

7 The capital investment programme of NIE

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Introduction

7.1. This chapter examines NIE's capital investment programme for the T&D Business. It examines actual expenditure in the current regulatory period; sets out NIE's proposals for the next regulatory period; and compares them with the assumptions made by the DG in his proposed price control. The chapter concludes with a brief reference to capital investment required for the Supply Business.

7.2. NIE's capital expenditure proposals covering the regulatory period 1997/98 to 2001/02 were initially contained in its 1995 to 2003 capital investment plan which was prepared in 1995. A 1996 supplement to NIE's capital investment plan covering only the five-year regulatory period was prepared by NIE in response to the DG's assessment of its capital requirements. This document included a revised capital expenditure programme showing an overall reduction in capital requirements of about 7 per cent on NIE's original plan. However, subsequent amendments by NIE (see paragraph 7.12) increased the capital requirement to within 0.5 per cent of the original plan (see Table 7.6). The DG also revised his July 1996 proposals, the net effect being that the overall total remained about the same (see Tables 7.4 and 7.5).

Capital investment criteria

7.3. NIE told us that, for the purposes of investment planning, it categorized planned expenditure under the primary headings of new business, load-related system work, performance-related system work, asset replacement, meters and miscellaneous. NIE pointed out to us that some of this investment was driven by statutory and licence mandates. It said that the Electricity Supply Regulations placed statutory requirements on PESs, and that the voltage variation limits in the regulations played a significant role in determining its investment level. It said that its licence standards incorporated quality clauses drawn from the Electricity Supply Regulations with which it had to comply as a licence condition. There were also external¹ and internal network planning standards which laid down guidelines aimed at achieving an acceptable level of network reliability and quality of supply. NIE stated that compliance with planning standards was a minimum requirement and that non-compliance was a clear indicator that remedial action was necessary to prevent network performance from deteriorating.

7.4. NIE said that although the achievement of certain long-term reliability standards was required by its licence, its investment plan was further influenced by customer expectations and comparisons with PESs in Great Britain (see Chapter 6). NIE had as a primary business objective that the reliability of supply in Northern Ireland should be no less than that provided by comparable companies in Great Britain. NIE also noted that environmental issues and improvements in safety, particularly in respect of overhead lines and substations in urban areas, had a considerable impact on network investment.

7.5. The DG stated that, in his view, the performance of the NIE network, measured on a range of service quality indicators, was within the ranges experienced by customers of comparable operators in Great Britain. He did not believe there was a case for NIE to improve its relative level of service above the levels currently achieved but acknowledged that the performance of the comparators was likely to improve over time as investment was made in their systems. The DG said that he had allowed a reasonable level of performance-related investment which would permit NIE to maintain its relative position given that other Great Britain distribution companies had performance improvement programmes in place.

Performance in the current regulatory period

7.6. NIE prepared a forecast for capital expenditure at the time of privatization, in which it was assisted by the engineering consultants M&M. The Government was assisted in reviewing the NIE forecast by the engineering consultants Ewbank Preece (now part of Mott Macdonald Group Ltd). This forecast is compared with actual expenditure in Table 7.1.

¹For example, Engineering Recommendation P2/5 of the Electricity Association (see paragraph 7.56).

TABLE 7.1 NIE: privatization forecast and actual T&D capital expenditure for the period 1992/93 to 1996/97

| | <i>£ million, 1996/97 prices*</i> | | | | | | |
|------------------------|-----------------------------------|----------------|----------------|----------------|----------------|---------------|-------------------|
| | <i>1992/93</i> | <i>1993/94</i> | <i>1994/95</i> | <i>1995/96</i> | <i>1996/97</i> | <i>Totals</i> | |
| Forecast | | | | | | | |
| <i>Transmission</i> | | | | | | | |
| Reinforcement | 5.7 | 7.8 | 13.4 | 11.2 | 6.5 | 44.6 | |
| Replacement | <u>2.7</u> | <u>4.9</u> | <u>4.3</u> | <u>6.2</u> | <u>6.2</u> | <u>24.3</u> | |
| Total (Transmission) | 8.4 | 12.7 | 17.7 | 17.4 | 12.7 | 68.9 | |
| <i>Distribution</i> | | | | | | | |
| New supplies | 14.1 | 13.8 | 13.8 | 13.6 | 14.1 | 69.4 | |
| Reinforcement | 32.7 | 29.8 | 30.3 | 30.5 | 28.8 | 152.1 | |
| Metering | 5.9 | 6.3 | 6.5 | 6.5 | 6.5 | 31.7 | |
| SCADA | <u>3.8</u> | <u>6.9</u> | <u>3.3</u> | <u>1.9</u> | <u>1.2</u> | <u>17.1</u> | |
| Total (Distribution) | 56.5 | 56.8 | 53.9 | 52.5 | 50.6 | 270.3 | |
| Total (T&D) | 64.9 | 69.5 | 71.6 | 69.9 | 63.3 | 339.3 | |
| Customer contributions | <u>(7.7)</u> | <u>(7.7)</u> | <u>(7.6)</u> | <u>(7.6)</u> | <u>(7.6)</u> | <u>(38.2)</u> | |
| Net total | 57.2 | 61.8 | 64.0 | 62.3 | 55.7 | 301.0 | |
| Actual† | | | | | | | |
| <i>Transmission</i> | | | | | | | |
| Reinforcement | 3.5 | 1.9 | 0.7 | 1.7 | 4.4 | 12.2 | |
| Replacement | <u>3.3</u> | <u>1.4</u> | <u>0.7</u> | - | - | <u>5.4</u> | |
| Total (Transmission) | 6.8 | 3.3 | 1.4 | 1.7 | 4.4 | 17.6 | |
| <i>Distribution</i> | | | | | | | |
| New supplies | 12.2 | 12.9 | 13.4 | 12.9 | 12.3 | 63.7 | |
| Reinforcement | 24.3 | 14.4 | 27.4 | 34.0 | 32.4 | 132.5 | |
| Metering | 9.1 | 3.8 | 4.5 | 3.6 | 3.5 | 24.5 | |
| SCADA | <u>0.8</u> | <u>0.8</u> | <u>1.0</u> | <u>0.5</u> | <u>1.3</u> | <u>4.4</u> | |
| Total (Distribution) | 46.4 | 31.9 | 46.3 | 51.0 | 49.5 | 225.1 | |
| Total (T&D) | 53.2 | 35.2 | 47.7 | 52.7 | 53.9 | 242.7 | |
| Customer contributions | (7.6) | (7.8) | (9.0) | (7.5) | (7.1) | (39.0) | |
| Net total | 45.6 | 27.4 | 38.7 | 45.2 | 46.8 | 203.7 | |
| | | | | | | | % |
| Difference | | | | | | | <i>underspend</i> |
| Transmission | 1.6 | 9.4 | 16.3 | 15.7 | 8.3 | 51.3 | 74.4 |
| Distribution | 10.1 | 24.9 | 7.6 | 1.5 | 1.1 | 45.2 | 16.7 |
| Total underspend | 11.7 | 34.3 | 23.9 | 17.2 | 9.4 | 96.5 | 28.4 |
| Contributions | (0.1) | 0.1 | 1.4 | (0.1) | (0.5) | 0.8 | |
| Net underspend | 11.6 | 34.4 | 25.3 | 17.1 | 8.9 | 97.3 | 32.3 |

Source: NIE.

*NIE's projected 1996/97 prices.

†The 1996/97 actual figures are based on a forecast from NIE dated 14 January 1997.

7.7. The total underspend of £96.5 million was fairly evenly divided in money terms between transmission and distribution, but in transmission only 25 per cent of the privatization forecast was spent whereas for distribution 83 per cent of the forecast was spent. The main underspend in distribution occurred in the first three years after privatization. NIE gave several reasons for the underspend. First, growth in peak demand had turned out to be lower than originally forecast. This was largely due, it said, to demand management actions such as the introduction of tariff structures that encouraged load transfer from peak to off-peak periods. This had been reflected in the improved load factor, which had increased from 56.2 per cent in 1992/93 to the 1995/96 value of 59.9 per cent. NIE also said that gains in efficiency (particularly in procurement practices) had reduced project costs. It added that it had made a slow start in establishing its post-flotation priorities, and preoccupation with privatization had contributed to deferment of some major works. There had also been an unwillingness among contractors at that time to establish themselves in Northern Ireland. A further factor was that NIE had substantially altered its investment strategy post-privatization to one of concentrating on improving the quality of supply in rural areas.

7.8. Appendix 7.1 gives a breakdown of the underspend for the period 1992/93 to 1995/96 (at 1996/97 prices) with the main reasons as put forward by NIE. The DG's opinion was that the underspend which had occurred was not solely due to efforts by management to reduce costs: some of it was a result of NIE having other priorities, particularly in 1993/94 and 1994/95. Some of the capital expenditure which had not been undertaken during the present price control period, but for which revenues had been allowed under the price control, would have to be undertaken in the future and it would not be reasonable to expect the customers to pay again for the financing of such expenditure. NIE stressed that investment not made in the first period would not appear in the opening asset base of the second period and the deferment therefore benefited customers through lower prices.

NIE's capital expenditure proposals

7.9. In the preparation of its proposals for the period 1997/98 to 2001/02 NIE again engaged the assistance of M&M who advised and checked on the reasoning and validity of various elements of the proposal. NIE's categorization of expenditure is explained in its internal guidance on the allocation of expenditure to revenue or capital, reproduced in Appendix 7.2.

7.10. To facilitate comparison of figures between the various sets of capital expenditure proposals for the next regulatory period we adjusted the figures to a common October 1996 price level where necessary. Some of the original proposals were based on 1994/95 prices and others on April 1995 price levels. The former have been increased by 5.92 per cent and the latter by 3.22 per cent.

7.11. For the regulatory period 1997/98 to 2001/02, NIE's original proposals, based on its 1995 capital investment plan, are given in Table 7.2. After an exchange of correspondence and proposals with the DG, NIE produced a 1996 supplement to its original investment plan which reduced capital expenditure by £24.9 million (about 7.2 per cent), as shown in Table 7.3. These figures were included in NIE's August 1996 corporate plan.

TABLE 7.2 Summary of NIE's 1995 capital investment plan for transmission and distribution

| | <i>£ million, 1996/97 prices</i> | | | | | |
|---------------------------------|----------------------------------|----------------|------------------|----------------|----------------|---------------|
| | <i>1997/98</i> | <i>1998/99</i> | <i>1999/2000</i> | <i>2000/01</i> | <i>2001/02</i> | <i>Totals</i> |
| <i>Transmission</i> | | | | | | |
| New business | [| | | | | |
| System work | | | | | | |
| Asset replacement | | | | | | |
| Total (transmission) | | | | | | |
| <i>Distribution</i> | | | | | | |
| New business | | | | | | |
| System work-load-related | | | | | | |
| System work-performance-related | | | | | | |
| Asset replacement | | | | | | |
| Metering | | | | | | |
| Miscellaneous (inc SCADA) | | | | | | |
| Total (distribution) | | | | | | |
| On-costs | | | | | |] |
| Gross total (T&D) | 86.5 | 90.8 | 80.9 | 67.0 | 78.6 | 403.8 |
| Contributions | (8.4) | (9.9) | (8.9) | (9.6) | (21.5) | (58.3) |
| Net total (T&D) | 78.1 | 80.9 | 72.0 | 57.4 | 57.1 | 345.5 |

Source: NIE.

TABLE 7.3 Summary of NIE's revised capital investment plan for transmission and distribution

£ million, 1996/97 prices

| | <i>1997/98</i> | <i>1998/99</i> | <i>1999/2000</i> | <i>2000/01</i> | <i>2001/02</i> | <i>Totals</i> |
|---------------------------------|----------------|----------------|------------------|----------------|----------------|---------------|
| <i>Transmission</i> | | | | | | |
| New business | [| | | | | |
| System work | | | | | | |
| Asset replacement | | | | | | |
| Total (transmission) | | | | | | |
| <i>Distribution</i> | | | | | | |
| New business | | | | | | |
| System work-load-related | | | | | | |
| System work-performance-related | | | | | | |
| Asset replacement | | | | | | |
| Metering | | | | | | |
| Miscellaneous (inc SCADA) | | | | | | |
| Total (distribution) | | | | | | |
| On-costs | | | | | |] |
| Gross total (T&D) | 80.2 | 81.8 | 63.0 | 69.0 | 66.6 | 360.5 |
| Contributions | (7.1) | (9.0) | (7.6) | (8.4) | (7.8) | (39.9) |
| Net total (T&D) | 73.1 | 72.8 | 55.4 | 60.6 | 58.9 | 320.6 |

Source: NIE's August 1996 corporate plan.

7.12. NIE subsequently increased its projected asset replacement expenditure by £19.2 million to correct what it now perceived to be an underestimate of the cost of 11 kV overhead line refurbishment, and also by £4.1 million for buildings which NIE had previously omitted for comparability reasons, having assumed incorrectly that the DG had allowed this item within operating costs.

The DG's assessment of NIE's capital expenditure requirements

7.13. The DG submitted that the reasonable level of capital expenditure should take three main criteria into account:

- (a) current network performance;
- (b) the extent to which customers required the performance of the system to be improved; and
- (c) the ability of NIE physically to undertake the proposed capital expenditure.

7.14. In respect of the first criterion, the DG stated that NIE's network performance and the quality of service received by its customers were within the ranges achieved by SHE and SWALEC, apart from the exceptional transmission failure that occurred in 1993/94. This was not disputed by NIE. The DG and NIE agreed that NIE should at least maintain its present position relative to the performance of other UK distribution systems (see paragraph 6.25). The DG said that the level of capital expenditure in his proposal included some performance-related expenditure which was expected to improve performance of the system in a cost-effective manner. The DG believed that the performance of the NIE system would therefore improve over the price control period and that NIE would at least maintain its present position relative to the performance of other UK distribution systems with his level of capital expenditure. As noted in Chapter 6, NIE did not agree with this view.

7.15. On the second criterion, the DG said that market research indicated that customers were generally content with the current level of service and were not prepared to pay more for better service. NIE, in contrast, provided evidence of complaints about poor quality of supply from a range of dissatisfied customers.

7.16. Regarding the third criterion, the DG doubted NIE's ability to carry out its proposed programme effectively, particularly in terms of its overhead line refurbishment programme. His view was based on NIE's failure by a large margin to carry out the capital expenditure it had originally programmed to be undertaken during the current regulatory period (see Table 7.1). The DG and NIE were in substantial agreement on the transmission expenditure for the new period but the DG questioned whether NIE had the necessary additional resources effectively to engineer and administer the full extent of its proposed distribution programme as well as its transmission programme.

7.17. For his assessment of NIE's capital expenditure requirements the DG was assisted initially by engineers seconded from OFFER but their assistance was withdrawn before they completed the assignment due, we were told, to other more pressing commitments. The DG then engaged the consultants RKD who worked from the information previously obtained by OFFER's engineers and by the DG; RKD did not have dialogue directly with NIE, nor had it visited the company. Although RKD did ask for permission to contact NIE, the DG considered that to allow RKD access to NIE would have served only to delay the production of the report. When at our request NIE was given RKD's report in December 1996, NIE was very critical of it. In particular it felt that the lack of contact between RKD and itself had resulted in a number of misunderstandings and misconceptions on RKD's part.

7.18. At the time the investigation was switched from OFFER to RKD, the DG considered that the OFFER engineers, who had had 20 man-days of meetings with NIE, had all the information necessary for the completion of the final report. In the DG's view, therefore, there was no need for RKD to contact NIE. A further reason for refusing RKD contact with NIE was the DG's concern that, because of the adversarial circumstances, the company had a clear objective to steer the consultants towards conclusions which allowed a higher level of capital expenditure, whereas the DG required the consultants to determine only that level of capital expenditure which in their opinion would reasonably be required.

7.19. The DG stated that to suggest the report was hindered by a lack of access to information presupposed that such information existed in the first place-the company had had six months to provide information and the DG assumed that, if information had been available, then it would have been provided. The DG also told us that the OFFER team considered that the quality of information provided by NIE was poor or poorly documented. However, our own consultants did not experience difficulty in finding the information they sought during the course of our inquiry. We noted, however, that the RKD report refers in several places to lack of access to information and it appeared during the course of our inquiry that RKD might have misunderstood NIE's approach to some issues.

7.20. On the basis of his underlying assumptions and the work of his consulting engineers, the DG concluded that NIE's allowed capital expenditure for the review period should be rather less than the company had proposed but significantly above actual expenditure achieved by NIE during the first price control period. In his July 1996 price control proposals he included provision for T&D capital expenditure as set out in Table 7.4.

TABLE 7.4 The levels of capital investment in the DG's price control proposals, July 1996

| | <i>£ million, 1996/97 prices</i> | | | | | |
|------------------------|----------------------------------|----------------|------------------|----------------|----------------|--------------|
| | <i>1997/98</i> | <i>1998/99</i> | <i>1999/2000</i> | <i>2000/01</i> | <i>2001/02</i> | <i>Total</i> |
| Transmission | 21.2 | 14.2 | 3.1 | 15.5 | 25.5 | 79.5 |
| Distribution* | 51.9 | 52.2 | 50.7 | 50.3 | 43.7 | 248.8 |
| Total (T&D) | 73.1 | 66.4 | 53.8 | 65.8 | 69.2 | 328.3 |
| Customer contributions | (10.0) | (11.4) | (10.3) | (10.9) | (22.8) | (65.4) |
| Net total T&D | 63.1 | 55.0 | 43.5 | 54.9 | 46.4 | 262.9 |

Source: OFREG.

*Includes non-operational capital expenditure.

7.21. In December 1996 the DG informed us that he had misinterpreted NIE's connection charge policy and acknowledged that there was a slight arithmetical error in the load-related expenditure projection which affected the values for distribution. In February 1997 the DG told us that he had allowed £16.4 million for on-

costs in his formal proposal because of his desire to achieve a settlement with NIE, but for the purposes of our inquiry he reverted to his original position (see paragraph 7.85). Incorporating these changes, the DG's proposal was as shown in Table 7.5.

TABLE 7.5 The levels of capital investment in the DG's price control proposals (amended)

| | <i>£ million, 1996/97 prices</i> | | | | | |
|------------------------|----------------------------------|----------------|------------------|----------------|----------------|--------------|
| | <i>1997/98</i> | <i>1998/99</i> | <i>1999/2000</i> | <i>2000/01</i> | <i>2001/02</i> | <i>Total</i> |
| Transmission | 21.2 | 14.2 | 3.1 | 15.5 | 25.5 | 79.5 |
| Distribution* | 47.7 | 48.9 | 50.1 | 45.9 | 46.5 | 239.1 |
| Total (T&D) | 68.9 | 63.1 | 53.2 | 61.4 | 72.0 | 318.6 |
| Customer contributions | (8.1) | (9.5) | (8.4) | (9.0) | (20.0) | (55.3) |
| Net total (T&D) | 60.8 | 53.6 | 44.8 | 52.4 | 52.0 | 263.3 |

Source: OFREG.

*Includes non-operational capital expenditure.

7.22. The DG proposed to restrict the refinancing of the underspent expenditure for the years 1993/94 and 1994/95 (see paragraphs 7.7 and 7.8). He considered that the underspend which occurred in 1992/93 was reflected in the value of the business at flotation. At the time of the DG's proposal the extent of the underspend for the final two years of the period (that is, 1995/96 and 1996/97) was unknown but he decided that any underspend in these years could be considered at the next review. The DG accepted that some of the underspend did reflect efficiency gains and therefore to endorse the principle that NIE should retain the benefit of genuine efficiency gains he proposed to deduct only half of his estimate of the financing effect of the 1993/94 to 1994/95 underspend, leaving NIE with the benefit of the remaining underspend.

Comparisons of NIE's capital expenditure proposals and the DG's assessment

7.23. Figure 7.1 shows, diagrammatically, the difference between NIE's corporate plan and the DG's proposal. For comparison, it also shows NIE's pre-privatization forecast and actual expenditure for the period 1992/93 to 1996/97 (all at 1996/97 prices) as set out in Table 7.1.

Summary of differences

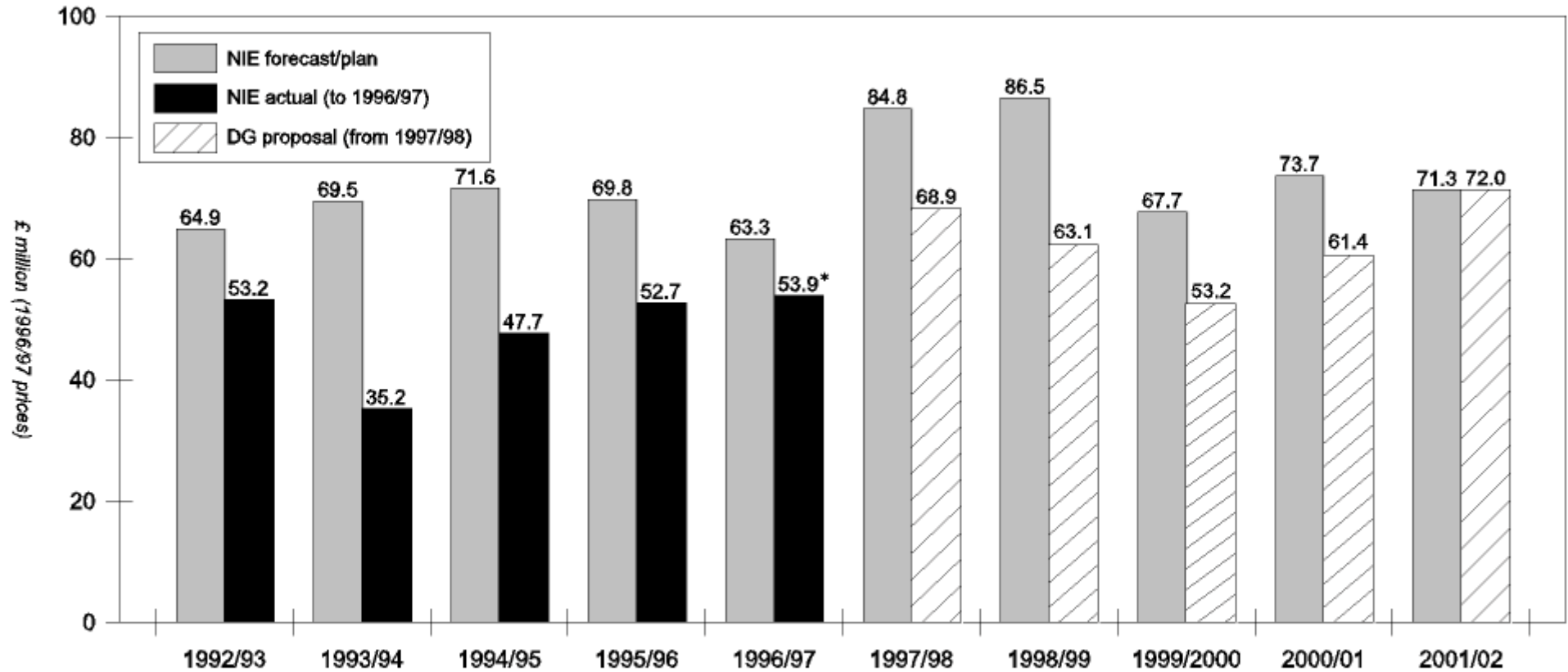
7.24. Throughout the inquiry there were difficulties in reconciling the categorization of capital expenditure used by the two parties-in particular between load-related system work and asset replacement. The DG presented an amended proposal in which he reclassified his view of expenditure in line with his understanding of NIE's categories, and which suggested allocations (at 1996/97 prices) within the ranges of £94 million to £104 million for new business and system load-related work and £73 million to £85 million for asset replacement.

7.25. The DG stated that, after reallocation of his proposed expenditure to NIE categories, the two sides were reasonably close to each other. He commented, however, that the ranges were indicative only and that this type of exercise could never achieve precise answers. NIE rejected the view that differences between the company and the DG arose largely from the use of different classifications of capital expenditure. In NIE's view, RKD had substantially overestimated asset replacement expenditure through using an inappropriate formula, and had substantially underestimated load-related expenditure as a result of an omission in the compilation of RKD's report. The DG's recommendations had, in NIE's view, perpetuated these errors. Although the two errors to some extent offset each other, it was important that the total allowed should be built up in a rational and defensible way. The DG, however, maintained that the differences were largely ones of classification.

7.26. NIE's proposals, the DG's assessment and the differences between them are shown by category of expenditure in Table 7.6 (all values adjusted to out-turn October 1996 prices, which we take as our definition of 1996/97 prices). The table shows that, overall, the difference between the DG's amended proposals and

FIGURE 7.1

NIE: forecast and actual capital expenditure, 1992/93 to 2001/02



Source: DG and NIE.

*Latest estimate as at January 1997.

Note: For the period 1992/93 to 1996/97, the chart compares NIE's pre-privatization forecast with its actual expenditure. For the period 1997/98 to 2001/02 it compares NIE's 1996 corporate plan with the DG's price control proposal. The NIE forecast figures from 1997/98 onward take into account the adjustments noted in paragraph 7.12. The chart shows gross totals, before deduction of customer contributions.

NIE's revised corporate plan was just over £80 million. There was very little difference in transmission expenditure. NIE's supplementary proposal omitted the 275 kV connection to a potential lignite-fired power station at Ballymoney, but this had no effect overall as the expenditure would be fully offset by contributions from the generator. The DG included significantly less expenditure on distribution, with differences in a number of categories. However, the single largest item of difference was on-costs (see paragraphs 7.85 to 7.88).

TABLE 7.6 Comparison between NIE's and the DG's proposals for capital expenditure totals for the period 1997/98 to 2001/02
£ million, 1996/97 prices

| | <i>NIE capital investment plan 1995</i> | <i>NIE corporate plan 1996*†</i> | <i>The DG's amended proposal</i> |
|-----------------------------------|---|----------------------------------|----------------------------------|
| Transmission | | | |
| New business | 12.3 | | |
| System work | 58.8 | 55.4 | |
| Asset replacement | <u>11.6</u> | <u>11.4</u> | |
| Total (gross) | 82.7 | 66.8 | 79.5 |
| Contributions | (12.3) | 0.0 | (12.3) |
| Total (net) | 70.4 | 66.8 | 67.2 |
| Distribution | | | |
| New business | 52.0 | 52.5 | |
| System work load-related | 78.4 | 62.0 | 114.5 |
| Asset replacement | 64.1 | 87.2* | 79.0‡ |
| System work performance-related: | | | |
| 11 kV rural protection | 4.1 | 4.1 | 4.1 |
| 11 kV automation | 9.3 | 9.6 | 8.1 |
| System development | 12.5 | 12.7 | 0.0 |
| Undergrounding 33 and 11 kV lines | 20.2 | 20.2 | 15.4 |
| Safety | 3.6 | 3.6 | 3.6 |
| Urban renewal | 5.7 | 5.7 | 0.0 |
| Environment | 2.0 | 0.0 | 0.0 |
| 33/11 kV changeover | 5.0 | 5.0 | 4.9 |
| Metering development | 22.0 | 12.5 | 15.2 |
| DCC and SCADA | 5.3 | 8.7 | 5.2 |
| Buildings | <u>4.1</u> | <u>4.1†</u> | <u>4.1</u> |
| Total (gross) | 288.3 | 287.9 | 239.1 |
| Contributions | <u>(46.0)</u> | <u>(39.9)</u> | <u>(43.0)</u> |
| Total (net) | 242.3 | 248.0 | 196.1 |
| On-costs | <u>32.8</u> | <u>29.3</u> | <u>0.0</u> |
| Total before contributions (T&D) | 403.8 | 384.0 | 318.6 |
| Total contributions (T&D) | <u>58.3</u> | <u>39.9</u> | <u>55.3</u> |
| Net total (T&D) | 345.5 | 344.1 | 263.3 |

Source: NIE and the DG.

*Includes NIE's increased projected asset replacement expenditure of £19.2 million to correct an underestimate of the cost of 11 kV overhead line refurbishment (see paragraph 7.12).

†Buildings were omitted initially from NIE's 1996 corporate plan (see paragraph 7.12).

‡These are approximate mid-point figures from the ranges quoted in paragraph 7.24.

Scenarios

7.27. NIE's August 1996 corporate plan assumed the early phasing out of generation from Coolkeeragh and Belfast West power stations together with the proposed introduction of the Moyle interconnector from Scotland by 1999. At that stage the input of power into the system would be almost wholly concentrated to the east and north of Belfast with the resultant implication of increases in load flows and transmission losses and a reduction in system security.

7.28. Other scenarios are possible which might have a significant impact on NIE's T&D Business. However, NIE told us that under the current regulatory regime, the T&D Business had no say in the location

of future generation or the phasing out of existing generation, other than that provided by its right to charge for connection to the system. There was no way of charging for a disconnection. Whilst the T&D Business could charge for the costs of any strengthening of the transmission system that might be consequential on the location of a new generator, it could not recover reinforcement costs from a generator who subsequently withdrew.

7.29. Under the present regime, the location and type of new generating plant would be a matter for competitive tender. As the most economical point for entry of all imported fuels was in the east of the province and the only significant indigenous fuel, lignite, was located in the same area, there was little incentive to replace Coolkeeragh power station with a new plant in the north-west, even though the closure of Coolkeeragh would mean increased demand on the transmission system in respect of both power flow and security. If a lignite-fired power station at Ballymoney were to go ahead, it would require a 275 kV overhead line to connect it to the transmission system at Kells which would also require the existing substation to be modified.

7.30. NIE said that it was possible that the natural gas pipeline currently connecting Belfast to Scotland could be extended to Londonderry to provide both domestic and industrial loads, but its economic viability would depend on a reasonably large penetration of the domestic heating/cooking market and take-up by a major industrial user (which could be a power station). NIE Enterprises Ltd¹ had made preliminary investigations of such a project, assuming a domestic load along the pipeline to about 40,000 consumers and a 240 MW combined cycle power station in the Londonderry area, but concluded that it was not viable, in the short to medium term, unless the potential market could be increased and/or the project received infrastructure support.

7.31. In view of the uncertainties surrounding any significant generation in the west of the province, together with the long lead-time (at least four years) needed for the planning, public inquiry and construction stages of a large 275 kV transmission and substation project, NIE believed its only reasonable option was to take the necessary steps to reinforce the transmission network, assuming the phasing out, within the regulatory period, of the main generation at Coolkeeragh and the consequential concentration of generation in the east. NIE told us that its forward planning included consideration of alternative scenarios but that the assumptions in the corporate plan were considered robust. Expenditure could, however, be reduced if generation continued in the north-west.

Transmission

7.32. The only significant difference between the DG's proposal and NIE's 1996 supplement to the corporate plan was the omission by NIE of the 275 kV connection (value £12.3 million) to the potential lignite-fired power station at Ballymoney. It was omitted because the project was speculative and, before it could go ahead, the project and its connections would almost certainly be the subject of a public inquiry. Given the time needed for such an inquiry, as well as wayleave negotiations, preliminary planning and engineering, it was unlikely that any significant investment would be needed before the end of the forthcoming regulatory period in 2001/02. In any event, as noted in paragraph 7.26, the net effect on NIE's capital expenditure was nil. The omission of the Ballymoney connection would mean that the modifications proposed at the Kells 275 kV substation could also be omitted.

7.33. We questioned NIE as to whether the reinforcement of the network in the north-west, which took some 23 per cent of the total demand of NIE's transmission network, could be delayed or reduced in scope if the life of Coolkeeragh power station were extended. NIE showed us the results of a study assuming future scenarios both with and without generation at Coolkeeragh. This demonstrated that if generation continued at Coolkeeragh the necessary transmission reinforcement expenditure could be reduced by £[*]. However, NIE's PPB told us that for generation to continue at Coolkeeragh a contract renegotiation would be required. The PPB considered that, in these circumstances, running costs would be reasonable for meeting peak loads but not for base loads, and that availability costs would almost certainly be very high relative to the capacity retained.

¹An NIE business involved in new opportunities and ventures.

*Figure omitted. See note on page iv.

7.34. NIE concluded that the uncertainties of future generation in the north-west justified its proposal for the Tyrone 275 kV project. It also noted that if, in the distant future, there was a need for a further link with the ESB system, the proposed 275 kV substation at Omagh would be a convenient terminal for such a cross-border interconnector.

7.35. The DG considered the justification for the Tyrone 275 kV transmission line and also whether it would be more appropriate to build a less costly line at 110 kV. The DG considered the justification for the 275 kV line to be marginal but he nonetheless allowed the proposed expenditure.

Distribution

7.36. In Table 7.6, 14 categories of distribution expenditure are listed. It is, however, difficult to be consistent in the categorization because of differing judgments as to whether the primary reason for an expenditure is load-related and, if not, to which category it is best allocated. For instance, the replacement of a transformer could be both load- and performance-related and could also possibly be regarded as asset replacement or part of urban renewal. Bearing this in mind, we now consider the individual categories in turn.

New business and load-related system work

7.37. NIE's proposals included the costs of specific schemes for the first three years of the period and long-run marginal costs (LRMC) of reinforcement for the remaining two years. The DG's consultants based their approach on LRMC for the whole of the regulatory period, using a 500 MW theoretical model which was defined by the Electricity Council in the 1980s and used by the (then) area electricity boards, and also by NIE, for tariff-setting purposes.

7.38. NIE stated that the model was not intended to derive system expansion costs and it did not include costs associated with new connections, nor did it take account of losses in the network or reflect the cost of adding new capacity.

7.39. RKD agreed that the model did not include connections but argued that using the model tended to give an overestimate of the cost of load-related expenditure. This was because demand was forecast to rise by 133 MW over the price control period and RKD considered it reasonable to assume that this load growth would be accommodated at a lower unit cost than large scale (500 MW) growth predicted by the model, as the actual system would have more spare capacity and backbone. RKD estimated that the 500 MW model would give a load growth figure approximately one-third above the true figure and that the increased allocation would be sufficient to allow for connection costs.

7.40. NIE disagreed with RKD's view that the model would give too high a cost. It said that the model did not incorporate the loading at specific points in the system at each voltage level when allocating costs at various network levels to produce Use of System charges. Hence the model would not necessarily identify spare capacity when compared with a load growth of 133 MW. NIE went on to state that:

- (a) greenfield models (such as the 500 MW model) represented an optimum arrangement which was never found in practice;
- (b) the starting point for the development programme was not uniform across the network;
- (c) load densities (and terrain) would have discontinuities which were not reflected in the optimum case; and
- (d) while the situation envisaged by LRMC might be approached in the long run, it could not be reached within the next five years.

Thus NIE claimed that it was not possible to achieve an optimum system arrangement as assumed in the 500 MW model when starting from a practical network that was already in service.

Asset replacement

7.41. Almost half of NIE's proposed expenditure on asset replacement related to the replacement and refurbishment of 11 kV overhead lines. NIE acknowledged that the various components of overhead lines had different life-spans which were partly dependent on the environment of their locations. It had therefore adopted a rolling programme of major line refurbishment based on a 15-year cycle. The bulk of the existing network had an age profile of between 15 and 50 years. NIE's aim was that, once the backlog of old unrefurbished lines had been removed, the refurbishment work would settle down to an annual programme of 1,333 km for the 20,000 km of 11 kV network.

7.42. Whilst we considered a refurbishment cycle of 15 years to be reasonable for initiating the programme, further experience may indicate that, eventually, a longer cycle is justifiable for many parts of the network. The optimum cycle would be a trade-off between the lower capital cost of a longer cycle and the consequential increase in R&M costs. NIE pointed out that network performance and safety factors would be important considerations in assessing any trade-off.

7.43. NIE said that in view of the large backlog of very old lines, the optimum cycle of refurbishment would not be an issue for the next regulatory period. It would become a relevant consideration for future periods when the backlog had been reduced to a level such that there were no lines that had not been refurbished within the previous 20 years. This position would not be reached until well into the third regulatory period.

7.44. For the forthcoming period NIE originally proposed the refurbishment of [†] km of line at a cost of £26.9 million. The breakdown of this cost, including elements of system development and rural protection (see paragraph 7.55) which would be carried out at the same time, is shown in Table 7.7. RKD's report suggested that NIE's unit costs as proposed were low but its target for annual kilometres was high. As far as unit costs for direct line refurbishment were concerned, NIE's estimate was £14 million or £[†] per km. RKD, however, considered that the rates should be nearer £[†] per km.

TABLE 7.7 NIE's proposed programme of 11 kV overhead line refurbishment, 1997/98 to 2001/02

| | <i>NIE's original proposal</i> | <i>NIE's revised proposal*</i> |
|---------------------------|--|--|
| Total length of line (km) | [†] | [†] |
| | <i>£m</i> | <i>£m</i> |
| System development | 4.5 | 4.5 |
| 11 kV rural protection | 4.1 | 4.1 |
| Asset replacement: | | |
| Transformers | 4.3 | 4.3 |
| 11 kV overhead line | <u>14.0</u> | <u>33.1</u> |
| Totals | <u>26.9</u> | <u>46.0</u> |
| | <i>£</i> | <i>£</i> |
| Cost per km | [†] | [†] |
| Cost per km line only | [†] | [†] |

Source: NIE.

*See paragraph 7.46.

7.45. RKD told us that the DG's proposal for 11 kV line refurbishment and rebuilding for the period was as shown in Table 7.8.

TABLE 7.8 The DG's allowance for 11 kV line refurbishment, 1997/98 to 2001/02

| | |
|---|------|
| [Details omitted. See note on page iv.] | 15.5 |
| [Details omitted. See note on page iv.] | 7.1 |
| | 22.6 |

Source: RKD.

7.46. Taking account of the experience of recent costs incurred in its current refurbishment programme, NIE acknowledged that it had underestimated the capital requirement for this work, and its revised estimate is given in Table 7.7 which shows the new requirement to be £46.0 million instead of £26.9 million. This was based on the refurbishment of [*] km of line a year made up of [*] km of three-phase and [*] km of single-phase 11 kV lines plus [*] km of three-phase rebuild. Again the expenditure includes an element for system development and for 11 kV rural protection which is carried out during and as a part of the refurbishment programme.

7.47. We calculated that, at the revised rate, assuming line condition is strictly age-related and taking into account the age profile of the existing lines, it would take about eight years before the oldest lines being refurbished were less than 20 years old. If the rate of refurbishment was reduced to 1,500 km a year the time elapsed would be nine to ten years and at 1,000 km a year it would be 14 to 15 years.

7.48. The programme of refurbishment for the 11 kV overhead lines started in 1994/95. The extent and cost of this work carried out in the last three years (which includes elements of system development and 11 kV rural protection where appropriate) is as shown in Table 7.9.

TABLE 7.9 NIE's actual programme of 11 kV line refurbishment, 1994/95 to 1996/97

| Year | Line refurbished km | Actual cost £m | Cost per km £ |
|---------|---------------------------|----------------------|---------------------|
| 1994/95 | [| 2.3 | [|
| 1995/96 | * | 5.1 | * |
| 1996/97 |] | 6.2 |] |

Source: NIE.

7.49. NIE said that the costs per km in Table 7.9 were not comparable to the rate of £[*] in Table 7.7 because the work was made up of a different mix (for instance, the former did not include any line rebuild). NIE said that the lower unit cost of its refurbishment work in 1994/95 and 1995/96 was due to a concentration on light spur lines and the use of a less stringent specification. It said that its experience had demonstrated that lines required different levels of work depending on their age, condition, design constraints and protection applications. NIE's monitoring programme had shown that many of the lines were in a worse condition than first thought and consequently the original specification did not reflect the extent of the work that was required.

7.50. M&M, at NIE's request, carried out a process audit on the 11 kV refurbishment programme. Included in the final report were details of the actual costs of refurbishment in 1995/96. Table 7.10 summarizes these costs on a per km basis for the works carried out by in-house crews as well as by outside contractors.

TABLE 7.10 Costs of in-house and contracted-out 11 kV refurbishment in 1995/96

| | Line length km | Materials £ per km £ | Installation and other costs £ per km | Total £ per km |
|----------------|----------------------|---------------------------------------|---|-------------------|
| In-house | [| | | |
| Contracted-out | | Figures omitted. See note on page iv. | | |
| Total/averages |] | | |] |

Source: NIE.

*Figures omitted. See note on page iv.

7.51. M&M reported that the in-house figures were not a true reflection of the total costs of the works because:

- financial overheads applied to in-house rates might not have been consistent with those experienced by contractors;
- NIE squads were working to instructions which might not have required the same stringent specification as that required from the contractors; and
- contractors had generally been allocated the overhead lines with the heavier workload, as was apparent when the cost of materials for in-house and contracted works were compared.

7.52. We noted that, as NIE was currently working on a backlog involving lines past the generally accepted life-span of between 35 and 40 years, the future work content per line should reduce as it removed the backlog. In addition the programme was still in its early stages and as it progressed along the learning curve, it might be expected that improvements could be achieved.

7.53. The asset replacement cost of the overhead line refurbishment including associated transformers amounted to £37.4 million (see Table 7.7). The principal components of the balance of NIE's proposed asset replacement programme (£49.8 million) were categorized as follows:

- (a) major projects including replacement of 33 kV switchgear and 11 kV outdoor switchgear (£6.8 million);
- (b) 33 kV overhead lines (£3.3 million);
- (c) replacing 6.6 kV switchgear with 11 kV switchgear to facilitate future operation of the 6.6 kV network at 11 kV (£4.6 million);
- (d) transformer replacement, excluding those already included in the 11 kV overhead line refurbishment programme (£4.7 million);
- (e) low-voltage lines (£7.8 million);
- (f) services and cut-outs (£9.7 million); and
- (g) meters (£9.8 million).

7.54. RKD in their report had expressed concern at possible under-investment by NIE in plant replacement and suggested that the population of some types of plant could age significantly. However, part of this concern appeared to be due to differences between NIE and RKD as to the categorization of expenditure. Following the DG's recategorization of expenditure, apart from 11 kV overhead line refurbishment, there was little difference between the DG's and NIE's overall totals for asset replacement.

Performance-related system work

7.55. NIE said that performance-related system work covered 11 kV rural protection, 11 kV automation, system development and to a lesser degree the undergrounding of overhead 33 kV and 11 kV lines. The first three, which were interrelated, concerned improving the performance and operation of the distribution system. The 11 kV network was protected in various ways based on a number of historical protection strategies which ranged from continuous connected systems with automatic circuit reclosures to fully fused networks. To standardize and improve protection, and ultimately line performance, NIE prepared a code of practice for rural protection (CP3/8). As the lines were being refurbished their protection was being modified to meet CP3/8. The work included installation of additional auto-reclosures, surge diverters and additional air-break switches, as well as the upgrading of circuit breakers, their protection and the upgrading of fuses.

7.56. The Electricity Association's Engineering Recommendation (1978) Security of Supply (P2/5) sets out different recommendations for circuits with group demand of less than 1 MW and greater than 1 MW. NIE stated that some of its circuits above the 1 MW threshold did not comply with P2/5 and work was scheduled to rectify this situation. NIE added that the majority of the circuits in the NIE rural network were below the 1 MW threshold but, because of their length and the number of consumers that would be affected by line faults, it had decided that strict application of P2/5 to these circuits would not deliver the required improvement in performance. NIE had therefore decided to start designing such circuits to meet what it assessed to be acceptable performance standards.

7.57. Regarding automation, NIE proposed to install five urban automation schemes at £[*] per scheme and 112 rural schemes at £[*] per scheme. In addition, work costed at £[*] would be required at the control centre. NIE put the combined cost of these items over the period at £9.6 million.

7.58. The system development work entailed the reconfiguration of 11 kV circuits in line with NIE's new performance standard design criteria. It was also designed to facilitate future automation and to ensure that statutory voltage requirements were met. The work included the uprating of circuits and the insertion of additional feed points from substations. NIE assessed the average cost per circuit for this work at £[*] and planned to treat [*] circuits a year which, for the five-year period, equated to £12.7 million in total.

7.59. The RKD report, whilst substantially supporting the expenditure on 11 kV protection and automation, disallowed the system development expenditure for two reasons: first, that the expenditure would be partly offset by savings in losses, and secondly, that it might have been double-counted within the replacement or refurbishment costs. The DG told us that his initial understanding had been that this expenditure related to general restructuring and reconfiguration of the network and was already allowed for in NIE's asset replacement and system performance improvement programmes. He said that OFFER had not been informed that it was related to rural protection. Given that there was a separate (and agreed) programme for rural protection, the DG said that he was at a loss to understand why this expenditure was not properly categorized.

7.60. NIE said that these statements did not accord with the very detailed information it had supplied to OFFER during the DG's review of capital expenditure. It also said that the effect of savings in losses would be minimal and rejected the suggestion that there was any double-counting.

7.61. NIE considered that it had lagged behind the general trend in Great Britain towards the undergrounding of 33 kV and 11 kV lines, particularly in urban areas. At the present time 75 per cent of NIE's network was overhead compared with 58 per cent in SWALEC, 72 per cent in SHE and a Great Britain average of 44 per cent (excluding London). NIE told us that its plans for undergrounding were driven by considerations of safety, maintainability, nuisance, visual amenity and general environmental pressures and that performance improvement was a secondary factor. The arguments for undergrounding were strongest for urban areas, many of which had developed and spread to surround lines and substations originally built for rural surroundings.

7.62. NIE told us that the cost of undergrounding was high; the typical ratios of the costs of underground cables to those of overhead lines for the three main distribution voltages were 9:1 for 33 kV, 5:1 for 11 kV and 3:1 for medium and low voltages.

7.63. NIE's programme for undergrounding overhead lines in urban areas was based on replacing 26 km of 11 kV and 12 km of 33 kV overhead lines a year. Its plan was to replace 760 km over a period of 20 years. NIE's estimate of the cost was based on unit rates for replacing 11 kV and 33 kV overhead line of £[*] and £[*] per km respectively, totalling £20.2 million over the five-year period (see Table 7.6). These rates include the conversion costs of the associated overhead-fed substations and the removal of replaced overhead line.

7.64. The DG proposed to scale back the 33/11 kV undergrounding programme to its historical level because he considered that NIE had not made a case, whether on safety, environmental or other grounds, for the increase in the level of expenditure proposed. The DG thought this reduction would act as an incentive on NIE to seek finance for undergrounding from sources other than the generality of customers, particularly for a

*Figures omitted. See note on page iv.

programme which would not improve the quality of supply enjoyed by customers in general, and would serve to give windfall gains to those householders who lived near lines which were undergrounded. However, NIE told us that a commitment to underground lines was in some cases a requirement without which planning permission would be withheld.

Safety

7.65. NIE told us that overhead installations in urban areas were particularly vulnerable to vandalism which could lead to dangerous situations arising, particularly at outdoor open-terminal and similar substations. It said that two accidents involving serious injuries had occurred in recent years on the four-pole-type substations which were a common feature of the NIE overhead system. According to NIE there were about 1,000 of these structures of which approximately 600 were in urban areas. The replacement of these with ground-mounted enclosed substations was the main expenditure listed by NIE under the category of safety and amounted to £2.4 million for the period.

7.66. Associated with the replacement of the urban four-pole substations and with the general question of undergrounding of overhead lines, particularly in urban areas, was the possible connection between electromagnetic fields (EMF) and the incidence of cancer. NIE said that whilst any linkage between EMF and cancer was unproven, there was increasing national and international concern on the subject. The presence of unshielded overhead wires and substations close to houses was likely to become a matter of increasing public concern.

7.67. Other items that NIE included under the safety heading were the replacement of unscreened connections with insulated ones in many of the 6.6 kV substations in Belfast, and the replacement of corroded and vandalized LV mini-pillars that were used for house service terminations and sectionalization.

7.68. The DG allowed all capital expenditure classified as safety-related in NIE's original submission. Hence, there was no dispute between the parties on these matters.

Urban renewal

7.69. In various housing estates where power is supplied from an overhead system, the final leg of LV distribution is often by insulated conductors fixed under the eaves of the houses. NIE said that the practice of undereave wiring, which was discontinued in the late 1960s, had safety as well as aesthetic disadvantages. For instance, when houses were repainted, the wiring was sometimes removed in order to paint under it or to replace or repair the eaves. This gave rise to the possibility of insulation damage and the consequential risks of electric shock or fire.

7.70. NIE estimated that currently there were about 650 km of undereave wiring on its system, all of which was over 25 years old with about two-thirds being over 40 years old. The cable insulation became brittle with time and, if disturbed, was prone to cracking. The security of the system was also dependent on the soundness of the eaves to which it was attached. NIE said that the replacement of this wiring on a like-for-like basis would not be acceptable either by householders or for reasons of safety. The safety risks had been increased by the fact that many of the properties, which at the time of the original installation were rented, were now privately owned; owner-occupiers were more likely than tenants to carry out modifications to their properties, often in an amateur DIY way, and the undereave wiring might be damaged in the process.

7.71. NIE planned to replace the undereave wiring by conventional underground cable, which was consistent with the overall policy of undergrounding distribution in urban areas. However, the cost was high, not only because of the basic difference between overhead and underground cable costs but also because of the longer route that underground cable had to take between adjacent properties. The cost included in NIE's proposals was based on a rate of £[*] per km of replaced undereave wiring.

7.72. The expenditure for renewal of undereave wiring was the main item listed under the category of 'urban renewal' for which an expenditure of £5.7 million had been proposed by NIE. NIE said that this

*Figure omitted. See note on page iv.

represented a replacement of the undereave wiring at a rate of about 4 per cent a year, so that it would take 25 years to replace it all. At this rate of progress much of the undereave wiring would be over 50 years old before replacement, implying a continuing significant safety risk.

7.73. NIE stated that it could replace undereave conductors with Aerial Bundled Conductor (ABC) which was the modern equivalent. However, due to the construction of the houses there were physical restrictions on its installation, requiring the use of additional protective guards. NIE considered that the use of such guards would make ABC even more visually obtrusive and objectionable to householders. NIE therefore considered that the only viable option was the replacement of undereave wiring with underground cable: like-for-like replacement was not a realistic option.

7.74. The DG, after reviewing the evidence put forward by NIE for this programme, took the view that it should not be allowed on the grounds that such undergrounding was unlikely to improve system performance and that NIE had made no case on safety grounds that it needed to be done. The DG was not satisfied that NIE had demonstrated that any acceleration of this programme above historic levels was justified and the volume, at historic levels, of this programme was allowed for as part of the asset replacement programme on a like-for-like basis.

Environment

7.75. NIE said that overhead distribution, particularly within urban areas, detracted from the amenity of the district. When it came to replacing such installations because of ageing equipment, there would be increasing public pressure not to replace like-for-like but to put the installation underground. In rural areas of outstanding scenery it was also likely that there would be pressure to reduce the impact of overhead lines by selecting line routes that reduced their prominence and also by selective undergrounding. Nevertheless, NIE did not include any expenditure under this heading in its revised proposals, although much of the justification of its undergrounding works was environmentally driven.

33 kV to 11 kV changeover

7.76. NIE told us that there was currently some direct transformation to medium and low voltages from the 33 kV network. In order to improve the security and safety of the 33 kV network NIE considered it desirable to transfer such tapplings to the 11 kV network. NIE confirmed that in addition to improving the security of the 33 kV network, its plans for removal of the majority of the tapplings would bring other benefits to customers. These included improving network safety levels; enhanced protection against disturbance in the event of faults; and providing a greater degree of flexibility as to voltage control, thus facilitating resupply to customers when there were outages on other circuits. There would also be a reduction in the amount of visually obtrusive equipment. NIE stated that an earlier review of the design of voltage levels on the distribution system by M&M had confirmed NIE's plans in this regard.

7.77. The DG in his original proposal allowed most of the proposed capital expenditure against this item but subsequently told us that there might be a stronger case than had been appreciated for disallowing it. He had been advised that the process of removing 33 kV/LV spurs from the 33 kV system and replacing them with a 33 kV/11 kV plus an 11 kV/LV system was of questionable merit. He doubted that there were any significant security or reliability benefits or any savings in system losses, and commented that customers were being asked to pay again for equipment which already existed, for no better performance. Additionally, a move to higher-voltage distribution was generally considered desirable and this programme appeared to be moving in the opposite direction.

Metering development

7.78. In NIE's original plan £22 million had been included for this item which included the following:

- (a) metering for new customers and substations;
- (b) metering associated with tariff changes;

- (c) prepayment metering;
- (d) phased introduction of Code 5 metering (monthly billed);
- (e) preventative measures against illegal electricity abstraction;
- (f) development trials of hand-held unit-based system for local data collection (for back-up in event of communication failure);
- (g) trials associated with use of standard load profiles;
- (h) phased limited introduction of new metering technology as required by electricity suppliers and customers;
- (i) procurement of open meter-reading software; and
- (j) development of system metering as required by NIE or WETS needs.

In NIE's supplementary proposal, the smart card element of prepayment metering, research and development trials and metering associated with WETS were removed, reducing the expenditure to £12.5 million which was below the level of £15.2 million proposed by the DG.

DCC and SCADA

7.79. In its supplementary proposal NIE showed an increase in expenditure of £3.5 million on the DCC and on the implementation of the monitoring and data transmission system, SCADA. NIE said that this increase was due to a rephrasing of the project programme. The DG had allowed the amount initially proposed.

Buildings

7.80. Expenditure on buildings and similar items was referred to by NIE as 'non-operational capital expenditure'. There was no dispute over this expenditure, which amounted to £4.1 million, but due to a misunderstanding NIE had, in the supplement to its corporate plan, included it with operating expenditure.

Contributions (connection charges)

7.81. NIE told us that its policy on normal charges levied on customers and generators for connection to the system was based on the following:

- (a) For customers with demand less than 1 MW, apart from authorized generators, connection charges could include amounts for the capitalized cost of the operation, repair and maintenance of the assets required for the connection. The connection charge payable would be 60 per cent of the total costs so calculated, with the balance to be recovered through charges for Use of System. This applied to both single- and multi-occupancy premises, including flats.
- (b) However, for housing developments of 12 or more dwellings a standard connection charge of £257 per dwelling applied. This charge had not changed since privatization.
- (c) For authorized generators and for over 1 MW customers the connection charge payable would be 100 per cent of the relevant costs. These costs could include amounts for the installation of the appropriate additional metering and for the costs of operation and maintenance of the NIE connection assets. In certain cases it was possible to agree an annual service charge for the expected costs for operation, repair and maintenance.

7.82. NIE stated that the cost of a domestic connection, based on two years of data on all domestic connections, whether urban or rural, was £803 which, because of the nature of the work, included a high proportion of on-costs (24 per cent). Even if the on-costs were deducted, 60 per cent of the resultant figure would still be £366 per dwelling, which was appreciably higher than the unit rate of £257 actually charged for housing developments.

7.83. NIE stated that its existing connection charge policy was not cost-reflective and it had proposed to the DG an approach based on the concept of 'tariff support'. Under this concept, all consumers would be charged the full cost of connection less published tariff support allowances reflecting the expected Use of System revenues arising from the connection. NIE commissioned NERA to provide a cost-benefit analysis of the proposed changes. The main conclusions were that the benefits of tariff support would be unlikely to be outweighed by the costs and that the proposed change would therefore help to reduce the total cost of electricity in Northern Ireland.

7.84. As far as distribution expenditure was concerned, once the DG had amended his figure, the difference between NIE's and the DG's view on contributions was relatively small, the DG's being £3.1 million higher over the period (see Table 7.6).

On-costs

7.85. NIE in its supplementary proposal included £29.3 million for on-costs. The DG had initially excluded all of this on advice from RKD that individual project costs were high enough to include on-costs. In his formal proposal he included £16.4 million based, he told us, on his desire to achieve an overall settlement with NIE. For the purposes of our inquiry, he reverted to his initial position.

7.86. NIE stated that the gross employment costs (including salaries, employers' national insurance contributions and pension contributions) of the following categories of staff were charged as on-costs to capital projects:

- design engineers;
- surveyors;
- wayleave and planning permission negotiators;
- work programmers and supervisors; and
- commissioning engineers.

Employment costs were the single largest item in on-costs, accounting in 1996/97 for 90 per cent of the total. Travelling expenses represented the only other significant item.

7.87. NIE told us that the level of on-costs expressed as a percentage of gross capital expenditure had fallen from 16 per cent in 1992/93 to an estimated 11 per cent in 1996/97. Its proposal for on-costs in the period 1997/98 to 2001/02 represented an average of 8.4 per cent of gross capital expenditure, a further significant fall.

7.88. NIE said that the typical level of consultants' charges for the design, engineering and supervision of major projects would be in the range 5 to 10 per cent of gross value. This would not, however, include allowances for wayleave and planning negotiations which would normally be carried out by the client. It would also be necessary to include additional items not covered in NIE's on-costs such as accommodation, clerical support, profit and higher mobilization costs.

Supply

7.89. According to NIE, its capital requirement of £0.2 million for each year of the period is principally required for computer equipment related to meter-reading data analysis. Given that the capital expenditure for the Supply Business is very small and that the proposed price control is based on turnover, rather than return on assets, the DG did not make a specific allowance for it in his proposals. It is, however, necessary to ensure that depreciation is allowed in operating expenditure (see paragraphs 8.1 and 8.91).