

**June 1999**

**Reviews of Public Electricity  
Suppliers 1998 to 2000**

**Scottish Transmission Price Control  
Review**

**Consultation Paper**

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**REVIEWS OF PUBLIC ELECTRICITY SUPPLIERS  
1998-2000**

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**SCOTTISH TRANSMISSION PRICE CONTROL REVIEW  
CONSULTATION PAPER**

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## FOREWORD

OFFER is undertaking a review of the price control of the two transmission businesses in Scotland and a review of Scottish trading arrangements, which includes a review of the appropriate degree of separation of businesses within ScottishPower and Scottish and Southern Energy. These reviews are inter-related, with the implementation of changes arising from the reviews scheduled to commence in April 2000. This paper relates to the review of the price controls and a forthcoming paper will cover issues relating to separation of businesses and Scottish trading arrangements.

In 1999 Scottish Hydro-Electric merged with Southern Electricity to form Scottish and Southern Energy. The licence for activities in Scotland refers to Scottish Hydro-Electric. This paper refers to Scottish Hydro-Electric to distinguish the activities of Scottish and Southern Energy in Scotland.

An OFFER consultation paper published in February 1998 explained that the present transmission price control review is part of a wider programme of reviews of Public Electricity Suppliers (PESs) covering separation of businesses, distribution price controls, competition in supply, metering, regulatory accounts and Scottish trading arrangements.

The original price controls for the Scottish transmission businesses were put in place by the Government before privatisation and operated from 1 April 1990. The price controls were reviewed in 1992/93, and revised price controls were set for the period 1994/95 to 1998/99. In April 1998 agreement was reached between OFFER and the companies to extend these price controls by one year, namely 1999/00. This paper refers to the price controls for the period from 1994/95 to 1999/00 as the “present” price controls.

In July 1998, OFFER published a consultation paper on price controls and competition in this programme of PES reviews. This described the main considerations likely to be relevant for the transmission price control review.

A further consultation paper was published in February 1999 on transmission business plans, which set out information derived from each company’s response to a questionnaire on operating costs and capital expenditure of its transmission business over the period until 2004/05.

This consultation paper sets out OFFER’s emerging thinking on the main considerations likely to be relevant for the transmission price control, and includes:

- form of the regulatory control;
- operating costs;
- capital expenditure; and
- financial issues.

The review of transmission price controls will also consider issues arising from the review of the separation of businesses and Scottish trading arrangements.

Draft proposals for revised transmission price controls are scheduled for publication later this summer, with final proposals before the end of the year. Final proposals should therefore be made at the same time as the price controls for the distribution businesses.

If either company does not accept the proposals for the transmission price control, then it may be necessary to make reference, in part or full, to the Competition Commission (previously the MMC), who will consider the matter and report in due course. If a reference is necessary and it appears that the Competition Commission will not be in a position to make recommendations in time to allow licences to be modified from 1 April 2000, then it would be important to consider whether some sort of transitional arrangements or licence modifications might be appropriate to protect the interests of customers.

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Comments are requested by 2 July 1999.

OFFER would prefer to publish all responses to this consultation paper by placing them in the OFFER library. All responses will be published in this way unless they are clearly marked as confidential.

We would be pleased to respond to queries about the contents of this paper. Queries about the price control review should be raised with Paul Dudley at the above address (telephone contact 0141 333 9271).

**OFFER**  
**June 1999**

## **1 BACKGROUND**

- 1.1 The transmission of electricity is an important part of the Scottish electricity industry. It accounts directly for about 5 per cent of a typical customer's bill. It provides a link between generation and distribution and can have a significant influence on the operations and costs of these activities. It is particularly relevant to the efficient operation of generation, which accounts for the majority of a typical customer's bill, and the promotion of competition in generation. The Scottish transmission businesses also include the interconnection between the Scottish and English electricity systems, which has an important bearing on the operations of, and competitive markets in, both systems.
- 1.2 The transmission business is also a significant contributor to the finances of each Scottish company. For instance, it accounts for approximately 10 per cent of the profits of the licensed Scottish electricity businesses of each company in its own area.
- 1.3 The review provides an opportunity to consider the price controls on the context of the future form and structure of transmission business activities, notably relating to system operation, the Scotland-England Interconnector and connections to the transmission network, in the context of other developments for the electricity industry, notably the reform of trading arrangements and the EU Internal Market for Electricity Directive.
- 1.4 On 20 May 1999, OFFER published a consultation paper on the PES distribution businesses (which include the distribution businesses of the Scottish companies). The paper sets out a number of principles which may be considered relevant in the context of the transmission review. The paper is referred to throughout this document as the 'May consultation paper on distribution'.
- 1.5 The primary objectives of the transmission price control review are similar to those for distribution, namely to strengthen the incentives on companies to increase efficiency and reduce costs, so that prices to customers can be lowered, while recognising that sufficient revenue can be raised to maintain an appropriate quality of service, to finance required new investment and to allow an appropriate return to shareholders. The transmission licensees have a statutory duty to develop and maintain an efficient, co-ordinated and economical transmission system and the operation of the price control needs to support the achievement of this obligation. In reviewing price controls the Director General will be guided by his statutory duties under Section 3 of the Electricity Act 1989.
- 1.6 The May consultation paper on distribution sets out the advantages and benefits of the present system of RPI-X regulation, and suggests some features which could be improved. It further suggests that greater reliance could be placed on inter-company comparisons than on periodic reviews. It proposes that additional incentives, focusing on quality measures, should be explored and that the quality of information available for regulatory purposes should be improved. A programme of work and consultation is proposed to implement improved

incentives. The advantages of RPI-X regulation apply equally to transmission, as do the features which could be improved.

- 1.7 Somewhat different considerations are likely to apply in transmission, where there are only three licensees in Great Britain rather than 14 in distribution. In addition the three transmission licensees appear to be more distinct from each other than the 14 distribution licensees. Even if the scope for inter-company comparisons is more limited in transmission, it may be possible to develop performance measures to introduce enhanced incentives. It is therefore important that the scope for enhanced incentives in transmission is given full consideration. Chapter 2 looks at RPI-X regulation, and the form and structure of the control.
- 1.8 The price controls should encourage the companies to achieve an optimal balance between:
  - network performance;
  - efficient capital investment;
  - efficient operating expenditure; and
  - efficient financial management.
- 1.9 Network performance relates to the security and availability of the network for electricity transmission; this is governed by planning standards and operational codes, and involves both operational and capital expenditure to ensure that performance levels are maintained and, where appropriate, improved.
- 1.10 The approach to the transmission price control reflects much of that outlined in the May consultation paper on distribution. Considerations of capital expenditure, operating expenditure and financial issues need to take account of transmission as a separate business activity within the company. Each company manages its transmission business together with distribution in a Power Systems activity. Where appropriate, it may be possible to draw conclusions from the review of distribution, for example in respect of the management of the business.
- 1.11 Operating expenditure is considered in Chapter 3. It includes comparisons of the companies' forecasts and OFFER's projections made during the previous price control review with outturn expenditures for 1994/95 and 1997/98. It sets out the companies' forecasts for the period 1998/99 to 2004/05 and outlines an approach to determine an efficient level of operating expenditures for the next price control period.
- 1.12 Capital expenditure is considered in Chapter 4. It includes comparisons of the companies' forecasts made during the previous price control review and outturn expenditures for 1994/95 to 1997/98. It sets out the companies' forecasts for the period 1999/00 to 2004/05 and outlines an approach to determine the appropriate level of capital expenditure for the next price control period.

- 1.13 Chapter 5 considers financial issues. It summarises the assessment provided in the May consultation paper on distribution, and outlines the considerations relevant to transmission. It concludes with an outline of aspects of the financial modelling being undertaken.
- 1.14 Chapter 6 raises a number of wider issues, pertinent to the review of the transmission price control. These issues relate to the further separation of transmission business from other company activities, the possible separation of system operator and/or Interconnector activities from the transmission business and transmission system policies that include connection arrangements and use of system charges.



## **2 FORM OF THE PRICE CONTROL**

### **Introduction**

2.1 This chapter looks at RPI-X regulation and the way it is applied to the transmission price control. It outlines how the review will be influenced by considerations discussed in the May consultation paper on distribution and considerations arising from the present operation of the Scottish transmission businesses. It explains the approach which will be taken on the form, scope, structure and duration of the price control.

### **RPI-X Regulation**

2.2 The transmission businesses constitute effective monopolies within their designated areas. To protect users of the transmission system, and ultimately final customers, from the potential abuse of monopoly power, the transmission businesses are subject to price controls.

2.3 The RPI-X form of price control may be expressed in several ways to meet the specific requirements of the business to which it is applied. The level of revenue allowed is typically determined by a maximum average price on a measure of units. The maximum average price is set for the first year of the price control and adjusted by a measure of the Retail Price Index (RPI) less an efficiency factor (X) for the remaining years of the control period. For transmission, the measure of units used in the present control is pre-set. Consequently the present price control takes the form of RPI-X, but effectively acts as a revenue control for the transmission business.

2.4 As a result of the application of the transmission price controls, the price during the present period has been on average in excess of 15 per cent below that during the previous price control period.

2.5 Utility regulation in the UK has recently been reviewed by the Government. The outcome of that review supported the continued use of RPI-X regulation provided regulators thought this was the most appropriate approach. It also encouraged regulators to consider greater use of error correction mechanisms alongside RPI-X regulation. Most respondents to OFFER's July 1998 consultation paper supported the retention of RPI-X regulation, including for the transmission business.

2.6 RPI-X regulation as applied to the transmission businesses has placed an emphasis on the periodic appraisal of costs during price control reviews in determining the regulated revenues for the subsequent control periods. In their periodic submission of business plans the companies may have the incentive to distort underlying costs through the allocation of costs between businesses (for example, transmission and distribution), types of expenditure (for example, capital and operating expenditures) and time (for example, delayed implementation of efficiency improvements towards the end of one price control period to maximise the effect of any savings in the next period).

- 2.7 It is for consideration how best the existing system of regulation may be developed to overcome some of these shortcomings while retaining the underlying benefits of the RPI-X form of control. Inter-company cost comparisons of the 14 PES distribution businesses form part of their present price control review. The establishment of cost comparators (yardsticks) or other mechanisms to provide greater incentives during the period of the price control is under investigation as part of the distribution review. The May consultation paper on distribution considers this in more detail, and proposed a programme of work and consultation to implement improved incentives.
- 2.8 While some comparative analysis may be applied for transmission, the limited comparative information from only two transmission businesses within this review reduces the scope for analysis. Nor, in many respects, are the businesses directly comparable with the National Grid Company (NGC), the transmission company of England and Wales. However, the similarity of some of the functions of the transmission and distribution businesses may enable some of the comparators identified for distribution to be applied to transmission. Further, to take account of the more limited scope in transmission to apply comparators of a company's performance against a measure of industry best practice, there may be scope to apply performance incentives by reference to the transmission licensees' own performance in recent years.
- 2.9 The establishment of these comparators (yardsticks) is unlikely to be completed for the additional measures to be introduced for April 2000. It may be appropriate to introduce the additional measures during the next price control.
- 2.10 ScottishPower and Scottish Hydro-Electric will be involved in the programme of work which has been proposed to consider this approach in distribution. There may be a read across between distribution and transmission. As in distribution, it would be appropriate to consider:
- identification and definition of the appropriate yardsticks;
  - specification of how the relevant data should be gathered and audited;
  - determination of the yardstick rewards and penalties; and
  - design of the settlement process by which the financial consequences are given effect.
- 2.11 It is for consideration whether, and to what extent, this approach can be applied to the transmission businesses.

## **Scope**

- 2.12 The transmission business activities as a whole presently include the planning, development and operation of the network at or above 132kV within the transmission licensee's designated area, and the Scotland-England Interconnector. The Scotland-England Interconnector includes assets in place at Vesting that were considered primarily to provide system security and assets put in place since Vesting that are primarily used for export of electricity from Scotland.

- 2.13 The present transmission price control relates to all assets in place at Vesting (pre-Vesting assets) and their associated revenues, and all post-Vesting assets and revenues excluding:
- exit connection charges for extra high voltage (EHV) customers;
  - entry connection charges for generators;
  - rental charges to the telecoms business; and
  - Interconnector upgrades (additional 750MW).
- 2.14 Consequently the present transmission price control includes revenue from the pre-Vesting Interconnector. In addition, NGC's transmission use of system charges associated with the pre-Vesting Interconnector capacity are treated as pass through by the Scottish transmission businesses.
- 2.15 Issues arising from the previous price control and relating to the regulation of the costs and revenues of the Interconnector include the following:
- while some pre-Vesting Interconnector charges are under contract, the outturn revenue and associated costs may differ from those forecast at the time of setting the price control. Hence the previous price control might have been set differently had the outturn levels been known at the time of setting the control. It is for consideration how any such differences should be taken into account for the next price control. Chapter 3 provides further details; and
  - while some revenue is recovered in use of system charges for electricity delivered to the Interconnector for export, there is presently no separate Interconnector charge. The charges for the Interconnector are under consideration in a review of Interconnector and use of system charges. Chapter 6 provides further details.
- 2.16 In 1997/98 Scottish Hydro-Electric's transmission business revenue was about £50 million of which about £3 million related to contractual charges for the post-Vesting Interconnector; about £5 million related to the contractual charges for the pre-Vesting Interconnector; and about £42 million comprised use of system and pre-Vesting connections. ScottishPower's transmission business revenue was about £128 million of which about £1 million related to exit connection charges for EHV customers, £13 million related to the contractual charges for the post-Vesting Interconnector; about £5 million related to contractual charges for the pre-Vesting Interconnector; and about £109 million comprised use of system and pre-Vesting connections. Some of the revenue not under contract relates to charges for transportation of electricity to the Interconnector.
- 2.17 Connection charges are levied when a generator or customer first connects to the transmission system or makes a material change in supply requirements, for example requesting an enhancement to its capacity of connection. Connection charges are treated as capital receipts by the transmission business.
- 2.18 Connection policy for generators is being considered as part of the price control review, with particular attention being given to the application of the policy and

call for change within Scottish Hydro-Electric's area. Chapter 6 provides further details.

- 2.19 In Scotland the 132 KV network is within the transmission business and its costs form part of the consideration for the transmission price control. In England and Wales the 132 KV network is within distribution and EHV use of system charges form part of the excluded revenue of the distribution price control. Large customers in Scotland and in England and Wales have expressed concerns about EHV charges, including that they have not reduced at the same rate as price controlled charges. The arrangements for regulation of EHV use of system charges are presently being reviewed.
- 2.20 The telecoms business of a company may use the transmission network to develop their own telecoms network. The transmission business then charges a rental to the telecoms businesses for use of its assets. The review will consider what costs within the transmission business should be attributed to use of the network by the telecoms business.
- 2.21 Other issues relating to the future regulation of the Interconnector business will be considered in the forthcoming consultation paper on the separation of businesses and trading arrangements in Scotland.

### **Structure**

- 2.22 The present definition of the transmission business includes a range of activities relating to planning, development and operation of the network within the designated area and the Scotland-England Interconnector.
- 2.23 During the present price controls the transmission businesses were involved in the development of System Data Provision (SDP) and Generation Registration Service (GRS), as part of the requirements for the settlements system in Scotland. The treatment of costs arising from these services forms part of the considerations in setting the level of the next price controls.
- 2.24 The previous price control for transmission set the level of revenue for the control period. The price control included a maximum price  $P_0$  for the initial year, an RPI-X adjustment to the maximum price and a pre-set quantity of units transmitted for subsequent years of the price control. Some customers have observed year-on-year price increases in excess of RPI-X. This has been caused by outturn units transmitted being lower than forecast, which, in part, may be attributed to the delay in the implementation of the Interconnector upgrade to 2200 MW. The permitted level of regulated revenue has been achieved by the companies, but customers in Scotland have not seen the benefits that would have arisen if outturn units matched forecast units. A lower forecast growth in units than applied in the price control would have recovered more revenue in the initial years and less revenue in the latter years of the price control, thereby reducing the year-on-year price changes observed during the period.

- 2.25 In their responses to the July 1998 consultation paper, Scottish Hydro-Electric suggested that the long-term drivers for the transmission business are growth in customer demand and embedded generation capacity. Scottish Hydro-Electric indicated a preference for a fixed income stream to match planned investment for general load growth and plant replacement. ScottishPower expressed support for the structure of the present price control but suggested that regulated revenue should be driven by network capacity rather than a forecast of units transmitted. It is therefore for consideration whether the structure of the price control should encompass demand, capacity, transmitted units or some other factor and whether the values for these factors should be outturn, pre-set, or some combination within the control.
- 2.26 The present price controls were extended for one year to cover 1999/00 and allowed each company to recover the same revenue, in real terms, for 1999/00 as that for 1998/99. The extension of the controls did not assume levels of capital expenditure, operating cost or cost of capital for 1999/00.
- 2.27 The price controls for the next period may be set for the year commencing 1999/00. The allowed revenue would be derived using the regulatory asset value at the start of the 1999/00 with projected operating costs, capital expenditures and cost of capital for the price control period for 1999/00 to the end of the control period. The price control for the period from 2000/01 may then be set by netting off the allowed revenue for 1999/00 from the allowed revenue calculated for the control period commencing 1999/00. It is for consideration whether this is the appropriate treatment of 1999/00 costs in setting the next price controls.

### **Duration**

- 2.28 Regulators have tended to set monopoly price controls for between 4 and 6 years. Respondents to the July 1998 consultation paper generally supported a 5-year control. The longer the time for which a price control is set, the greater the incentive companies have to make efficiency savings. However, a longer duration also increases the risk of unexpected circumstances, and the possibility of company performance being significantly different from the projections and assumptions used in setting the price control.
- 2.29 The previous review considered the options of bringing the start of the following price controls into line with the NGC price control, the supply price controls or the distribution price controls. Co-ordinated reviews for distribution and Scottish transmission were seen to provide the benefit of taking account of the synergies between distribution and transmission within the two Scottish companies. The transmission and distribution price controls were set for 5-year periods commencing 1994 and 1995 respectively and the transmission price controls were extended subsequently by one year to enable the transmission and distribution reviews to take place simultaneously. It is for consideration whether it will continue to be desirable to review the price controls of distribution and Scottish transmission at the same time.

- 2.30 The review of Scottish trading arrangements is addressing the case for changes to the definition and activities of the transmission businesses. These changes may require the opening the price controls within the next price control period to take account of developments in other parts of the electricity market.
- 2.31 Opening a price control once it is set can introduce an element of regulatory uncertainty. The implementation of the conclusions of the review of Scottish trading arrangements may affect the activities of the transmission business. While these changes are likely to be completed within the period of the next price controls, the form and timing of any changes are not presently known. If changes to the price controls are necessary, consequent on the review of Scottish trading arrangements and within the next price control period, the need for clarity and continuity will be carefully considered. It may, for instance, be appropriate to consider some form of transitional measures to limit the financial impact of any changes during the period.

### **Issues for Consideration**

- 2.32 Views are invited on any aspect of the issues raised in this chapter and in particular on:
- the development of alternative incentive mechanisms to complement the form of regulation used to date;
  - the structure of the controls, and in particular issues relating to the Interconnector, separation and GRS/SDP and the factors used within the control formulae;
  - the treatment of costs for 1999/00 in setting the next price controls; and
  - the duration of the price controls and the possible need to open the price controls to take account of other developments.

### 3 OPERATING COSTS

#### Introduction

- 3.1 Transmission business spending can be broken down into capital costs and operating costs. Capital costs cover spending on assets the benefit of which would be expected to last over several years, such as transformers or switchgear. Operating costs cover the day-to-day costs of running the network, such as repairs and maintenance, planning, control, overhead costs, depreciation and Interconnector costs and transmission system rates. Total transmission business spending was £50 million and £29 million in 1997/98 out of a total revenue of £130 million and £51 million, for ScottishPower and Scottish Hydro-Electric respectively.
- 3.2 In this chapter consideration is given to the operating costs of the transmission businesses under the arrangements for the present price controls. In those controls allowances have been made for operating costs that include the costs of the pre-Vesting Interconnector but exclude those relating to the post-Vesting Interconnector upgrades. A major component of the Interconnector's costs are determined by contractual arrangements, although there remain Interconnector cost elements that are more directly under the control of transmission business management.
- 3.3 System rates are considered to be largely outside the control of the companies. System rates are levied by the Government and, in the short term, management can do little to influence these costs. However, it is for consideration whether management should have an incentive to minimise such costs.
- 3.4 The remaining costs, over which the transmission businesses have more direct control, account for about one quarter to one third of total transmission business spending and include:
- engineering costs - the costs of planning, monitoring and controlling the system, and repairing and maintaining transmission business assets; and
  - corporate costs - costs which cannot be attributed directly to any particular business but are incurred in running the company as a whole.
- 3.5 In addition, capital expenditure on information technology systems, vehicles and certain property is classified as non-operational capital expenditure. A company may choose not to provide these services from within the transmission business and instead use third-party contractors or affiliated service companies. In these circumstances the costs of providing these services may appear as a transmission business operating cost rather than as transmission capital expenditure. It will be appropriate to consider non-operational capital expenditure together with operating costs as part of this review and ensure that any allowance for non-operational spending represents an efficient level of expenditure.

3.6 This chapter includes comparisons of the companies' forecasts and OFFER's projections made during the previous price control review with outturn costs for 1994/95 to 1997/98. It sets out the companies' forecasts for the period 1999/00 to 2004/05 and outlines an approach to determine OFFER's projections for the next price control period.

### Companies' Forecasts, OFFER's Projections and Outturn Figures

3.7 It is informative to compare outturn costs with the companies' 1992 forecasts and OFFER's 1993 projections, both made as part of the review leading to the present price control. Tables 3.2 and 3.3 show the operating costs (excluding depreciation, all Interconnector operating costs and system rates), pre-Vesting operating costs and rates for 1994/95 and 1997/98 for the ScottishPower and Scottish Hydro-Electric respectively.

**TABLE 3.1: COMPANY'S FORECASTS, OFFER'S PROJECTIONS AND OUTTURN FOR SCOTTISHPOWER'S COSTS IN 1994/5 AND 1997/98 (£MILLION 1997/98 PRICES)**

Category	Scenario	1994/95	1997/98
Operating costs (excluding depreciation, all Interconnector operating costs and rates)	Company's Forecast	23	24
	OFFER's Projection	18	17
	Outturn	27	16
Rates	Company's Forecast	12	12
	OFFER's Projection	12	12
	Outturn	11	11
Pre-Vesting Interconnector costs	Company's Forecast	4	5
	OFFER's Projection	4	5
	Outturn	4	6
Total	Company's Forecast	39	41
	OFFER's Projection	34	34
	Outturn	42	33

**TABLE 3.2: COMPANY'S FORECASTS, OFFER'S PROJECTIONS AND OUTTURN FOR SCOTTISH HYDRO-ELECTRIC'S COSTS IN 1994/95 AND 1998/98 (£MILLION 1997/98 PRICES)**

Category	Scenario	1994/95	1997/98
Operating costs (excluding depreciation, all Interconnector operating costs and rates)	Company's Forecast	10	10
	OFFER's Projection	9	9
	Outturn	9	6
Rates	Company's Forecast	3	3
	OFFER's Projection	3	3
	Outturn	3	3
Pre-Vesting Interconnector costs	Company's Forecast	8	8
	OFFER's Projection	7	8
	Outturn	8	9
Total	Company's Forecast	21	21
	OFFER's Projection	19	20
	Outturn	20	18



3.8 Comparisons of company forecasts with outturn figures and OFFER's projections with outturn costs for ScottishPower in Table 3.1 show that:

- Outturn operating costs (excluding depreciation, all Interconnector operating costs and rates) were greater than the company's forecast and OFFER's projection by £4 million and £9 million respectively in 1994/95, and were lower than the company's forecast and OFFER's projection by £8 million and £1 million respectively in 1997/98;
- Outturn rates were lower than the company's forecasts and OFFER's projections by £1 million in 1994/95 and 1997/98;
- Outturn pre-Vesting Interconnector costs were £1 million greater than the company's forecast and OFFER's projection in 1997/98 and the same in 1994/95; and
- Overall outturn operating costs related to the control were greater than the company's forecast and OFFER's projection by £3 million and £8 million respectively in 1994/95 and were lower than the company's forecast and OFFER's projection by £8 million and £1 million respectively in 1997/98;

and for Scottish Hydro-Electric in Table 3.2 show that:

- Outturn operating costs (excluding depreciation, all Interconnector operating costs and rates) were £1 million lower than the company's forecast and the same as OFFER's projection in 1994/95 and were lower than both the company's forecast and OFFER's projection by £4 million and £3 million respectively in 1997/98;
- Outturn rates were the same as the company's forecasts and OFFER's projections for 1994/95 and 1997/98;
- Outturn pre-Vesting Interconnector costs were the same as the company's forecast and £1 million greater than OFFER's projection in 1994/95 and £1 million greater than the company's forecast and OFFER's projection in 1997/98; and
- Overall outturn operating costs related to the price control were £1 million lower than the company's forecast and £1 million greater than OFFER's projection in 1994/95 and lower than the company's forecast and OFFER's projection by £3 million and £2 million respectively in 1997/98.

3.9 The variations between the companies' forecasts, OFFER's projections and outturns shown in Tables 3.2 and 3.3 require further consideration within the price control review.

3.10 It is for consideration to what extent the companies' forecasts for the next control period are reliable and how variations between out-turns and OFFER's projections, in respect of system rates and Interconnector costs, should be treated for future price controls (as discussed in Chapter 2).

## Movements in Costs Since 1994/95 and Companies' Forecasts for the Period Until 2004/5

3.11 Table 3.3 shows operating costs of the Scottish transmission businesses, less depreciation of network assets, Interconnector operating costs and business rates. Outturn costs for 1994/95 to 1997/98 fell one-third or more for both businesses.

**TABLE 3.3: TRANSMISSION BUSINESS OPERATING COSTS EXCLUDING DEPRECIATION OF NETWORK ASSETS, INTERCONNECTOR COSTS AND RATES (£MILLION 1997/98 PRICES)**

Company	Actual		Company's forecasts	
	94/95	97/98	00/01	04/05
ScottishPower	27	16	18	18
Hydro-Electric	9	6	6	5
Total	36	22	24	23

3.12 Forecast costs submitted by the companies for 2000/01 and 2004/05, on a comparable basis to those for 1994/95 show:

- for Scottish Hydro-Electric costs continue on a falling trend from the start of the next price control period 2000/01 to 2004/05; and
- for ScottishPower costs rising for the start of the next control period and maintained at the same level in 2004/05.

3.13 The movements in the outturn and forecast costs differ from those for the Scottish distribution businesses as discussed in the May consultation paper on distribution. This would suggest some differences in cost drivers between the distribution and transmission businesses, and a more detailed assessment of these costs will form part of the transmission and distribution reviews. For example, the step increase in cost between 1997/98 and 2000/01 in the case of ScottishPower may largely be attributed to the company's projections including a transfer of system operator costs from generation wholesale into transmission.

### Approach

3.14 The proposed approach to determine appropriate levels of operating costs for the next price controls follows on from that of the last price control review, and includes the following steps:

- establishing the outturn operating costs for a base year;
- adjusting the costs to standardise, in accounting terms, for the treatment of capitalisation of expenditure, cost allocations and recharges between transmission and other company activities and non-recurrent costs;
- adjusting the costs for the base year taking into consideration the efficiency of each company and comparative efficiencies between companies;
- projecting the adjusted operating costs forward for the duration of the price controls with consideration for future efficiencies and cost drivers;

- adding to the projected costs any allowed provision for one-off costs. As examples, consideration will be given to the provision for System Data Provision (SDP) and Generation Registration Service (GRS) as part of the settlement system in Scotland and, in the case of ScottishPower, the transfer from generation wholesale to transmission of costs relating to the system operator function. Further adjustments may be required relating to separation of the system operator function and Interconnector and the reform of Scottish trading arrangements; and
  - adding provisions for system rates and Interconnector costs as may be appropriate for the price controls.
- 3.15 OFFER's consultants, Pannell Kerr Foster (PKF), are assisting with this work which is closely related to similar work being undertaken for the distribution price control review (discussed in the May consultation paper on distribution). Assistance is also being provided by OFFER's technical consultants, PB Power, particularly regarding the application of capitalisation policy and engineering costs.
- 3.16 Following their analysis of the companies' responses to business plan questionnaires, visits to each company to clarify areas of uncertainty and further information gathering, the consultants are preparing their reports and further details will be published in due course. Preliminary assessments of some parts of the consultants' work have been drafted for discussion with the companies.
- 3.17 Table 3.4 shows the base-year operating costs (excluding depreciation, Interconnector operating costs, rates and any initial SDP/GRS costs) and preliminary adjustments identified by the consultants to standardise data in accounting terms. The costs are standardised for:
- capitalisation of expenditure arising from changes in capitalisation policy that affect the classification of expenditure between operating costs, non-operational capital expenditure and network capital expenditure;
  - cost allocations and recharges between transmission and other company activities and, in particular, the allocation of corporate overheads to transmission and profit taken out of transmission and into other parts of the company; and
  - restructuring costs, provisions and exceptional items relating to non-recurrent costs.

**TABLE 3.4 ACCOUNTING STANDARDISATION OF BASE-YEAR OPERATING COSTS (EXCLUDING DEPRECIATION, INTERCONNECTOR OPERATING COSTS, RATES AND INITIAL SDP/GRS COSTS) (£MILLION 1997/98)**

Company	Unadjusted base year cost	Capitalisation adjustment	Allocations and recharges	Non-recurrent costs	Adjusted base year cost
ScottishPower	15.9	0.0	-1.7	1.3	15.5
Scottish Hydro-Electric	6.1	0.0	0.1	0.4	6.6

3.18 The consultants have identified no reason to adjust base-year costs regarding capitalisation and have identified minor adjustments in allocation and recharges and non-recurrent costs. The principal adjustments identified by the consultants relate to the allocation of corporate overheads and provisions. When compared to their respective unadjusted base-year costs, the adjusted cost is lower in the case of ScottishPower and higher in the case of Scottish Hydro-Electric.

3.19 In considering efficiency in 1997/98, the base year for their analysis with regards to distribution activities, PKF have developed a number of benchmarks to assess company efficiency, both in terms of operating practices and costs as part of the distribution price control review. These may also apply to transmission activities. Factors influencing the efficiency of the distribution and transmission activities include organisational structures, the approach to outsourcing and procurement, human resource policy, engineering policy, IT strategy and the level of corporate costs.

3.20 In developing benchmarks and comparisons relating to these factors PKF are considering the following:

a) In respect of organisational structures, the extent companies have reduced costs by:

- introducing centralised functions;
- moving from geographic to functional structures;
- reducing the number of depots, control centres and drawing offices; and
- redesigning business processes to focus on delivering outputs at minimum costs.

b) Where human resource issues are concerned, the extent companies have reduced costs by:

- introducing the multi-skilling of appropriate staff to improve productivity;
- developing flexible working and annualised working hours to increase effectiveness;
- controlling sickness and overtime levels;

- benchmarking wage rates against economy wide averages;
- reducing staff numbers; and
- delaying management structures.

c) In relation to engineering functions, the extent companies have reduced costs by:

- adopting condition based maintenance procedures;
- developing non-invasive maintenance techniques to streamline procedures; and
- restructuring field operations teams.

3.21 PKF are also considering the extent to which companies have developed strategies for the outsourcing, procurement and market testing of services and activities and the effectiveness of IT systems and strategies.

3.22 In addition to their work on costs in the base year, PKF have also been asked to consider the factors influencing cost levels in the future and to make a projection of the efficient level of operating costs between the base year, 1997/98, and 2004/05. Projections of transmission business operating costs for the period after 2000 will be published in the draft proposals, scheduled for publication in August 1999.

3.23 The analysis relating to base-year efficiencies and future projections may also be extended to the Interconnector business. However, partial or full separation of the Interconnector activities from transmission is also under consideration. This will be discussed further in the forthcoming consultation paper on the separation of businesses and trading arrangements in Scotland, and may influence the allocation of and provision for operating costs within the control, as discussed in Chapter 6.

3.24 The level of system rates in Scotland, including those relevant to the transmission business, is presently under review by The Scottish Office. The existing prescribed method of valuation is expected to continue for a period of at least five years commencing from April 2000. An indication of any rebalancing in the charging of rates between businesses may be available in August.

### **Issues for Consideration**

3.25 This paper does not draw any conclusions about the potentially efficient level of operating costs for the base year or thereafter. This is the subject of an-going work as described above.

3.26 Views are invited on any aspect of the issues relating to transmission operating costs, and in particular on:

- considerations for the next price control arising from the comparison of the companies' forecasts, OFFER's projections and outturn figures of operating costs for 1994/95 and 1997/98; and

- the approach to establishing the level of provision for operating costs in the next price control period.

## **4 CAPITAL EXPENDITURE**

### **Introduction**

- 4.1 Capital expenditure forms an important part of transmission costs and makes a significant contribution to the level of transmission charges. It also influences network performance.
- 4.2 OFFER's projections for capital expenditure in the present price control period (1994/95-1998/99) followed submissions made by the companies in 1992 and analysis and modelling work by OFFER. For the present price control review the companies have submitted outturn expenditures for 1994/95 to 1997/98 and forecasts through to 2004/05. OFFER's review of capital expenditure for the next price control is assisted by technical consultants, PB Power (formerly Merz and McLellan).
- 4.3 OFFER's projections for the level of capital expenditure in the next price control period will be influenced by what has happened in the present price control period. Comparison of the companies' 1992 forecasts, OFFER's projections and outturn expenditures raises important questions about the treatment of capital expenditure. For example, consideration will need to be given to the profiling of expenditure and whether any adjustments for under- or over-spend are appropriate. It is relevant to consider:
- whether the companies' 1992 forecasts were credible in the light of outturn results;
  - whether there is evidence of unnecessary or inappropriate capital expenditure;
  - whether and to what extent the companies have been able to reduce capital expenditure through improved efficiency; and
  - whether network performance levels have been affected by the companies' spending behaviours.
- 4.4 In making projections for the level of capital expenditure for the next price control period, two aims will be important:
- ensuring appropriate levels of network performance at least overall cost; and
  - incentivising capital efficiency and hence reductions in overall cost levels.

### **Background**

- 4.5 Historically, operational capital expenditure has been treated in two parts, load related and non-load related. Load related expenditure (LRE) is associated with the connection (or disconnection) of generation plant and customers directly connected to the transmission system, reinforcements to the existing system to accommodate revised connections and also general load growth. Non-load related expenditure (NLRE) relates principally to the replacement of life-expired assets, expenditure on network control and information gathering facilities,

diversions, expenditure related to the environment and measures to enhance network performance.

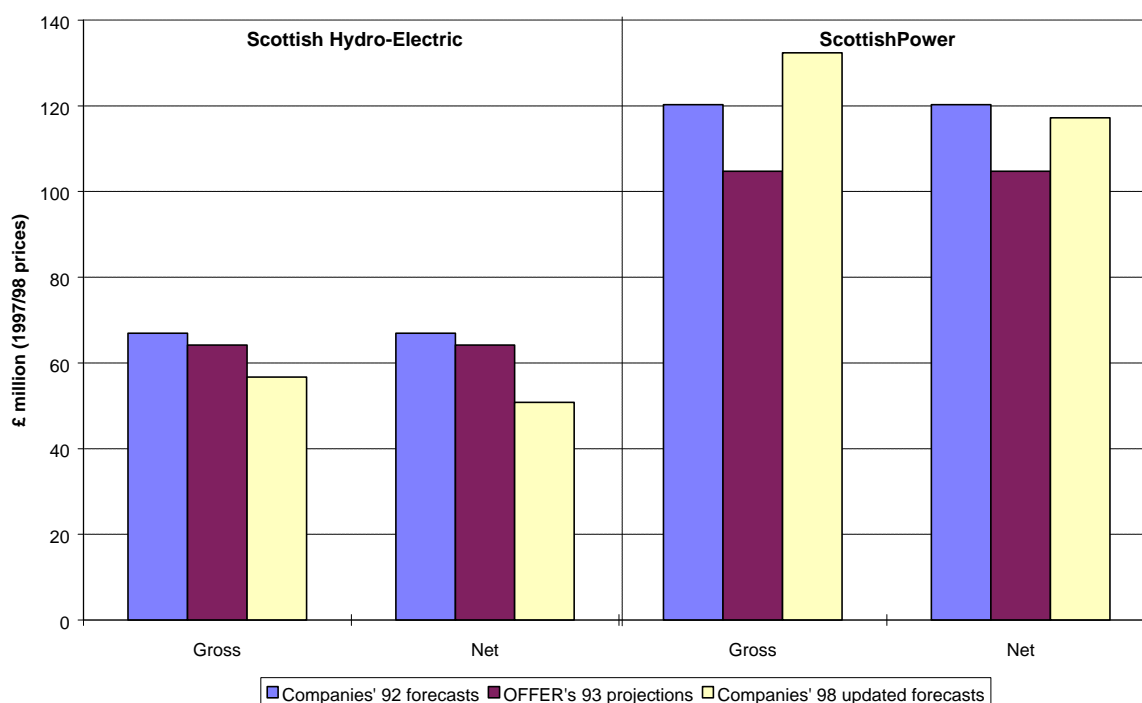
- 4.6 Although it is appropriate to maintain a distinction between LRE and NLRE, in some cases the investment drivers will be a combination of the above factors, with network rationalisation, the replacement of ageing assets and improved network performance often being provided as part of a reinforcement scheme required by increasing electricity demand. Consequently the allocation of expenditure to LRE or NLRE may be somewhat arbitrary.
- 4.7 In general terms the drivers of LRE, namely the number and location of new power station and customer connections, or disconnections, and increases in electricity demands of existing customers are outside the direct control of each transmission business. However, in the case of NLRE, in the short to medium term, the levels of investment are largely within the companies' discretion, other than with respect to the relatively small proportion of expenditure associated with safety and environmental measures. Consequently there may be some balancing of NLRE against LRE where capital expenditure has been constrained to a large extent by financial and/or engineering resource restrictions.
- 4.8 The Scottish transmission systems transfer electricity at voltage levels of 132 kV and above within Scotland and to and from the Scotland-England Interconnector. Interconnector assets existing at Vesting were considered primarily to provide system security and were included in the regulatory asset base for the price control. The post-Vesting upgrade of the Interconnector to 1600 MW is primarily used for export and its expenditure was excluded from the regulatory asset base, and not included in the calculation of allowed revenue, during the last price control review. A further upgrade of the Interconnector to 2200 MW is scheduled to be completed in the next few years and another (to 2500 MW) is proposed. In addition, expenditure is planned by ScottishPower in respect of the Scotland-Northern Ireland Interconnector. Separation of an Interconnector business is raised in Chapter 6 and may be discussed further in a forthcoming consultation paper on separation of businesses and electricity trading arrangements in Scotland.
- 4.9 When a new generator or customer is connected to the network or wishes to upgrade its connection, a lump sum capital contribution is levied. The present price control was set on the basis of funding capital expenditure net of capital contributions. The assessment of a capital contribution is influenced by a company's connection policy. The connection policy is being reviewed by OFFER particularly in respect of the policy in Scottish Hydro-Electric's area, and its conclusion may have an impact on the level of future capital expenditure. This is considered further in Chapter 6.



## Capital Expenditure During 1994/95 to 1998/99

4.10 In late 1992, both companies submitted capital expenditure forecasts, for the years 1994/95 to 1998/99 (subsequently referred to as the “companies’ 92 forecasts”). OFFER made its own projections for capital expenditure in respect the same period in 1993, subsequently referred to as “OFFER’s 93 projections”. These forecasts and projections are shown in Figure 4.1 for both the gross capital expenditure and the net capital expenditure, the latter excluding capital contributions and Interconnector expenditure. As part of the present review, the companies have submitted outturn figures for expenditure in the first four years of the present price control period and updated projections for the remaining year (subsequently referred to as the “companies’ 98 updated forecasts”) which are also included in Figure 4.1.

**FIGURE 4.1: GROSS AND NET CAPITAL EXPENDITURE - 1994/95 TO 1998/99**



4.11 OFFER’s 93 projections for LRE and NLRE were determined largely by reviewing the companies’ forecast expenditure plans on a project-by-project basis.

4.12 OFFER’s 93 projections of the gross and net levels of expenditure were lower than the companies’ 92 forecasts of expenditure. Scottish Hydro-Electric’s and ScottishPower’s 92 forecasts of net expenditure for the period 1994/95 to 1998/99 of £67 million and £120 million were adjusted to £64 million and £105 million respectively by OFFER (all prices on 1997/98 basis).

4.13 The companies’ 98 updated forecasts of net expenditure are 11 per cent higher and 21 per cent lower than OFFER’s 93 projections for ScottishPower and Scottish Hydro-Electric respectively. However, the companies’ 98 updated

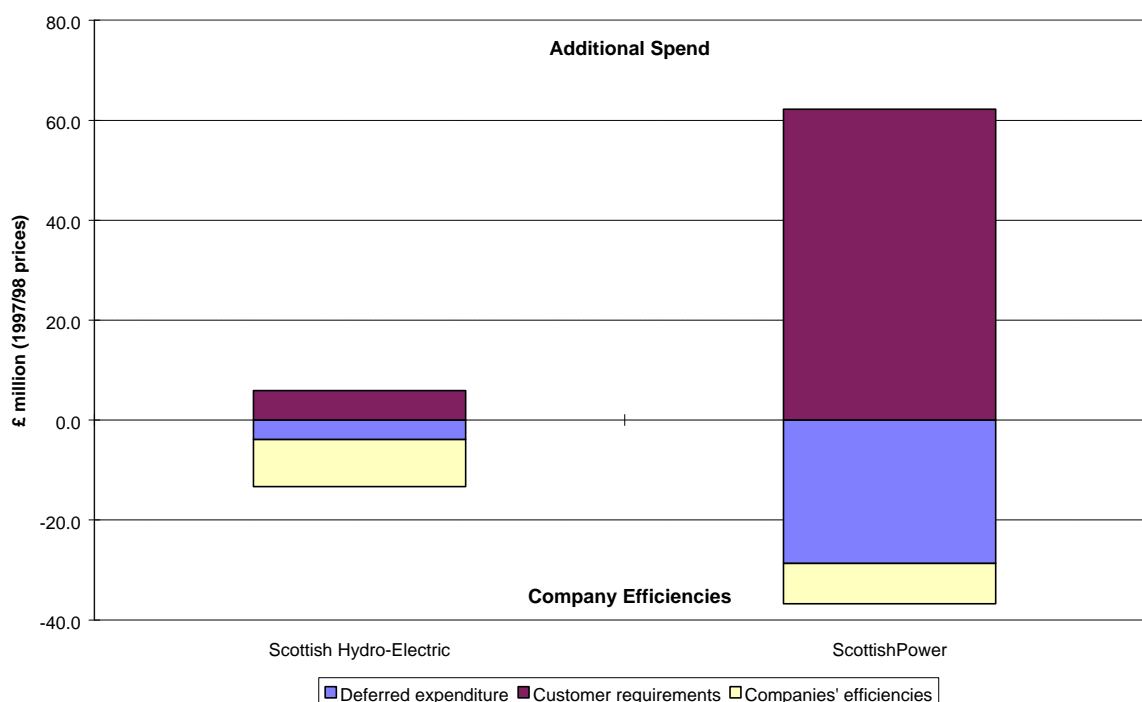
forecasts also indicate that both companies are likely to underspend against their own 92 forecasts of net expenditure.

- 4.14 During the course of the present price control period changes to the companies' capitalisation policies may have taken place. Although no changes have been identified at present, account may be taken of any changes identified during the review.

### Expenditure Variances

- 4.15 The companies have attributed variances from OFFER's 93 projections of gross capital expenditure to their own efficiency measures, deferral of expenditure and changes in customer requirements. Figure 4.2 shows the companies' explanations broken down into the main categories.

**FIGURE 4.2: COMPANIES' EXPLANATIONS FOR GROSS CAPITAL EXPENDITURE VARIANCES - 1994/95 TO 1998/99**



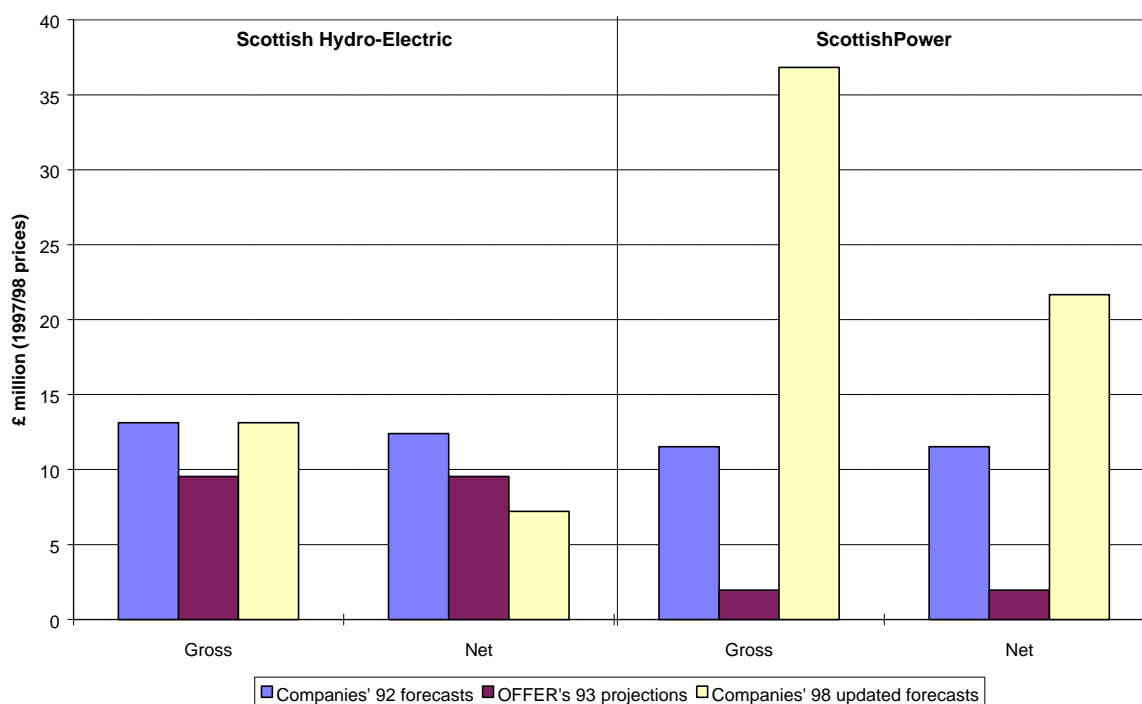
- 4.16 Efficiencies have been claimed by the companies with respect to capital expenditure, principally through lower procurement costs, labour savings and design efficiencies. Procurement efficiencies are claimed to have resulted from a significant opening of the supplier base, the adoption of less restrictive equipment specifications and approvals of overseas suppliers, coupled with the use of partnership type contracts. Labour savings have been claimed through business reorganisation and change. Design efficiencies have included the greater use of an integrated planning approach and the use of innovative designs. The increased knowledge of asset condition and loading levels has also assisted the design process.

- 4.17 Further analysis is required to establish whether the companies have been efficient. It is inappropriate for the companies to benefit from savings where underspending is judged to jeopardise network performance. Similarly, customers should not bear the cost of unwarranted expenditure.
- 4.18 Some consideration has been given to possible factors contributing to variances in LRE and NLRE in the period from 1994/95 to 1998/99.

#### Load Related Expenditure 1994/95 to 1998/99

4.19 Figure 4.3 shows the differences between the companies' 92 forecasts, OFFER's 93 projections and the companies' 98 updated forecasts for LRE during the period. Figure 4.3 shows both the gross LRE and the net LRE.

**FIGURE 4.3: LOAD RELATED EXPENDITURE - 1994/95 TO 1998/99**

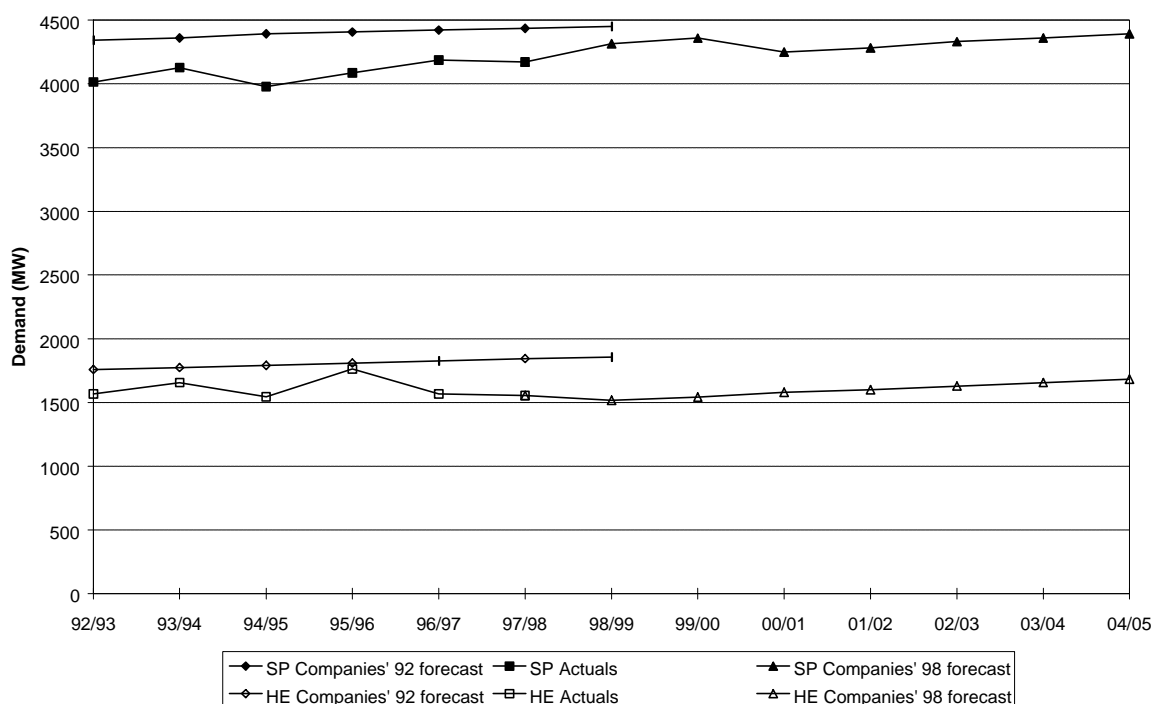


- 4.20 Load related expenditure may be expected to vary from forecasts as new power station and customer connections, power station closures, and increases in electricity demands of existing customers are largely outside the direct control of each transmission business.
- 4.21 The requirements for new connections and upgraded connections for power stations and customers were greater than anticipated in the companies' 92 forecasts and OFFER's 93 projections for both ScottishPower and Scottish Hydro-Electric.
- 4.22 The requirement for capital expenditure for network reinforcement for Scottish Hydro-Electric has been lower than its own 92 forecast and OFFER's 93

projections while that for ScottishPower has been greater than its own 92 forecast and OFFER's 93 projection. ScottishPower has attributed the large increase in capital expenditure requirements to record levels of inward investment in Scotland. This will be investigated.

4.23 System maximum demand, rather than the number of units transmitted, is considered by the companies to be the main driver for investment. The companies' 92 forecasts and 98 updated forecasts for the annual system maximum demands for 1992/93 to 2004/05 are shown in Figure 4.4.

**FIGURE 4.4: SYSTEM MAXIMUM DEMANDS**



4.24 Actual system maximum demand has been markedly lower than originally forecast. In the case of Scottish Hydro-Electric an extremely cold period in the winter of 1995/96 resulted in only a small variance between actual and forecast demands for that year. The companies' 98 updated forecasts show a year-on-year increase in system maximum demand. While the actual system demand is presented in Figure 4.4, normalised "Average Cold Spell (ACS)" demand would normally be employed for system planning purposes and a straight comparison of actual recorded and forecast demand may be somewhat misleading.

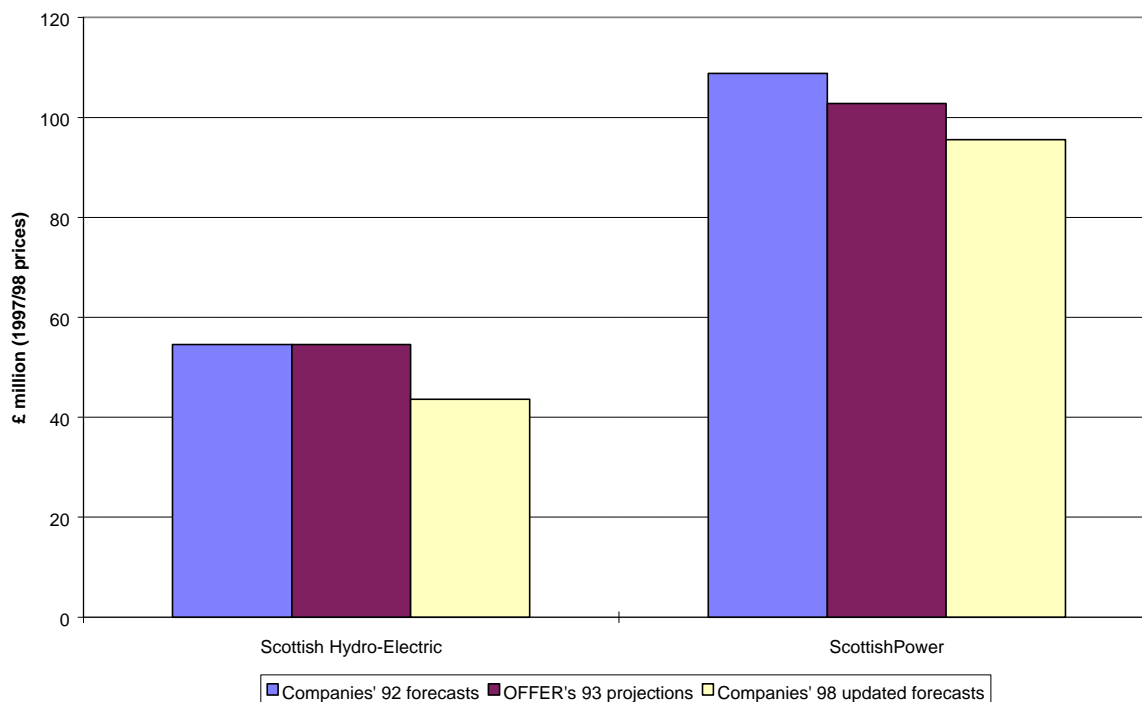
4.25 Further consideration will be given to the reasons for the differences between forecasts and outturn LRE.

#### Non Load Related Expenditure 1994/95 to 1998/99

4.26 Figure 4.5 shows comparisons of NLRE between the companies' 92 forecasts, OFFER's 93 projections and the companies' 98 updated forecasts. The companies' 98 updated forecasts show that NLRE is lower than OFFER's 93

projections for both companies. Outturn NLRE is particularly low during the initial years of the price control period when compared to those of the companies 92 forecasts and OFFER's 93 projections.

**FIGURE 4.5: NON-LOAD RELATED EXPENDITURE - 1994/95 TO 1998/99**



4.27 Since the submission of the 92 forecasts the companies have reviewed and amended their asset replacement policies and strategies, which has tended to increase asset lives and allowed deferral of investment.

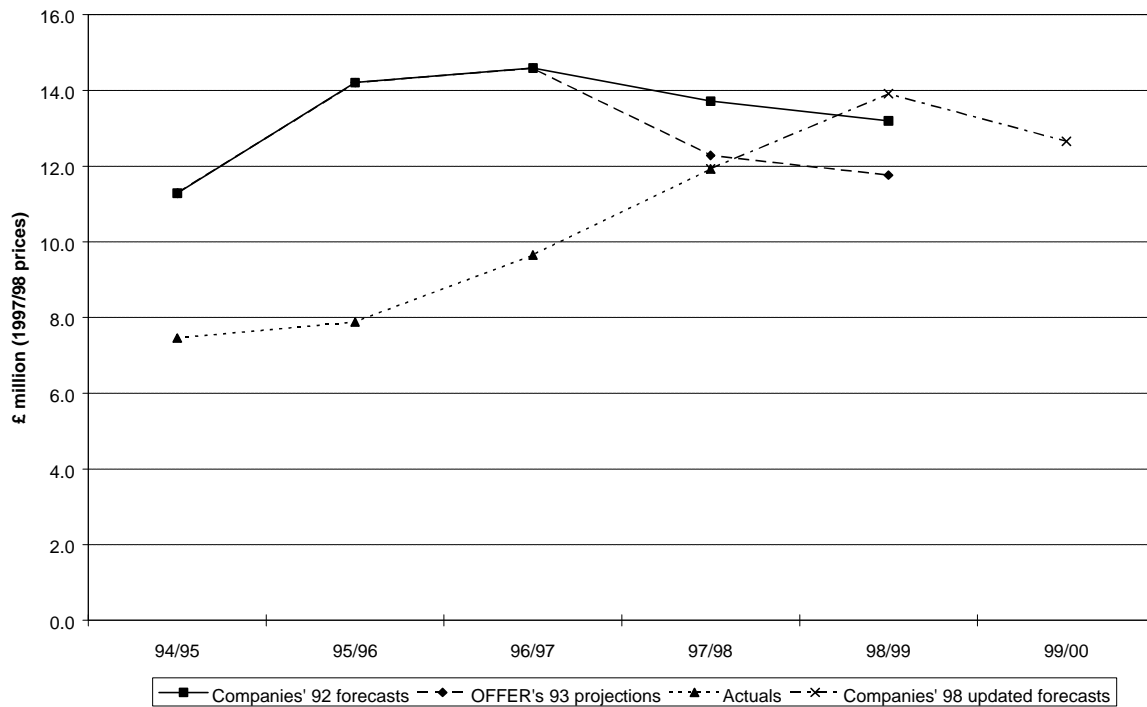
### Extended price control

4.28 The price control for 1994/95 to 1998/99 was extended by one year so that the start of the next price control in April 2000 coincides with that of the next distribution price control. For the year 1999/00 the companies are allowed to recover the same revenue, in real terms, as that for 1998/99. The extension of the control does not assume a level of capital expenditure for 1999/00.

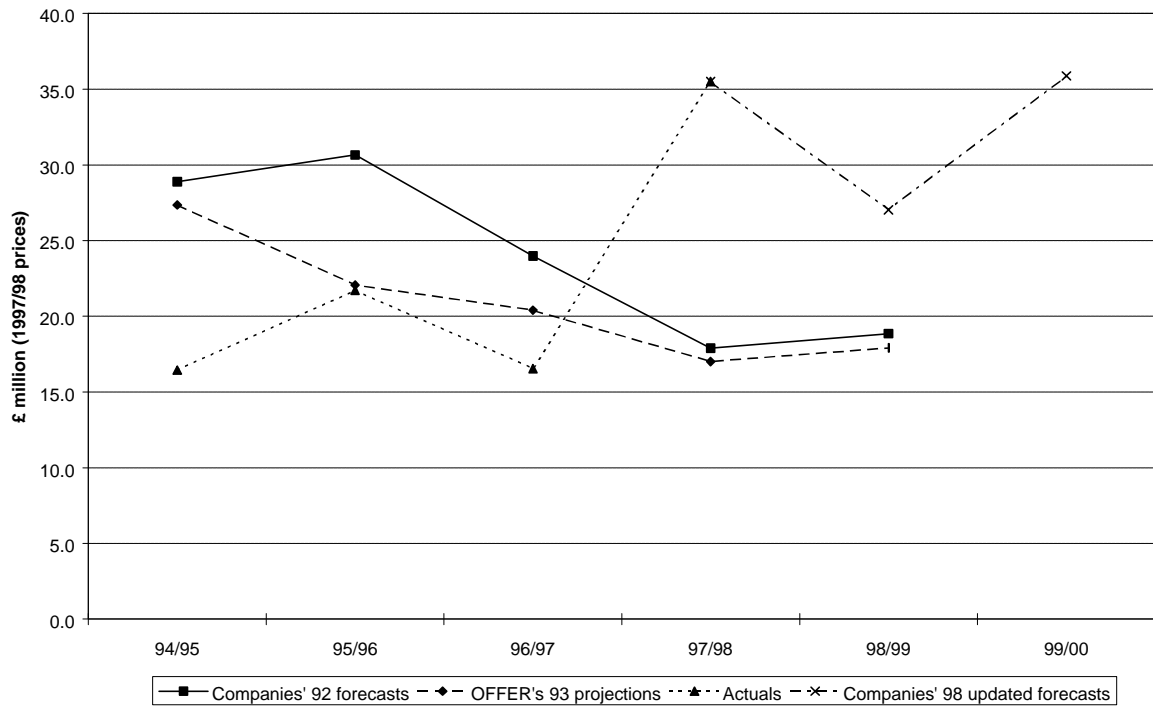
4.29 For 1999/00 the levels of net expenditure projected by the companies (ie excluding capital contributions and Interconnector expenditure) are £36 million for ScottishPower and £13 million for Scottish Hydro-Electric. Comparisons of Scottish Hydro-Electric's and ScottishPower's 92 forecasts, OFFER's 93 projections and companies' 98 updated net expenditures are shown in Figures 4.6 and 4.7. The companies' projected expenditures for the year 1999/00 have been included in these figures as an extension to the companies' 98 updated forecasts.

4.30 The companies' projected expenditures for the year 1999/00 are substantially more than the average expenditures for the period from 1994/95 to 1998/99 of £23 million and £10 million for ScottishPower and Scottish Hydro-Electric respectively. The projected levels of expenditure for 1999/00 will be examined together with those for the period from 2000/01 to 2004/05.

**FIGURE 4.6: SCOTTISH HYDRO-ELECTRIC'S CAPITAL EXPENDITURE, NET OF CAPITAL CONTRIBUTIONS AND INTERCONNECTOR EXPENDITURE**



**FIGURE 4.7: SCOTTISHPOWER'S CAPITAL EXPENDITURE, NET OF CAPITAL CONTRIBUTIONS AND INTERCONNECTOR EXPENDITURE**



## Network performance since Vesting

4.31 Network performance relates to the security and availability of the network for electricity transmission. This is protected by planning standards and operational codes, and involves operational and, in particular, capital expenditure to ensure that performance levels are maintained and, where appropriate, improved. The performance of the network is monitored by measuring the number of incidents of faults that result in a loss of supply to one or more customers, the level of unsupplied energy from the incidence of faults and the percentage of time that transmission circuits are out of service. As discussed in the February consultation paper for the transmission businesses and OFFER's Report on Distribution and Transmission System Performance 1997/98 (November 1998), the level of network performance has improved since Vesting and been maintained during the present price control period. The future level of expenditure will be reviewed to maintain and, where appropriate, improve network performance during the next price control review.

## Capital Expenditure in the Period from 2000/01 to 2004/05

### Analysis of Company Forecasts

4.32 As part of the present review, the companies have also provided forecasts for the period 2000/01 to 2004/05 (subsequently referred to as the "companies' 2000 forecasts").

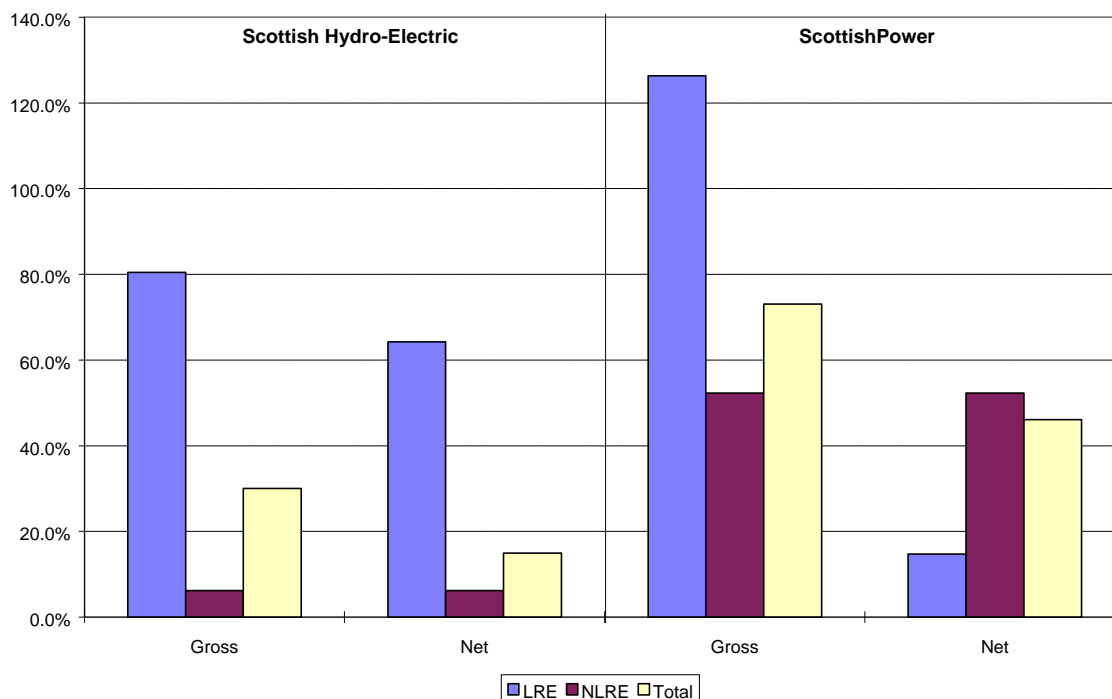
4.33 The companies' 2000 forecasts and their 98 updated forecasts of LRE, NLRE and total expenditure are compared in Table 4.10 and Figure 4.8.

**TABLE 4.10: COMPARISON OF COMPANIES' 2000 FORECASTS OF CAPITAL EXPENDITURE WITH 98 UPDATED FORECASTS (£MILLION, 1997/98 PRICES)**

	Load-related			Non-load related			Total
	Hydro Electric	Scottish Power	Total	Hydro Electric	Scottish Power	Total	
Companies' 2000 Forecasts (2000/01 to 2004/05)	38	94	132	48	162	210	342
Companies' 98 Updated Forecasts (1994/95 to 1998/99)	13	37	50	44	96	140	190
Increase	25	57	82	4	66	70	152



**FIGURE 4.8: CHANGES IN LRE, NLRE AND TOTAL CAPITAL EXPENDITURE BETWEEN 2000/01-2004/05 AND 1994/95-1998/99**



4.34 Considerable increases in expenditure by ScottishPower for LRE and NLRE and by Scottish Hydro-Electric for LRE are projected by the companies for the next price control, when compared to the companies' 98 updated forecasts. These forecasts will be subject to detailed study during the review.

4.35 The companies' 2000 forecasts will be critically examined against the criteria of obtaining maximum capital efficiency and therefore lowest prices for customers while ensuring that network performance is maintained or improved. This examination will build on the analysis used during the last price control review and will address the following points:

- whether the companies' 2000 forecasts can be expected to reflect underlying needs taking into account experience in the present price control period;
- what stance should be adopted for the projected change in capital expenditure during the next price control period; and
- the extent to which good practice identified in the present price control period should be embodied into OFFER's projections.

4.36 Transmission business capital expenditure is largely driven by relatively few, large scale investments to meet the requirements of generators, interconnectors, distributors, customers and also the replacement of life-expired assets. Consequently capital expenditure for the transmission business will need to be reviewed on a project-by-project basis. The projects will be reviewed to assess:

- their classification into the categories of LRE and NLRE;
  - their justification for inclusion as a project requiring implementation during the next price control; and
  - the reasonableness of the companies' estimated capital costs.
- 4.37 The companies' transmission licences require the companies to plan and develop the transmission system in accordance with planning standards. In Scotland these include the transmission system security standard (NSP 366), the security of supply standard (P2/5) and voltage limit standards. The companies' expenditure plans will be reviewed to ensure that they are genuinely driven by these standards.
- 4.38 The examination will take account of the main expenditure drivers including underlying demand growth, the effect of new connections and/or power station closures, the movement of demand within a network and asset replacement practices. The companies' forecast expenditure plans will also be reviewed as to their consistency with expenditure incurred during the present price control.
- 4.39 Gross LRE includes capital expenditure for the companies' Interconnector upgrades although this expenditure is outside the price control. This expenditure will be reviewed to ensure capital expenditure related to the price control has not been incurred for the benefit of the companies' activities outside of the price control.

#### **Issues for Consideration**

- 4.40 Views are invited on any aspect of the issues raised in this chapter, and in particular on:
- the extent to which past underspends can be justified on the basis of efficiency savings or relate to mis-forecasts or changes in other factors;
  - the extent to which capital expenditure has been unnecessarily high or inappropriate in the present price control period;
  - the extent to which companies have distorted the phasing of capital expenditure programmes and what should be done about this;
  - the extent to which companies' plans for expenditure on Interconnector developments might influence main transmission system costs, and what influence this may have on charges to customers;
  - the determination of appropriate levels of load-related expenditure for the next price control period;
  - the determination of appropriate levels of non-load related expenditure for the next price control period; and
  - in determining the above, the extent to which longer-term considerations of asset replacement or possible deterioration in performance ought to be included in considerations of capital expenditure.

## **5 FINANCIAL ISSUES**

### **Introduction**

- 5.1 The May consultation paper on distribution sets out the relevant financial issues and developed a framework for consideration of the cost of capital and asset valuation. Many similar considerations apply to the transmission businesses.
- 5.2 The allowed revenue is determined from consideration of the operating costs for the transmission business, the level of return on an asset value and an allowance for depreciation, taking into account capital expenditure. For Scottish Hydro-Electric the allowed revenue may also be affected by a transfer of funds from its generation business known as the Hydro Benefit, under Schedule 7 of its licence.
- 5.3 This chapter provides an assessment of the cost of capital an allowance for depreciation and issues raised by the Hydro Benefit.

### **Cost of capital**

- 5.4 The level of return that is required by the financial markets is called the cost of capital. The components used to estimate the cost of capital are discussed in the May consultation paper on distribution. The cost of capital is calculated as the weighted average cost of debt and equity finance, with an allowance for corporation tax.
- 5.5 For the previous price controls a cost of capital of 6 per cent has been applied to the PES transmission businesses. The cost of capital for the regulated transmission business was considered to be less than that for transmission business as a whole and less than that for the company or distribution business.
- 5.6 Many of the factors influencing the level of the cost of capital for distribution apply to transmission. Others may differ. An initial assessment of the framework for considering the cost of capital for the Scottish transmission businesses is discussed below.

### **Gearing**

- 5.7 Companies can be financed by both debt and equity. The proportion of debt to debt plus equity is referred to as gearing. In calculating an average cost of capital it is necessary to make an assumption about gearing. Gearing also influences the cost of both debt and equity finance. It will be appropriate to assume that companies have reasonably efficient levels of gearing to encourage financial efficiency and protect the interests of customers.
- 5.8 The evidence presented in the May consultation paper on distribution suggests that PES gearing levels in the range of 50 to 60 per cent would be consistent with the debt maintaining an investment grade credit (low risk) rating. It is for further consideration whether the level of gearing applied for transmission

should differ from or be similar to that for distribution. For illustration a figure of 50 per cent is used for calculation of the cost of capital in this chapter.

### **Cost of Debt Finance**

- 5.9 The distribution review paper distinguished two components of the cost of debt finance, namely a risk free component and a company specific risk premium.
- 5.10 The real risk free rate is not directly observable. However, it is possible to derive an estimate from the return available on UK Government index linked gilts (ILGs) and treasury bills. The average redemption yield on ILGs over the last two years has been about 2 per cent and the average over the last three years 2½ per cent, and suggests a range for the risk free rate of 2 to 2½ per cent.
- 5.11 In addition it may be appropriate to take into account that a reasonably efficient capital structure would have required the PESs to have increased debt significantly since the last price control review. A one-third per cent adjustment for historic debt is applied for the calculation of the cost of debt.
- 5.12 The debt risk premium reflects the additional return required by the providers of debt finance to hold corporate rather than government debt and can be estimated as a premium over the real risk free rate. A debt premium of 1 and 1¼ per cent, based on the spread of bonds, is applied for the calculation of the cost of debt.
- 5.13 The distribution paper therefore suggested that the real cost of debt finance is in the range 3.3 to 4.1 per cent, composed of the estimate of the real risk free rate of 2 to 2½ per cent, one-third per cent adjustment for historic debt and a risk premium of 1 to 1¼ per cent. It is for consideration whether a similar range is applicable to the transmission business.

### **The Cost of Equity Finance**

- 5.14 The distribution review paper used the capital asset pricing model (CAPM) approach to estimate the cost of equity finance. This approach adds an estimate of the real risk free rate to an estimate of the appropriate equity risk premium (ERP). To calculate the appropriate ERP, two factors are taken into consideration, the ERP for the market as a whole and the riskiness of the company relative to the market.
- 5.15 Based on the available evidence a range of between 3 and 4.2 per cent for the ERP appears appropriate. This is consistent with the bottom half of the range for the ERP in the MMC's report on Cellnet and Vodafone (December 1998), and appears to take account of present City and investor expectations.
- 5.16 An indication of the specific riskiness of a company relative to the market is given by the beta coefficient. This aims to predict the extent to which a company's share price would tend to change in response to changes in the level

of the overall market, and seeks to measure a company's non-diversifiable risk relative to equities generally.

- 5.17 In estimating the appropriate beta for the transmission business, consideration needs to be given to the risks the transmission business itself is exposed to, rather than the risks that might be associated with activities in the wider group. Transmission is a monopoly business with little scope for the development of competition in the operation of the network.
- 5.18 A number of factors suggest that the beta value for transmission may be lower than for distribution. Both revenues and costs are more fixed in nature and revenues come from a range of sources, suggesting relatively lower non-diversifiable risks for transmission. This has been reflected in the use of a relatively lower beta value for transmission in the previous price control review.
- 5.19 The May consultation paper on distribution suggests that the asset beta is in the range of 0.45 to 0.55. For the transmission business under the price control, the asset beta is illustrated to reflect a lower beta value in the range of 0.40 to 0.50, consistent with equity beta values of 0.8 to 1.0.
- 5.20 Table 5.1 takes the ranges for the risk free rate and ERP, and combines these with the range for asset betas to give a range for the post-tax cost of equity of 4.4 to 6.7 per cent for transmission, assuming a level of gearing of 50 per cent.

**TABLE 5.1 POST TAX COST OF EQUITY CAPITAL**

<b>Component</b>	<b>Low Case</b>	<b>High Case</b>
Risk free rate	2%	2.5%
Equity Risk Premium	3%	4.2%
Asset Beta	0.40	0.50
Gearing	50%	50%
Equity Beta	0.8	1.0
Post-tax Cost of Equity	4.4%	6.7%

- 5.21 It is for consideration whether it will be appropriate to retain the assumption that the risks for transmission are less than those for distribution, with correspondingly lower beta values for transmission.

## Adjusting for Taxation

- 5.22 As well as paying dividends and interest, companies must also finance corporation tax payments. As interest payments are allowable against corporation tax, the cost of debt finance does not need to be adjusted upwards to take account of corporation tax.
- 5.23 In a report on Cellnet and Vodafone (December 1998), the MMC concluded that calculations should be made by adjusting the post-tax cost of equity by a multiplier of  $1/(1-0.3)$  or 1.429, for 30 per cent corporate tax.
- 5.24 Table 5.2 shows the calculation of a 4.8 to 6.8 per cent range for the pre-tax cost of capital using estimates for the post-tax cost of capital and a tax wedge of 1.429.

**TABLE 5.2: WEIGHTED AVERAGE PRE-TAX COST OF CAPITAL**

Component	Low Case	High Case
Cost of debt	3.3%	4.1%
Post-tax cost of equity	4.4%	6.7%
Taxation adjustment	1.429	1.429
Pre-tax cost of equity	6.3%	9.6%
Gearing	50%	50%
Pre-tax WACC	4.8	6.8

- 5.25 It will be necessary to further consider matters relating to the calculation of the cost of capital as the price control review progresses and assess any additional information that emerges. In coming to a final judgement on the cost of capital, it will be appropriate to ensure that the estimate used is consistent with an efficiently financed transmission business.

## Asset Valuation

- 5.26 In order to secure continuing access to funds on acceptable terms, an enterprise needs to provide a return on the capital invested in its business. In the last transmission price control review the capital invested in each transmission business was considered in two parts, the initial capital at flotation and investment made since then.

## Assets Acquired at Flotation

- 5.27 For the present price control the asset value at flotation was taken to be the net CCA book value. This value accounted for the value of transmission assets within the transmission licensee's area and the value of pre-Vesting Interconnector assets.

- 5.28 The MMC reviewed the value of assets for Scottish Hydro-Electric's businesses in its May 1995 report. The MMC valuation method translated the flotation value for the company as a whole into a value for the transmission and distribution business by subtracting a value for the generation business. The generation assets were valued on the basis of the same relationship to their current cost book value as was implicit in their market valuation of the assets of the generating companies of National Power and PowerGen. The values of the transmission and distribution businesses that emerged from this review, were close to the values used by The Scottish Office in setting Scottish Hydro-Electric's original price control, and it was this original price control value that the MMC used as the basis for its 1995 distribution price control proposals.
- 5.29 It is for consideration whether any alternative valuation of assets at flotation would be more appropriate than the net CCA value. Table 5.3 shows net CCA cost values at flotation for the two transmission businesses in 1997/98 prices. The net CCA cost for Scottish Hydro-Electric originally would have been £192 million in 1997/98 prices but is adjusted to £171 million to exclude telecom assets.

**TABLE 5.3 VALUE OF ASSETS AT FLOTATION IN 1997/98 PRICES**

<b>Company</b>	<b>£Million</b>
ScottishPower	734
Scottish Hydro-Electric	171

- 5.30 Consistency in the approach to the value of assets at flotation would reduce uncertainty among providers of capital which could otherwise increase the cost of capital. The retention of the net CCA valuation of the transmission business was supported by the companies in their response to the July 1998 consultation paper. In addition, in its May 1997 report on British Gas, the MMC explained that the approach adopted to asset valuation in its 1993 report remained appropriate, suggesting that the MMC believes that there are advantages in consistency.

#### **Investment Made since Flotation**

- 5.31 Since Vesting capital expenditure has been added to the asset base of the transmission businesses. For the present price control, outturn expenditure was added for historic years and projected expenditure for the remaining years. For the next price control it is for consideration whether the addition of capital expenditure to the asset base to April 2000 is to be on the same basis as that used for the previous price control or based on the levels of capital expenditure allowed for in the price control.
- 5.32 The outturn capital expenditure figures may be affected by changes in the accounting treatment of costs. In distribution some PESs are capitalising expenditure that was previously treated as operating expenditure, while others have classified expenditure, previously designated non-operational expenditure, as network capital expenditure. In transmission the effects of these accounting

practices are expected to be less pronounced because transmission business expenditure tends to be dominated by a few, large projects, rather than a series of smaller investments. Even so, consideration will be given to ensure capital expenditure additions to the asset base are applied on a consistent basis.

### Next Price Control

- 5.33 As discussed in Chapter 2 the price controls for the next period may be set for the year commencing 1999/00 whereby the allowed revenues would be derived using an opening regulatory asset value for 1999/00, together with projected operating expenditure, allowance for depreciation and cost of capital for the price control period from 1999/00.
- 5.34 Provisional estimates of the opening values of the two companies for 1999/00 in 1997/98 prices are shown in Table 5.4. These provisional estimates are based on the capital expenditure projections of the companies as submitted in their responses to the business plan questionnaires and may be revised following completion of the review of capital expenditure later this year.

**TABLE 5.4 PROVISIONAL OPENING ASSET VALUE FOR 1999/00  
(IN £MILLION 1997/98 PRICES)**

	<b>ScottishPower</b>	<b>Scottish Hydro-Electric</b>
Opening Net Asset Value for 1990/91	733	171
less depreciation allowance	351	82
plus capital expenditure	217	130
Opening Net Asset Value for 1999/00	599	219

### Depreciation

- 5.35 For the previous price control review the provision for accounting depreciation was straight line and based on average asset lives of 20 and 40 years respectively for the pre- and post-Vesting assets of ScottishPower and average assets lives of 22 and 48 years respectively for the pre and post-Vesting assets of Scottish Hydro-Electric. It is for consideration whether these asset lives should continue to apply for the present price control review.
- 5.36 Allowance is made for depreciation on the opening assets at the time of Vesting. These assets are typically depreciated using the average life of about half that of new assets, leading to step changes in the depreciation allowances and a possible cliff-face when the opening assets become fully depreciated. It is for consideration, as part of the distribution price control, how this may be resolved and a possible approach is outlined in the May consultation paper.
- 5.37 Since transmission assets typically have a longer expected life than distribution assets, the step change in asset values observed for some distribution business



within the next few years is not expected for transmission within the same time-frame. However, consideration will need to be given to whether the resolution of the issue for distribution may be relevant to the setting of the next control for the Scottish transmission businesses.

### **Hydro Benefit**

- 5.38 Schedule 7 of the Scottish Hydro-Electric licence includes provision for a transfer of a sum known as the Hydro Benefit from the generation business of Scottish Hydro-Electric to its transmission and distribution businesses. The provision was made to enable the overall level of transmission and distribution charges in Scottish Hydro-Electric's designated area to be adjusted to the levels in ScottishPower's designated area.
- 5.39 The level of the Hydro Benefit provision was taken to be the lesser of (a) the required amount to bring Scottish Hydro-Electric distribution and transmission costs in to line with those of ScottishPower and (b) the amount the generation business could fund the distribution and transmission businesses arising from the benefit of its hydro-electric plant. At the time of privatisation (1990/01) the provisions for (a) and (b) were estimated to be £40 million and £70 million respectively. Hence the Hydro Benefit was set at £40 million, and split £29 million and £11 million for distribution and transmission respectively.
- 5.40 The figures for (a) were derived as the difference between unit distribution and transmission costs between Scottish Hydro-Electric and ScottishPower. The figure for (b) was derived as the difference in costs with and without hydro-electric plant, assuming for these purposes that hydro-electric plant was replaced by combined-cycle gas turbines.
- 5.41 The Hydro Benefit was not activated during the first price control period for either transmission or distribution. The provision was activated for the present price control for distribution, but not for transmission.
- 5.42 The MMC Report for Scottish Hydro-Electric in 1995 reviewed and retained the provision of the Hydro Benefit. The value of (b) above was analysed under a variety of assumptions and the MMC confirmed the view that more than £40 million was available from generation and this provision, adjusted for inflation, should be available for application in the distribution and transmission price control reviews.
- 5.43 The application of the Hydro Benefit and, in particular, the basis of the comparison with ScottishPower are being reviewed as part of the present price control reviews. It is for consideration what, if any, elements should be excluded from the comparison when assessing the level of Hydro Benefit to be applied.
- 5.44 Further consideration needs to be given to the method for assessing whether use of system charges in Scottish Hydro-Electric's area are indeed "similar" to those in ScottishPower's area. The structure of use of system charges and the balance between charges, does differ to some extent between the two areas.

Other considerations, on trading arrangements in particular, may require changes to these charging arrangements.

- 5.45 It is for consideration whether there is a need to apply the Hydro Benefit to Scottish Hydro-Electric's transmission business and, if so, what level of Hydro Benefit should be applied. The provision has been made available and may be used to bring the overall level charges in Scottish Hydro-Electric in line with those of ScottishPower. It is for consideration whether all costs of the transmission business should be taken into account in assessing whether it is appropriate to invoke the provisions for Hydro Benefit.

### **Financial Modelling**

- 5.46 In the light of the DGES's duty to secure that licence holders are able to finance the carrying on of the activities which they are authorised by their licences to carry on, consideration is being given to the supporting checks that might be appropriate on the financial position and viability of the licence holder.
- 5.47 The transmission price control applies only to certain transmission business activities. This might suggest confining any supporting checks on financial viability to the transmission business. On the other hand the licence holder is the PES, and where PESs have been taken over and have become parts of larger groups, licence conditions have been put in place that limit the scope of the other activities carried out by the PES itself and create a financial ring fence round the PES to protect it from financial difficulties that might arise in the wider group. These circumstances suggest it is appropriate to focus checks for financial viability on the PES, rather than the wider group.
- 5.48 The checks typically relate to ensuring that the investment grade credit rating of the PES can be retained during the next price control period, provided that the PES is efficient in managing its business and finances. Particular consideration will be given to the level of debt, cash and cash flow as part of the review.

### **Issues for Consideration**

- 5.49 Views are invited on any aspect of the financial issues associated with the transmission price control review, and in particular on:
- the levels of gearing, cost of debt, equity finance, corporation tax, and in particular the beta value;
  - the approach to valuing assets at Vesting;
  - the approach to updating the asset value for capital expenditure since Vesting; and
  - the application of the Hydro Benefit.

## **6 OTHER ISSUES**

### **Introduction**

6.1 This chapter outlines a number of issues that may influence the outcome of the review of the transmission price control. These issues relate to the functions and charges of the transmission business.

### **Functions**

6.2 Various businesses of ScottishPower and Scottish Hydro-Electric will be required to be separated in operational, managerial and, in some cases, legal terms. These developments reflect the EU Directive on Common Rules for the Internal Market in Electricity, the assurances provided to the Secretary of State for Trade and Industry as part of the merger of Scottish Hydro-Electric and Southern Electric and in consequence of ScottishPower's proposed merger with PacifiCorp, and the suggestion of ScottishPower and Scottish Hydro-Electric themselves to introduce, in some form, independent operation of their transmission systems.

6.3 In respect of transmission, the scope for separation of businesses includes the following:

- the separation of the management and operation of the transmission businesses from all other businesses to include, in particular, separation from generation, wholesaling and all supply businesses;
- the separation of system operator activities from the transmission business and the possible reallocation of functional responsibilities relating to the management and operation of scheduling and despatch, demand forecasting, frequency control, operational planning, use of system and connection policy and the procurement of ancillary services; and
- the separation of management and operation of an Interconnector business distinct from the transmission business.

6.4 Separation of transmission has implications for the costs allocated to the transmission business that are within the price control. The separation of the role of system operator and/or Interconnector business could lead to the removal of associated costs from the transmission business price control.

6.5 It also has implications for the regulation of the separated activities. Consideration will need to be given to the regulation of these activities as part of the overall consideration for their separation.

6.6 Further details of the scope for analysis in connection with the separation of businesses will be discussed in the forthcoming consultation paper on separation of businesses and electricity trading arrangements in Scotland.

### **Use of System and Generator Connection Charges**

- 6.7 Expenditure on capital assets is recovered through a connection charge and use of system charges. In simple terms the assets used for the benefit of an individual party connecting to the system are described as connection assets, and are funded through connection charges. These are distinguished from assets that form part of the wider infrastructure and provide benefits to all users of the transmission system.
- 6.8 The capital contributions recovered in connection charges are netted off the gross expenditure of the transmission business to derive a level of (net) expenditure for addition to the regulatory asset base and recovery through infrastructure use of system charges. Consequently the projected level of expenditure incurred by the transmission business for connection and not recovered through connection charges impacts on the price control.
- 6.9 In England and Wales NGC uses a set of rules to define the connection assets related to the connection charge. These rules do not require the connectee to pay for reinforcements deep into the NGC transmission system as part of the connection charge. All other infrastructure reinforcements required as a consequence of that connection are funded out of use of system charges spread over all users of the system.
- 6.10 ScottishPower operates a similar type of connection policy although the definition of the connection boundary differs from that of NGC. ScottishPower can also seek a change to the connection policy arrangements in specific cases, subject to the approval of the DGES. Like NGC, ScottishPower levies infrastructure charges on all users to fund infrastructure reinforcements, though the apportionment of these charges on to the different categories of users (ie. generation and demand) can differ from that of NGC.
- 6.11 Scottish Hydro-Electric, in its Statements for Transmission and Distribution Use of System Charges and Connection, purport to operate a deep connection policy whereby a new connection is not only liable for the costs of its immediate connection assets but also for any infrastructure reinforcements. For a number of years Scottish Hydro-Electric has also reported from its system modelling a transmission constraint between Kintore and Tealing that would involve a substantial infrastructure reinforcement cost for its removal, and therefore a considerable connection charge for connectees north of the constraint. No connection has yet been made and charged for the cost of this infrastructure reinforcement.
- 6.12 The method for setting connection and infrastructure charges is directly related to the concept of transmission access and a generator's access rights. In England and Wales NGC has arrangements in place for compensating generators who are constrained off due to transmission limitations. Such arrangements do not exist in Scotland. In ScottishPower's area, the occasions where constraints exist is sufficiently limited that no arrangements for dealing with constraints have been developed. In Scottish Hydro-Electric's area, the company purports to have a transmission constraint and to apply a deep connection policy.

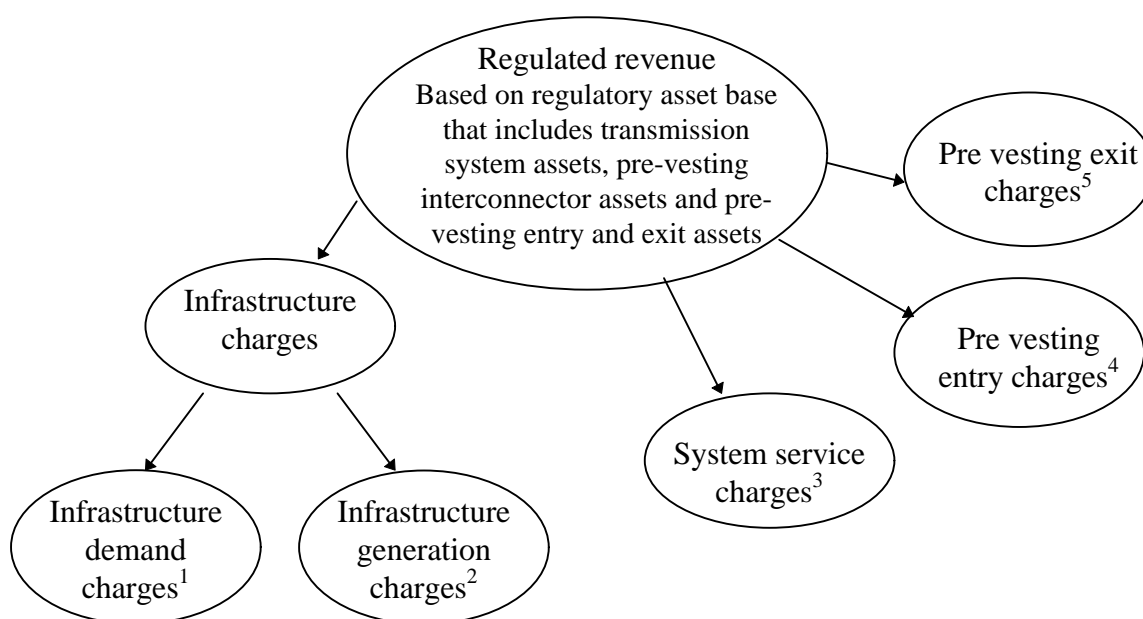
- 6.13 A consultation paper issued in January 1998 by Scottish Hydro-Electric identified a number of alternatives to their present connection policy. Some consideration was given by OFFER and the company to a proposed way forward but this was not conclusive. There was broad agreement among respondents on the need to change the connection policy but no agreement on what should replace it. The issue was to be further reviewed as part of the transmission price control review.
- 6.14 OFFER has undertaken an initial review of connection policy in Scottish Hydro-Electric's area and is in discussions with Scottish Hydro-Electric with a view to taking the matter forward. This review involves consideration of the following:
- the application of the connection policy with respect to consistency and transparency;
  - the conditions that define the transmission constraint and system reinforcement costs; and
  - the options for revising the connection policy.
- 6.15 The options for revising the connection policy range from amending the existing connection arrangements and enabling generators to have non-firm connections, to moving to a shallow connection policy.
- 6.16 Consideration is being given to the merits of the various options both as part of the review of trading arrangements and the review for the transmission price controls, with key drivers being:
- the considerable level of interest from new entrants seeking connection;
  - the arrangements with respect to the reported constraint between Kintore and Tealing; and
  - the possible harmonisation of the connection policy with those of ScottishPower and NGC.
- 6.17 Consideration of connection policy in Scotland is inextricably linked to the review of trading arrangements and will be discussed further in the forthcoming consultation paper on the separation of businesses and trading arrangements in Scotland.

### **Use of System Charges and Interconnector Charges**

- 6.18 The present structure of regulated use of system charges and pre-Vesting connection charges for ScottishPower's and Scottish Hydro-Electric's transmission system are shown in Figure 6.1. The companies publish further details of transmission charges in a charging statement required under Condition 2 Part VI of their licence. While the categories of charges are similar for ScottishPower and Scottish Hydro-Electric, the methodology used to determine these charges varies between the companies, resulting in different use of system charges. It is for consideration whether it is appropriate for the methodology for setting charges to vary significantly.

6.19 At present, generators using the pre-Vesting Interconnector capacity are required to pay infrastructure demand charges and system service charges because transfers across the Interconnector are treated as demand and, as there is no identifiable supplier that can be charged in England and Wales, the charge falls on the generator. It is then for consideration whether there is merit in amending the present charging structure and rebalancing the charges to parties and what impact this may have on the price control review.

**FIGURE 6.1: CURRENT USE OF SYSTEM CHARGES AND PRE-VESTING CONNECTION CHARGES**

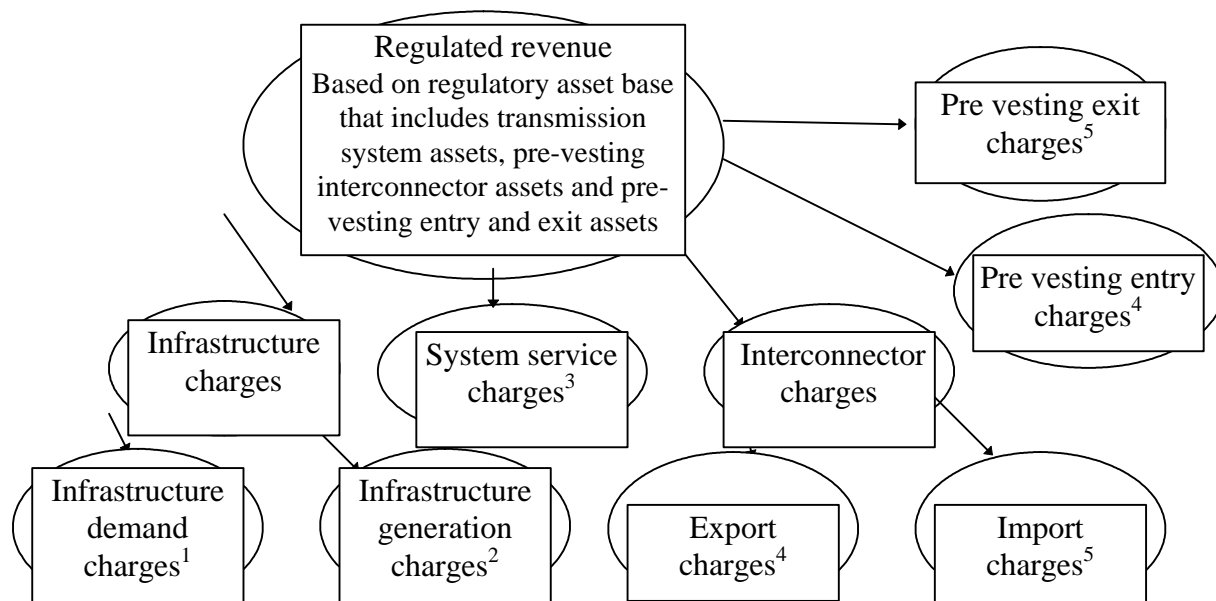


Notes:

- 1 Payable by suppliers and Interconnector users who export to E&W.
- 2 Payable by all generators and Interconnector users who import from E&W.
- 3 Payable by suppliers and Interconnector users who export to E&W.
- 4 Payable by generators with entry assets that were in place prior to vesting.
- 5 Payable by distribution networks and directly connected customers with exit assets that were in place prior to vesting.

6.20 As an example, the Interconnector charges could be separated from the infrastructure charges as illustrated in Figure 6.2. This is likely to lead to a change in the infrastructure generation and demand charges payable by all generators and suppliers in Scotland and the introduction of an Interconnector charge for users of the Interconnector. For such an option consideration would need to be given to the apportionment of revenue recovery through the pre-Vesting Interconnector charges and the infrastructure charges to ensure that importing and exporting generators paid a reasonable contribution to the costs of the Interconnector.

**FIGURE 6.2: OPTION FOR AMENDING USE OF SYSTEM CHARGES**



**Notes:**

- 1 Payable by suppliers.
- 2 Payable by generators.
- 3 Payable by suppliers.
- 4 Payable by Interconnector users who export to E&W.
- 5 Payable by Interconnector users who import from E&W.
- 6 Payable by generators with entry assets that were in place prior to vesting.
- 7 Payable by distribution networks and directly connected customers with exit assets that were in place prior to vesting.

6.21 More substantive changes to use of system charging arrangements in Scotland, for example involving the creation of a single use of system charging basis regardless of whether users are located in NGC's, ScottishPower's or Scottish Hydro-Electric's area, will form part of the considerations for the trading arrangements and may be discussed in the forthcoming consultation paper on separation of businesses and electricity trading arrangements in Scotland.

6.22 In addition to the consideration of charges relating to the Interconnector, in the July 1998 consultation paper, OFFER expressed an interest in reviewing a proposal made by ScottishPower in 1995 to rebalance its charges between exit, entry and infrastructure charges. The proposal was based on a revaluation of assets and allocation of costs between charging components. OFFER requested an update of ScottishPower's paper last year and is awaiting the company's response.

## Issues for Consideration

6.23 Views are invited on any aspect of the issues raised in this chapter, and in particular on:

- how the issues of separation should be treated in the context of the next price control;
- concerns related to connection policy in Scottish Hydro-Electric's area, and the scope for change to non-firm connection or a shallow connection policy;
- whether revised use of system and Interconnector charges should be developed and implemented; and
- whether further consideration needs to be given to the rebalancing of charges between entry, exit and use of system in ScottishPower's area.