Transmission Investment for Renewable Generation

Initial Proposals

August 2004

Summary

This document sets out for consultation Ofgem's initial proposals for incentive arrangements to provide funding for transmission investment for renewable generation. Final proposals are expected in November 2004.

The Government has a target for renewable generation to provide ten per cent of UK electricity in 2010 with a further aspiration to double this share by 2020. Renewable Obligation Orders were introduced in 2002 and 2004 to promote the development of renewable generation. Substantial volumes of new renewable generation plant are now under construction or in planning and it has become clear that investment will be required to strengthen and extend the transmission system, particularly in Scotland and potentially in Northern England.

When the present transmission price controls were set no specific allowance was made because the extent and timing of any transmission investment for renewable generation could not have been forecast with any degree of accuracy. The transmission investment that is now required cannot wait until the next price control period (April 2007) without delaying the construction of new renewable generation, or causing substantial constraint payments to generation connected to the existing system and not used to its full capacity. This would not be in the interests of either renewable generators or consumers – who would ultimately pay these constraint costs. For these reasons, this document sets out initial proposals for funding investment in the transmission networks during the period before the next transmission price controls take effect.

An initial consultation was published in October 2003. The second consultation in May 2004 proposed an adjustment mechanism to supplement the existing price controls and to provide appropriate incentives for additional investment in transmission networks.

To review each investment proposal made by the transmission licensees for the reinforcement of transmission networks and to assist in developing initial proposals Ofgem engaged engineering consultants Sinclair Knight Merz (SKM). They have considered forecasts of renewable connections; the trade offs between investment and constraint costs; the risks of stranded transmission assets and the licensees' estimated costs. A copy of SKM's draft report has also been published today and is available on the Ofgem website.

Ofgem welcomes the responses made to the May 2004 consultation. They have assisted in the preparation of a framework to assess the level of appropriate investment in the

transmission network which should allow transmission licensees to fund efficient investment without unnecessary delay. The licensees' investment projects can be classified as follows.

- **Baseline investment** – investment projects for which, on the basis of SKM's analysis, the savings in forecast constraint and other costs exceed forecast investment costs. Such projects will be funded, subject to the licensee delivering the appropriate increases in network capacity. SKM's report indicates that the Beauly-Denny and Sloy area reinforcements meet these criteria.

- **Incremental investment** – investment projects for which, on the basis of SKM's analysis, there is greater uncertainty as to whether forecast constraint costs (although likely to be substantial) would be greater than the investment required to relieve those constraints, or where there may be significant delays before construction should commence. In these cases, in order to protect the interests of consumers, an adjustment to the existing price controls will be made to allow initial development and pre-construction costs to be recovered. These projects could proceed once the above uncertainties are resolved. The proposals to upgrade the England-Scotland interconnector and the North East ring fall into this category.

- **Additional investment** – SKM's analysis demonstrates that, for other investment projects forecast constraint costs are likely to represent less than 50 per cent of forecast investment costs. There is uncertainty as to the level of firm interest in generation connections and thus a significant risk that such investment could become stranded. For these projects transmission licensees have three options. First, a licensee will have the opportunity to provide further information to allow the project to be treated as baseline or incremental investment. Second, Ofgem could specify a revenue driver (perhaps based on the amount of additional generation capacity that would connect) to provide the licensee with revenue but also protect consumers from the risk of stranded assets. Third, a licensee could seek long term access arrangements with generators – perhaps on a similar basis to arrangements in the gas industry. These would be designed to guarantee an appropriate level of funding. The projects proposed by the transmission companies that fall within this third category are the Heysham area reinforcement, Kendoon area connection infrastructure, the Beauly to islands projects (Shetland/Orkney/Western Isles) and the Beauly-Keith reinforcement.

These initial proposals should protect and safeguard consumers' interests by allowing the efficient and timely transmission investment necessary for new renewable generation to access the market a cost effective fashion, and, avoid any unnecessary delays to the development of renewable generation.

Responses to this document are sought by 24 September 2004 to allow final proposals to be published by November 2004. They should be sent to:

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1. Introduction

Purpose

1.1. This document sets out initial proposals for an approach to funding cost effective investment in transmission systems in response to increased demand from renewable generators for connections to the distribution and transmission networks. Demand for connections is rising in Scotland and the North of England as a result of subsidies provided by the Government through the Renewables Obligation Orders. This document invites views on the appropriateness of the suggested incentive mechanisms and the level of investment required prior to the next price control reviews. It focuses on establishing a framework to provide incentives for an efficient level of investment, given the forecast pattern of renewable generation. It does not seek to provide additional subsidies for investment in renewable generation.

Rationale

1.2. Three transmission companies (transmission licensees) operate in Great Britain: the National Grid Company (NGC) which operates in England and Wales; SP Transmission Limited (SPTL) which operates in the South of Scotland and Scottish Hydro Electric Transmission Limited (SHETL) which operates in the North of Scotland.

1.3. At the last electricity transmission price control reviews (undertaken in 1999 for SPTL and SHETL and in 2000 for NGC) there was significant uncertainty regarding the likely level and pattern of emerging renewable generation and so it was not practicable to make allowances in the price controls or establish incentive arrangements for the associated investment. Since these price control reviews there has been an increase in the demand for transmission capacity by renewable generators. The increase in renewable generation capacity has been developed in response to obligations on electricity suppliers under the Renewables Obligation Order 2002 and the Renewables Obligation (Scotland) Order 2004 to supply an increasing proportion of electricity from renewable generation or face financial penalties.

1.4. The Government has a target for renewable generation to provide 10 per cent of UK electricity supply in 2010 with a further aspiration to double this share by 2020. However, the statutory guidance the Government has provided to Ofgem on social and environmental matters[1] makes it clear that initiatives designed to promote the wider environmental objectives of Government, that would have significant financial implications for consumers or for regulated companies, are primarily a matter for the Government.

1.5. The Renewables Obligation Orders are creating significant demand for renewable generation and the market has reacted by bringing forward proposals for new renewable generation stations. A large proportion of these proposed new developments are for wind powered generation in Scotland, connecting to either the distribution or transmission networks. It is likely that significant additional investment in transmission networks will be necessary to allow the efficient connection and operation of this anticipated additional generation capacity.

1.6. If the funding of transmission investment is not addressed before the next main price control reviews, there is a risk that the transmission companies may not invest in response to demand in an economic and cost effective manner. This could delay the connection of new generation to the transmission and distribution networks and/or increase the costs of constraining new or existing generation plant off the system. This would not be in the interests of consumers who would ultimately pay these constraint costs.

1.7. In light of these factors this document sets out initial proposals to incentivise transmission investment for renewable generation now, rather than waiting until the next main price control reviews to deal with these matters.

Previous documents and correspondence

1.8. Ofgem has written to transmission licensees explaining that certain costs associated with the planning and development of transmission reinforcement projects would be taken into account at future price control reviews. Nevertheless all three transmission licensees have stressed the importance of

[1] The Social and Environmental Guidance to the Authority has been issued under section

making decisions on transmission investment for renewable generation as soon as possible.

1.9. In October 2003 an initial consultation on the funding of transmission investment for renewable generation was published, it set out three options:

- take no action before the next price control reviews (the work associated with these reviews will not be completed before the end of 2006)
- re-open the price controls, or
- add an adjustment mechanism to the existing controls to deal with renewable related expenditure.

1.10. The October consultation suggested that waiting for the next price control reviews might unduly delay investment and that a full reopening of price controls might require a relatively lengthy process and could undermine current efficiency targets and incentive arrangements. On this basis, it suggested that adding an adjustment mechanism to the price controls would be the best way forward.

1.11. In May 2004 a second consultation[2] explained that it would be appropriate to develop an adjustment mechanism to supplement the existing price control arrangements. The document also described three approaches to setting the incentive mechanism:

- a lump sum allowance calculated on a similar basis to the existing price controls
- a revenue driver that would only provide additional revenue if new generation were to connect to the transmission system, or
- cost pass through with investment spending automatically increasing the revenue licensees are allowed to recover from their consumers.

[2] 'Transmission investment for renewable generation' – second consultation, Ofgem, May 2004

Impact Assessment

1.12. Appendix 1 sets out a draft Impact Assessment (IA) relating to the initial proposals for transmission investment for renewable generation. This is being carried out pursuant to section 5A of the Utilities Act 2000 (as amended by the Sustainable Energy Act 2003).

1.13. The IA has been undertaken because the incentive arrangements allow for the funding of a very significant level of investment. These initial proposals are assessed against a base case scenario (i.e. do nothing until the next price control review). The IA draws on work completed by SKM in assessing the costs and benefits of the transmission licensees' proposals for reinforcement expenditure.

Structure of the document

1.14. This document includes the following Chapters.

- Chapter 2 provides the background to these initial proposals and discusses the statutory and regulatory framework within which Ofgem and the transmission licensees operate.
- Chapter 3 summarises the main issues raised by respondents to the May 2004 consultation. Copies of all non confidential responses can be found on Ofgem's website.
- Chapter 4 summarises SKM's draft report on the transmission licensee's proposals for reinforcement expenditure.
- Chapter 5 sets out initial proposals for an adjustment mechanism to operate alongside the transmission price controls and invites view on these initial proposals.
- Chapter 6 summarises the main issues on which this paper seeks views and sets the timetable for making final proposals.
- Appendix 1 sets out a draft impact assessment.

Consultation Responses

1.15. If you would like to comment on the issues raised in this document, please respond (via email if possible to the address below) by 24 September 2004. Responses will be placed in the Ofgem library and on the website (www.ofgem.gov.uk) and therefore any confidential material should be included as a separate annex. Any written responses should be addressed to:

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1.16. If you would like to discuss the issues raised in this document please contact Jonas Törnquist on the above number or alternatively Tolani Azeez (020 7901 7043) or Ayesha Uvais (020 7901 7307).

Timetable

1.17. It is intended to publish final proposals in November 2004. It is envisaged that final proposals would be published together with a statutory consultation on any licence modifications to the transmission licensees' price control licence conditions. If a licensee were to reject the proposed licence modifications, it would be necessary to consider whether a reference should be made to the Competition Commission.

2. Background

Statutory Framework

2.1. Ofgem is the Office of the Gas and Electricity Markets, which supports the Gas and Electricity Markets Authority. The Authority's powers and functions in relation to the regulation of the electricity industry are set out in the Electricity Act 1989 (as amended).

2.2. The Authority's principal objective in carrying out its functions under the Electricity Act is 'to protect the interests of consumers [both existing and future] ...wherever appropriate by promoting effective competition...'. The Electricity Act requires that in doing so the Authority must also have regard to:

- the need to secure that all reasonable demands for electricity are met
- the need to secure that licence holders are able to finance their licensable activities, and
- the interests of the disabled , chronically sick, those of pensionable age, those with low incomes and those residing in rural areas.

2.3. Subject to the above, the Authority is also required to carry out its functions in a manner which is best calculated to:

- promote efficiency and economy on the part of persons authorised by licences or exemptions to carry out licensable activities
- protect the public from dangers arising from licensable activities
- secure a diverse and viable long-term energy supply, and
- contribute to the achievement of sustainable development.

2.4. The Authority is also required to have regard to the effect on the environment of licensable activities, to any social and environmental guidance issued by the Secretary of State.

2.5. The Electricity Act provides the framework for the licensing regime relating to the generation, transmission, supply and distribution of electricity.

2.6. Under section 9(2) of the Electricity Act, holders of transmission licences are obliged to develop and maintain an efficient, economic and co-ordinated electricity transmission system and to facilitate competition in the supply and generation of electricity.

Price controls

2.7. The transmission and distribution companies' price control arrangements are typically reviewed every five years. At the price control review transmission licensees provide forecasts of capital and operating expenditure over the price control period, based on expected developments on the network and forecast generation connections, disconnections and demand growth. Ofgem reviews these plans, consults and discusses these forecasts with transmission licensees and then makes proposals. These proposals set out Ofgem's views on the revenues required by each transmission licensee to finance efficient levels of capital and operating expenditure for the next five years. Finally, modifications are made to each company's licence, to specify the amount of revenues the companies are allowed to recover.

2.8. As noted in the rationale, when the present price controls were set there was insufficient information available to make allowances for transmission investment for renewable generation. These matters are being addressed now in these initial proposals.

2.9. The price control provides strong incentives for transmission licensees to reduce costs. There are a number of measures in place at present, including security standards and the monitoring of quality of service performance, designed to ensure that quality of supply is not jeopardised. Over time it will be appropriate to consider the development of a wider range of output measures and incentive arrangements to improve incentives for efficiency and quality.

2.10. In electricity transmission, limited progress has been made in respect of improving incentives and to the extent that it is practicable the intention is to

further enhance incentives in the future. The aim of these incentives could include:

- establishing output measures to assist in judging whether capital expenditure is efficient
- where appropriate, embedding output measures into the price control as a revenue driver or as part of an incentive scheme so that the level of allowed revenue automatically adjusts for changes in the specified output
- developing incentives that encourage licensees to invest in a timely way to meet the needs of their customers
- providing financial incentives on licensees to minimise any interruptions in supply, and
- ensuring that system users face cost reflective charges and considering whether system users should signal present and future demands through their willingness to pay use of system charges.

Electricity distribution price control review

2.11. Ofgem published its initial proposals document on the electricity distribution price control review in June 2004[3]. A particular consideration for the distribution price controls is the expected significant increase in distributed generation. Given the high level of uncertainty in the location and volume of new distributed generation and the variability of the impact on the distribution networks, the cost of investment for distributed generation is to be funded by a combination of 80 per cent cost pass through and a revenue driver based on the new generation capacity connected. These arrangements have been designed to take advantage of the desirable characteristics of revenue drivers – providing an incentive on distribution licensees to invest efficiently in response to changing patterns of demand, while at the same time dealing with uncertainty by allowing a significant element of cost pass through.

[3] 'Electricity distribution price control review: initial proposals', Ofgem, June 2004

2.12. These arrangements are designed to allow distribution companies to:

- earn a rate of return which is more than their allowed cost of capital for other investments – but which is not excessive
- be protected against the risk of a significant number of projects providing very low returns, and
- face limited risks of returns below the cost of capital on the overall investment in generation connections.

2.13. Other considerations for the electricity distribution price control review include incentivising asset replacement and demand related capital expenditure.

NGC's system operator incentives

2.14. NGC has two roles - transmission asset ownership and maintenance (TO) and system operation (SO).

2.15. The TO maintains the high voltage transmission network in England and Wales and carries out investment. The SO undertakes the short-term activities necessary to operate the high voltage transmission network in England and Wales safely, economically and efficiently. The price control applies to TO activities with SO activities subject to separate incentive arrangements.

2.16. In establishing NGC's SO incentive schemes, Ofgem sets target levels of costs. If actual costs are below this target then NGC keeps a proportion of the reduction in costs as an incentive payment. If costs are above target, NGC bears a proportion of the costs in excess of the target. NGC's overall gains or losses are limited by a cap on payments and a floor on losses.

Enhanced SO incentive scheme

2.17. Ofgem has previously suggested that in the longer-term an enhanced incentive scheme could be developed for transmission networks. Under an enhanced scheme NGC could have improved financial incentives to respond to signals from market participants indicating the need for additional transmission capacity. These matters will be considered as part of the next main transmission price control review.

The development of offshore wind generation

2.18. In November 2002 the DTI published A Strategic Framework for Offshore Wind Industries. This document consulted on the proposed arrangements for offshore wind generation site leases. In July 2003 the DTI launched the second round of tenders for offshore site leases, with the sites to be concentrated in the Thames Estuary, Greater Wash and off the coast of North West England. Following the tender process fifteen offshore sites were awarded, allowing for a total expected capacity of around 6 GW of offshore wind generation.

2.19. The Government has announced that it will introduce a new regulatory regime for offshore transmission and offshore distribution. The Energy Act contains provisions to allow the Secretary of State to modify the licensing regime for the purposes of facilitating offshore transmission and offshore distribution. The Energy Act received Royal Assent on 22 July 2004.

2.20. The development of offshore wind generation is likely to have implications for transmission system investment, although the extent and timing of the demand for additional investment is not yet fully clear. Ofgem and DTI are working on these issues and further consultations should take place later in 2004/05.

BETTA

2.21. BETTA go-live is planned for 1 April 2005, and adjustments to the transmission licensees' price controls will be made to reflect these new GB-wide transmission and trading arrangements.

2.22. The present transmission price controls for SHETL and SPTL are intended to last until 31 March 2005. It is proposed to extend these price controls for two years to 31 March 2007 to align the price control review dates with those for other transmission licensees in both electricity and gas, enabling all transmission issues to be considered together at the next main reviews.

2.23. Ofgem will shortly be publishing its draft price control proposals covering the extensions and modification of the price controls for SPTL and SHETL, that will apply for the two years from BETTA go-live on 1st April 2005.

2.24. Work has also started on the extensions to NGC's TO price control and SO internal cost incentives for 2006/7.

2.25. Since the transmission infrastructure related to renewable generation spans all three transmission licensees the development of adjustments to the price controls to allow for this expenditure is being coordinated separately from the above price control work. Proposals on transmission investment for renewable generation will be additional to any adjustments for BETTA. Measures will be developed to ensure that no double counting of investment takes place between the various strands of work on price controls, in order to ensure that consumers do not pay twice for investment.

3. Respondents' views to May 2004 document

3.1. This Chapter provides a summary of the 18 responses to Ofgem's May 2004 document. The majority of respondents supported the development of an adjustment mechanism to supplement the existing price controls. Respondents offered views on a range of subjects including:

- the appropriate adjustment mechanism to supplement the existing price controls
- incentives for investment and how to address delays in the construction of investment schemes
- the setting of output measures for investment projects
- the appropriate cost of capital to finance investment
- determining the efficient level of investment
- the trade-off between investment in network reinforcement and the costs of constraining generation plant off the system
- minimising the probability of investment leading to under used or stranded transmission assets
- use of conventional generation to address the intermittency of wind generation
- the advantages and disadvantages of locational differentials in transmission charges
- long-term transmission system access arrangements for generators
- the allocation of transmission system access rights for generators and whether these access rights should be tradable, and
- the treatment of distribution connected generators.

3.2. Non confidential responses to the May 2004 document are located on Ofgem's website. This Chapter sets out a summary of respondents' views to the three main issues identified in the May 2004 consultation paper:

- developing an appropriate adjustment mechanism to supplement the existing price controls
- assessing the appropriate level of transmission investment, and
- contractual and charging arrangements.

Developing an appropriate adjustment mechanism

May 2004 document

3.3. The May 2004 document suggested that an adjustment mechanism to supplement the existing price controls would be appropriate given the increasing demand for transmission access from renewable generators. Such a mechanism should enhance existing signals and incentives on transmission companies to invest in additional network capacity in an efficient and timely manner. Ofgem consulted on three options for developing an adjustment mechanism to supplement the existing price controls. The options were:

- a lump sum allowance set on a similar basis to existing price controls
- a revenue driver, and
- cost pass through.

3.4. Ofgem noted that due to the weak incentive properties associated with cost pass through arrangements it was unlikely that this would be the best approach. There would be advantages in supplementing the basic approach to setting price controls with output measures and revenue drivers where practicable, to ensure that licensees deliver real improvements in transmission system capability.

3.5. The May 2004 document consulted on whether:

- the revenue deriving from the adjustment mechanism should be based on funding the projections of investment costs between 2004/5 and 2006/7

- outputs should be identified to assist in establishing whether licensees have delivered investment that is fit for purpose, and any suggestions as to what sort of outputs would be most appropriate

- there is a mechanism that could be adopted that would deal with the uncertainties created by the requirements on licensees to obtain planning consents for new investment

- the cost of capital should be consistent with that used in setting the main price controls, and

- it would be appropriate to identify revenue drivers to determine the level of revenue that a licensee would be entitled to in each year.

Transmission licensees' views

3.6. There was agreement among the transmission licensees that a lump sum mechanism would be an appropriate approach to provide funding for additional capital expenditure. They noted that such an approach would be compatible with the present price control framework, providing investment certainty and appropriate incentives for timely and efficient investment.

3.7. Two of the transmission licensees disagreed with the suggestion that a cost pass through mechanism was unlikely to be the best way forward. They said that a cost pass through mechanism could help in dealing with the uncertainties associated with network investment. One transmission licensee noted that there was no evidence to indicate that a cost pass though mechanism had poor incentive properties while the other considered that the reduction in uncertainty would outweigh any difficulties with incentives.

Revenue driver and output measures

3.8. The transmission licensees suggested that a revenue driver would not be appropriate. They considered that revenue drivers were more appropriate for incremental investment rather than large scale investment. The transmission

licensees also considered that the development of a revenue driver could involve a significant amount of work, for example in developing output measures, which would not be compatible with finalising incentive arrangements in a timely manner.

3.9. The transmission licensees also noted that the revenue drivers would need to take account of distribution system embedded renewable generation, which could be licence exempt and may not have a contractual relationship with transmission network owners.

Investment delays

3.10. One transmission licensee suggested that investment delays that extended to the next price control period could be addressed through the roll forward of regulatory asset values at the next price control review. One transmission licensee proposed that in the event of delays any advance funding should be returned to consumers.

Cost of capital and financing issues

3.11. With regards to the appropriate cost of capital for investment, one transmission licensee supported a cost of capital that was at least that set under the current price control, ie 6.5 per cent for transmission companies, and should be higher if additional risks are to be imposed on the transmission licensees. One transmission licence was of the view that 6.5 per cent cost of capital would be insufficient to reflect the risk of the investment. One transmission licensee proposed that the depreciation period for transmission investment for renewable investment should be 15 to 20 years.

Other respondents' views

Setting an appropriate adjustment mechanism

3.12. A minority of respondents did not consider that any adjustment to the current price control would be necessary. Other respondents considered that a lump sum allowance would be an appropriate adjustment mechanism as it would be broadly consistent with the existing price controls and would provide transparent incentives.

3.13. A number of respondents supported a revenue driver and considered that it would provide better incentives for efficiency. Many of those respondents supporting a revenue driver considered that it would need to be relatively sophisticated and flexible. There was also support for a hybrid arrangement with a revenue driver for incremental capacity. These could provide certainty for a proportion of investment while also providing incentives for efficient network reinforcements.

Output measures

3.14. Some respondents supported the development of output measures to ensure that network investment is fit for purpose. Suggested output measures included a measure of the level of additional capacity on the network arising from the investment and a measure of the amount of capacity available for immediate utilisation. Those who did not consider output measures to be necessary said that work undertaken up to 2007/08 would focus on seeking planning consents. Output measures could therefore be considered in the next price control review.

Investment delays

3.15. Of those who responded on the issue of investment delays it was proposed that a claw back mechanism could be put in place to recover any allowed revenue that was not needed because of planning delays.

Cost of capital

3.16. Some respondents considered that the cost of capital should be the same as in the main price control. One respondent considered that the cost of capital should be higher as there would be fewer opportunities to outperform on a lump sum allowance compared to the main price control.

Ofgem's views

3.17. Initial proposals for the adjustment mechanism to supplement the existing price controls are set out in Chapter 5. This Chapter also addresses issues such as investment delays, output measures and cost of capital.

Determining the efficient level of investment

May 2004 document

3.18. The May 2004 document described the process for determining the appropriate level of transmission investment necessary to meet renewable generation developments. Ofgem noted that consultants would provide support for this work, which would include reviewing the transmission licensees' forecasts of investment. In particular, it sought views on:

- the likely level and pattern of renewable generation
- the assumptions that should be made about the operation of existing conventional plant, particularly in Scotland
- assessing whether transmission upgrades are economic on the basis of assessing the expected difference in the capitalised costs of constraints that are likely to occur with and without the network upgrade (assuming broadly cost reflective transmission charging) against the capitalised cost of financing and maintaining the transmission system upgrades, and
- the best approach to assessing the expected costs of reinforcement schemes.

Transmission licensees' views

3.19. Two transmission licensees suggested that a broad range of considerations needed to be taken into account in assessing which network reinforcements would be economic. These included the cost of constraints, security and quality of supply standards and changes in the level of transmission losses.

3.20. One transmission licensee said that while the constraint cost test is appropriate for the development of renewable generation, if there is a technical constraint on the network, the investment needs to be made irrespective of the narrow economic test.

3.21. A transmission licensee also commented that due to the inability of wind generation to provide reliable voltage and frequency control, a certain amount of

conventional generation would be required to ensure reliable and secure system operation.

Other respondents' views

3.22. Some respondents were of the view that the planned investment upgrades were necessary and should be delivered at the earliest opportunity. Some respondents were concerned about restrictions on generation connections in Scotland. They considered that the transmission licensees should consider ways of increasing capacity on the existing network as soon as practicable.

3.23. Other respondents considered that transmission upgrades should be assessed on the basis of economic viability by giving consideration to expected levels of constraint costs with and without the network upgrade.

3.24. Some respondents said that as renewable generation output tended to be more intermittent than conventional generation, some increase in constraint costs would be more efficient than transmission network reinforcement.

3.25. Other respondents considered that constraint cost management was not appropriate as an alternative to the investment proposals and would send the wrong signals to developers as it would act as a disincentive to achieving the Government's renewables targets.

3.26. It was also suggested that the risk of stranded assets should be considered in addition to constraint costs. In particular it was proposed that only reinforcement which is of benefit to the majority of connected users should be carried out to reduce the risk of stranded assets. It was also proposed that higher constraint costs should be permitted until the need for investment becomes clearer to avoid the potential for stranded assets.

Ofgem's views

3.27. A summary of SKM's assessment of the appropriate level of transmission investment and Ofgem's initial views on these matters is set out in Chapter 4. A copy of SKM's draft report has been published alongside these initial proposals.

Contractual and charging arrangements

May 2004 document

3.28. The May 2004 document described some of the main features of the contractual and charging arrangements for access to each of NGC's, SHETL and SPTL's transmission networks. The document also outlined recent consultations on these arrangements.

3.29. It sought views on:

- what changes, if any, might be appropriate to NGC's charging methods to take account of the increasing levels of renewable generation
- whether generators that trigger significant investment in the transmission system should be required to commit to longer-term access arrangements to reduce the chance of assets being stranded
- whether access rights be allocated on a first come first served basis or whether all generators be treated consistently
- whether transmission entry and exit rights could be tradable and whether this would assist generators and network operators in efficiently resolving trade offs between network constraints and investment, and
- how to ensure that distribution connected generators, which are exporting energy and/or increasing flows on transmission networks, make an appropriate contribution towards the cost of transmission networks.

Transmission licensees' views

3.30. The transmission licensees noted that many of the issues outlined in the May 2004 consultation document have been consulted upon in other documents. They sought clarification on how Ofgem intends to take these matters forward.

3.31. One transmission licensee considered that NGC's charging methods should not be amended to take account of increased renewable generation but rather that subsidies for renewable generation should be given explicitly (e.g. through

Renewable Obligation Certificates (ROCs)). It said that modifying NGC's charges to the benefit of a class of user could be discriminatory and may dampen the cost reflective signals to power station developers to make efficient trade offs between different locations and voltage levels.

3.32. One transmission licensee suggested that locational charges given by NGC's current charging model are extreme and that reducing the impact of locational charges would mean that additional subsidies would not be needed to facilitate additional renewable generation.

3.33. One transmission licensee indicated that there may be a potential for a scheme under which users would indicate their long-term needs through long-term access arrangements. However, it noted that the environment in the gas market for long-term access rights is different to that in electricity. Two of the transmission licensees noted that there has been little industry support for long-term access rights. One transmission licensee stated that a suitable tradable product had not yet been identified and that it was not clear that the benefits would outweigh the costs. The transmission licensee noted that market based arrangements could give rise to complexities and transactional costs. Two transmission licensees stated that long-term access arrangements would effectively be a deep connection charge.

3.34. One transmission licensee stated that access rights should continue to be allocated on a first come first served basis to ensure that existing customers have priority over any new customers. Another transmission licensee said that access rights should be allocated on an equitable basis so that there would be no perverse incentive to hoard capacity.

3.35. It was noted that NGC is already developing arrangements in England and Wales to trade or transfer Transmission entry capacity (TEC)[4]. One transmission licensee considered that it would be difficult to manage the trading of TEC across Scotland except at times of extended plant outages.

3.36. One transmission licensee welcomed the suggestion of a review of arrangements for distribution connected embedded generators, and indicated that these

[4] CUSC amendment proposal 068 'Competing requests for TEC' was raised by NGC to facilitate trading of

generators should face the costs they impose on transmission networks. Another transmission licensee said that BETTA has been promoted on the basis that it would reflect arrangements in England and Wales. It considered that it would be unacceptable to change these arrangements at this late stage of the BETTA project.

Other respondents' views

3.37. A number of respondents supported NGC's cost reflective charging methods. Some respondents said that the issue of NGC's charging methods was being dealt with as part of BETTA and should not be part of this consultation.

3.38. Several respondents did not support long term access rights and said that they would effectively represent a deep connection charge. Other respondents supported long term access rights on basis that they could address the issue of stranded assets and could provide stability in charges.

3.39. Some respondents indicated that it would be inappropriate for certain generators to commit to long term access rights on the basis that the arrangements should be the same for all generators. There was little support for tradable rights. It was argued that tradable rights could increase uncertainty in the market and could be a disincentive to invest in generation. It was also stated that tradable rights could increase costs to wind farm development costs.

3.40. Most of the respondents that commented on the issue considered that access rights should be allocated on a first come first served basis.

3.41. Some respondents supported a review of distribution connected embedded generation. In particular they considered that generators should be liable for the costs that they impose on the transmission system.

Ofgem's views

3.42. Consistent with the views of the majority of respondents, Ofgem has decided to take forward matters relating to charging though the BETTA project, code

modification procedures and at the next full reviews of the transmission price controls. It is likely that the following considerations will remain important:

- cost reflective pricing
- the advantages of simplicity and transparency in charging arrangements
- the ability for system users to signal their future network requirements
- exploring the scope for long and shorter-term access rights and appropriate charges to reflect the range of products available
- assessing the merits of firm and non- firm access rights
- the tradability of access rights
- the appropriate cost recovery mechanisms for network investment, and
- the appropriate charging for distribution system embedded generation.

4. SKM's assessment of efficient investment

Introduction

4.1. The three transmission licensees developed forecasts for transmission network reinforcements based on the analysis carried out as part of the transmission licensees' Renewable Energy Transmission Study (RETS). The study was instigated at the request of the Government. Ofgem appointed engineering consultants SKM to assist in the technical and economic evaluation of the reinforcement proposals put forward by each licensee. This assessment underlies and supports Ofgem's initial proposals for the adjustment mechanism set out in Chapter 5.

4.2. This Chapter outlines SKM's method and provides a brief summary of their findings. It also sets out Ofgem's initial views on the SKM analysis. SKM's draft report has been published alongside this document.

SKM's methodology

4.3. The objectives of SKM's analysis were to review:

- **the level of anticipated connections** of new renewable (and conventional) generation to distribution and transmission networks in Scotland
- **the need for transmission investment** to meet efficiently the anticipated additional demand for generation connections, and
- **the cost of the proposed transmission investments** as put forward by the licensees.

4.4. Each of these aspects of SKM's review is addressed in separate sections below.

The level of anticipated connections

4.5. SKM reviewed the licensees' assumptions and analysis regarding the likely level and location of new connections for renewable generators. These assumptions were largely based on connection activity, such as connection

applications and expressions of interest from developers, in each licensee's geographical area. SKM also analysed the likely correlations of wind generation across various geographic locations and the intermittent nature of renewable generation.

4.6. Sensitivity analysis undertaken by SKM produced a range of the likely level of wind connections by 2010. As part of this work SKM considered the incentives to invest in renewable generation, given the current market value of ROC's.

The need for transmission investment

4.7. If the transmission system is not reinforced and constraints occur as a consequence, consumers may be exposed to the cost of constraining generators unable to access the transmission network. Consumers are also exposed to the costs of upgrading the transmission networks. Therefore SKM has undertaken an assessment of the costs and benefits of the investment projects put forward by licensees.

4.8. SKM's analysis compares the capitalised cost of upgrading the transmission system (discussed in more detail in the following section) with the capitalised savings in constraining generators off the system if the upgrade takes place (calculated by comparing constraint costs with and without network upgrades). The review also encompasses a technical evaluation of the proposed engineering solutions and transmission system load flow modelling.

4.9. The transmission licensees are required to operate and develop their networks to certain security standards. These standards were not developed to deal with large scale wind generation and so may need to be reconsidered in the future. SKM carried out some initial analysis on how these security standards might be developed and factored these considerations in to their recommendations for transmission investment for renewable generation. In the light of this work and increases in the level of wind generation NGC may need to initiate a review of GB transmission security standards.

4.10. SKM assessed the cost of constraining generation in two stages by assessing:

- the likely *volumes* of constrained energy. This assessment was based on an estimate of expected level of new renewable connections, detailed power flow modelling and the enhanced capacity resulting from each proposed upgrade to the transmission system, and

- the *cost* of the constrained energy. This assessment considered the type of generation that would be constrained off, the type of replacement generation, and its location.

4.11. In its report, SKM outlines three approaches to assess the cost of constrained energy.

- **An economic valuation of conventional generation constraint costs**. The constrained energy value using this approach is the difference in marginal costs between the constrained generation and its replacement generation. The value depends on the types and ages of generation and SKM estimates that the cost varies between approximately £1 MWh and £5 MWh.

- **A market based valuation of constraint costs**. The constrained energy value using this approach is based on an assessment of the average difference between the System Buy Price (SBP) and System Sell Price (SSP) in the NETA balancing mechanism. This price difference is taken as an indication of the net cost to the System Operator (SO) of balancing the electricity transmission system in the case of transmission constraints in the electricity market. SKM's estimates that approach would value constrained energy at approximately £10 MWh.

- **Economic valuation of renewable generation constraint costs**. SKM have assumed that if a renewable generator is constrained the constraint value would include both the ROC buy-out price and the fuel saving for a conventional replacement generator. SKM estimates the value of constrained energy on this basis at around £45 MWh.

4.12. SKM's report sets out sensitivity analysis encompassing a range of assumptions on the value of constrained energy and constraint volumes.

The cost of the proposed transmission investments

4.13. SKM reviewed the costs of each investment proposal put forward by licensees based on their previous experience in evaluating transmission network investment projects. This included benchmarking of the cost assumptions used with other similar projects, both in the UK and overseas.

4.14. SKM also reviewed the processes that licensees had undertaken in putting together their investment proposals, for example through the use of competitive tendering.

SKM's findings

4.15. SKM forecast that about 4,000 MW of wind generation is likely to connect in Scotland by 2010 and a further 500 MW in the North-West of England. They identified that these projections were relatively uncertain, and attributed a possible range around this estimate of $\pm$1000 MW.

4.16. SKM's recommendations for each investment project are summarised below.

Table 1: Summary of SKM's recommendations

	Reinforcement proposal	SKM's estimated total project cost (£'000s)	Costs seeking regulatory sanction (£'000s)	Break-even capacity (SKM forecast) [1]	SKM's initial views
1	Beauly-Denny related	331,928	331,928	1,200 MW (1500 MW)	Justified on the basis of savings in constraints costs and losses.
2	England/Scotland Interconnectors	151,887	151,887	Up to 5,000 MW (4000 MW)	Further assessment required before the project could be deemed justified at this stage, proceed with initial design and engineering works. Should follow project 1.
3	North East Ring	139,654	139,654	Up to 5,000 MW (4000 MW)	Unlikely to be justified at this stage, proceed only with initial design and engineering works. Should follow projects 1 and 2.
4	Heysham area reinforcements	65,158	65,158	As above with 500 MW local wind farms (offshore) (4000 MW)	Lower cost alternative should be investigated. Should follow projects 1 and 2.
5	Kendoon area connection infrastructure	90,049	90,049	350 MW (300 MW)	Lower cost alternative should be investigated.
6	Sloy area reinforcements	45,963	20,963	150 MW (310 MW)	Justified on the basis of accepted connection offers and associated savings in constraint costs.
7	Beauly to islands (Shetland/Orkney/ Western Isles)	625,000 (SKM estimate)	4,137 Initial engineering	NA – depends on the economics of wind generation on the Scottish islands, (1921 MW)	Initial design and feasibility work should be underwritten by the developer.
8	Beauly to Keith reinforcement	158,449	282 Initial engineering	Circa 5,000 MW north of Beauly (1500 MW)	Well ahead of need, review at a later date.
	TOTAL	**1 608 088**	**804,058**		

(1): The level of renewable connections necessary to justify each of the projects differs according to the cost and location of the proposed upgrade.

Ofgem's views

4.17. In the May 2004 consultation paper Ofgem suggested that the basic test for whether transmission upgrades are economic would involve assessing the expected difference in the capitalised costs of constraints that are likely to occur with and without transmission system upgrades (assuming broadly cost reflective transmission charging) and comparing these benefits to the potential costs of the capitalised expenditure necessary for network reinforcements. Respondents to the May 2004 consultation offered a range of views as to the appropriateness of this assessment. Some respondents supported this broad approach, others said that Ofgem should do more to incentivise transmission investment while others suggested a cautious approach given the uncertainties regarding the level and pattern of future renewable generation development in Scotland.

4.18. Ofgem's principal statutory objective is to protect the interests of consumers. Consistent with this objective it is important to ensure that licensees providing monopoly network services operate and develop their networks in an efficient manner. On this basis the incentives created by the regulatory regime should encourage transmission companies to invest in their networks on a cost effective basis and in response to the demands of generators and suppliers. In order for investment to be cost effective it is appropriate to consider the costs and benefits of each investment project.

4.19. Ofgem's engineering consultants have assessed the costs and benefits of the various transmission investment projects put forward by licensees. The detail of their method requires further consultation. In particular, it will be necessary to give careful consideration to the valuation of constrained energy, as discussed below. Nevertheless the broad approach appears consistent with Ofgem's statutory objectives and also ensures that the regulation of transmission licensees does not create any unnecessary barriers to Government policy designed to increase renewable generation.

Constraint Costs

4.20. Ofgem's initial view is that the value of constraint costs would be most appropriately based on the costs that consumers are exposed to and the willingness of generators to pay for firm access to the transmission network. In the case of wind generation that has firm access to the transmission network the costs of the constraint payments made by the system operator and ultimately passed on to consumers may be relatively high. In part this is because the operation of the arrangements for ROCs that will tend to push up the costs of constraining wind generation that has firm access to the transmission network. Wind generators may bid into the electricity balancing mechanism in a way that reflects their opportunity cost of not generating. Bids may reflect the revenue lost from energy sales and the market price of ROCs (which is significantly above the £30 MWh buyout value for ROCs, although the market price may fall over time). This would give a higher value than most estimates of the economic value of the savings in greenhouse gas emissions associated with renewable generation. Nevertheless, constraint costs will reflect actual costs to consumers and give a broad indication of the willingness of generators to pay to avoid being constrained off the transmission network.

Level of Renewable Generation

4.21. SKM suggest using 4500 MW as a central case for the likely level of new renewable connections. These forecasts are subject to uncertainties and Ofgem would welcome further views on these matters.

Way Forward – Initial Proposals

4.22. The analysis produced by SKM suggests that some of the projects put forward by transmission licensees for reinforcement investment to allow the connection of renewable generation are clearly justified by the prospective reductions in constraint costs. These results are robust to a range of assumptions on the value and volume of constrained energy.

4.23. In relation to other of the projects put forward by licensees there is more uncertainty as to whether the benefits of the proposed investment projects outweigh the costs at this point in time. Ofgem's initial proposals are

designed to reflect the different levels of uncertainty associated with different projects. Such an approach should ensure that efficient investment can take place without undue delay where appropriate, while costs and risks to consumers are minimised.

4.24. SKM's analysis suggests that the following broad classification of the investment projects reviewed could be adopted.

Table 2: Initial Classification of the Investment Projects

Justified baseline investment projects	
Beauly-Denny	Justified on the basis of savings in constraints costs and losses. Low risk of stranded assets
Sloy area reinforcements	Justified on the basis of accepted connection offer and associated savings in constraint costs. Low risk of stranded assets.
Possibly justified projects, where assumptions are uncertain or where projects are contingent on other reinforcements	
England/Scotland Interconnectors	Further analysis required. Should follow Beauly-Denny project.
North East Ring	Unlikely to be justified at this stage. Should follow Beauly-Denny project.
Projects requiring further connection interest and/or analysis to reduce costs or uncertainties	
Heysham area reinforcements	Lower cost alternatives should be investigated. The present project has a relatively high risk of stranded assets.
Kendoon area connection infrastructure	Appears ahead of need and a relatively high risk of stranded assets if forecast connections do not materialise.
Beauly to islands (Shetland/Orkney/ Western Isles)	Dependent on underlying economics of wind generation on Scottish Islands assuming cost reflective transmission charges. Prospective developers would need to enter into longer term access arrangements to protect consumers from the costs of stranded assets.
Beauly / Keith reinforcement	Appears to be well ahead of need.

4.25. The classification for each project is discussed in Chapter 5, alongside initial proposals for an appropriate adjustment mechanism to the transmission licensees' price controls.

Views invited

4.26. Views would be welcome on any aspect of the issues raised in this Chapter and in particular on:

- the estimates of the level of renewable generation likely to connect,
- the appropriate levels and values of the constraint costs
- the assessment, classification and criteria used for the projects summarised in tables 1 and 2, and
- the review of GB wide transmission security standards discussed in paragraph 4.9.

5. Implementing an appropriate adjustment mechanism

5.1. This Chapter describes the initial proposals for an adjustment mechanism to the present price controls to incentivise investment by transmission licensees in response to increasing demand for connections by renewable generators.

5.2. In making these initial proposals Ofgem has carefully considered respondents' views to the May 2004 consultation paper and the draft report from its engineering consultants. The SKM report provides a technical and economic evaluation of the investment proposals put forward by the three transmission licensees.

Background

5.3. In setting the transmission price controls in1999 and 2001, no allowance was made for significant increases in renewable generation. Ofgem's May 2004 consultation document set out three options for an adjustment mechanism to the transmission price controls, to apply between April 2004 and April 2007 that could provide the licensees with incentives to invest in a timely and efficient way:

- **a lump sum allowance**, similar to existing price controls, whereby Ofgem agrees a level of investment to form part of each transmission licensee's regulatory asset value (RAV),
- **a revenue driver**, to provide transmission licensees with a predetermined increase in revenue as additional generation connects to its network, or
- **cost pass through,** whereby the level of investment would be automatically recovered through allowed revenues.

5.4. The May 2004 document indicated that given the potentially weak incentive properties associated with cost pass through arrangements, it was unlikely that this arrangement would by itself provide the best way forward. Nevertheless, it might be appropriate to consider hybrid arrangements, combining options to take advantage of their desirable characteristics.

5.5. In developing the preferred option Ofgem has taken into consideration the views of respondents to the May 2004 consultation paper. In the light of these views the initial proposals are based on the following considerations:

- protecting the interests of consumers by incentivising transmission licensees to operate and develop their networks in a timely and efficient manner
- providing licensees with incentives to react in a timely way to increases in demand for transmission capacity from renewable generation
- ensuring that regulatory policy does not present an unnecessary obstacle to Government policy designed to increase renewable generation
- the need to balance the costs of network reinforcement with the benefits of reductions in constraint costs and where appropriate reductions in network losses
- the advantages of identifying clear outputs (for example in terms of the increase in network capacity) that would result from any investment projects funded from transmission charges so that it is clear that the licensees deliver what has been paid for and to prevent any double counting with existing and future price controls
- providing incentives for reinforcement projects to be carried out efficiently and cost-effectively
- the need to prevent licensees from making windfall gains from delays arising because of the need to obtain planning permission for network reinforcements
- the desirability of protecting generators, suppliers and consumers from paying higher charges to fund stranded investment, and
- developing regulatory arrangements that are not unduly bureaucratic or burdensome on industry participants.

SKM's report

5.6. Ofgem appointed SKM to assist with the technical and economic evaluation of the transmission expenditure proposed by transmission licensees to accommodate additional demand for renewable generation capacity in Scotland.

5.7. The May 2004 document noted that the basic test for whether transmission upgrades are economic and efficient would include assessing the difference in annual costs of constraints (with and without network upgrades) against the annual cost of financing and maintaining the transmission system upgrades. The review by SKM has focussed on this test, the SKM draft report is summarised in Chapter 4 and published alongside this document.

Ofgem's initial proposal

5.8. The investment proposals put forward by the licensees can be categorised as follows:

- **Baseline investment** – investment projects where SKM's analysis demonstrates that the savings in constraint and other costs exceed the investment costs. SKM's report indicates that the Beauly-Denny reinforcement proposal and Sloy area reinforcement project would meet these criteria. These results are robust against a range of constraint costs and volumes.

- **Incremental investment** – investment projects where SKM's analysis indicates that while constraint costs are likely to be substantial there is uncertainty as to whether they will be greater than the investment required to relieve the constraints, or where it may be more efficient to delay the project. This category would include projects which may become economic only if other reinforcement projects proceed. Incremental investment projects may themselves be conditional on obtaining the relevant planning consents, which are subject to an independent legal process. In these circumstances it would only be appropriate to fund the initial development and pre-construction work costs. This would allow the project to proceed as soon as the uncertainties were resolved while at the same time protecting consumers

from funding significant costs associated with stranded assets (pre-construction costs are relatively modest). The England/Scotland interconnector upgrade and the North East ring reinforcement proposals could fall into this category.

- **Additional investment** – SKM's analysis demonstrates that, for many of the other investment projects capitalised constraint costs are likely to represent less than 50 per cent of investment costs. There is uncertainty as to the level of firm interest in generation connections and thus a significant risk that such investment could become stranded. For these projects transmission licensees have three options. First, a licensee would have the opportunity to provide further information to allow the project to be treated as baseline or incremental capacity. Second, Ofgem could specify a revenue driver (perhaps based on the amount of additional generation capacity that would connect) to provide the licensee with revenue but also protect consumers from the risk of stranded assets. Third, a licensee could seek long-term access arrangements with generators. These arrangements would be designed to guarantee an appropriate level of funding. The projects proposed by the transmission companies that fall within this third category are the Heysham area reinforcement, Kendoon area connection infrastructure, the Beauly to islands projects (Shetland/Orkney/Western Isles) and the Beauly-Keith reinforcement.

The incentive arrangements for these three categories of project are discussed in more detail below.

Baseline investment

5.9. For baseline capacity, a revenue allowance, rather than a revenue driver or cost pass through, would be the most appropriate approach. It appears to be unnecessary to develop a revenue driver when there is a reasonably clear and unambiguous requirement for baseline capacity investment. Moreover, a revenue allowance is preferable to a cost pass through approach as it places incentives on the transmission licensees to build capacity efficiently.

5.10. Baseline capacity would include those identified investment projects where SKM's analysis demonstrates, with a reasonable level of certainty, that the estimated capitalised cost of constraint management would be higher than the investment costs. These investment projects are summarised below:

Table 3: Baseline Investment Projects

Network investment	Transmission company	Renewable capacity[1] increase to justify project (MW)	Total project cost (£millions)
Beauly Denny	SHETL/SPTL	1200	332
Sloy area reinforcements	SPTL/SHETL	150	21

(1) Varies according to project cost and location.

5.11. The revenue allowance could be calculated using SKM's estimate of the project costs. This should provide an independent estimate of project costs and protect consumers from funding any over-estimated investment costs.

5.12. These estimated project costs could be translated into an annual allowance by calculating regulatory depreciation and a return on net assets. Respondents to the May 2004 document expressed a range of views on how transmission investment for renewable generation should be financed – in particular in relation to assumptions on the cost of capital and assumptions with respect to regulatory depreciation lives. These matters will require further consideration in formulating final proposals.

5.13. Output measures would be set for each project in the baseline category to provide clarity as to what licensees were expected to deliver in relation to each project. These could be based on SKM's assessment of the increase in network capacity and capability that each project should deliver.

5.14. It would be important to ensure that licensees did not benefit from any delays in investment created by the planning process. Therefore, revenue allowances for depreciation and returns would not be paid until the project had received all necessary consents and construction had started.

5.15. It would also be important to ensure that licensees had an incentive to complete network reinforcement projects as quickly as practicable. Licensees would be

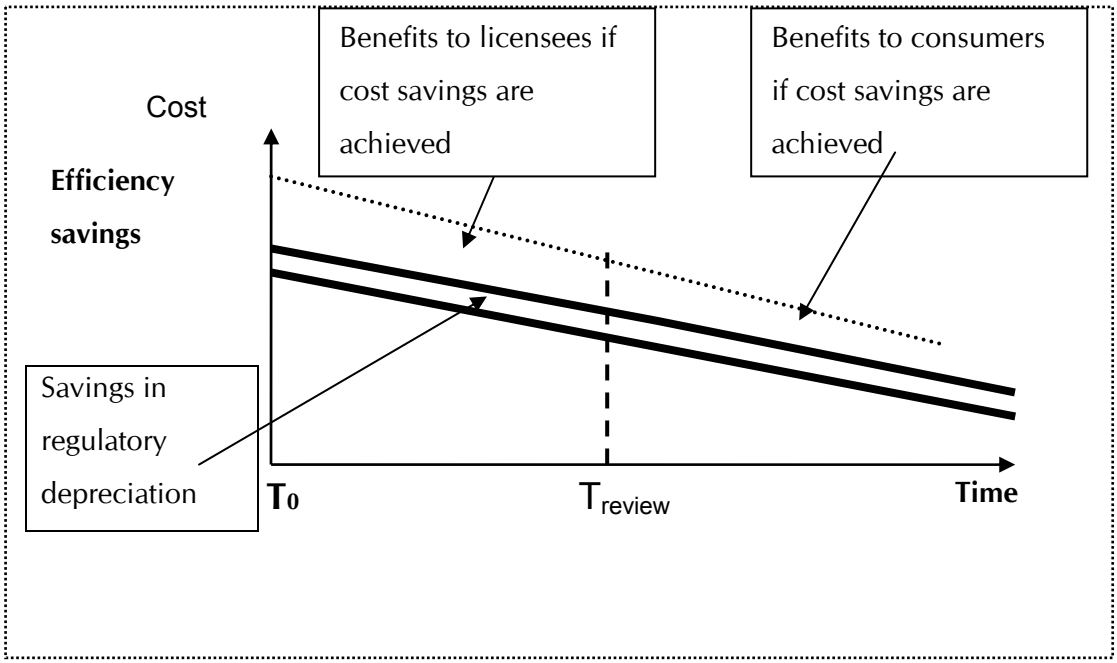
allowed to recover pre-construction costs before planning consents for a project were granted. After securing the relevant planning consent and commencing construction licensees would receive a revenue allowance for interest during construction, perhaps based on the estimate of the cost of debt finance used to set the overall cost of capital. After construction had been completed and the licensee had demonstrated that the project had delivered the outputs discussed in paragraph 5.13, the licensee would receive a revenue allowance consistent with the full cost of capital and depreciation.

5.16. Where the licensee delivered outputs in excess of those set at the start of the project and where these outputs delivered benefits to system users then it is for consideration as to whether a licensee should be allowed a higher level of return. Where the outputs delivered were less than those set at the start of the project and this had a detrimental impact on network users then the licensee would receive lower returns. It would be for consideration if the adjustment to revenue should be pro rata to the licensee's performance in delivering outputs.

5.17. Ofgem would undertake an ex post review to determine whether the agreed output measures had been delivered. If the output measures have been delivered, the actual investment costs would be incorporated in the regulatory asset value after a period of five to ten years, provided costs have been properly incurred and there is no evidence of inefficiency. This approach would provide an overall incentive for cost efficiency while providing a degree of risk sharing with network users. For instance, if a licensee could deliver a project for less than the estimate of the efficient level of costs provided by SKM it would retain the difference in financing and depreciation allowances for the period until actual investment was added to the RAV. When actual investment was added to the RAV the transmission licensees' customers would benefit from the lower than expected costs. The use of outputs would nevertheless provide incentives for the licensee to deliver an appropriate level of network capacity.

5.18. Figure 1 shows how efficiency savings would be shared between licensees and consumers / generators.

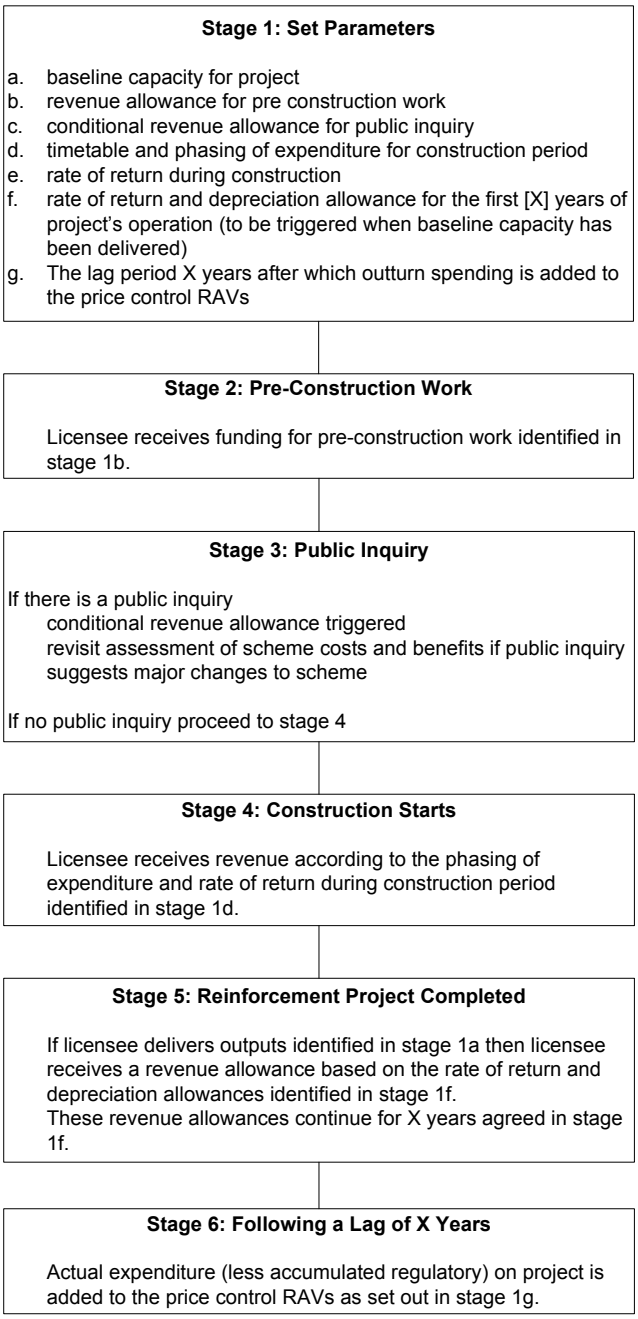
Figure 1: Baseline Cost Efficiency Incentive Scheme



5.19. Licensees would be entitled to recover the revenue allowances in a similar way to price control revenue. Following the implementation of BETTA then NGC will set transmission charges on a GB basis. It will recover its price control revenue plus any allowances for transmission investment for renewable generation, along with equivalent entitlements of the Scottish transmission licensees. NGC would then transfer the relevant allowances to the Scottish companies. Cost reflective charging would ensure that those system users that created the need for the investment faced appropriate price signals for the use of transmission capacity.

5.20. The process for establishing baseline capacity is depicted schematically in Figure 2.

Figure 2: Process for Establishing Baseline Capacity



Incremental investment

5.21. Incremental capacity would include those investment projects where analysis suggests that there is some remaining uncertainty as to whether the project should go ahead, but that there would be significant advantages in carrying out

pre-construction work while these uncertainties are resolved. This suggests that the regulatory framework should allow the financing of this pre-construction work.

5.22. Incremental investment projects are summarised in the table below.

Table 4: Incremental Investment Projects

Network investment	Transmission company	Renewable capacity[1] increase to justify project (MW)	Total project cost (£million)	Planning costs (£million)
England/ Scotland Interconnector	NGC/SPTL	5000	152	3.3
North East Ring	NGC	>6000	140	5.6

(1) Varies according to project cost and location.

5.23. For incremental capacity investment it is appropriate to provide an initial revenue allowance for the delivery of the planning stage costs, such as scoping out the necessary investment work and obtaining planning permission. This would ensure that no undue investment delays occur, while protecting consumers from the risk of financing assets that are not economic.

5.24. These revenue allowances would be based on SKM's assessment of the transmission licensees' estimates of the likely development costs of each project prior to April 2007. Before an application for planning permission is made Ofgem would review whether the investment should be treated as baseline or additional investment capacity. The next full transmission price control reviews might provide a timely opportunity to undertake such reviews.

5.25. The incremental capacity approach would facilitate flexibility by allowing potentially time consuming pre-construction work to go ahead while allowing time to ensure greater certainty about the various costs and benefits of the scheme. Transmission licensees would have certainty that it would be able to recover the pre-construction costs and would nevertheless retain flexibility to respond to changes in demand.

5.26. A disadvantage of this approach is that consumers could be asked to meet the costs involved in the planning and design stages of a project that might subsequently not be built. Nevertheless, this disadvantage is reduced by only including those projects that have a relatively high probability of being in the baseline at the next main price control reviews.

5.27. The revenue allowances could be based on SKM's estimates of the costs or pre-construction work. It is for consideration how these revenue allowances would be treated in the price control regime. It may be appropriate to treat the pre-construction costs as a revenue cost and not capitalise these costs or add them to the RAVs. This should avoid double counting and consumers paying for costs twice.

Additional network investment

5.28. Additional network investment would be those investment projects for which analysis suggests that capitalised constraint costs would be less than 50 per cent of the investment project costs. Over time this uncertainty should reduce and if appropriate these projects could either be classified as baseline or incremental network capacity. Ofgem's initial view is that the following investment projects should be categorised as additional network investment.

Table 5: Additional Network Investment Projects

Network investment	Transmission company	Renewable capacity[1] increase to justify project (MW)	Total project cost (£millions)
Heysham ring area reinforcement	NCG	700	65
Kendoon area connection infrastructure	SPTL	350	90
Beauly to Shetland/ Orkney/ Western Isles	SHETL	n/a	500
Beauly/ Keith reinforcement	SHETL	n/a	158

(1) Varies according to project cost and location.

5.29. At this stage there is uncertainty about the future pattern of generation in Scotland and the future level of constraint costs. While Ofgem's views have been informed by SKM's draft report there remains a range of plausible scenarios for the future level of constraint costs and renewable generation in Scotland. Transmission licensees may decide that they have sufficient confidence in these alternative scenarios such that they are prepared to push ahead with the investment project. Ofgem would intend to facilitate such investment, provided that consumers were protected from the risk of funding uneconomic transmission assets.

5.30. On this basis it is intended to allow the funding of this investment by the use of:

- **a revenue driver** that would be set at the start of each project and would allow the transmission licensee to recover revenue in proportion to the additional generation capacity that connected to the network as a result of the completion of the project. Such a revenue driver could allow the licensee to earn higher rates of return if the project was a relative success in terms of increasing generation connections. A licensee would earn significantly less revenue if the anticipated increase in renewable generation failed to materialise, and/or

- **longer-term commercial arrangements** between generators benefiting from the investment and the transmission licensee, under which generators are able to guarantee/underwrite payment of transmission charges over the long term. In return for committing to longer term charging arrangements the generator could be entitled to longer-term access rights.

5.31. These projects could also be re-examined in the light of responses to this document and at the next main price control review; to establish whether new information suggested that they should be included either as baseline or incremental network capacity.

5.32. If a transmission licensee were to want to proceed on the basis of a revenue driver Ofgem would need to review in more detail:

- scope of investment

- project plans and costs
- expected increase in network capacity, and
- the extent of additional generator connections.

5.33. An advantage of a revenue driver is that the risk to consumers is minimised in that the risk of stranded assets is borne either by transmission licensees or generators. Licensees would only be able to recover costs to the extent that generators were prepared to pay for the additional capacity being provided.

5.34. A disadvantage to the licensee of the revenue driver is that it would be exposed to a significant amount of risk. The prospect of higher returns may not be sufficient to encourage transmission licensees to respond to demand. Therefore transmission companies may prefer to consider seeking a long term access arrangements with developers to mitigate these risks.

Summary

5.35. In summary the initial proposals categorise investment as baseline, incremental or additional investment projects. As discussed in paragraph 5.13 output measures will be established, where appropriate, as part of implementing an adjustment mechanism to operate alongside the main price controls. These initial proposals should ensure that:

- transmission licensees have certainty with regard to the recovery of costs for the delivery of agreed baseline capacity
- incentives are placed on the transmission licensees to ensure that investment is undertaken efficiently in terms of both build efficiency and responding to demand for capacity
- there is flexibility to allow transmission licensees to undertake incremental investment projects in stages to minimise the risks of stranded assets

- transmission licensees have incentives to respond to changes in demand for capacity through the use of output measures and the arrangements associated with additional investment
- no projects put forward by licensees to date will be prevented from going forward, although in certain instances licensees would need to accept funding on the basis of a revenue driver or find generators willing to enter into suitable longer-term commercial arrangements, and
- the flexibility will be retained to move incremental capacity projects into the baseline and additional investment projects to the baseline or incremental categories, if additional information emerges that would justify these changes.

Views invited

5.36. Ofgem welcomes views on any aspect of the issues raised in this Chapter and in particular on whether:

- it is appropriate to separately identify baseline, incremental and supplementary incremental capacity
- the initial categorisation of projects set out in Chapter 5 is reasonable
- the incentives associated with each category of investment are appropriate
- network capacity is an appropriate output for baseline investment and whether generator connections are an appropriate revenue driver for additional investment
- the revenue allowances should be calculated for baseline network capacity in terms of assumptions on regulatory depreciation lives and the cost of capital
- additional rewards should be provided if transmission licensees are able to provide outputs beyond those envisaged in the baseline, and

- the process for reviewing investment projections in the future to ensure that, if necessary, they are moved to a different category, is appropriate.

6. Next Steps

6.1. This Chapter summarises the key issues for consultation and Ofgem's proposed timetable for completing its transmission investment for renewable generation work stream.

6.2. Ofgem's initial proposals set out a framework for an adjustment mechanism to supplement the existing price controls from the period 2004/5 to 2006/7. In developing these proposals, Ofgem is responding to changes in the patterns of demand for connection and transmission capacity as a result of a growth in the renewable generation.

6.3. Further consideration will need to be given to the effects of transmission investment for renewable generation on transmission charges.

Views invited

6.4. As an ongoing part of this consultation, Ofgem would welcome views on any aspect of the issues raised in the initial proposals and in particular on:

- the estimates of the level of renewable generation likely to connect
- the appropriate levels and values of constraint costs
- the assessment and classification of projects summarised in Tables 1 and 2 in Chapter 4, and
- the review of GB wide transmission security standards discussed in paragraph 4.9.

6.5. Additional views are sought on the detailed proposals set out in Chapter 5 for an adjustment mechanism. In particular views are invited on whether:

- it is appropriate to separately identify baseline, incremental and supplementary incremental capacity
- the initial categorisation of projects set out in this Chapter

- the incentives associated with each category of investment are appropriate
- network capacity is an appropriate output for baseline investment and whether generator connections are an appropriate revenue driver for additional investment
- the revenue allowances should be calculated for baseline network capacity in terms of assumptions on regulatory depreciation lives and the cost of capital
- additional rewards should be provided if transmission licensees are able to provide outputs beyond those envisaged in the baseline, and
- the process for reviewing investment projections in the future to ensure that, if necessary, they are moved to a different category, is appropriate.

Way forward and timetable

6.6. The timetable for completing this and related work streams is summarised below. This assumes that no objections are received to the licence modifications that should be published alongside the final proposals document.

2004

- Transmission investment for renewable generation - final proposals to be published in November 2004.

2005

- Transmission investment for renewable generation – licence modifications to take effect in January 2005.
- BETTA go-live in April 2005
- Main transmission price control reviews start

2006

- Proposals for the main price controls

2007

- Implementation of 2007/8 price control review

Appendix 1 - Impact Assessment

Introduction

1.1 Ofgem is required to carry out impact assessments (IAs) under section 5A of the Utilities Act 2000, as amended by the Sustainable Energy Act 2003. Section 5A requires that the Ofgem carries out IAs:

- whenever it proposes to do anything for the purposes of, or in connection with, the carrying out of any function exercisable by it under or by virtue of Part 1 of either the Electricity Act or the Gas Act, and
- It appears to Ofgem that the proposal is important.

1.2 Section 5A defines a proposal as important where its implementation would be likely to lead to one or more of the following:

- involve a major change in the activities carried out by the Authority
- have a significant impact on persons engaging in the generation, transmission, distribution or supply of electricity or gas
- have a significant impact on persons engaged in commercial activities connected with the generation, transmission, distribution or supply of electricity
- have a significant impact on the general public of Great Britain or part of Great Britain, or
- have significant effects on the environment.

1.3 Ofgem initial proposals, as set out in this Initial Proposals document, are to introduce a price adjustment mechanism to the current transmission price controls to fund efficient network investment required to meet the anticipated additional demand for renewable generation connections. Ofgem considers that the initial proposals set out in this consultation warrant an IA because of the materiality of the associated investment for transmission licensees and the environmental impacts of the proposed transmission investment plans.

1.4 This IA considers a base case scenario (i.e. do nothing) against the initial proposals, for each of the eight main investment proposals that transmission licensees have submitted to Ofgem. It compares the investment costs against the savings in constraint costs that would result from the investment.

1.5 Where appropriate the costs and benefits of the initial proposals will be quantified although it should be recognised that this may not always be practicable. That is, it may be difficult to quantify some costs and benefits accurately, especially where the benefits may accrue over a number of years.

1.6 Ofgem will develop final proposals on transmission investment for renewable generation in autumn 2004. Ofgem will take into account respondents' views to these initial proposals, including any comments on this draft IA, in developing its final proposals. In particular, Ofgem would welcome comments from interested parties on the costs, benefits and risks associated with the options considered in this IA.

1.7 The IA has been developed against the background of Ofgem's principle objective and statutory duties (summarised in Chapter 2 of this document).

Policy objectives

1.8 It is important for transmission networks to be operated and developed in an efficient and co-ordinated manner to protect the interests of consumers. This includes having incentives to respond to the changing demands of system users.

1.9 The intention behind the initial proposals for transmission investment for renewable generation is to provide transmission licensees with incentives to respond efficiently to an increase in demand for transmission capacity because of significantly increased renewable generation connections.

1.10 Ofgem has proposed introducing an adjustment mechanism to the current price controls for the three transmission licensees in GB – NGC, SPTL and SHETL to fund transmission investment for renewable generation. These initial proposals are in response to actual and expected increases in renewable generation in response to the obligations that the Government has put in place on electricity suppliers under the Renewables Obligation Orders.

1.11 The intention behind the initial proposals to introduce an adjustment mechanism to fund transmission investment for renewable generation is to provide transmission licensees with incentives to respond efficiently to an increase in demand for renewable generation connections.

1.12 This potential additional investment in the transmission systems was not allowed for when the price controls for the three transmission companies in GB were set.

Overview of key issues

Renewable energy obligations

1.13 The Government has put in place obligations on electricity suppliers under the Renewables Obligation Order 2002 and the Renewables Obligation (Scotland) Order 2004 in order to stimulate growth in renewable energy generation. Under the Orders, suppliers are required to produce information to Ofgem that an increasing proportion of the electricity that they supply is from renewable energy sources. Suppliers do this by producing Renewable Obligation Certificates (ROCs), which are issued to renewable generators on a per MWh basis, or by making a buy -out payment, which is currently £ 30 MWh of the supplier's renewables obligation. A supplier's renewables obligation for the period 1 April 2004 to 31 March 2005 is 4.9 per cent of its total electricity supply.

1.14 The market has responded to these incentives provided by the ROCs scheme by developing wind generation –particularly in Scotland. The prospective increase in electricity flows across the network will mean that either transmission networks will need to be reinforced or the pattern of generation will need to be constrained by the capacity of the existing network. It is appropriate to consider the costs of the proposed investment projects against the benefits they would bring in terms of constraint reduction. It is important to do this now as the lead times for transmission investment are relatively long – in part because of the need to obtain planning and other consents for new overhead transmission lines.

Constraint costs and investment costs

1.15 The estimated investment costs have been assessed against the potential savings in constraint costs and transmission losses under the base case scenario of no

investment being undertaken. Chapter 4 of this document discusses constraint management costs in more detail.

1.16 Ofgem's engineering consultants have assessed the costs and benefits of the various transmission investment projects put forward by licensees. The detail of their method requires further consultation. In particular, it will be necessary to give careful consideration to the value and volume of constrained energy.

1.17 For the purposes of this IA, the constraint cost estimates made by SKM can be used to give an indication of the appropriateness of the upgrade projects. SKM has used a value of constraint costs of £45 MWh to constrain energy from renewable generators (although for key projects such as Beauly-Denny SKM have also carried out sensitivity analysis). On an economic basis this estimate may be relatively high given traditional estimates of the wider social costs of greenhouse gas emissions. On a market based approach, the estimate may be relatively low given the current ROC market price of around £50 MWh (although this may fall over time).

1.18 For constraining conventional generation, SKM has based its analysis on a relatively conservative economic cost of £1 MWh to £5 MWh, and a somewhat higher market based price of £10 MWh.

Assessing the licensees' investment proposals

1.19 In order to give further clarity to the need for an adjustment mechanism, Ofgem asked SKM to review:

- **the level of anticipated connections** of new renewable (and conventional) generation to distribution and transmission networks in Scotland
- **the need for transmission investment** to efficiently meet the anticipated additional demand for generation connections, and
- **the cost of the proposed transmission investments** as put forward by the licensees.

1.20 SKM's draft report is being published alongside this document. The analysis compares the capitalised cost of upgrading the transmission system (discussed in

more detail in the following section) with the capitalised savings in constraining generators off the system if the upgrade takes place (calculated by comparing constraint costs with and without network upgrades).

Efficiency

1.21 Unless action is taken now, it is unlikely that the transmission investment that is now required would take place until the next price control period, which commences in April 2007. This could lead to delays in the construction of new renewable generation, or to substantial constraint payments if new generation is built but then cannot be connected to the system or cannot be used to its full capacity. Given the subsidies in place for renewable generators from ROCs payments, the cost of constraining renewable generation could be significantly higher than conventional generating plant.

1.22 These outcomes would not be in the interests of either renewable generators or consumers. Therefore it is appropriate to consider the best approach to funding investment in the transmission networks in the period until the next main transmission price controls take effect.

Options

1.23 The October 2003 consultation paper on transmission investment for renewable generation explored three options to address the issue of appropriate and timely investment in transmission networks:

- rely on existing mechanisms i.e. do nothing until the next price control review
- re-open all three price controls, or
- add an adjustment mechanism to the existing controls to deal with renewable expenditure.

1.24 In May 2004, Ofgem published its second consultation on this issue. This consultation proposed adding an adjustment mechanism to the transmission price controls to accommodate any efficient network investment to meet the anticipated additional demand for renewable generation connections.

Ofgem's preferred option

1.25 This August document considers the detail behind Ofgem's preferred option, which is to implement an adjustment mechanism to the current price controls to fund efficient network investment. This IA compares the base case scenario – do nothing – against Ofgem's initial proposals to introduce an adjustment mechanism to provide the necessary investment costs to meet the anticipated additional demand for renewable generation connections.

1.26 The assessment compares the cost of constraining generation against the costs of the reinforcement, drawing on the analysis completed by SKM.

Costs and Benefits

1.27 The initial proposals for transmission investment for renewable generation are to introduce an adjustment mechanism to fund efficient network investment. In order to give further clarity to what may be considered as efficient network investment, the investment proposals put forward by the licensees have been initially classified as:

- baseline investment – where investment costs are less than capitalised constraint costs
- incremental investment – where it is unclear whether investment costs are less than the likely reduction in constraint costs and where staged investment planning costs are warranted, and
- additional investment - where additional information is required before providing funding for baseline or incremental investment, or licensees need either to arrange for long-term access arrangements with generators to justify investment or rely on a revenue driver to provide funding for the investment.

1.28 While all aspects of SKM's assumptions and issues raised by SKM are subject to consultation, Ofgem considers that at this stage it is a reasonable to use SKM's estimates for the following reasons:

- *level of new connections* – the central case of 4,500 MW for new renewable generation and sensitivities of +/- 1000 MW appears to cover a plausible range of outcomes for renewable generation in Scotland

- *associated constraint costs* - SKM's assumptions on constraint costs for renewable generation are based on £45 MWh but range between £20 MWh to £50 MWh. The sensitivities do not undermine the conclusions for the most important project in the baseline, which is Beauly-Denny (ie for a plausible range of lower values or volumes for constrained energy Beauly to Denny would remain economic)

- *investment proposal costs* – SKM has assessed the estimated project spend for each investment proposals and has concluded that the costs are in line with their expectations.

1.29 Table 6 to this Appendix sets out estimates of the capitalised investment costs of each project and compares these with the reductions in capitalised constraint costs that would occur if the project were completed to timetable.

Table 6 – Costs and Benefits of the Investment Proposals

Reinforcement	Capitalised investment costs required to justify project (£ million)	Generation capacity to justify project (MW)	Wind generation capacity (MW)		Capitalised savings in constraints, betterments and losses attributable to proposed reinforcement (£ million)(*)		Stranded Asset Risks
			Present capacity	SKM estimate by 2010	With present firm capacity	With SKM estimate by 2010	
1- Beauly-Denny	332.22	**W: 1200 MW** E: as above M: not applicable	820 MW	1500 MW	**W: 189.63** E: as above M: not applicable	**W: 974.61** E: as above M: not applicable	Low
2 - Sloy area reinforcements	20.58	**W: 275 MW** E: as above M: not applicable	303 MW	310 MW	**W: 42.63** E: as above M: not applicable	**W: 44.1** E: as above M: not applicable	Low
3 - Kendoon area connection infrastructure	89.67	**W: 350 MW** E: as above M: not applicable	228 MW	300 MW	**W: 4.41** E: as above M: not applicable	**W: 45.57** E: as above M: not applicable	Medium, however lower cost/risk alternative should be investigated
4 -England/Scotland Interconnectors upgrade.	151.41	W: 300 to 2400 MW **E: 3700 to 5000 MW** M: 1000 to 3600 MW	2,700 MW	4000 MW	W: 1440.6 **E: 32.34** M: 220.5	W: Very high **E: 74.97** M: 289.59	Sensitive to constraint costs, staging and operation of conventional stations in Scotland
5 - North East Ring upgrade.	139.65	W: 1200 to 3100 MW **E: 6200 to 6800 MW** M: 2400 to 5000 MW	2,700 MW	4000 MW	W: 661.5 **E: 20.58** M: 149.94	W: 955.5 **E: 45.57** M: 224.91	
6 - Heysham area reinforcements	64.68	Not quantifiable with available information, however significantly greater than 4 above	3,250 MW	4000 MW	Not quantifiable with available information, estimated to be manageable by other means		High. Lower cost alternatives should be investigated. Project will be staged after 4 above
7 - Beauly to islands (Shetland/Orkney/ W.Isles)	-	Not applicable. Specific connection driven assets with costs recoverable from customer	125 MW	1921 MW			N/A
8 - Beauly / Keith reinforcement	-	Circa 5000 MW north of Beauly	820 MW	1500 MW			N/A

(*) W:£45 MWh for wind generation, E:£1/5 MWh - £45 MWh for economic cost of generation, M: £10 MWh for market based cost of generation.

Environmental impact

1.30 The base case scenario (i.e. do nothing) would be likely to have adverse consequences for one of the Government's goals for energy policy - to put the UK on a path to cut carbon dioxide (CO_2) emissions by some 60 per cent by 2050, with real progress by 2020.

1.31 To support this goal the Government is aiming for ten per cent of UK electricity to come from renewable sources by 2010 and an aspiration to double this by 2020.

1.32 Under the base case scenario transmission licensees would have less of an incentive to invest to reinforce their networks leading to constrained renewable plant and the possible curtailment of network investment in Scotland. This would lead to fewer renewable generators connecting to the network and higher carbon dioxide emissions. In contrast the initial proposals are designed to provide for an efficient level of transmission investment.

1.33 Constraining renewable plant also has consequences for emissions if the plant generating in its place is conventional fossil-fuel generation. For instance in the case of the Beauly-Denny line the constrained energy volumes given existing generation are forecast to be about 480 GWh. However, over time this is forecast to increase to about 1600GWh. Network logistics mean that wind generation is most likely to be constrained. Table 7 shows that depending on the alternative generation used, this could lead to an increase in CO_2 emissions of between 565 kt and 1500 kt. The Government expects 9.2 million tonnes of CO_2 savings to be delivered by the Renewables Obligation[5].

Table 7 – CO_2 emissions avoided by removing network constraints at Beauly-Denny

	Installed wind capacity	Constraint energy volumes	Substituted by current grid average	Substituted by CCGT	Substituted by coal
	MW	*GWh*	*Kilotonnes of carbon dioxide*		
Beauly-Denny	1900	1600	675	565	1500

NB The constrained energy volumes figure is based on an average of scenarios with 1800 MW ad 2000 MW installed wind capacity

[5] DETR (2000) Climate change the UK programme

1.34 However, the initial proposals to introduce an adjustment mechanism to fund transmission investment for renewable generation may also have environmental impacts. Specifically, environmental impacts may result from an expanded or upgraded high voltage transmission system, such as:

- visual impact from new build and wires. The visual impact of additional new transmission lines could be considered to be unsightly and the siting of wires and towers and other installations can have effects on habitats, archaeology and other items of natural or cultural importance. For the proposed investment projects, visual impact issues differ depending on the projects. Building a new 400kV line (e.g. Kendoon) or upgrading a 132kV line to 400kV (e.g. Beauly-Denny) will result in the construction of larger towers which could have a detrimental effect on the visual amenity of the area. It could also have significant impacts on surrounding areas during the construction phase e.g. disturbance of habitats. However, in the case of a project where circuits would be reconductored, such as the interconnector upgrades, the impacts on visual amenity are likely to be much less. Issues relating to visual impact can be considered as part of the planning and consents process for new overhead lines, which are matters for local and national Government.

- Impact of new generating stations. Increasing the capacity of lines to accommodate renewables will lead to the development of new generating stations which will have an environmental impact in their own right, for example impacts from the construction of new plant on visual amenity, and areas of natural or cultural heritage.

Security of supply

1.35 The base case or do nothing option could create potential barriers to entry for renewable and other forms of generation unable to connect to the transmission system in a timely and efficient manner.

1.36 The initial proposals to implement an adjustment mechanism could provide benefits to security of supply by:

- encouraging diversity in energy production, in both location and fuel type, and

- providing funding for pre-construction work to enable a robust assessment and development of design options to strengthen the network links between the transmission systems in Scotland and England.

1.37 Nevertheless, it is unlikely that these benefits would be significant given the intermittent nature of wind generation.

Risks and unintended consequences

1.38 If Ofgem were to do nothing, the transmission licensees could under invest in the transmission systems thereby increasing constraint costs and undermining the development of renewable generation.

1.39 All new overhead transmission lines need planning permission and other Government consents. The outcomes of this process are uncertain and may delay transmission reinforcement projects. Nevertheless, the proposed design of the adjustment mechanism described in Chapter 5 is intended to prevent licensees recovering revenue if investment is delayed.

1.40 There is a risk that the level of anticipated connections from renewable generators is over estimated and that as a result, over investment occurs in transmission infrastructure. Sanctioning over investment could lead to a risk of stranded assets, which could increase consumer prices unnecessarily. Nevertheless, the approach of allocating investment projects to baseline, incremental and additional categories, together with providing the flexibility for projects to move between the categories should serve to mitigate some of these risks and the potential for stranded assets.

Competition

1.41 The implementation of an adjustment mechanism to facilitate investment in transmission network infrastructure would have only limited effect upon competition in the GB wholesale electricity market. Nevertheless, the timely implementation of a funding mechanism for transmission investment for renewable generation should tend to increase competition as renewable generators would have better access to the GB markets.

Distributional effects

1.42 In examining distributional effects it is appropriate to consider the impacts of the initial proposals to implement an adjustment mechanism for transmission investment for renewable generation between and within groups of consumers.

1.43 Users connected to the high voltage transmission system in England and Wales[6] are liable for the following charges[7]:

- a connection charge is payable when a user connects to the system. The charge is shallow and covers any assets that do not have the potential to be shared by another user

- Transmission Network Use of System (TNUoS) charges. TNUoS is a locationally varying zonal charge levied on a £/kW basis based on a generator's maximum flow onto the grid or users maximum offtake from the grid during a charging year. TNUoS charges allow NGC to recover the revenue allowed within its price control with 73 per cent of the charge is payable by customers taking power from the grid and 27 per cent by generators, and

- Balancing Services Use of System charge. In its role as System Operator (SO) NGT is responsible for ensuring that demand and supply is balanced in real time. It has a range of balancing options for achieving this and is incentivised to do so at the lowest possible cost[8]. The costs of system balancing (including recovering the costs of transmission constraints) are levied on users via Balancing Services Use of System (BSUoS) charges. These charges are levied across generation and demand in proportion to metered volumes.

Distributional Effects without network investment

[6] (NGT is currently consulting on the charging arrangements to apply GB Wide from 1 April 2005[6])
[7] For full details of charges see NGC's charging statements webpage

1.44 Constraint costs would increase and feed into the BSUoS charge paid by all parties. It is likely that these additional costs would ultimately be borne by consumers.

1.45 Less renewable generation could increase the market price for ROCs.

Distributional Effects of undertaking network investment

1.46 Transmission investment for renewable generation will increase the revenue NGC is able to recover from TNUoS charges. Some initial drivers and impacts of investment of this type on charges may be summarised as follows:

- a high proportion of the costs associated with investment in the Scottish networks, assuming a broadly cost reflective charging model, would fall on Scottish generators
- in NGC's existing charging model demand charges are the inverse of generation charges. Therefore, increased investment in the North may increase zonal charges in Southern and South West England, and
- constraint costs would fall relative to the base case.

1.47 More renewable generation could reduce the market price of ROCs. Whether competition would be such to reduce the market price below the ROCs buy-out price of 30 MWh is not clear.

Review and compliance

1.48 Under a base case scenario any investment undertaken by the transmission licensees over and above their agreed capital expenditure within the current price controls would be subject to an economic efficiency test at the next price control.

1.49 The proposed adjustment mechanisms would form part of a framework of ex ante and ex post reviews of each investment proposal, in order or ensure that costs are efficiently and economically incurred. These arrangements should not

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http://www.nationalgrid.com/uk/indinfo/charging/mn_charging.html

[8] For details of NGC's SO Incentive see http://www.nationalgrid.com/uk/indinfo/betta/gb_consultations.html

create a significantly greater administrative burden than that associated with main price control review process.

1.50 The initial proposals for incentive arrangements are outlined in more detail in Chapter 5 of the main consultation document.

Conclusion

1.51 The initial proposals to implement an adjustment mechanism to the transmission price controls will seek to address the risk that transmission licensees may not invest in response to growing demand for transmission capacity from renewable generators.

1.52 Implementing an adjustment mechanism to fund transmission investment should also provide environmental benefits and should not have any adverse implications for security of supply or competition. At this stage no significant adverse distributional implications of the initial proposals have been identified.

1.53 The compliance costs of the initial proposals should be modest given the relatively small number of transmission reinforcement schemes under consideration.

1.54 In considering the need to implement an adjustment mechanism to fund efficient investment, Ofgem has initially categorised projects as baseline, incremental and additional investment proposals. In categorising projects in this way, the proposed adjustment mechanism also provides incentives designed to promote:

- the cost effective management of constraint costs
- timely and efficient investment, and
- the interests of consumers, in that they would not be asked to bear the costs of stranded assets.