for a connection agreement is very low relative to overall project costs, and has contributed to the large queue of generation on the system. This is why we consider that National Grid's queue management initiatives are an important part of the suite of proposals needed to address the deficiencies in the transmission access arrangements.

4.15. A major challenge faced by the transmission companies is the uncertainty of the need for transmission capacity in the future, for example due to delays in the planning process for new generation projects and the lack of signals for existing generators to exit the system. This uncertainty and lack of clear demands can result in sub-optimal investment decisions by the transmission licensees. Reforming certain aspects of the transmission access regime in a manner designed to remove these deficiencies, would be beneficial. If greater certainty of generators' capacity requirements were visible ahead of time it would help to address this problem. There are practical issues associated with how this improved level of certainty is achieved; for new generators the ability to make financial commitments to transmission investment is likely to be closely linked to a project's consent status. For existing generators key issues, such as plant condition and fuel prices, may be more significant drivers behind decisions to disconnect or keep a plant in operation.

4.16. In terms of when required infrastructure is delivered once the need is clear, the influencing factors are the time required to obtain relevant planning consent and the construction period. A typical transmission construction project on its own is relatively straightforward to manage within a predictable timescale. However, the sheer volume of the potential build programme on the GB transmission network and the requirement to fit it into constrained outage windows present a challenge for the delivery of timely and cost-effective infrastructure in line with need from the users. Also, whilst the planning process is influenced by external factors outside the control of the transmission companies, some of the delays in the process may be obviated by additional preparatory work.

4.17. We therefore believe that there is scope for the transmission companies to be more proactive in targeting resources in the most efficient way and deliver the infrastructure that is of most benefit to facilitate the connection of renewable generation. We note that some respondents to the Call for Evidence document believe there would be benefit in Ofgem signing off strategic investment ahead of need from generators. Ofgem believes that this is likely to lead to inefficient investment and divert valuable resources away from projects that could deliver genuine benefit. A practical way forward may be to set appropriate incentives for the transmission companies to reward early delivery of infrastructure to accommodate new generation and to disincentivise late delivery relative to a defined connection date, in addition to establishing an access framework that clarifies the need for infrastructure earlier.

4.18. In addition to the initiatives to improve the accuracy of information on projects in the queue, there is also the need to consider whether aspects of the planning and operating criteria in the GB SQSS can be altered to enable greater sharing of capacity, or building less capacity for a given volume of generation, to reduce the need for system reinforcement. We also believe there is a need to further explore the potential for the system to be operated in such a way that more capacity can be freed up from existing wires, by, for example, making greater use of weather related ratings on the network. We recognise that alternative approaches to system planning and operation present involve risks and potential costs for the transmission licensees or users of the system, but as yet there has been limited work to quantify what these risks and costs are. Therefore we would welcome further analysis, and have written to the transmission licensees to take this work forward urgently.

System operation

4.19. The amount of transmission capacity that can be made available in operational timescales determines the amount of transmission access that can be allocated in the planning stage. It also determines whether and how much the usage by parties already holding transmission access should be curtailed in the operational stage.

4.20. Whilst useful work has been undertaken by the TSORG group, helping to provide useful insight into the practices and tools used by the licensees, Ofgem considers that further steps could be taken to enhance system operation. In particular, the work of TSORG was not conducted from the perspective of undertaking cost-benefit analysis of initiatives that were identified, such as greater use of enhanced weather ratings, greater use of intertrips and fair weather relaxations. We therefore have asked the transmission companies to take forward additional analysis to identify the costs and benefits associated with such initiatives, and in particular to understand the trade-offs between releasing more capacity from the system against costs and security of supply. We have also asked the transmission companies to consider how any proposed changes that are of demonstrable benefit may be implemented.

4.21. In addition to determining the amount of transmission infrastructure required to connect given levels of generation, the GB SQSS governs the amount of transmission capacity that can be made available in operational timescales. A review of certain aspects of the operational criteria, such as the type of contingencies to be covered, in particular the N-2 rules, may reveal scope for accommodating more generation output in otherwise constrained areas. Clearly the review must also take into account the potential increased costs of system operation as well as the risks of loss of supply. We have asked the transmission companies to consider these factors in their review of the GB SQSS.

Follow up GB SQSS and system operation work

4.22. Ofgem has written to the licensees to initiate further work on enhancing system operation, and has requested responses by the end of February 2008. Ofgem's work to date has identified a range of relatively quick wins that can be

instigated by the transmission licensees in operating the system. These measures relate to enhancing the use of existing equipment rather than building additional infrastructure, such as by greater use of fair weather relaxations or closer to real time line ratings. As part of this work programme, Ofgem is also writing to the licensees to look at more fundamental aspects of the GB SQSS (considering whether there is scope for better exploiting existing network capacity) and has asked for a response by the end of March 2008. The four main areas in which Ofgem is requesting responses include:

- Transmission system capability.
    - Consider viability of extending weather enhancement techniques, and greater information provision on these tools between TOs.
    - Consider scope for additional hot-wiring[14] across the TOs' systems.
    - Review the use made in operational planning and control timescales of short term rating information.
- Transmission system utilisation.
    - Develop a methodology for illustrating utilisation of transmission boundaries to take account of pre-gate closure actions to manage constraints.
    - Assess options for recording reasons for constraint actions.
    - Consider scope for automating the production of utilisation information using a defined methodology.
    - Describe number of generators in the GB queue that are seeking to change the agreed date for connection to the GB transmission system.
    - Provide information about the dependencies between planned transmission system reinforcement works and new generation connections.
- Limiting factors in current regulatory framework.
    - Identify any data exchange restrictions in current regulatory framework that hinder transmission system development.
    - Review application of GB SQSS in relation to fault conditions.

[14] Hot-wiring involves increasing the tension in transmission conductors so that higher loads can be accommodated.

- Identify requirements in the planning criteria of the GB SQSS that were key triggers for transmission system reinforcement for generation projects in the GB queue.

- Develop GB SQSS review work plan, including assessing greater role for probabilistic assessment in planning, moving from N-2 to N-1 or N-D.

- Development.

  - Provide information about research/development projects that may release transmission system capacity and/or may facilitate connection of new generation (some projects may be covered by Ofgem's Innovation Funding Incentive (IFI) reporting arrangements).

  - Compare GB SQSS with planning and operational standards that apply in other countries.

  - Provide information on initiatives for enhancing transmission system capability.

4.23. Ofgem has requested the various workstrands to be completed by end February 2008 for certain areas and end March 2008 for others. Ofgem considers that this will provide sufficient time for its request to be addressed, and will fit in with our TAR timetable.

4.24. In certain areas the information that Ofgem is requesting is licensee-specific, and in other areas all three licensees are applicable. In keeping with the spirit of TSORG, Ofgem considers it would be helpful if the transmission licensees were able to tackle some of the actions jointly.

4.25. Following on from the shorter term actions Ofgem has identified, if there are any areas which warrant further exploration in the longer term, Ofgem will liaise with the licensees and provide guidance to develop an appropriate way of taking the work forward. This approach will also include us providing guidance on which areas Ofgem sees as being of highest priority.

System Operator incentive review

4.26. Ofgem has recently held a workshop on the longer term review of system operator incentives. At the workshop held by Ofgem on 1 November 2007, there was little support for Ofgem giving priority to work to establish a long term system operator incentive scheme. Many of these concerns related to the difficulty of establishing a long term regime whilst simultaneously managing other changes in the regulatory framework that will also have an impact on the system operator's costs and incentives.

4.27. Ofgem recognises these concerns. In the near future Ofgem will not therefore start additional work to prepare a long term scheme. However, given the issues

associated with achieving the 2020 renewables targets, the review of transmission access and the cash-out review may require Ofgem, National Grid and industry participants to revisit longer term system operator issues sooner. Ofgem welcomes any further discussion on these issues and expects to return to them in due course.

Initial conclusions

4.28. Work so far has identified areas in delivering and operating the transmission infrastructure that could make available additional transmission capacity in a timely and efficient manner. Many of the potential measures would involve the balancing of the benefit of accommodating more generation against the consequences of higher costs or risks to security of supply. Ofgem has asked the transmission companies to undertake further analyses of the cost-effectiveness of these measures and to report on their findings and potential implementation plans.

4.29. We also consider that there is further scope for ensuring that the transmission companies have effective incentives to be more proactive and target resources at delivering transmission capacity in line with the need of renewable generators and other users. A user commitment approach with firmer delivery dates could provide appropriate incentives for the licensees to undertake pre-planning work in a timely manner. We will continue to work with the industry and the licensees to develop the appropriate framework most likely to meet the TAR objectives and assess the costs and benefits of such an approach.

4.30. Reviews of certain aspects of the GB SQSS could further reveal scope for releasing more capacity sooner. We have asked the transmission companies to initiate work to assess the costs and benefits of potential changes such as moving from N-2 to N-1 criteria and report in due course.

5. Initial recommendations

Chapter summary

➔ This chapter sets out our views of what shorter term and longer term improvements can be made to the existing arrangements to provide a more appropriate set of access arrangements.

5.1. Ofgem and BERR recognise the size of the challenges facing the transmission system on the path to 2020 and beyond. As such we have identified in our interim report a set of measures which we believe have the potential to meet the challenges, in the short and longer term.

5.2. In identifying the most appropriate path to 2020 and beyond, it is important to be clear of what the deficiencies are in the existing arrangements. We consider that the weaknesses in the current arrangements can be found in the following key areas:

- Given the scale of demand for new generator connections, the current "queue" of projects seeking to connect does not reflect the likely order that projects will be ready to connect. The current first-come-first served approach taken by National Grid to connecting generation does not assess or reflect the status of generating projects in the queue. Resolving this issue is key in improving prospects for faster connection. In particular, new generators are often unable to get connection dates that match their project development timescales.

- Although construction times for new generation and transmission capacity are similar it can take years for planning permission to be granted to allow construction to begin on major transmission infrastructure. If enacted by Parliament, the Planning Reform Bill should help improve the planning process in England and Wales and reduce the time it takes to deliver new transmission capacity.

- Existing generators have limited incentives to release or sell transmission capacity in the short-term, given uncertainty over whether they will be able to acquire it again in the future. Generators are required to give only very limited notice of their intention to close and/or disconnect from the system making it harder for the system operator to reallocate capacity quickly to other generators.

- In addition to the practical problems of the existing regime in delivering new capacity there are some process difficulties that need addressing. Recent efforts by National Grid and the industry to amend the access arrangements through changes to the industry codes have been relatively slow. National Grid and industry need to make sure that any further proposals for reform are assessed and brought forward for decisions as quickly as possible without compromising proper assessment and consultation.

- A further problem we have identified is that the quality of information regarding infrastructure plans made available between transmission licensees and

generators is limited, and may result in poor or costly decisions to locate plant on the system given limited knowledge of cost and timing implications resulting from transmission factors.

5.3. Our interim report on how these issues can be resolved are split broadly into initiatives relating to:

- Access reform, and
- Delivering and operating infrastructure.

5.4. In addition to these primary areas we have also identified some initiatives relating to process and governance that we believe should be progressed.

Access Reform

5.5. Our Call for Evidence sought views on key aspects of the alternative access models. These have now been explored further and assessed against the criteria that were described in the Call for Evidence document. Our initial views are provided in this document, where we have narrowed the range of issues being considered, by taking a practical view of what is the most efficient suite of changes to address the aims of TAR. Following this publication, we intend to provide a more detailed analytical paper in spring 2008.

5.6. Our initial conclusions on access reform are:

- Funding is available for significant transmission investment but other problems with the arrangements (for example the uncertainty regarding the future need for transmission capacity) are preventing transmission companies making the necessary investment quickly.
- In the short-term, National Grid as GB system operator (SO) should make sure that available capacity is allocated to projects currently in the connection queue that are able to use it. In practice, this means prioritising projects with consents and financing in place. This should be supported by appropriate information on generation projects wishing to connect so that decisions on where to connect can be taken in full knowledge of what the relevant issues are.
- Given the challenges associated with building new transmission infrastructure, we must look at how efficiently existing capacity is being used. Sharing transmission capacity will become increasingly important as we move towards 2020. The growth in intermittent generation should enable the SO to connect more generating capacity for a given amount of transmission capacity.
- In the longer term, a package of measures (some elements of which could be put in place relatively soon) is likely to provide a new and enduring access regime that allows sharing of capacity to enable more efficient use of transmission infrastructure.

- In the short to medium term, renewable projects need to have more confidence that, if they achieve planning consent, they will have a grid connection offer with appropriate defined and enforceable transmission rights that are reasonably consistent with their likely development programme. One way to achieve this is by putting stronger commercial incentives on the transmission companies to deliver on time firm connection dates to developers who have made appropriate financial commitment. In the next stages of the review we will consider how the components of access regimes may interact, with a view to bringing forward revised models supported by qualitative and quantitative analysis for further consultation in spring 2008.

5.7. In the next stages of the review we will consider how the components of access regimes may interact with a view to bringing forward revised models supported by qualitative and quantitative analysis for further consultation early in 2008.

Delivering and Operating Infrastructure

5.8. Ofgem has established and chaired an advisory body to carry out a review of GB system operation, with the cooperation of the three transmission licensees. As a result, in Ofgem's Short Term Access Governance (STAG) report published in October 2007, some measures were identified which could have the potential to reduce constraint volumes and enhance operational efficiency.

5.9. Running in parallel to this work and extending into spring 2008, the GB Security and Quality of Supply Standards (GB SQSS), review group has recently consulted on the principles for accommodating intermittent generation are appropriate. A final report on this issue will be submitted to Ofgem in spring 2008.

5.10. Our initial conclusions on Delivering and Operating Infrastructure are:

- Ofgem has written to the licensees to initiate further work on enhancing system operation, and has requested responses by the end of spring 2008. Work to date has identified a range of relatively quick wins that can the transmission licensees can implement. These measures relate to enhancing the use of existing equipment rather than building additional infrastructure, such as by greater use of fair weather relaxations or closer to real time line ratings. Ofgem is also writing to the licensees to look at more fundamental aspects of the GB SQSS (considering whether there is scope for better exploiting existing network capacity) and has asked for a response by the end of March 2008.

- The planning standards (GB SQSS) may need to be more closely tailored to ongoing generation and system requirements. The transmission asset owners (TOs) are currently looking at methodologies to incorporate wind generation in planning and consult on this issue on 9 January 2008, prior to a final conclusions document for Ofgem’s decision by the end of March 2008.

- A user commitment approach with firmer delivery dates could provide appropriate incentives and better information for transmission companies to undertake pre-planning work in a timely manner. We will conduct further assessment and analysis and present further views in our spring 2008 document to explore how to deliver this.

Implementation

5.11. Implementation of the final conclusions of this review will depend on the extent and nature of any changes that are proposed. The appropriate implementation route will be influenced by the inter-dependency of the proposed changes, their proposed timing and the likely need to deliver a coherent and co-ordinated package of measures that may cut across several industry codes and the transmission licences.

5.12. We are not ruling out, at this stage, recommending that the Government considers legislation as a means of delivering co-ordinated change to transmission access arrangements. But any recommendation would need to take into account the time needed to enact relevant legislation compared with the use of existing industry governance arrangements that may be able to deliver the required changes relatively quickly.

5.13. However, the existing industry governance regime, specifically in relation to the Connection and Use of System Code ((CUSC), which is managed by National Grid)) recent track record on these issues has been poor. Although Ofgem has recently announced a review of industry codes governance review we will need to consider whether this will deliver sufficiently quickly to give us confidence that the industry code modification process is the best route to make changes to the access regime.

6. Implementation

Questions

There are no questions in this chapter.

Approaches to implementing changes to transmission access arrangements

6.1. The Energy White Paper stated that this interim report would consider the case for amending primary and secondary legislation. The case for taking powers through legislation can not yet be concluded. As we develop revised straw-man proposals we can make an assessment of the appropriate implementation route for each measure we are proposing.

6.2. The way in which the conclusions of this review may be implemented will depend on the extent and nature of any changes that are proposed. Key factors in deciding on appropriate implementation routes will be the inter-dependency of the proposed changes, their proposed timing and the likely need to deliver a coherent and co-ordinated package of measures that may cut across all the industry codes.

6.3. We are not ruling out, at this stage, proposing legislation as a means of delivering co-ordinated change to transmission access arrangements. Such a recommendation would need to take into account the likely time needed to enact relevant legislation as opposed to the use of industry governance arrangements which may allow some measures to be brought in relatively quickly. Recent experience of industry governance processes however, especially where proposed amendments are relatively significant, has been that they will also take some time to deliver and may not provide the most co-ordinated approach.

6.4. Ofgem set out in the STAG report their view that there are challenges associated with the relatively narrow focus of the industry codes processes in the case of transmission access issues and that there are areas of the existing arrangements that are inflexible. The process can be arduous and slow, for example in the case of CAP131 over 30 permutations of the amendment were identified, each needing to be assessed and ranked.

6.5. Any approach to change will necessarily be supported by detailed consultation with industry and other stakeholders and will be delivered with close support from industry.

Current modification arrangements

Industry codes

Background to the industry codes

6.6. The Electricity Act 1989 (as amended) and the Gas Act 1986 (as amended)[15] provide that companies involved in the generation, transmission, distribution or supply of electricity, or the transportation, supply or shipping of gas, or that participate in the operation of an electricity or gas interconnector, require licences, unless exempted from that requirement by the Secretary of State.

6.7. Ofgem[16] determines the content of these licences, and has used them to require the establishment of a number of multilateral industry codes that underpin the gas and electricity markets.

6.8. These codes establish detailed rules for industry that govern market operation and the terms for connection and access to energy networks.

Modifying the codes

6.9. Each code can be modified and proposals to do so may be made by their signatories (generally network operators and those who use that network, although the categories of signatory do differ from code to code) or by consumer representatives (generally energywatch).

6.10. Each code has a panel or committee that oversees the assessment of proposed changes to that code. For some kinds of proposed changes that body will also make the final decision on whether implementation is appropriate, but this is not always the case.

6.11. Some complete codes (such as the Connection and Use of System Code, Balancing and Settlement Code or Uniform Network Code), or sub-sections of codes (such as Part 1 of the Distribution Connection and Use of System Agreement) may only be amended with the approval by, or at the direction of, the Authority.

[15] See sections 4(1) and 5(1) of the Electricity Act 1989 and sections 5(1) and 6A of the Gas Act 1986

[16] Ofgem is the Office of the Gas and Electricity Markets Authority and the terms "Authority" and "Ofgem" are used interchangeably throughout Authority documentation

Right of appeal on decisions

6.12. The Energy Act 2004[17] introduced a right for market participants to appeal Ofgem's decisions on proposed changes to industry codes to the Competition Commission, subject to that decision being eligible for appeal.

6.13. The Secretary of State has powers to designate documents in respect of which relevant decisions may be appealed and conversely, to describe decisions that are excluded from the right of appeal. This designation and exclusion may be subject to periodic review and change.

6.14. Currently, the Secretary of State has designated that decisions on the following codes and agreements are eligible for appeal[18]:

- Balancing and Settlement Code ("BSC");
- Connection and Use of System Code ("CUSC");
- Network Code;
- Supply Point Administration Agreement;
- Master Registration Agreement, and
- Uniform Network Code.

6.15. There are two specific exclusions from the right of appeal for the designated codes shown above. These exclusions are where:

- When the Authority is in agreement with the majority recommendation of the code's own governing panel[19]; or
- When the Authority considers that the delay caused by holding an appeal against that decision is likely to have a material adverse effect on the availability of electricity or gas for meeting the reasonable demands of consumers in Great Britain.

[17] See section 173
[18] By article 3 of the Electricity and Gas Appeals (Designation and Exclusion) Order 2005 (SI 2005/1646)
[19] Article 4 of the Order

Changes to modification arrangements

Industry governance

6.16. TAR is not intended to be a wide-ranging review of industry governance arrangements. Ofgem is in the process of conducting a review of the industry code governance arrangements[20], which will take forward this area of work. However, the terms of reference for TAR do allude to the importance of the governance arrangements in delivering changes to the current mechanisms enshrined in industry codes.

6.17. It has been many years since some of the major codes such as the BSC and CUSC were introduced. Since then, other codes and agreements have been designated, we have seen significant structural change in the gas market through the Distribution Network sales programme, and, following calls for increased accountability in code decision making, there have been statutory changes to the regulatory framework within which the codes rest.

6.18. Some of the most significant statutory changes are contained in the Sustainable Energy Act 2003 and the Energy Act 2004. These include:

- The requirements on the Gas and Electricity Markets Authority (the Authority) to conduct Impact Assessments before reaching important decisions in defined circumstances;
- The introduction under the Energy Act of a right of appeal to the Competition Commission on eligible Authority code decisions, and
- The introduction under the Energy Act of better regulation duties on the Authority.

6.19. Both pieces of legislation underline the need for Ofgem to make its decisions based on credible evidence that has been appropriately tested and to ensure that its reasoning underlying these decisions is transparent and consistent. But whilst these obligations rest with the Authority, the nature of the code modifications process means that much of the day-to-day activity in evidence gathering and testing rests with industry and the code panels. The rules, behaviours, and resources applied to these activities can aid, or impede, our ability to reach an optimal decision on any given proposal.

[20] For more information please see the following link: http://www.ofgem.gov.uk/Licensing/IndCodes/Governance/Documents1/Open%20letter%20announcing%20governance%20review.pdf.

6.20. Increasingly Ofgem has become concerned that there may be weaknesses in the way the codes are governed and that this may be preventing both industry and consumers from getting full value from these arrangements. In addition to these factors, the entry into the market place of smaller players, such as distributed energy providers and micro-generation interests, has also led to concerns that the existing code arrangements are too complex and inaccessible. As such, Ofgem considers that it is timely to consider whether the code arrangements in their current form represent an undue barrier to entry to smaller players and whether there are changes that can be made to simplify these arrangements and reduce unnecessary regulatory burdens.

6.21. Over recent months, Ofgem has raised a number of concerns regarding the quality of modification reports and the analysis undertaken on modification proposals both in the gas and electricity sectors[21]. In particular, Ofgem shares the concerns of some market participants that modification reports and consultation documents often do not make sense on a standalone basis and lack an effective and critical assessment of modification proposals. In many cases both costs and benefits of proposals are not adequately assessed. Similarly, assessments of proposals against the objectives of the code in question are often limited and lacking in analysis that would enable us to conclude whether a change is merited.

6.22. Ofgem has also raised concerns over the past year regarding the effectiveness of existing workgroup processes and whether these workgroups are generating robust and critical analysis of modification proposals. Further, if the conclusions of these groups, as set out in workgroup or modification reports, are opaque and/or misleading then those not present may effectively be disenfranchised from the process.

6.23. The need to ensure that the Authority's decisions are based on clear and transparent reasoning and robust analysis has been further emphasised by the recent decision of the Competition Commission on the appeal of the Authority's decisions on the gas offtake modification proposals. The Authority may only be able to meet the high standards required of it if the code modification reports themselves demonstrate well argued and effective analysis.

6.24. Ofgem has recently published an open letter consultation[22] setting out its intention to explore a range of areas of the existing arrangements which may not be working appropriately. Responses to this letter are due by 22 January 2008, with follow up events to be notified shortly.

[21] Recent examples of this include UNC proposals 088 and 149/149a, and BSC proposal P213.
[22] This letter is available from the following link: http://www.ofgem.gov.uk/Licensing/IndCodes/Governance/Documents1/Open%20letter%20announcing%20governance%20review.pdf.

New legislative powers

6.25. The Secretary of State currently has no powers to mandate changes to industry codes and licences. The Authority, however, has powers to amend licences under the Electricity Act 1989 and the Gas Act 1986[23]. However, depending on the extent and nature of change, legislation may be required. In previous circumstances where relatively far-reaching changes have been required to industry codes and licences, statute has given the Secretary of State for Business and Regulatory Reform powers to amend licence conditions.

6.26. For example the Energy Act 2004[24] provided that if the Secretary of State considered it necessary or expedient for the purpose of implementing the BETTA arrangements he could modify (or add to) either the conditions of a particular licence, or the standard conditions of generation, transmission, distribution or supply licences. The Secretary of State also had powers to make incidental, consequential or transitional modifications[25] (under which power, amendments to related codes and agreements could be made).

6.27. The Secretary of State's powers to change licence conditions and the underlying codes were time-limited[26]. This was intended to allow the coordinated introduction of the BETTA arrangements.

6.28. If required the Government could consider enacting legislation containing such time limited powers in order to deliver the recommendations of the review. Any such approach would be preceded by consultation on the detailed measures. Timing would be dictated by the complexity of any changes being made and opportunities within the Government's legislative programme.

[23] Section 11 of the Electricity Act 1989 and section 23 of the Gas Act 1986.
[24] See section 134 of the Energy Act 2004.
[25] Section 134(2) of the Energy Act 2004.
[26] Section 134(8) of the Energy Act 2004.

7. Way forward

7.1. As set out in the Energy White Paper 2007, this document is a report to the Secretary of State, and is therefore not a formal consultation document. However, if any parties wish to respond on any of the issues contained within this document, please do so electronically by 28 February 2008 to the following email addresses: transmissionaccessreview@ofgem.gov.uk and transmission-access-review@berr.gsi.gov.uk.

7.2. Unless marked confidential, any responses that we receive 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.

7.3. 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.

7.4. As set out elsewhere, the process we envisage from this point onwards will be broadly as we have conducted the review to date, in that the consultation process will be a combination of documents, industry seminars and individual meetings.

7.5. In terms of key documents in the TAR process, the following timetable will be in force:

- Spring 2008 – publish more detailed identification and assessment of viable transmission access models, and
- May 2008 – publish a final recommendations report, including options for governance and legislative changes to bring about agreed access reform model.

7.6. We are currently in the process of undertaking both qualitative and quantitative analysis running in parallel to this consultation document. This interim report provides a high level description of the approach we are taking, in developing scenarios and detailed inputs reflective of our transmission access strawmen, which we will run through a model of the transmission system to generate key outputs on costs. This will be given more visibility in a stand alone publication in spring before our final recommendations in May 2008.

7.7. Ofgem and BERR are proposing that further work will be taken forward in conjunction with industry via workshops and seminars, the timings of which are yet to be decided, to seek views and present issues for consideration. We consider that this process, in conjunction with ad hoc industry meetings has worked well to date.

7.8. Invitations to workshops and seminars will be issued by letter following the publication of this document. It is expected that these meetings will take place in Ofgem or BERR's offices in London as appropriate.

Appendices

Index

Appendix 1 - Supporting qualitative assessment work

1.1. As part of the work we have commissioned from Poyry Energy Consulting, the options within each of the access components detailed in chapter 3 are being assessed against summarised criteria that are designed to mimic the detailed assessment criteria set out in the Call for Evidence:

- Promoting social and environmental objectives. Any proposals should be consistent with Ofgem's and BERR's statutory duties, reflecting the direct impacts that the transmission systems have on the environment, as well as the role the transmission systems play in facilitating broader social and environmental objectives. Proposals should also be consistent with the Government's climate change targets and should better support accommodation of renewable generation through timely connection and appropriate access products that provide certainty for developers;

- Promotion of competition. The arrangements should promote competition between industry participants, facilitating market entry and preventing undue discrimination between classes of users;

- Efficient network development. Transmission companies should have incentives to optimise the use of existing capacity, including release of unused capacity. In addition, demands for capacity should be appropriately signalled, ensuring that transmission licensees have sufficient information to efficiently allocate and provide capacity. Licensees should be rewarded for responding dynamically to changing circumstances to develop their networks in an economic, efficient and coordinated manner;

- Appropriate allocation of risk. Risk should be allocated appropriately between transmission companies, network users and consumers, which should be reflected in the charges levied on and/or payments made to relevant parties;

- Simplicity, transparency and minimising implementation and operational costs. Access arrangements and associated incentives should form a coherent whole, recognising interactions between different aspects of transmission policy, and should be capable of being implemented as simply and transparently as practicable so as not to disadvantage any class of user. The arrangements should not impose undue implementation or administrative costs on industry participants, recognising that such costs might be expected ultimately to be passed on to consumers;

- Security of supply. The mechanisms developed should not have a negative impact on the security of supply;

- Costs to consumers. Costs that are paid by users and consumers should be appropriate and proportionate. There is a need to strike the right balance

between short-term costs and long-term benefits of accommodating more renewable generation, and

- Compliance with applicable legal requirements. Including the Electricity Act 1989, the Energy Act 2004 and relevant European law.

1.2. To aid simplicity in discussion in the section below, the transmission access models common 'building block' components have been coded as follows: the definition of access rights (D), the allocation of access rights (A), pricing of access rights (P) and provisions for secondary trading of access rights (T). Each building block can be broken down into a number of sub-components or 'decision points', each of which has several possible options, (hence D1a, D2b etc). In this context, work has been undertaken to identify and assess the options for each decision point, to consider linkages between these options and to assess viable 'collective' groupings. The key outputs from this work and the next steps are summarised below. Further information on Poyry's qualitative assessment work will be provided in the analytical paper in spring 2008.

Individual options and their assessment

1.3. We have identified nine 'decision points' and 21 options (some of which reflect the status quo) within the four building blocks. In identifying the options for assessment, we have applied some pre-filtering in order to focus only on those options which, based upon our initial consideration, appear viable, whilst discarding options which appear non-viable. This is to ensure that assessment is targeted onto those areas where it is most worthwhile. It is important to note that the selection of options for consideration has not been informed by modelling or other quantitative analysis. However, the list of options is non-exhaustive and the identification of selected options is not intended to rule out additional options or combinations of options that could be included in a comprehensive 'long list' for later selection.

1.4. Each identified option has been assessed individually (i.e. in isolation from options at other decision points) relative to the status quo. The six assessment criteria (in no particular order of precedence) are outlined in Table 1[27].

Table 1 - Assessment criteria

Abbreviation	Assessment Criteria
Env	▪ promoting environmental objectives
Comp	▪ promotion of competition
SoS	▪ security of supply
Net	▪ efficient network development

[27] These criteria encompass all of those listed in the TAR Call for Evidence, but the original set has been re-organised in order to make the assessment of multiple options more manageable.

Abbreviation	Assessment Criteria
Cost	▪ costs to consumers (on an ongoing basis)
Imp	▪ ease of implementation

1.5. The assessment is designed to identify key issues arising from the various options and is deliberately qualitative and high-level in nature. This assessment has been conducted without considering the detailed design solutions for actual implementation of the options discussed. This means that there is the potential for negative effects to be mitigated and for positive effects to be enhanced by the design solution selected. Therefore, the assessments represent an initial, non-binding view. Importantly, the assessments reached may be revised in the future as a result of more in-depth analysis.

1.6. For each of the criteria, we judged whether the impact of the option would be positive (✓), very positive (✓✓), negative (×), very negative (××) or neutral (-). The options and their individual assessment are outlined in Table 2.

Table 2 - decision points and options: high level assessment

Decision point	Op. ID	Option description	Env	Comp	SoS	Net	Cost	Imp
Definition of access rights								
Geographic definition	D1a	Nodal	n/a status quo					
	D1b	Zonal	✓	✓		×	×	✓
Durability and obligations (long term products)	D2a	Indefinite, asymmetric	n/a status quo					
	D2b	Defined period, symmetric	✓	-	×	✓	×	××
Firmness of access products	D3a	Fully firm when commitment is made to purchase		✓		✓	×	✓
	D3b	Interruptible/non-firm access right with level of firmness or price revealed ex-ante	✓	-		✓	-	×
	D3c	Non-firm right that allows generator to access the system with ex-post pricing	✓	✓		✓	-	×
Allocation of access rights								
Total allocated quantity	A1a	'System-driven' limits	n/a status quo					
	A1b	'Requirements-driven' limits	✓✓	-	-	×	×	×
Treatment of existing rights	A2a	Prioritise incumbents	n/a status quo					
	A2b	No prioritisation of incumbents	✓	-	×	×		××
Pricing of access rights								

Decision point	Op. ID	Option description	Env	Comp	SoS	Net	Cost	Imp
Basis for pricing	P1a	LRMC (basis)[28]	n/a status quo					
	P1b	Cost-based WTP SRMC (basis)	-	✓		✓	×	×
	P1c	Bid-based WTP (e.g. LRMC+)	-	✓		✓	-	××
Secondary trading of access rights								
Temporal divisibility	T1a	In line with SO defined products	n/a status quo					
	T1b	Further subdivision e.g. daily, half-hourly	✓	✓			×	×
Last time for bilateral trading	T2a	Before or at Gate Closure	n/a status quo					
	T2b	Defined ex-post	✓	-			×	-
Trading between zones (or nodes)	T3a	Based on exch. rate provided on application	n/a status quo					
	T3b	Based on pre-published exch. rate	✓	✓			×	

1.7. The initial qualitative assessment summarised in table 3 highlights several areas for closer consideration due to their potential impact including, amongst others, the durability and obligations (long term products) and the treatment of existing access rights. In many cases, the impact of one option is not independent of other choices made at other decision points. In some cases, these relationships may mitigate impacts or, indeed, preclude certain combinations from emerging. These relationships are relevant to the creation of collective options (groupings), as discussed below.

Collective options and their assessment

1.8. The assessment of individual options in isolation, and the linkages between them, is a useful starting point from which to build. The next logical step is to identify and assess 'collective' options, which are combinations of mutually reinforcing individual options. These 'collective' options are not end-to-end transmission access solutions. Rather, the 'collective' options presented are combinations of mutually reinforcing individual options, gathered together to form possible sub-components of an end-to-end solution. A non-exhaustive selection of internally reinforcing 'collective' options is as follows:

- C1a 'status quo' - firm rights (D3a) allocated within system-driven limits (A1a), with prioritisation of incumbents (A2a) and priced on a LRMC basis (P1a);

[28] The existing pricing regime is LRMC-based to the extent that the locational variation in prices is determined by an LRMC methodology.

- C1b 'connect-and-manage' - firm rights (D3a) allocated beyond system-driven limits (A1b), with prioritisation of incumbents (A2a) and priced on a LRMC basis principles (P1a);

- C1c 'connect-and-pay' - firm rights (D3a) allocated on a scale between system-driven limits (A1a) and 'requirements driven (A1b), with no prioritisation of incumbents (A2b) and priced on a willingness-to-pay (LRMC+) basis (P1c), and

- C1d 'non-firm access' - combining the status quo with a suite of interruptible/overrun products (options D3b or D3c) for which either the permitted quantities or the access prices (option P1b, using SRMC principles) are set close to real time.

1.9. The outcome of the high-level assessment of the pros and cons of 'connect-and-manage' (C1b), 'connect-and-pay' (C1c) and 'non-firm access' (C1d) relative to the status quo (C1a) is provided in Table 3.

Table 3 - collective options: high level assessment

Collective options	Env	Comp	SoS	Net	Cost	Imp
C1b 'connect-and-manage'	✓✓	-	-	×	××	✓
C1c 'connect-and-pay'	✓	-	×	✓	-	××
C1d 'non-firm access'	✓	✓		✓	×	×

Next steps

1.10. The high-level qualitative assessment of the individual options and 'collective' options conducted to date provides a useful point from which to scope out and conduct an in-depth assessment of the viable combinations of end-to-end solutions. Developing and conducting this process will form the next steps of the Transmission Access Review. This is expected to entail the following steps:

- Develop credible end-to-end transmission access solutions (TA solutions);
    - build on the work already undertaken in relation to individual options, linkages and collective options to identify appropriate TA solutions;

- Develop a framework within which to conduct in depth quantitative assessment of the TA solutions using existing modelling capabilities, plus any further modelling as required;
    - map assessment criteria;
        - transpose the high-level assessment criteria into a more detailed set of indicators, including for each indicator whether it is quantitative or qualitative;
    - design assessment framework;
        - propose a framework within which the results of the assessment indicators may be collated and the TA solutions compared (e.g. scoring methodology);

        - identify weightings (if any) to be linked to individual indicators;
    - design mapping between TA solutions and models;
        - identify the key inputs to each of the analysis models and map these onto the various TA solutions;
        - identify sources for key inputs or intermediate analysis required to deliver inputs;
        - identify the key outputs from each of the analysis models (and other source analysis) and map these onto the assessment indicators;
    - identify gaps;
        - identify cases where the effect of TA solutions cannot adequately be represented by existing analysis models;
        - identify cases where required assessment indicators are not supported by the outputs from existing analysis models and for which qualitative assessment is unlikely to be sufficient;
        - scope and commission/conduct the additional analysis required to carry out the detailed quantitative assessment;

- Assess the results of the analysis within the assessment framework;
    - assess the analysis undertaken;
    - populate the assessment framework based on the assessment indicators;
    - assess and verify assessment results;
    - appraise TA solutions in light of assessment results, and

- Based on the assessment, set out proposals for changes to the transmission access framework consistent with the relevant policy goals.

Appendix 2 - 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, 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.[29]

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[30].

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 consumers, present and future, 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[31], and
- The interests of individuals who are disabled or chronically sick, of pensionable age, with low incomes, or residing in rural areas.[32]

[29] Entitled "Gas Supply" and "Electricity Supply" respectively.
[30] 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.
[31] 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.

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[33] 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;
- Contribute to the achievement of sustainable development, 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 Regulation[34] 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.

[32] The Authority may have regard to other descriptions of consumers.
[33] Or persons authorised by exemptions to carry on any activity.
[34] Council Regulation (EC) 1/2003

Appendix 3 – Glossary

A

Access Rights

The rights to flow specified volume of electricity, usually from a specified location (node or zone) to an explicitly or implicitly defined destination (e.g. market hub), and for a defined period. For firm access rights, a failure to deliver access due to insufficient network capacity is associated with financial compensation. For non-firm access rights, the flow is terminated without compensation when capacity is unavailable.

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.

B

Balancing Mechanism (BM)

The mechanism for the making and acceptance of offers and bids pursuant to the arrangements contained in the BSC.

Bid

In the context of the Balancing Mechanism, a bid is a tool used by the GBSO, whereby a user submits data representing its willingness to reduce generation or increase demand. National Grid then decides whether or not to accept the bid.

British Electricity Trading and Transmission Arrangements (BETTA)

The arrangements for the trading and transmission of electricity across Great Britain which are provided for by Chapter 1 of Part 3 of the Energy Act 2004, which have replaced the separate trading and transmission arrangements which existed prior to 1 April 2005 in Scotland and in England and Wales.

Balancing Services Use of System Charges (BSUoS)

The charges levied by National Grid in respect of the activities it undertakes to keep the transmission system in electrical balance at all time.

C

Connection Entry Capacity (CEC)

A measure of the maximum capability, expressed in MW, of a connection site and the associated generation units' connection to the transmission system.

Connection and Use of System Code (CUSC)

Multi-party document creating contractual obligations among and between all users of the GB transmission system, parties connected to the GB transmission system and National Grid is relation to their connection to and use of the transmission system.

Consents

The process of obtaining Consents for the construction of a new overhead line to serve, for example, a wind farm can essentially be broken down into two distinct areas. Consents to be obtained from the Secretary of State/ Planning authorities etc in relation to permission allowing a line to be built and secondly, and more practically, consents from landowners who will be affected by the construction of the new line.

For a new line consent under section 37 of the 1989 Act will be required. Inevitably proposals for a new line will be subject to a public inquiry. It is possible that recent changes in the regulations governing the conduct of inquiry in England and Wales may assist the process by reducing the requirement to justify the need for the line. Whether or not this proves to be the case, site specific issues such as those raised by statutory consultees (including local planning authorities, English Nature, English Heritage or the Environment Agency) or local residents take up a great deal of time at any inquiry. It is unlikely that any reduction on time spent justifying the need for the line will have a significant impact on the overall duration of the process.

In addition to section 37 consent, the DNO/TO must also obtain consent from the landowners over whose land the line will run. If a voluntary agreement cannot be struck, then either the land will have to be compulsory purchased, under the provisions of section 10 and Schedule 3 (which is usually used for substations), or a Necessary Wayleave obtained over it, under the provisions of section 10 (Schedule 4 paragraphs 6-8). Both the Compulsory Purchase Order process and the Necessary Wayleave process can take a significant amount of time.

Constraints

In the event that the pattern of generation may exceed the safe operational limits of a particular line or transmission system equipment, the GBSO will take actions to reduce the output of generators at specific locations on the system. At present these actions are taken in the Balancing Mechanism in the form of bids, and also via ancillary services, such as Pre-Gate Closure Balancing Mechanism Unit Transactions (PGBTs). Where a user's output is constrained down at a point on the system, the overall balance of energy will need to be retained, and costs will be incurred by the GBSO in bringing replacement energy onto the system.

Contracted background

This is the planning background against which National Grid assesses applications for connection and use of system. The contracted background includes all users that have entered into an (ongoing) agreement with National Grid for connection or use of system.

D

Deep reinforcement

Deep reinforcement refers to the works conducted on the wider transmission system in order to accommodate a change in the generation and demand pattern.

Department for Business, Enterprise and Regulatory Reform

The Department brings together functions from the former Department of Trade and Industry, including responsibilities for productivity, business relations, energy, competition and consumers, with the Better Regulation Executive (BRE), previously part of the Cabinet Office. The Department leads on making sustainable improvements in the economic performance of the regions. It is jointly responsible, with DfID and the FCO respectively, for trade policy, and trade promotion and inward investment.

Distributed Generation

A generator directly connected to a distribution system or the system of another user.

E

Evergreen

In the context of access rights, evergreen relates to access rights that do not have a finite end date.

F

Final Sums Liabilities (FSL)

The calculation of securities required for Users for their own works and for works that they will share with other Users.

G

GB System Operator (GBSO)

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 GB transmission system. National Grid is the GB system operator.

GB Transmission System

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

I

Interruptible Products

Products which allow National Grid to remove the right to generate prior to a given point at zero (or a reduced) cost.

K

Kilowatt (kW)/Megawatt (MW)/Gigawatt (GW)

A kW is the standard unit of electricity, roughly equivalent to the power output of a one-bar electric fire. A MW is a thousand kilowatts. A GW is a thousand megawatts.

Kilowatt hour (kWh)/Megawatt hour (MWh)/Gigawatt hour (GWh)

One kilowatt hour is the amount of electricity expended by a one kilowatt watt load drawing power for one hour. A MWh is a thousand kilowatt hours. A GWh is a thousand megawatt hours.

L

Limited Duration Transmission Entry Capacity (LDTEC)

LDTEC is a firm capacity product, which is provided within the financial year. It can provide access for a maximum of one financial year, and does not confer additional rights beyond the end point of the product. The availability of LDTEC would be assessed against operational criteria according to a pre-defined timetable that would provide access within three weeks from National Grid's receipt of an application.

Long-run marginal costs (LRMC)

In the context of electricity transmission, long-run marginal costs are the marginal costs of establishing and using network capacity. They include, for example, marginal costs for network reinforcement, as well as resulting network losses and residual congestion costs.

Local works

Those works required to provide a generator with a connection to the transmission network that would enable it to export power.

O

Offer

In the context of the Balancing Mechanism, an offer is a tool used by the GBSO, whereby a user submits data parameterising its willingness to increase generation or reduce demand. National Grid then decides whether or not to accept the offer.

S

Short-run marginal costs (SRMC)

In the context of electricity transmission, short-run marginal costs are the marginal costs of using established network capacity. They include, for example, network losses and congestion costs.

Short Term Transmission Entry Capacity (STTEC)

STTEC is a firm capacity provided, provided within-year, in 4, 5 or 6 week blocks.

T

Transmission Asset Owner (TO)

There are three separate transmission systems in Great Britain, owned by three Transmission Asset Owners, National Grid Electricity Transmission plc, Scottish Hydro Electric Transmission Ltd and Scottish Power Transmission Ltd. National Grid also has the role of system across the whole of Great Britain.

Transmission Entry Capacity (TEC)

The contracted maximum amount of electricity that each user is permitted to export on to the GB transmission system at any given time.

Transmission Network Use of System (TNUoS) charges

Charges that allow National Grid to recover the costs of providing and maintaining the assets that constitute the GB transmission system.

Appendix 4 - Summary of responses to the Call for Evidence

Introduction

1.1. This appendix provides an overview of the responses to the first consultation as part of the Transmission Access Review. It summarises the main points made in the responses to each of the questions raised in the consultation. A total of 30 responses were received to the 'Transmission Access review: A Call for Evidence to the Transmission Access Review' August 2007.

1.2. The questions that were raised as part of the consultation are outlined below:

Questions

Chapter 3

- **Question 1:** Do you consider that there is a need for change to the existing transmission access arrangements?
- **Question 2:** Do you agree with our assessment criteria?
- **Question 3:** Is the concept of sharing of transmission capacity (i.e. having less transmission capacity for a given amount of connected generation) the right approach to explore?
- **Question 4:** Do you consider that there is an issue with the property rights associated with TEC as set out in the CUSC?
- **Question 5:** Are the transmission access models set out in this document broadly appropriate in considering how to meet the Government's medium and long-term aspirations? Are there other models that should be considered?
- **Question 6:** Are there any issues arising from the growth in offshore generation that need to be taken into account in considering access reform for the onshore transmission network?

Chapter 4

- **Question 1:** What approaches to improving the delivery of infrastructure should we consider?
- **Question 2:** Which operational measures are likely to improve connection prospects?

Chapter 5

➔ **Question 1:** What changes to the constraint mechanism may be needed to create incentives for timely connection and disconnection from the transmission network and to sharpen investment signals?

1.3. An overview of the issues raised by respondents is summarised below.

Chapter 3

Question 1: Do you consider that there is a need for change to the existing transmission access arrangements?

1.4. The majority of respondents to this question considered that there was a need for change to the transmission access arrangements, and a large number of these suggested that fundamental change was needed. The reasons given for this were that delays generators are experiencing in connecting to the network need to be addressed and that this will help in the achievement of Government targets for renewable energy. Several parties stated that the planning process is adding to these delays, and that any deficiencies in the contractual framework need to be addressed. Another respondent suggested that the current access products were no longer suited to the requirements of intermittent renewable generation such as wind.

1.5. However, a small number of respondents, four in total, considered fundamental change was not needed. The justification for this was that it was considered too costly and time consuming and changes within the existing governance framework would be sufficient.

1.6. One respondent argued that the scope of the review should be altered as it does not take account of the growth of generation above demand. Another party argued that prioritising connection agreements within the queue for capacity should be the main priority and concentrating on developing financially firm access products.

Question 2: Do you agree with our assessment criteria?

1.7. The majority of respondents to this question supported the assessment criteria for the Transmission Access Review. However, many respondents suggested that priority needed to be given to certain assessment criteria, or indeed each of the assessment criteria needed to be ranked. The reasons given for this were that the environmental objective, it was argued, may conflict with other objectives for efficiency and not take account of the social benefits of connecting more renewable generation. Three respondents explicitly stated that environmental objectives should be placed top priority. Alternatively, some suggested that the balance of risk needed to be considered with regard to connecting more renewable generation against the costs of operating the system.

Question 3: Is the concept of sharing of transmission capacity (i.e. having less transmission capacity for a given amount of connected generation) the right approach to explore?

1.8. The responses to this question were mixed on whether or not sharing transmission capacity should be explored. Some supported the idea of sharing, but suggested that further clarification was needed on rights, compensation and operational issues. One party suggested that constraint mechanisms should be market based if sharing was introduced whereby the cost of the constraint would be targeted back to the generator that caused them. Another respondent recognised it was worthy of consideration, but argued that it maybe difficult to implement and maintain security of supply on the network.

1.9. Other respondents were not in favour of the concept of sharing transmission capacity. The reasons for this were based on concerns that it may mean only temporary rights for new entrants to the transmission system. Some respondents were concerned that sharing would increase capacity constraints to all other generators. Others argued that sharing already exists through the GB SQSS and further clarification on what the standards permitted was needed. One respondent argued that sharing capacity would not help congestion and delays in connection, so immediate benefits would not be realised.

Question 4: Do you consider that there is an issue with the property rights associated with TEC as set out in the CUSC?

1.10. The majority of respondents to this question considered that the way in which the rights associated with TEC were defined are not problematic. A number of respondents suggested that enduring firm access was important for investment. One respondent suggested that TEC was not an entry right but a boundary flow limit. A further respondent questioned whether TEC was a property right at all as it can be modified within the CUSC.

Question 5: Are the transmission access models set out in this document broadly appropriate in considering how to meet the Government's medium and long-term aspirations? Are there other models that should be considered?

1.11. Three models plus the overrun model were set out for consideration in the Call for Evidence document. A summary of responses to each model can be found below:

Incremental Change

1.12. Responses were divided on this model. Several respondents suggested that incremental change should be pursued. Whilst most were supportive of current initiatives to reduce the queue in the short term, others considered that a focus on more fundamental change was needed to bring about appropriate changes in the long term, and incremental change was not adequate to address the problems with transmission access.

Connect and Manage

1.13. Again responses to this model were divided, with 7 respondents supporting this approach to allow renewable generation to connect ahead of network reinforcements, and the same number expressing concern. Some respondents argued that this approach would ensure maximum utilisation of the network and would provide strong signals for investment in infrastructure by the TOs. Of these 7 respondents, 2 suggested that it would be a good interim solution to manage generation demand and delays to connection. However, a number of respondents had serious concerns over the level of costs that would be passed onto other generators on the system through increases in constraint costs. It was suggested that this could be mitigated by charging these constraints back to those that imposed them. However the difficulty in managing this type of system was also outlined by respondents. One respondent suggested this approach was very risky.

Auctions

1.14. The introduction of capacity auctions was not supported by respondents, of which 22 were received. The reasons given for this were varied. Many respondents argued that the absence of firm rights would limit investment by generators and will not provide long term investment signals to the TOs. One respondent considered that auctions may provide long-term investment signals.

1.15. Some respondents argued that a complex auctions regime would provide a barrier to new entry and would create distortions in the market if access was treated as a commodity. A number of respondents considered that an auction regime would translate into an increase in risk for generators. Another respondent argued that auctions were undesirable as renewable generation would have an unfair advantage because of the RO subsidy. A further respondent argued that there are major issues with the current gas auction regime with regard to transparency and complexity, which should not be extended to electricity. It was also suggested that it would be expensive and complicated to implement a similar mechanism in electricity. One respondent suggested there may be problems with over and under-recovery of auction revenue that had not been considered.

Overrun

1.16. The Overrun model received a mixed response from industry. Respondents recognised there was a risk associated with the costs of overrun which may make the management of the transmission system problematic. One respondent also argued that overrun could weaken investment signals. However, a further respondent did mention it could be developed as part of a suite of access products.

Question 6: Are there any issues arising from the growth in offshore generation that need to be taken into account in considering access reform for the onshore transmission network?

1.17. 18 responses were received from industry on issues in relation to offshore generation. The majority of respondents agreed that offshore generators should receive the same treatment as onshore generators, and therefore any developments from the review should be applicable to offshore. However, one respondent was keen to stress that there should be no cross subsidy between offshore and onshore generation.

Chapter 4

Question 1: What approaches to improving the delivery of infrastructure should we consider?

1.18. 20 responses were received from industry on the approaches for delivering infrastructure. A number of suggestions were made by industry, the most common of which are outlined. These are that planning process needs to be aligned with generators and that this needs to be done in further in advance this was raised by 6 respondents. More extreme views from certain respondents suggested that strategic planning was needed. Several respondents commented that reform of the GB SQSS may help connect more renewable generation.

Question 2: Which operational measures are likely to improve connection prospects?

1.19. 23 responses from industry were received on this question. The responses were divided into suggestions to consider the outcomes of the review to the GB SQSS and to review the SO incentives scheme so that the GBSO operates the transmission system efficiently and in particular by more effective management of constraints.

Chapter 5

Question 1: What changes to the constraint mechanism may be needed to create incentives for timely connection and disconnection from the transmission network and to sharpen investment signals?

1.20. 20 responses from industry were received in relation to changes to the constraint mechanism that maybe needed. Only three respondents considered that no change to the constraint mechanism was needed. Others respondents argued that the constraint mechanism is critical and provides strong investment signals. One respondent suggested that changes should be made so that constraint costs are borne by the participant that caused them. However, this respondent stated that as constraints are only a small element of the electricity price too much emphasis should not be placed upon them.