

Transmission Access Review - Analytical Discussion Document

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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 existing grid capacity 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 our Interim Report, this document represents our Analytical Discussion document. The TAR project will culminate in a final recommendations document in May 2008.

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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 existing grid capacity and the operation of the existing 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 (and other lower carbon) 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, an Interim Report to the Secretary of State, held several industry seminars, and produced separate reports on delivering and operating infrastructure and shorter term initiatives. This document constitutes our analytical paper which provides a status report on some of the analysis that has been taken to support our policy objectives. Our next document will be Ofgem and BERR's 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/WhIMkts/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/Consultation/DecisionsResponses/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

Transmission Access Review – Interim Report to the Secretary of State. January 2008.

http://www.ofgem.gov.uk/Networks/Trans/ElecTransPolicy/tar/Documents1/080131_TAR%20Interim%20Report_Consultation_FINAL.pdf

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Summary

Executive Summary

As part of Ofgem and BERR's Transmission Access Review, we have commissioned work to help identify and analyse the constituent building blocks of viable transmission access models or "strawmen", building on our comment to more thoroughly and logically assess the range of options for reform. This document provides a progress report on the analytical work that has taken place between our Interim Report publication in January 2008 and our Final Recommendations document in May 2008.

We explained in our Interim Report that the broad range of potential permutations for transmission access reform could result in the best solution being missed if we narrowly assessed pre-constructed strawmen. We have therefore explored with our consultants the range of building blocks to identify feasible end-to-end transmission access strawmen. This document provides a description of our consultants' detailed thinking on what the access building blocks are, what the key drivers are, and ultimately how the building blocks fit together to form strawmen. The strawmen developed from the building block approach have all been constructed with two key drivers in mind: the need to enable more efficient use of existing and future transmission capacity and substantial investment in new capacity. This document also sets out initial views of the issues that arise from the strawmen that have been constructed from our building blocks.

Running in parallel to this process we are also conducting a detailed Cost Benefit Analysis of the strawmen that we have identified in this document. We will publish our findings in our May 2008 Final Recommendations document, which will also include our Impact Assessment. It is important to recognise that the Cost Benefit Analysis work that is being produced by our consultants represents their independent views of the issues, and not necessarily Ofgem and BERR's. We are therefore not tied to recommending one particular strawman and may see benefits in a range of different key features. In our Final Recommendations document we will set out clearly our thinking on what the key features of the transmission access regime should be to fulfil the objectives of the review.

1. Background

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, to support better the timely and cost-effective connection of significant volumes of renewable generation.

1.2 The Government has a target that 10% of 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 20% of all Europe's energy should come from renewables sources. The UK is committed to meeting its fair share of this EU-wide target. 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 Government expects to publish a consultation document on its Renewable Energy Strategy in summer 2008 with a view to publishing the strategy in spring 2009.

1.4 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.

1.5 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 lead times, given the large amount of new renewable and conventional generation 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 operated on the basis of better sharing of transmission capacity between generators.

1.6 The Government's main objective for the transmission access review is to connect renewable generation to the transmission network quickly and cost effectively 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 firm 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 and other forms of low carbon electricity generation 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.

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.

1.9 At the outset of TAR, we were clear that the existing transmission charging methodology was not a major area of review in isolation. However, we were clear that there will be implications for the charging methodology and arrangements of any material change to the underlying access arrangements.

1.10 We still think that the implications for transmission charging as a result of access changes need to be considered in detail in an appropriate forum. We welcome National Grid's intended approach of conducting assessment of potential CUSC change with associated transmission charging issues in a more holistic manner.

TAR Publications

1.11 Ofgem and BERR have thus far published the following documents:

- **A Call for Evidence for a Review of Transmission Access**¹ – this document was published in August 2007, and sought views on the issues to be considered over the course of the TAR project, and included initial

thoughts on access models, delivering and operating infrastructure and incentivising efficient system operation;

- **Transmission Access Review - Interim Report to the Secretary of State** - Ofgem and BERR published its Interim Report to the Secretary of State in January 2008, and set out our key conclusions for transmission access which 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 identifying and 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 (as well as new conventional and low carbon generation) 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.

The EU renewable energy targets set an unprecedented challenge for our electricity networks. We need to be sure that steps identified now do not preclude further necessary measures as the government's Renewable Energy Strategy is developed; transmission access reform needs to provide 'no regrets' measures that are robust for the high levels of renewable penetration now envisaged. The Government plans to consult on the delivery of the UK share of the EU 2020 targets during 2008.

1.12 Ofgem has also published the following supporting documents:

- **Transmission System Operation Review Group (TSORG) Report** - 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. As mentioned in the Interim Report, Ofgem has written to the Transmission Licensees requesting additional analysis to be undertaken on a number of areas relating to enhancing capability of the transmission system. The deadline for the second phase of Ofgem's information expired at the end of March 2008. We are considering the information we have received and will present our findings at a subsequent industry seminar.

- **Short Term Access Governance (STAG) report** – related to the TSORG work, 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.

1.13 All these documents can be found on Ofgem's website at www.ofgem.gov.uk. Links can be found in the "Associated Documents" section of this document.

Stakeholder engagement

1.14 Since publication of our Call for Evidence document, Ofgem and BERR have held three public seminars to discuss issues in relation to transmission access. The first two seminars on 18 September and 5 November 2007 respectively focused on the principles of transmission access, whilst the third seminar focused on the regime for delivering and operating transmission infrastructure.

1.15 Continuing industry engagement is vital in ensuring that TAR progresses appropriately. 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.

1.16 We were also recently involved in two industry seminars held by National Grid in which it set out its views of potential approaches to deal with the energy challenges we face via existing governance processes. We welcome the effort made by the industry to engage constructively in this debate, and continue to believe that the impetus is firmly with industry. As stated in the TAR Interim Report we have not ruled out proposing legislation as a means of implementing the conclusions of the TAR, but that industry processes may be able to deliver the necessary reforms faster than legislation

2. Analytical framework

Introduction

2.1. This document provides an update on Ofgem/BERR's analytical programme to support TAR. As we have set out previously, we consider 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 have therefore developed an analytical process that focuses on the key access building blocks.

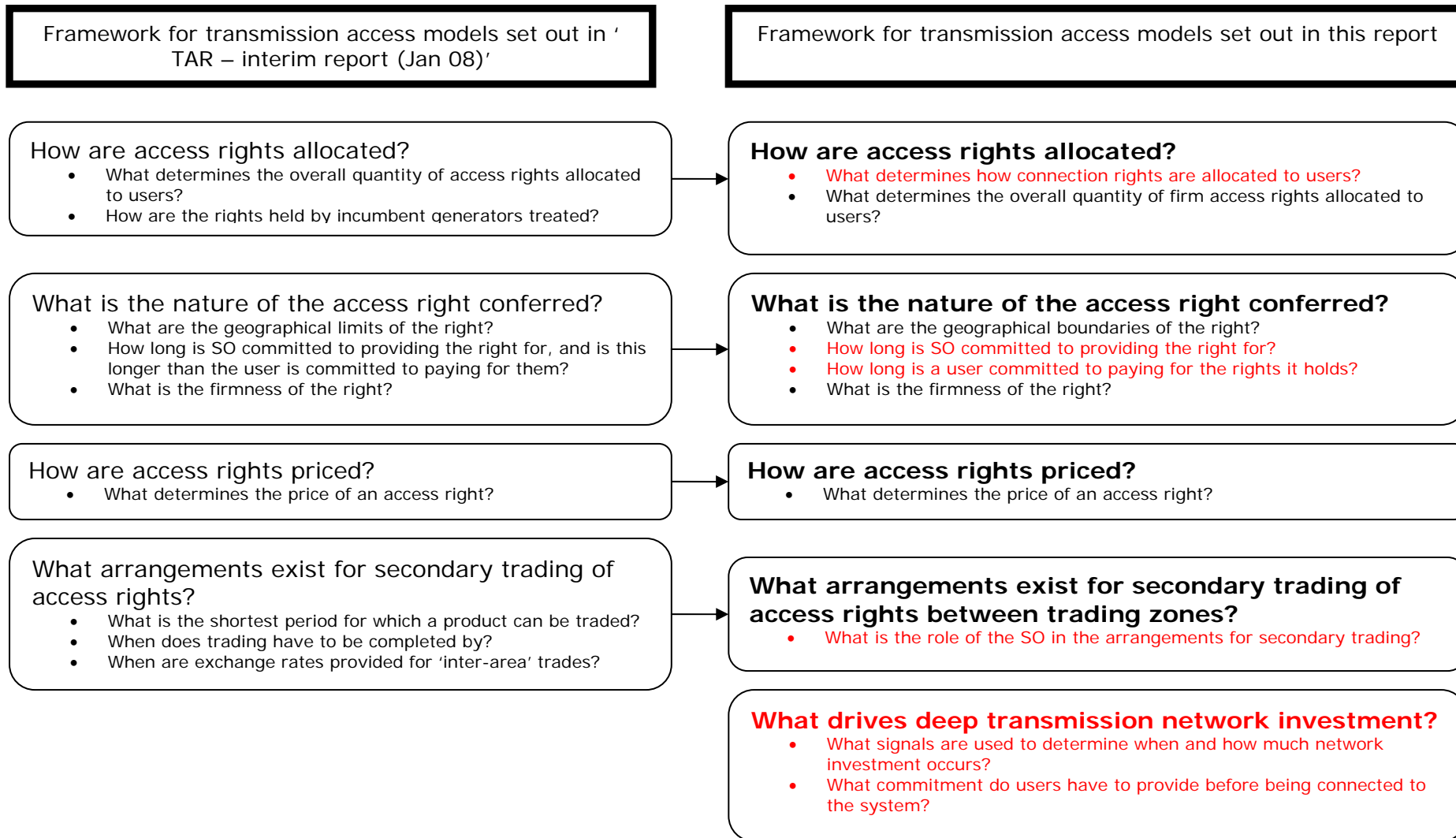
Access Building Blocks

2.2. In the interim report we set out a structure for access models based on a set of building blocks. By bringing together defined building blocks we have been able to assess the benefits of different combinations of elements and the extent to which they are mutually supporting. A fuller description of the building block approach is set out in our January 2008 Interim Report, particularly in the section on developing access models (3.19-3.35). The interim report included an appendix setting out the detailed analysis provided by Pöyry. In addition, IPA has also been asked to develop a building block framework for transmission access.

2.3. We have built on and integrated these two approaches to develop the framework for transmission access options presented in this document. This framework maintains a structure of transmission access models that are based on a number of key building blocks. These blocks are split up into a number of more detailed decision points.

2.4. The table below shows in summary what our key building blocks now look like, with changes from the model framework in the interim report, highlighted in red.

Table 1 – key transmission access building blocks



2.5. Significant investment in additional capacity will be required to accommodate higher levels of renewable generation. Therefore, we have added an extra building block related to the drivers of transmission investment. This reflects the importance of the framework for network reinforcement and extension in the efficient provision of access capacity. This building block includes decision points related to the timing, magnitude and funding of network investment.

2.6. Our consultants have also introduced another decision point which helps to clearly distinguish between the rights to connect to the system and the rights to access the system. This distinction was implied in the structure presented in the interim report but it may be helpful to make it more explicit within the model framework. This is similar to the difference between Connection Entry Capacity (CEC) and Transmission Entry Capacity (TEC) in the current arrangements.

2.7. Our consultants have assumed that after a transition period, all existing rights will be treated on the same basis as newly issued rights. The nature and duration of this transition period will be the subject of discussion of more detailed proposals than presented in this document. Therefore, there is no longer a decision point in relation to the treatment of existing rights.

2.8. In practical terms, the approach set out in some of the models may present difficulties, for example in relation to the treatment of existing generators transmission access rights, if proposed under the current statutory framework and industry code arrangements. The existing statutes, licence conditions and relevant code objectives broadly require arrangements that promote competition in the generation market and, to that end, to avoid any undue discrimination between different classes of generator on the terms on which they connect to and access the transmission system. It should be noted, however, that the Renewables Directive provides that Member States may provide priority access for electricity produced from renewable energy sources.

2.9. Strawmen models that envisage different access regimes for different generators (even for a transitional period), and specifically where existing generators and new generators gain access to the system on different terms will need to be carefully assessed to see whether any resulting discrimination is objectively justified and consistent with the current statutory framework.

2.10. The decision points comprising the secondary trading building block have been encapsulated into a single decision point which reflects the key dimension of the role played by the SO.

Analytical Progress

2.11. The models presented in this document relate to the allocation of connection and access rights to generation that should support increased renewable deployment. However, the renewable generation targets are defined in terms of output rather than capacity. At this stage, it is important to note that a firm right to dispatch does not guarantee that a generator will be able to physically access the system. Instead, it provides for the generator to receive financial compensation in the event that it is unable to physically access the system.

2.12. One of the determinants of the relationship between connected renewable capacity and renewable output will be the actions taken by the System Operator (SO) in the Balancing Mechanism. The SO may require generators to increase or reduce output for either energy balancing or network management issues. Renewable generators are likely to have lower marginal costs than non-renewable generation (as there is no fuel cost unlike conventional generators). It is likely that it will be cheaper for the SO to constrain conventional generation ahead of renewable generations. However, renewable generators may still be constrained down for network management issues, either as a result of congestion on the system ('constraints') or for system stability reasons (e.g. frequency or reactive power). The detailed operation of the Balancing Mechanism with respect to renewable generation is outside the scope of this review.

2.13. The EU renewable energy targets set an unprecedented challenge for our electricity networks. We need to be sure that steps identified now do not preclude further necessary measures as the government's Renewable Energy Strategy is developed. Transmission access reform needs to provide 'no regrets' measures that are robust for the high levels of renewable penetration now envisaged. The Government plans to consult on the delivery of the UK share of the EU 2020 targets during 2008.

Access Models

Access models – key themes

2.14. This section describes how key underlying themes have been taken into account in developing the transmission access models presented in this report. Each model addresses these issues in a different way. Therefore, the impact assessment of these models will provide insight into how magnitude and distribution of costs and benefits differs for each of these models.

2.15. As noted in the interim report, the accommodation of increased levels of generation will require both:

- *"more efficient use of both existing and future capacity"*.

2.16. All of the models are designed to facilitate the use of existing infrastructure to the maximum operational extent. This is supported by mechanisms for facilitating the efficient allocation, reallocation and use of available rights and transmission capacity. This means that those parties who value access the most (whether they be existing generators or new entrants) hold rights (not necessarily exclusively) at time of delivery. This will result in an improved ability for parties to share access (i.e. no longer need or demand assets dedicated to providing access solely for them) although there may still be a role for 'use it or lose it' mechanism to deal with concerns about market power in particular locations if a small number of generators hold all of the rights and capacity in that location is constrained.

2.17. Each model achieves this in a different way. Model A effectively oversells capacity and allocates access rights in excess of system capability. Model B facilitates the trading of a range of flexible access products. The final model provides all physical access through "overrun" arrangements.

- *“substantial investment in new capacity”.*

2.18. All of the models include mechanisms related to the timing, magnitude and funding of network investment. In this context, investment should be taken to cover many activities with varying cost implications. This ranges from grid studies and the provision of information, applications for planning consent right up to capital costs associated with physical investment.

3. Development of access models

3.1. Pöyry and IPA were asked to use their respective building block frameworks to set out and describe viable end-to-end strawman models for transmission access arrangements in Great Britain. The Pöyry and IPA reports are included in the appendices to this document.

3.2. We have used these pieces of work to inform our thinking on what are the advantages and disadvantages of the transmission access strawmen. Whilst Poyry and IPA have their independent views on these issues, we do not think it is appropriate to recommend one particular strawmen over another on the basis of the work done to date. All of the strawmen have their own strengths and weaknesses which will be identified by the full Cost Benefit Analysis work we will present as part of our final report and Impact Assessment in May 2008. This work is vital in informing our recommendations for transmission access.

3.3. The set of models presented in this report are designed to capture the full range of options that are likely to make a helpful contribution to the debate about transmission access reform. This means that these models are intended to test reasonable combinations of the building blocks rather than provide a definitive view of which models should be pursued. There are some combinations of options that are likely to be mutually reinforcing and other combinations that are mutually exclusive. Where appropriate, we have indicated these issues in the discussion of each model.

3.4. The reports produced by Poyry and IPA are appended to this document. It is not our intention to repeat in detail the findings of our consultants in this document. However, it is useful to outline the key features of the models and some of the issues associated with them, as set out below.

3.5. This section briefly describes the key features of these options in Table 2.

3.6. Table 2 shows how the options have been brought together to describe alternative access models:

- Model A adopts a 'connect and manage' approach to transmission access in which the right to access the system is driven by the requirements of connecting generators.
- Model B uses market-based mechanisms to deliver access to the party that values it most at any given time and is based on the 'Evolution' model proposed by National Grid and described in the TAR Interim Report.
- Model C is based on a locational marginal pricing approach.

Table 2 - options available at each decision point

Building blocks	Decision points	ID CODE	Options at each decision point			
			a	b	c	d
How are access rights allocated?	What determines how connection rights are allocated to users?	A1	Allocated no more than three years after application (subject to the generator satisfying specified project development criteria)	Allocated to generators according to their requirements		
	What determines the overall quantity of firm access rights allocated to users?	A2	Allocated to the generator at the same time as the rights to connect	Availability determined by system capability		
What is the nature of the access rights conferred?	What are the geographical boundaries of the right?	D1	Nodal	Zonal		
	How long is the SO committed to providing the right for?	D2	Long-term (3 years+)	Annual	Short-term	Indefinite
	How long is a user committed to paying for the rights that it holds?	D3	Long-term (3 years+)	Annual	Short-term	
	What is the firmness of the right?	D4	Fully financially firm at point of purchase ('compensation at bid price in BM')	Non-firm right with ex-ante pricing (e.g. 'compensation at pre-agreed price in BM')	Non-firm right with ex-post pricing (overrun)	
How are access rights priced?	What determines the price of an access right?	P1	Cost-based	Bid-based willingness to pay		
What arrangements exist for the secondary trading of access rights between trading zones?	What is the role of the SO in the arrangements for secondary trading between trading zones?	ST1	SO-administered	Flexible arrangements with SO as counterparty	Flexible arrangements with SO not required to be counterparty	
What signals are primarily used to determine when and how much deep network investment occurs?	What signals are primarily used to determine when and how much deep network investment occurs?	N1	Constraint costs	Value of bids for initial allocation of long-term firm access	SRMC of transmission	Prices paid in secondary trading mechanisms
	What commitment do users have to provide before being connected to the system?	N2	Commitment relates to cost of local connection assets	Commitment relates to local connection assets + capacity share of relevant upstream reinforcement costs	Commitment relates to local connection assets + per capita share of relevant upstream reinforcement costs	

3.7. Table 3 below demonstrates how these options have been combined to form each of the models presented in this report.

Table 3 – description of the transmission access models

Building blocks for document	Decision points for document	Models		
		A	B	C
		Connect + Manage	Market Based	Locational marginal pricing
How are access rights allocated?	What determines how connection rights are allocated to users?	A1a Allocated no more than three years after application (subject to the generator satisfying specified project development criteria)	A1b Allocated to generators according to their requirements	A1b Allocated to generators according to their requirements
	What determines the overall quantity of firm access rights allocated to users?	A2a Allocated to the generator at the same time as the rights to connect	A2b Availability determined by system capability	A2b Availability determined by system capability
	What are the geographical boundaries of the right?	D1a Nodal	D1b Zonal	D1b Zonal
		How long is the SO committed to providing the right for?	D2d Indefinite	D2a-c Access rights available for range of different durations
What is the nature of the access rights conferred?	How long is a user committed to paying for the rights that it holds?	D3a Long-term	D3a-c Symmetric with SO	D3b Annual
	What is the firmness of the right?	D4a Fully financially firm rights	D4a, D4c Fully financial firm rights + overrun	D4c All physical access through overrun
	How are access rights priced?	P1a Cost-based	P1a, P1b Bid-based willingness to pay for firm right + 'cost-based' charge for overrun	P1a, P1b Bid-based willingness to pay for FTR + 'cost-based charge' for overrun
What arrangements exist for the secondary trading of access rights between trading zones?	What is the role of the SO in the arrangements for secondary trading between trading zones?	ST1a SO-administered	ST1c Flexible arrangements with SO not required to be counterparty	ST1b Flexible arrangements with SO as counterparty
What signals are primarily used to determine when and how much deep network investment occurs?	What signals are primarily used to determine when and how much deep network investment occurs?	N1a Constraint costs	N1b (N1d) Value of bids for long-term firm access rights (supported by prices paid in secondary trading mechanisms)	N1c SRMC of transmission
	What commitment do users have to provide before being connected to the system?	N2a Commitment relates to cost of local connection assets	N2b Commitment relates to local connection assets + capacity share of relevant upstream reinforcement costs	N2c Commitment relates to local connection assets + per capita share of relevant upstream reinforcement costs

Model A

3.8. Model A adopts a 'connect and manage' approach to transmission access in which the right to access the system is driven by the requirements of parties. This reflects the model's primary focus of facilitating increased generation deployment. The key elements of this model are described below.

3.9. A new generator receives a guarantee of being connected to the transmission system no more than three years after the submission of their application. This is subject to their application satisfying specified project development criteria. These criteria may relate to physical (e.g. completion of local works), legal (e.g. planning consent) or financial issues. The new generator will be allocated firm access rights upon connection to the system. These rights can only be used to access the system at the node to which the generator is connected.

3.10. Connection of new generation is further facilitated by a pre-connection user commitment that only relates to the cost of local connection assets. Once it has connected to the system, the generator has a commitment to pay annual access charges for a de minimis period, with an extended notice period of at least 3 years to broader cover the wider reinforcement costs.

3.11. As there is no (system-determined) cap on the quantity of firm access rights available, these rights are available at prices set by the system operator. These prices reflect the long run marginal cost (LRMC) of providing access to the system for the pricing zone in which the generator is located.

3.12. As generators are able to freely obtain long-term firm access rights from the system operator (SO), there is little emphasis on putting in place arrangements to facilitate the secondary trading of firm access rights. Therefore, any trading of nodal rights would be done before gate closure on the basis of exchange rates published by the system operator.

3.13. The transmission network operator uses the information provided by the magnitude and distribution of constraint costs in making its decisions about the timing and magnitude of network investment to increase the physical capacity of the transmission system.

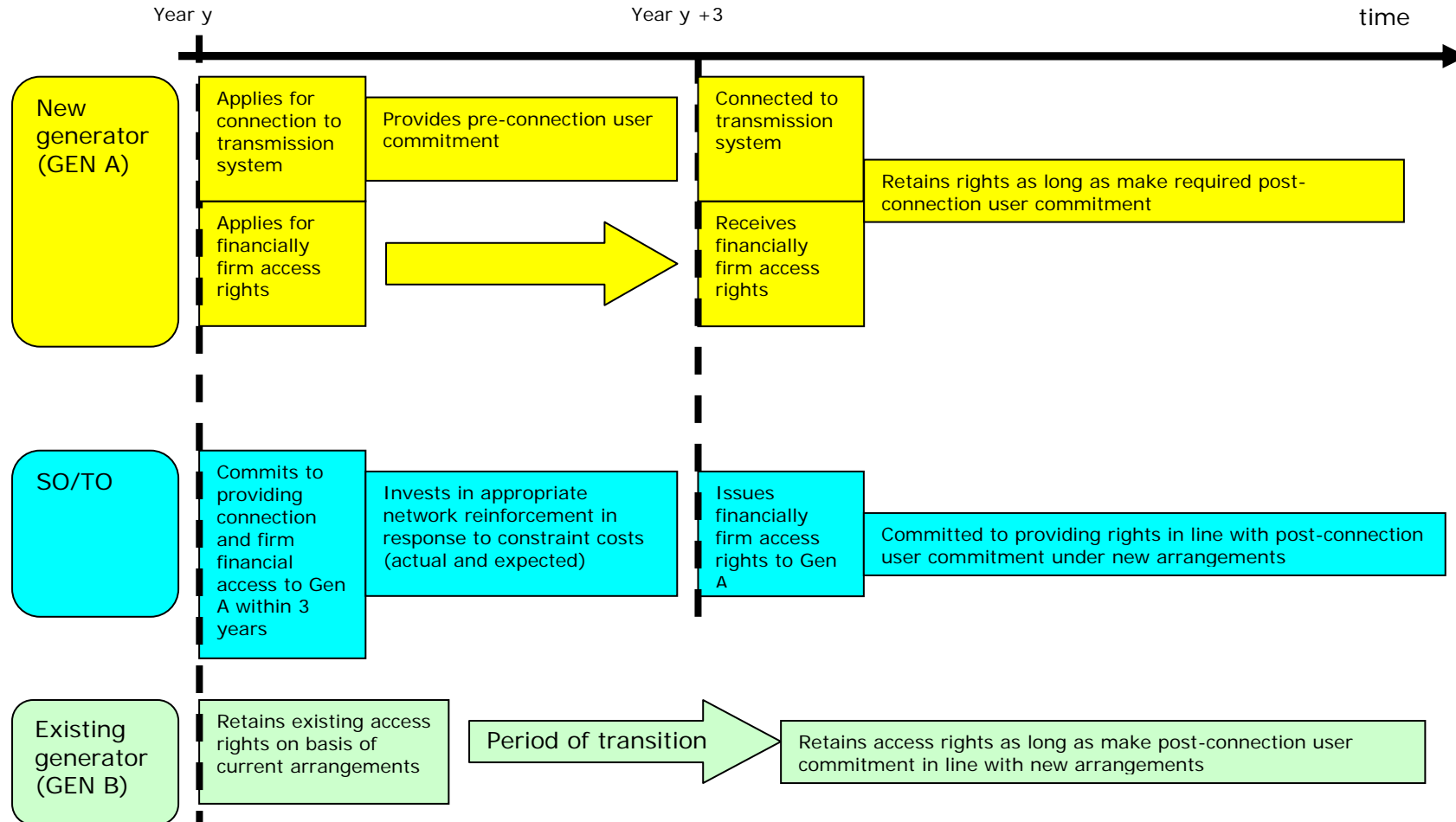
3.14. Figure 1 shows how Model A is constructed. Where the model differs significantly from current arrangements, those features are highlighted in bold.

3.15. Figure 2 provides an outline of how the rights and responsibilities of different parties change over time under the arrangements embodied in Model A. It demonstrates the relative simplicity of the access arrangements provided by this model.

Figure 1 – description of Model A

<p>Common assumptions: allocation of access rights</p> <ul style="list-style-type: none"> ■ There will be no reduction from current levels in the aggregate quantity of connection rights from the current level. ■ There will be no reduction from current levels in the aggregate quantity of firm access rights ■ After a transition period, all existing rights will be treated on the same basis as newly issued rights 	<p>Model features: allocation of access rights</p> <ul style="list-style-type: none"> ■ Right to connect is allocated to the generator no more than 3 years after it has submitted a (compliant) application (A1a) ■ Firm rights to access the system are allocated to the generator at the same time as the connection rights (A2a)
<p>Common assumptions: nature of access rights</p> <ul style="list-style-type: none"> ■ Entry-exit system ■ Entry rights only, demand treated implicitly ■ Capacity kept separate from energy market 	<p>Model features: nature of access rights</p> <ul style="list-style-type: none"> ■ Nodal rights (D1a) ■ Indefinite commitment from SO (D2d) ■ Long-term commitment from generator (D3a) ■ All rights are financially firm at point of allocation (D4a) ■ Long-term, fully financially firm rights (D3a)
<p>Common assumptions: pricing of access rights</p> <ul style="list-style-type: none"> ■ Long run marginal costs remains the primary revenue driver for the transmission operator ■ (pre-transition) existing rights continue to be priced on an administered basis that reflects LRMC of transmission 	<p>Model features: pricing of rights</p> <ul style="list-style-type: none"> ■ Administered (cost-based) pricing (P1a)
<p>Common assumptions: secondary trading of rights</p> <ul style="list-style-type: none"> ■ Trading of rights within the same geographically defined area can be done at an exchange rate of 1:1 ■ Baseline of current arrangements for 'inter-area' trading 	<p>Model features: secondary trading of rights</p> <ul style="list-style-type: none"> ■ SO-administered trading of rights between nodes (ST1a)
<p>Common assumptions: network investment drivers</p> <ul style="list-style-type: none"> ■ The transmission price control places a network investment incentive regime on the transmission network operator. ■ User commitment relates to at least the cost of the local connection assets 	<p>Model features: network investment drivers</p> <ul style="list-style-type: none"> ■ Constraint costs are primary source of network investment signals (N1a) ■ User commitment relates to local connection assets (N2a)

Figure 2 – Model A: outline of rights and responsibilities for different parties over time



Issues

3.16. The key issue for a “connect and manage” regime is the additional cost of system constraints that would be expected to emerge. This is the result of the allocation of firm access rights without any reference to physical system capability. The increase in constraint costs will be mitigated by the rate at which renewable projects can satisfy the relevant project development criteria, such as obtaining necessary planning consents.

3.17. These constraint costs are explicitly borne by network users and ultimately customers. The system operator faces some limited exposure to the level of constraint charges through the SO incentive scheme. Under the current arrangements, the SO bears some of the increase or decrease in constraint costs around a pre-determined target level. The majority of the costs are currently recovered from generation (who will seek to recover them from suppliers in setting their prices in the wholesale market) and suppliers through the Balancing Services Use of System (BSUoS) charging mechanism. Suppliers in turn will seek to recover all of these costs through the prices they charge business and domestic electricity customers.

3.18. The volume and price of constraints associated with a connect and manage approach are influenced by a number of factors. In the case of the former, the volume of constraints will depend on the extent to which generation wishing to export onto the transmission system exceeds its physical capacity. As connect and manage implies that generation can export onto the system without the required transmission infrastructure reinforcements, the volume of constraints depends on the amount of generation connecting in advance of the any transmission investment required and the duration of the advancement. These factors would need to be assessed in detail in coming to a view as to the likely volume of additional constraints.

3.19. The volume of constraints is likely to rise with connect and manage as it is likely to lead to renewable generation connecting in areas of the transmission system that are already heavily congested and/or where significant reinforcement is required to accommodate the new and existing generation that will want to access the system at the same time.

3.20. The impact of connect and manage on the price that generators seek in the event of constraints is more difficult to predict. There is a long history of concerns and Ofgem investigations into whether the conduct of generators where transmission constraints are in place was abusive. Ofgem has recently announced an investigation into Scottish and Southern Energy plc and Scottish Power Ltd² following a complaint about their behaviour during periods where transmission constraints were in place.

3.21. In assessing the strawman models we will need to consider and conduct analysis of the risks and potential mitigations in relation to the scope for constraint costs to rise significantly as a result of market abuse. Mitigation measures could be ex-ante, for example, by requiring methodologies to be in place that determine the price that generators are paid in the event of a transmission constraint, or ex post such as redress under the Competition Act

² For more information please see the following link:

<http://www.ofgem.gov.uk/Media/PressRel/Documents1/Ofgem%2012.pdf>

1998. In the case of ex-post measures, customers could be exposed to the cost of any abusive pricing practices until a case is concluded (and this may include any appeal to the Competition Appeal Tribunal. This process could take between up to four years. We will need to assess carefully the potential risks, associated costs and what could be done to mitigate these risks in assessing this strawman proposal.

3.22. There are also problems with the current market rules that could give rise to other concerns about this strawman if it was likely to give rise to a significant increase in the volume of constraints even if market power concerns could be addressed. Ofgem recently published an impact assessment that showed that the existing rules do not properly remove the costs of resolving transmission constraints from the calculation of energy imbalance prices. This defect can give rise to distortions in competition in the wholesale market as generators out of balance can pay (or receive) too high (low) a price when they sell or buy energy through the imbalance arrangements. Although there are currently two modification proposals (P212 and P217) that seek to correct this defect. But an assessment of these proposals would also have to consider the risk that these problems could continue and assess the potential harm.

3.23. This strawman also raises the issue discussed previously of the treatment of new versus existing generators. Although any concerns regarding the potential for undue discrimination could, however, be addressed by adopting the same arrangements for all generators with no transition for existing generators.

Possible variants of Model A

3.24. There are a number of possible variants of the connect and manage model. Some of these variants could mitigate some of the potential increase in constraint costs compared with the existing arrangements and associated constraint costs.

- Limiting the provision of a guaranteed connection within a fixed timescale in export-constrained areas to a class of 'eligible generators';
- Issuing non-firm access rights in place of a proportion of the firm rights issued to newly connecting generators;
- Fixing the price ex-ante that new (or new and existing users) are paid in the event that the SO has to constrain them off the system due to network constraints (this need not require the actual price level to be fixed but could, for example, be based on an agreed methodology that linked compensation to "lost profit" for example the difference between operating costs and the wholesale price); and
- Lengthening the time period (beyond three years) within which the SO has to allocate firm access rights in response to a compliant application.

3.25. In the first variant, a key role is played by the conditions under which generation in export-constrained areas can qualify for the allocation of connection and access rights. Where possible, this definition should be based on objective criteria against which the performance of a particular application can be easily and quantitatively assessed (e.g. physical and/or financial criteria). The TAR is focused on the facilitation of renewable generation. Therefore, one possible variant could be that in export-constrained areas, eligibility for connection and

access rights would be limited to generation whose connection facilitated an increase in renewable generation (subject to meeting project development criteria). Conventional thermal generators in export-constrained areas may qualify as eligible generation in instances where they would provide system support (e.g. through frequency response).

3.26. As mentioned earlier, variant models that envisage different access regimes for different generators (even for a transitional period), and specifically where existing generators and new generators gain access to the system on different terms will need to be carefully assessed to see whether any resulting discrimination is undue.

3.27. The conditions for eligibility could be extended to include instances in which the connection of generation will make a positive contribution to security of supply for example, although detailed consideration of the appropriateness of such an approach would need to be considered given the Energy White Paper's conclusions that security of supply can and should be left to the market to resolve. However, the more complicated the conditions for eligibility, the more difficult it is for the TO to demonstrate that it is applying the rules in a transparent manner. However, this may not provide greater uncertainty than current arrangements for determining the allocation of access rights.

3.28. One method of allocating non-firm rights is to provide generators with access rights that require the generator to submit a pre-determined bid price into the Balancing Mechanism. Therefore, before or at Gate Closure, the generator would submit a Final Physical Notification (FPN) of their intended generation output. They would then find out through the relevant Balancing Mechanism processes as to whether they are actually able to export their intended output or not. One example of the methodology for determining their required bid price is to link it to the prevailing market price for energy in the relevant period. Although there has been much industry discussion and debate, including during the assessment of a recent proposal (CUSC Amendment Proposal 148 - Deemed Access Rights to the GB Transmission System for Renewable Generators) about how feasible it is in practice to specify rules that appropriately reward generators for any lost profit when a constraint is in place. This is because different generation types have different variable costs and earn different margins for a given wholesale price. A thermal generator for example "avoids" the costs of using fuel and EU ETS permits when it does not generate whereas a renewable generator has no fuel costs, very low operating costs and would also not earn a ROC if it cannot generate and so would face much greater financial loss, for a given wholesale price, than a conventional generator.

3.29. Such products will be more attractive to plant with greater control over its level of output. This is because when output from other plant is low, the energy price is likely to be high with little chance of the plant being constrained off even with non-firm rights. Therefore, plant with more controllable output may be willing to trade their existing firm rights with the non-firm rights held by new generators. However, this of course assumes that there are no market power issues and low transaction costs so that rights would be freely traded between generators in a liquid market.

3.30. The use of non-firm rights would make the constraint costs associated with these rights implicit rather than explicit because they are borne by generators rather than customers.

3.31. The conditions under which the system operator provide connection and allocation rights will determine how risk is balanced between customers and the new generator. These will also interact with the incentives placed on the TO with respect to network investment³.

Model B

3.32. Model B uses market-based mechanisms to deliver access to the party that values it most at any given time. This can be achieved through a combination of the initial allocation and secondary trading of a range of access products. This includes firm access rights of different duration and the provision of a facility for generators to generate and gain access the system through "overrun arrangements" i.e. generate when they do not hold access rights and pay an overrun charge. The key elements are of this model are described below.

3.33. A new generator is able to be connected to the transmission system upon submission of an application that satisfies specified project development criteria. These criteria may relate to physical (e.g. completion of local works), legal (e.g. planning consent) or financial issues.

3.34. However, connection to the system does not confer any firm access rights on the generator. There are a number of different ways in which the generator is able to export its output onto the transmission system (up to their level of Connection Entry Capacity). These include:

- Obtaining firm access rights from the system operator ('initial allocation'); making successful bids for long-term firm access rights; making successful bids for short-term firm (or interruptible) access rights;
- Obtaining firm access rights from other generators ('secondary trading'); and
- Using the overrun facility.

3.35. In making its network investment decisions, the network operator will take into account the values placed on long-term firm access rights in the bids that it receives in the initial allocation process. These will be supported by the evidence from the prices seen in secondary trading mechanisms. If the system operator receives bids for access rights for a sufficiently long period (rather than a snapshot) that are significantly above the long run marginal cost of providing that access, then firm access rights will be provided to the successful bidders within three years of the auction.

3.36. In order to facilitate secondary trading of rights up to real time, a firm access right provides a generator with firm access within a trading zone (which is a collection of different nodes). The boundaries of trading zones may or may not coincide with the boundaries of (current or future) pricing zones. As it is assumed that trading of rights within a zone can be done on a 1:1 basis, the definition of

³ Ofgem have recently announced the launch of a two-year review of the network regulation regime. This is expected to feed into the next transmission price control review, which will take effect from April 2012.

rights as zonal allows for the easy and quick trading of rights within a larger area than a single node.

3.37. In addition, model B contains arrangements to facilitate the secondary trading of firm access rights between different zones. These arrangements include the use of pre-published exchange rates for inter-zonal trades, which can be completed after gate closure (up to a specified deadline). There is no restriction on the duration over which rights can be divided into for trading purposes. The system operator is not required to be a counterparty to the trade.

3.38. Any existing right would need to be converted to the same basis as a new right before it can be entered into the secondary trading mechanisms. This is done to encourage holders of existing rights to convert their rights to the same basis as new rights. As with other models where there are different approaches for new and existing generators, detailed consideration would need to be given as to whether or not any resulting discrimination can be objectively justified. One potential mechanism to overcome any concerns would be for all users, both existing and new generators to start with the same ability to bid for rights in the initial allocation.

3.39. This model is similar to the 'evolution' approaches that have been described by National Grid at a number of industry events. Both approaches are intended to increase the flexibility of access options open to generators. Therefore, they emphasise the importance of the system allocating a range of access products and the facilitation of secondary trading of access rights, through measures such as zonal definitions. The model presented in this document goes beyond the NG model by allowing trading to occur ex-post and on an inter-zonal basis.

3.40. Both models seek to have a more clearly defined duration of access products with more symmetry in the length of obligations placed on SO (to provide access) and generators (to pay for access) after the allocation of access rights. Model B includes a mechanism designed to encourage the conversion of existing rights into defined period rights, whereby a generator can only trade a right if that right is valid for a defined period.

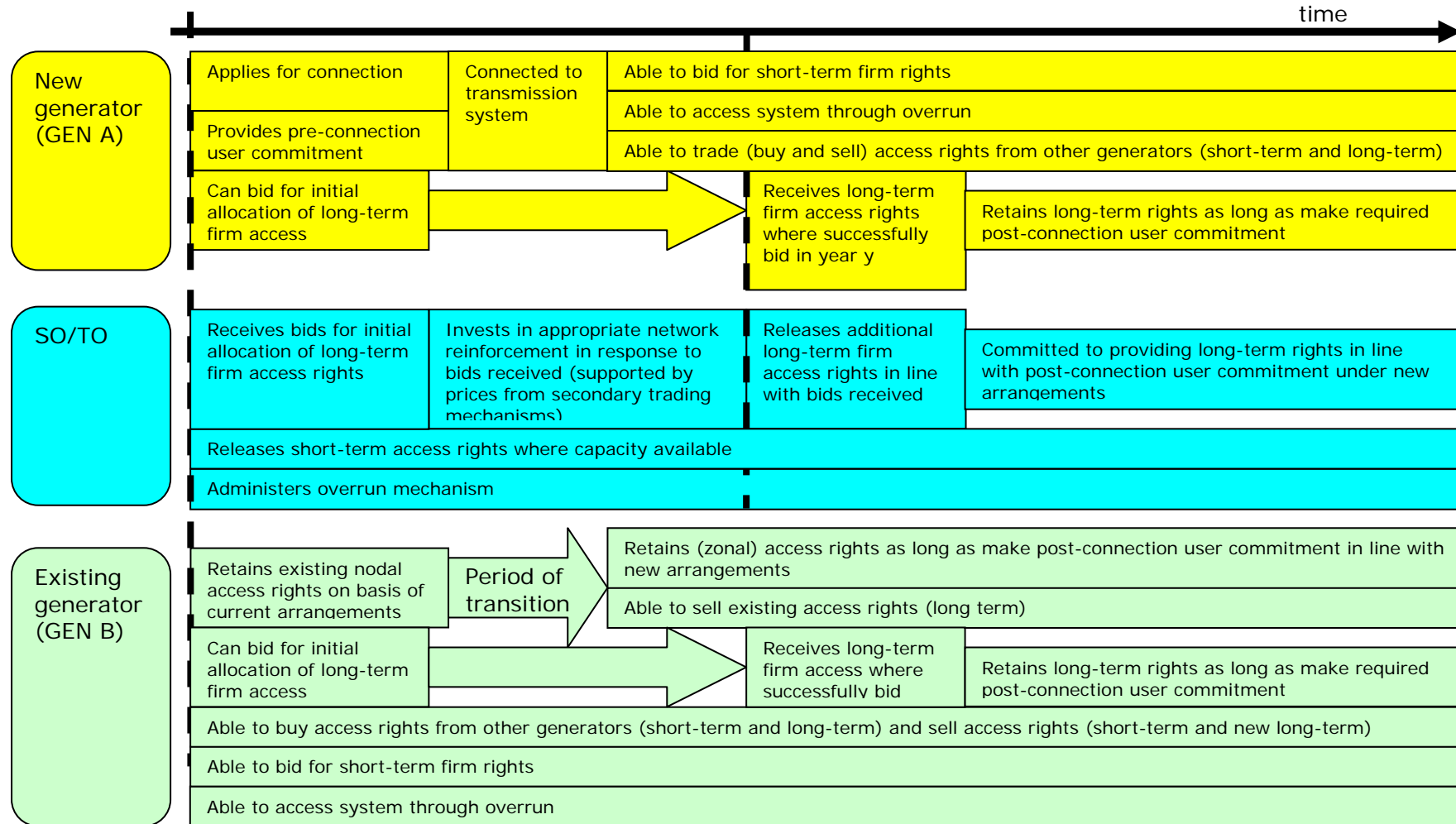
3.41. Figure 3 below shows how Model B is constructed. Where the model differs significantly from current arrangements, those features are highlighted in bold.

3.42. Figure 4 provides an outline of how the rights and responsibilities of different parties change over time under the arrangements embodied in Model B. It illustrates the range of different options open to generators under this model.

Figure 3 – description of model B

<p>Common assumptions: allocation of access rights</p> <ul style="list-style-type: none"> ■ There will be no reduction from current levels in the aggregate quantity of connection rights from the current level. ■ There will be no reduction from current levels in the aggregate quantity of firm access rights ■ After a transition period, all existing rights will be treated on the same basis as newly issued rights 	<p>Model features: allocation of access rights</p> <ul style="list-style-type: none"> ■ Rights to connect are allocated to the generator based on their requirements (A1b) ■ The aggregate quantity of firm access rights that the SO allocates is based on system capability for relevant period (A2b)
<p>Common assumptions: nature of access rights</p> <ul style="list-style-type: none"> ■ Entry-exit system ■ Entry rights only, demand treated implicitly 	<p>Model features: nature of access rights</p> <ul style="list-style-type: none"> ■ Zonal rights (D1b) ■ SO commitment lasts for a defined period that reflects length of access product (D2a-c) ■ Post-connection user commitment is symmetric with SO obligations (D3a-c) ■ Firm rights (long-term; short-term) (D4a) ■ Overrun with ex-post pricing (D4c)
<p>Common assumptions: pricing of access rights</p> <ul style="list-style-type: none"> ■ Long run marginal costs remains the primary revenue driver for the transmission operator ■ (pre-transition) existing rights continue to be priced on an administered basis that reflects LRMC of transmission 	<p>Model features: pricing of rights</p> <ul style="list-style-type: none"> ■ Willingness to pay pricing for all newly allocated firm rights (P1b) ■ Administered pricing (SRMC) for physical access through over-run (P1a)
<p>Common assumptions: secondary trading of rights</p> <ul style="list-style-type: none"> ■ Trading of rights within the same geographically defined area can be done at an exchange rate of 1:1 ■ Baseline of current arrangements for 'inter-area' trading 	<p>Model features: secondary trading of rights</p> <ul style="list-style-type: none"> ■ Flexible arrangements for secondary trading of rights between zones with SO not required to be counterparty (ST1c)
<p>Common assumptions: network investment drivers</p> <ul style="list-style-type: none"> ■ The transmission price control places a network investment incentive regime on the transmission network operator. ■ User commitment relates to at least the cost of the local connection assets 	<p>Model features: network investment drivers</p> <ul style="list-style-type: none"> ■ Network investment driven by bids received for initial allocation of long-term firm capacity, supported by prices in secondary trading mechanisms (N1b, N1d) ■ User commitment relates to local connection assets + capacity share of upstream reinforcement (N3b)

Figure 4 – Model B: outline of rights and responsibilities for different parties over time



Issues

3.43. This model involves the creation of a number of different mechanisms for the initial allocation and secondary trading of a range of flexible access products. Therefore, a key issue for this model is whether it is feasible that a sufficiently liquid market develops for the trading of access close to real time. It will also be important to understand the extent to which the opportunity of obtaining short-term access, either through short-term firm rights or through overrun, is sufficiently certain for developers when trying to obtain financing.

3.44. The lumpy nature of network investment means that the use of price signals to trigger network investment could lead to some perverse incentives for generators. For example, they may be reluctant to bid a high price for a right to access in a particular zone if it results in a large investment in increased system capability in a particular zone. Instead they may choose to piggyback on the investment triggered by high bids from other users.

3.45. As with other models, if the strawmen envisage different access regimes for different generators (even for a transitional period), and specifically where existing generators and new generators gain access to the system on different terms they will need to be carefully assessed to see whether any resulting discrimination is undue.

Model variants

3.46. There are a number of possible variants to this model. These typically centre on the arrangements for secondary trading. A 'use it or lose it provision' could be used to replace or stimulate a liquid secondary trading market close to real time. Under such a provision, holders of firm rights have to provide notification ahead of their intended use of their capacity holdings ahead of gate closure. This could facilitate the release of unused capacity as short-term firm access products. There may also be changes to the nature of secondary trading between zones. Alternatively, if there are concerns about the potential for the abuse of locational market power in the secondary trading market, it is possible to have greater involvement of the SO in secondary trades. However, this may reduce the speed of secondary trading of firm access rights between zones. At the extreme, the National Grid 'evolutionary model' relies on secondary trading within rather than between zones.

3.47. This strawman also raises the issue discussed previously of the treatment of new versus existing generators and consistency with the existing statutory framework. Although any concerns regarding the potential for undue discrimination could, however, be addressed by adopting the same arrangements for all generators with no transition for existing generators.

Model C

3.48. Model C is based on a locational marginal pricing approach, which exposes all participants to the short run costs of transmission access in each half hour. The model maintains the separation of energy and capacity markets. The key elements of this model are described below.

3.49. A new generator is able to be connected to the transmission system upon submission of an application that satisfies specified project development criteria. These criteria may relate to physical (e.g. completion of local works), legal (e.g. planning consent) or financial issues.

3.50. The existing TEC product would be replaced by a system of purely financial products, called FTEC (Financial Transmission Entry Capacity). These products are defined on a zonal basis. This would happen with immediate effect for newly issued rights and after a period of transition for existing TEC holdings.

3.51. As firm access rights are no longer allocated to generators as part of their connection to the system, new generators (and existing generators post-transition) are only able to export onto the transmission system through an overrun mechanism (up to their level of Connection Entry Capacity). This means that all parties are exposed to the ex post marginal cost of short run transmission access. For each zone, this is equivalent to the difference between the 'unconstrained national' electricity price and the 'constrained zonal' energy price. The payments made by generators are determined in relation to their Final Physical Notifications, rather than metered levels of generation.

3.52. Holders of the FTEC product are entitled to receive payments from the system operator. These are equivalent to the short run marginal cost of transmission for the relevant zone multiplied by their holdings of FTEC. In some instances, these costs may be negative which would require the holders of FTEC to make payments to the SO. There is no link between the payments received or made and the (notified or metered) generation pattern of the holder of the FTEC. These payments are designed to operate as a hedge for generators against variations on the short run marginal cost of transmission in each zone.

3.53. Generators can obtain FTEC through bidding for the rights initially allocated by the system operator or through secondary trading mechanisms. Flexible secondary trading arrangements (as outlined in Model B) are in place with the system operator acting as a counterparty to all trades. As FTEC is a long-term financial product with no requirement for close to real time liquid trading, the secondary trading arrangements can be less flexible than those included in Model B. This includes the scope for having FTEC defined on a nodal rather than zonal basis.

3.54. Where constraints are significant, the prices paid to FTEC holders will be high. However, it is also likely that the initial allocation of FTEC will vary locationally according to the costs of providing access at particular points on the system. Therefore, in making its network investment decisions, the network operator will take into account the payments made to and received from FTEC holders.

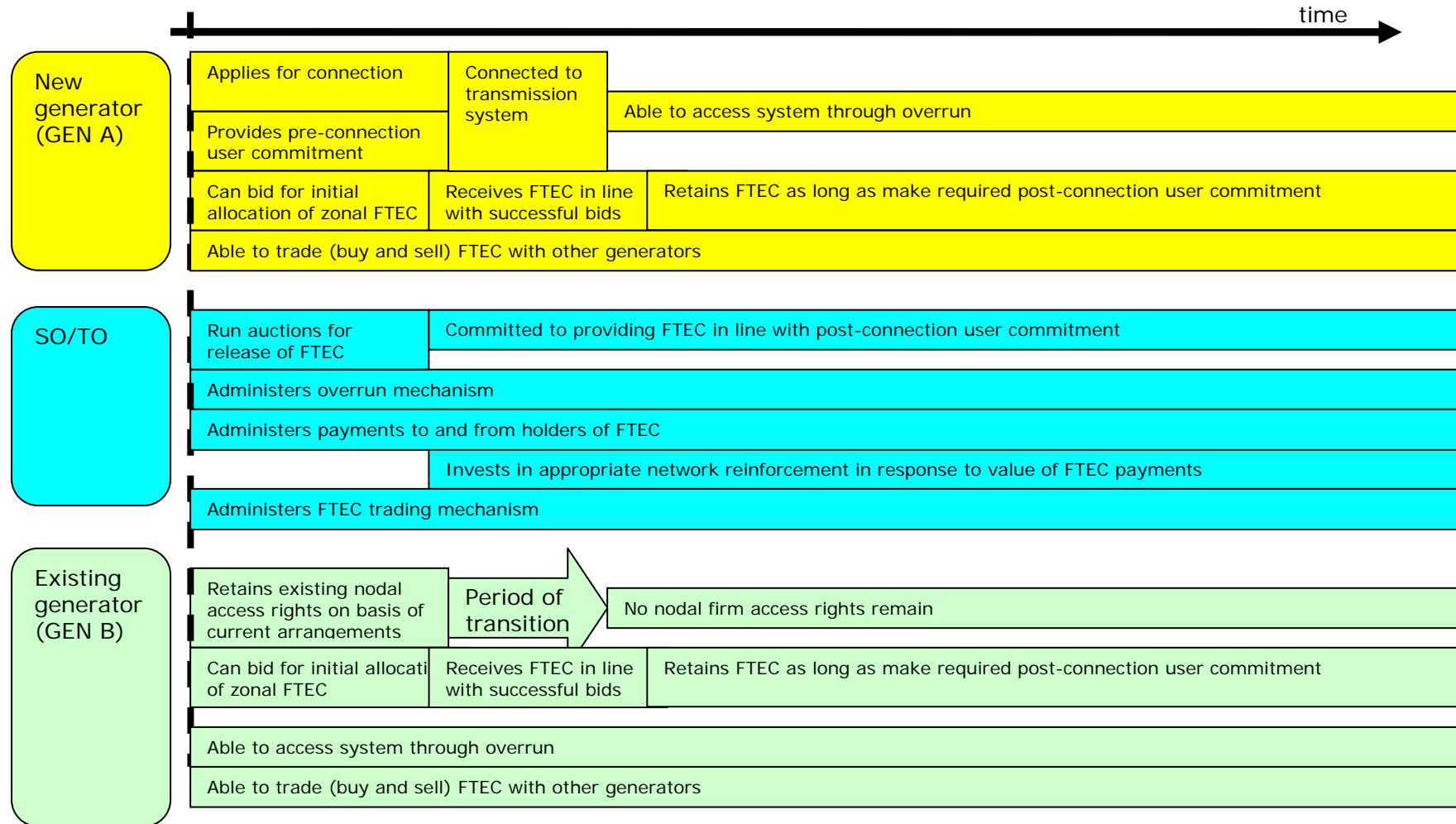
3.55. Figure 5 below shows how Model C is constructed. Where the model differs significantly from current arrangements, those features are highlighted in bold.

3.56. Figure 6 provides an outline of how the rights and responsibilities of different parties change over time under the arrangements embodied in Model C.

Figure 5 – description of Model C

<p>Common assumptions: allocation of access rights</p> <ul style="list-style-type: none"> ■ There will be no reduction from current levels in the aggregate quantity of connection rights from the current level. ■ There will be no reduction from current levels in the aggregate quantity of firm access rights ■ After a transition period, all existing rights will be treated on the same basis as newly issued rights 	<p>Model features: allocation of access rights</p> <ul style="list-style-type: none"> ■ Rights to connect are allocated to the generator based on their requirements (A1b) ■ The aggregate quantity of FTEC that the SO allocates is based on long-term system capability (A2b)
<p>Common assumptions: nature of access rights</p> <ul style="list-style-type: none"> ■ Entry-exit system ■ Entry rights only, demand treated implicitly ■ Capacity kept separate from energy market 	<p>Model features: nature of access rights</p> <ul style="list-style-type: none"> ■ Zonal rights (D1b) ■ SO has annual obligation (with respect to FTEC only) (D2b) ■ Generator has annual obligation (with respect to FTEC only) (D3b) ■ All physical access through over-run (D4c)
<p>Common assumptions: pricing of access rights</p> <ul style="list-style-type: none"> ■ Long run marginal costs remains the primary revenue driver for the transmission operator ■ (pre-transition) existing rights continue to be priced on an administered basis that reflects LRMC of transmission 	<p>Model features: pricing of rights</p> <ul style="list-style-type: none"> ■ Bid-based pricing for all non-grandfathered FTEC rights (P1b) ■ Administered pricing (SRMC) for physical access through over-run (P1a)
<p>Common assumptions: secondary trading of rights</p> <ul style="list-style-type: none"> ■ Trading of rights within the same geographically defined area can be done at an exchange rate of 1:1 ■ Baseline of current arrangements for 'inter-area' trading 	<p>Model features: secondary trading of rights:</p> <ul style="list-style-type: none"> ■ Flexible arrangements for secondary trading of FTEC between zones with SO required to be counterparty (ST1b)
<p>Common assumptions: network investment drivers</p> <ul style="list-style-type: none"> ■ The transmission price control places a network investment incentive regime on the transmission network operator. ■ User commitment relates to at least the cost of the local connection assets 	<p>Model features: network investment drivers</p> <ul style="list-style-type: none"> ■ Network investment driven by pattern of FTEC payments (N1c) ■ User commitment relates to local connection assets + per capita share of upstream reinforcement (N3c)

Figure 6 – Model C: outline of rights and responsibilities for different parties over time



Issues

3.57. There are a number of potential issues that would need to be considered in the assessment of this model:

- Appetite of generators to be exposed to short run marginal transmission costs, given the potential for this to be high and unpredictable. Generators risk profiles will ultimately decide whether or not they are happy to be exposed to the SRMC, or whether they contract for FTEC in advance. One issue in this area is how any potential grandfathering of rights impacts on the amount of FTEC generators have, and how much additional they will need to contract for, or expose themselves to the SRMC.
- Recovery of transmission costs by system operator;
 - Incomplete recovery of costs of local transmission assets;
 - Under or over recovery of costs (although this could potentially be resolved via a commodity charge)
- Timeliness of investment signals provided by FTEC payments; and
- Converting physically-based rights to financial rights.

3.58. Under this model, all (notified) export is priced on the basis of short run marginal costs of transmission. Therefore, it will be important to understand how generators perceive the riskiness of exposure to these costs. If generators view such exposure as being very risky, then they may only be willing to submit final physical notifications in line with their holding of FTEC as this would provide them with a complete hedge across variations in short run marginal costs. If this happens, then the mechanisms for initial allocation (such as the extent of grandfathering from current TEC holdings) and secondary trading of FTEC becomes crucial in determining the impact of this model on the ability of new generators to access the system.

3.59. The perception of the risk will also be affected by whether the zonal transmission prices are symmetric and hence allowed to be negative. If zonal transmission prices are negative, this implies that FTEC holders would have to make payments to the system operator. This may reduce the perceived value of holding FTEC as a pure financial product.

3.60. There may be an issue as to whether short run marginal costs of transmission are able to signal investment requirements in a timely manner. Given the lead times associated with network investment, it would be important to understand the extent to which the magnitude and pattern of current constraints are a robust indicator of the magnitude and pattern of future constraints. Therefore, it may be helpful for the network operator to also take account of price signals from FTEC allocation and secondary trading mechanisms. However, the value of FTEC may be driven by expectations about the volatility of short run marginal costs of transmission (and hence the value of FTEC as a hedge) as much as the actual level of these costs.

3.61. In the current transmission access arrangements, generators pay for transmission access based on the capacity of their TEC holdings. Their payments are not determined by the extent to which they use their access capacity. In model C, generators pay for transmission access based on their intended use of

the system for export. This access is priced in line with short run marginal transmission costs. In order to provide the option for each generator to export onto the system through overrun, the system operator will be required to maintain local (transmission) assets. Therefore, if a generator uses the system (in terms of the intended export volumes included in its Final Physical Notifications) less than expected, the system operator may not recover the costs of the local connection assets for that generator. Therefore, it may be appropriate to introduce a per kW charge for Connection Entry Capacity for local assets to allow the recovery of these costs by the system operator.

3.62. There is currently a residual under or over recovery of costs by the system operator, which is distributed amongst users of the transmission system. Given that within-year revenue from short-term sales and the costs and revenue associated with overrun would be less certain, greater reliance would be placed on the year-on-year correction mechanisms for total allowed revenue or a commodity charge on generators.

3.63. The removal of the link to physical access in the rights held by incumbents will need to be considered in terms of potential implications for project financing, existing contracts etc. Furthermore, the implementation will need to include a review of the applicability of the GBSQSS and the existing pricing regime for a purely physical product, rather than the existing quasi-physical TEC, and what planning standard (if any) should be used to govern users' rights to overrun.

3.64. As mentioned elsewhere, strawmen models that envisage different access regimes for different generators (even for a transitional period), and specifically where existing generators and new generators gain access to the system on different terms will need to be carefully assessed to see whether any resulting discrimination is undue.

Next steps

3.65. The purpose of this document is to set out the progress that has been made in identifying and assessing potential options for transmission access reform, following the interim conclusions for general access principles as set out in our Interim Report. Running in parallel with this document, we are continuing to work on a detailed Cost Benefit Analysis of the range of strawmen that we have identified in this document, which will feature in our May Final Recommendations document.

3.66. The purpose of producing this analysis is to inform our recommendations and ensure that we have given appropriate consideration to the various issues that different approaches to transmission access create. Whilst the analysis will be a vital tool in ensuring we consider the range of costs and benefits, it represents our consultants' independent views, and not our own. We are therefore not tied to recommending one particular strawman and may see benefits in a range of different key features. In our Final Recommendations we will set out clearly our thinking on what the key features of the transmission access regime should be to fulfil the objectives of the review.

4. Way forward

4.1. Ofgem and BERR would like to hear the views of interested parties on any aspect of this document, and in particular the analytical work produced by Poyry and IPA. We are requesting any responses to be submitted electronically by 15 May 2008 to the following email addresses:

- transmissionaccessreview@ofgem.gov.uk, and
- transmission-access-review@berr.gsi.gov.uk

4.2. Unless marked confidential, any responses that we receive will be published by placing them in Ofgem's library and on its website at 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.

4.3. 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.

4.4. This document constitutes an update of the analytical work that we have undertaken so far. We have clearly committed to producing detailed qualitative and quantitative analysis of an appropriate range of options for transmission access. The first stage of this analysis in terms of developing the assessment framework, the clear principles of the range of models and indicative qualitative views of the costs and benefits feature has already been conducted, and the findings presented in the attached reports from Poyry and IPA. The next stage, which is underway, is a detailed assessment of the costs and benefits of each of the models set out in this document. As mentioned elsewhere, this assessment procedure will inform our position on the key recommendations we outline in the May Final Recommendations report. It does not mean that we will be clearly recommending a particular strawman, but rather we will be very clear on what the key features of transmission access should be to deliver against the objectives of TAR.

4.5. Ofgem and BERR are proposing that further work will be taken forward in conjunction with industry 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.

4.6. 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.

4.7. In terms of key documents in the TAR process, following publication of this document we will be producing our last document in the current TAR process:

- May 2008 – publish a Final Recommendations report, including detailed Cost Benefit Analysis of the key models identified by Poyry and IPA, and Ofgem and BERR's key principles for transmission access for recommendation to the Secretary of State.

Appendices

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Appendix 1 - TAR assessment criteria

1.1. The TAR assessment criteria which covers the elements we consider need to be considered when assessing models of transmission access, are detailed below:

- 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.

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.⁴

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 accordingly⁵.

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 them⁶, and
- The interests of individuals who are disabled or chronically sick, of pensionable age, with low incomes, or residing in rural areas.⁷

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:

⁴ Entitled “Gas Supply” and “Electricity Supply” respectively.

⁵ 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.

⁶ 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.

⁷ The Authority may have regard to other descriptions of consumers.

- Promote efficiency and economy on the part of those licensed⁸ 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 Regulation⁹ 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.

⁸ Or persons authorised by exemptions to carry on any activity.

⁹ Council Regulation (EC) 1/2003

Appendix 3 – Analytical Discussion Document response

1.1. Ofgem and BERR would like to hear the views of interested parties in relation to any of the issues set out in this document.

1.2. Responses should be received by 15 May 2008 and should be sent to:

David Hunt
Senior Manager – Electricity Transmission Policy
Office of Gas and Electricity Markets
9 Millbank
London
SW1P 3GE

e-mail: transmissionaccessreview@ofgem.gov.uk

And copied to:

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

e-mail: transmission-access-review@berr.gsi.gov.uk

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

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

1.5. Any questions on this document should, in the first instance, be directed to David Hunt (e-mail: david.hunt@ofgem.gov.uk, telephone 020 7901 7429), or Phil Hicken (e-mail: phil.hicken@berr.gsi.gov.uk, telephone 0207 215 3936).

Appendix 4 – 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.

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 compulsorily 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).

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 5 - Summary of responses to the Interim Report

Introduction

1.1. This appendix provides an overview of the responses to the TAR Interim Report to the Secretary of State. Whilst we did not seek any specific views from the industry the document was open for consultation for 28 days. We received nine responses to the Interim Report in total.

Rationale, scope and process for the Transmission Access Review

1.2. One respondent expressed concern that the time taken for the Transmission Access Review may act as an incentive for generators to opt for a connection to the distribution system instead of the transmission system. A further respondent argued that the report neglects the impact of distributed generation on transmission access and should be considered. Another respondent considers that small hydro should be given more attention as they consider it is more efficient than wind generation and can better serve local consumers.

1.3. One party explicitly agreed with the objectives of the review, whilst another argued that the objectives of the review should be ranked. This latter respondent argued that Ofgem's statutory duties are overly restrictive. One party also argued that planning issues should be considered in the TAR project as it is crucial in delivering change.

1.4. Argue there is a trade off between the transmission investment and constraints incurred in remote areas of the network and that in the long it would be more efficient to undertake investment as the RO subsidy would inflate the constraint mechanism. Suggest radical change needed for the transmission access review

1.5. One party argued that the case for fundamental reform needs to be substantiated. This respondent advocates strategic investment to help minimise connection delays. It also believes the current TEC-based access products and cost-reflective charging should remain. A further respondent states that cost reflective charging is needed and advocates a new commitment element be added that is linked to generator user commitment. One respondent considers that user commitment should be based on a £/KW tariff that is fixed and is not subject to change like TNUoS.

Governance and legislation

1.6. One party strongly advocates that industry governance arrangements are the best mechanism by which change arising from TAR can be implemented. A further respondent set out that it does not agree with the criticism of the code amendment process. One party clearly suggests that primary legislation is not needed

1.7. One party was concerned that a number of ideas under consideration via TAR have previously been blocked by the code governance process. However, this respondent still proposes that this is the most appropriate route for change.

1.8. Several parties argued that the 3rd EU package of legislation and revised Renewables Directive should be more explicitly considered. One such party also considers that renewable generation should have clear priority over other new generation.

Form of transmission access

1.9. One respondent advocates 'connect and manage' with strategic investment to ensure renewable energy is guaranteed to connect, and that such as strategic approach would also be beneficial for nuclear generation. Another respondent considers strategic investment should be adopted for renewable energy.

1.10. One respondent argues that any increase in commitment would act as a barrier to entry only. Conversely, another respondent considers that more commitment from generators to use the system is needed. A further respondent supports connect and manage providing impact on constraints is manageable. This party also does not believe an Overrun product could be applied to the Connect and Manage Model. Another respondent considers that there is a misunderstanding of what connect and manage means.

1.11. One respondent does not support connect and manage or auctions without grandfathering due to concerns over discrimination. This respondent considers that there should be more development of short term TEC trading arrangements, non-firm TEC in relation to spill/overrun and intertrips as these features would be beneficial to wind generation.

1.12. With regard to sharing capacity one respondent suggests that scenario analysis is undertaken as they believe the fear of increases in constraint costs is exaggerated. A number of respondents welcomed the potential for capacity sharing. One respondent considered that voluntary TEC sharing could be pursued, but that removing by TEC directly, investor confidence would be damaged substantially. This party also considers that NGET should be able to designate voluntary TEC sharing zones. Another respondent advocates development of shared capacity products, including the trading of capacity to encourage existing generators to release capacity.

Incentivisation

1.13. One respondent advocates incentivising the GBSO to release ex-ante short term capacity combined with a cost reflective overrun product. This party believes that development of trading should also be considered in conjunction.

1.14. One party was unclear whether the work stream relating to incentivising efficient use of the transmission system is still being considered.

1.15. One party considers that an increased role for the economic justification in the planning standard for investment in the network, and the GBSO's incentive regime should be better aligned with the economic trade-offs inherent in the

planning standard. In particular this party considers there should be less focus on constraint costs in the SO incentive mechanism. A further respondent considers that the SO incentive should be reformed so any increase in constraints does not adversely affect the company.

1.16. One respondent considers that an incentive should be provided to the transmission companies to provide connections on time.

Delivering and operating infrastructure

1.17. One respondent considers that an N-1 security standard would provide substantial benefits, and welcomes the review of the GBSQSS. This respondent argues that connecting more generation at N-1 will not reduce the level of security and will be beneficial to competition in generation. However, another generator does not see benefit in changes to the GBSQSS.

1.18. One respondent argues that line ratings and security limits are too conservative, and supports hot-wiring so that better use of existing transmission assets can be achieved. A further respondent supports the initiatives designed to maximise existing capacity developed through TSORG.

1.19. One party considers that those generators awaiting connection should be re-prioritised so those who are best able to use the capacity are at the front of the queue. Another respondent does not support first-come-first-served principle for allocating transmission capacity, and instead capacity should be allocated on the basis of those who are best able to use it.

1.20. To address uncertainty of transmission access one respondent argues that firm connection dates no further than four years into the future should be provided by National Grid.