January 2002

Report on distribution and transmission system performance 2000/2001

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1. Introduction

1.1 Licensees who operate transmission and distribution systems are required to report annually to the regulator on their performance in maintaining system security, availability and quality of service[1]. Since 1991 Ofgem has produced an annual report in which information from all licensees in Great Britain has been consolidated in a single report that also contained comment on emerging trends.

1.2 In the past year, however, there have been a number of developments that have caused Ofgem to question whether the report should continue to be published in its traditional format:

- Early work on the Ofgem Information and Incentives Project (IIP) revealed inconsistencies in the way companies measured and reported on incidents in their areas. This has created doubts about the accuracy and comparability of some of the data.

- The IIP subsequently put in place new definitions and reporting arrangements that have been operating since 1 April 2001 and will be fully implemented from 1 April 2002. In future the data submitted by the companies will also be audited. Given the new reporting requirements for distribution businesses Ofgem intends, in future, to publish information on the quality of service for distribution businesses in a different format.

- Differences between Ofgem's in house computer hardware/software and that originally used by Offer for production of the annual report created difficulties in production of the 1999/2000 report. It was recognised that this would necessitate additional work in preparation a 2000/2001 report, and some changes in the presentation of the information.

1.3 Despite the difficulties and disadvantages outlined above, it has been decided to publish a report in the traditional format for 2000/2001. This will ensure that there is no gap in published information prior to the conclusion of the current

[1] Public Electricity Supply Licence Conditions 6 - 9, Electricity Distribution Licence: Standard Condition 5

review and publication of data for the first year of operation of IIP. There are however some changes from previous years:

- Many of the diagrams have a slightly different format (Excel rather than Lotus charts) though the information is essentially the same.

- Comments are limited to general comments, rather than comparison of the performance of particular companies.

- Since 1995 the report has included information on security and availability for each company disaggregated by company operating units (Figs 2 & 5 in previous reports). This has been extracted from information provided by companies as part of their Quality of Supply reports following their acceptance of proposals from the Regulator[2]. The software used for production of this year's report does not lend itself to production of these diagrams in their traditional format and there are additional difficulties in obtaining comparable data following internal changes in some companies. Consequently Figs 2 & 5 have not been produced this year. For information on disaggregated performance reference should be made to the Quality of Supply report available from each company.

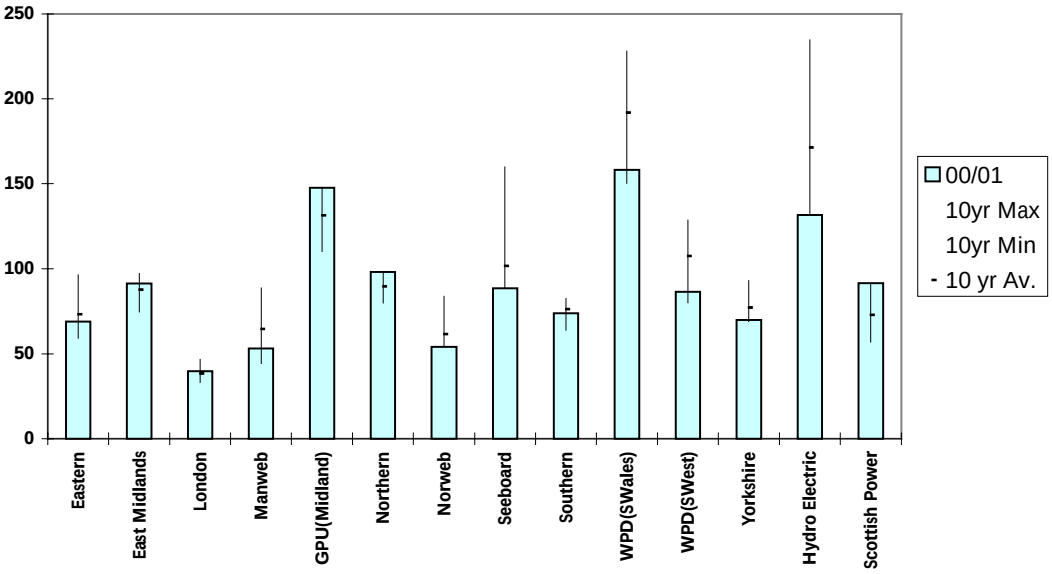
1.4 This report is a summary of information provided by the distribution and transmission system licensees. In some cases companies chose to submit commentaries and explanation in support of their figures. Copies of the reports submitted by the companies can be inspected at the Ofgem Library, 9 Millbank London SW1P 3GE or details may be obtained from each reporting company. Data used in compiling this report may be viewed, along with the report, at Ofgem's website - www.ofgem.gov.uk. Further information, including in some cases disaggregated information, is also contained in Quality of Supply reports published by each company.

[2] Quality of supply and Capital Expenditure – A paper by the Director General of Electricity Supply, Ofgem, 25 October 1995.

2. Security

2.1 Information on the overall security of supply, measured in terms of the number of interruptions experienced by consumers connected to distribution system of each distribution company, in provided in Fig 1. This shows the number of interruptions per 100 consumers in 2000/01, the average for the past 10 years, and the range of annual figures over the past 10 years. The data covers all interruptions, including those caused by bad weather, faults and pre-arranged shutdowns for maintenance and construction work. Interruptions due to failures of other systems (e.g. generation and transmission) are included though these are relatively insignificant.

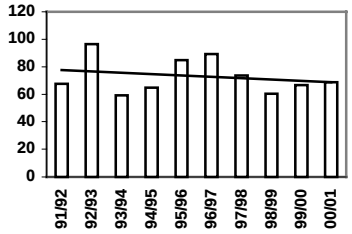
Fig 1 - SECURITY - Supply interruptions per 100 consumers
10 year range indicated by vertical line
GB average 84 interruptions/100 cons



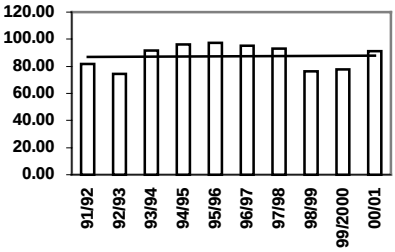
2.2 Fig 3 shows trends in security of supply as measured by the number of interruptions per 100 consumers served by each company in the past 10 years.

Fig 3 – Security Trends

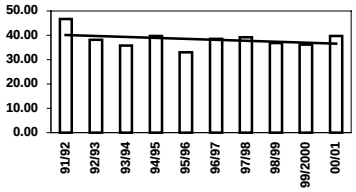
Eastern



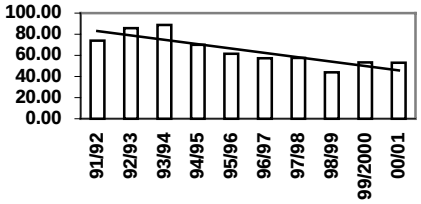
East Midlands



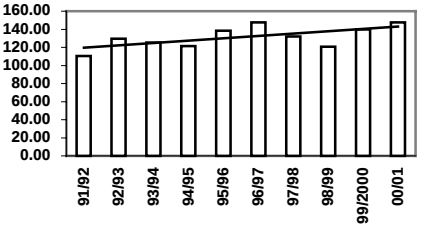
London



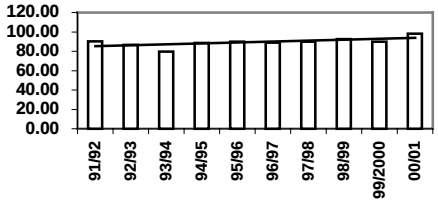
Manweb



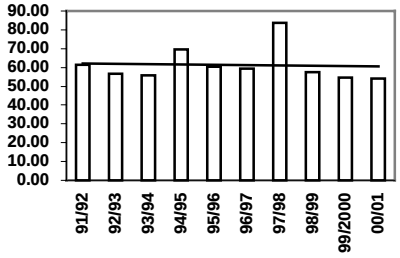
Midlands



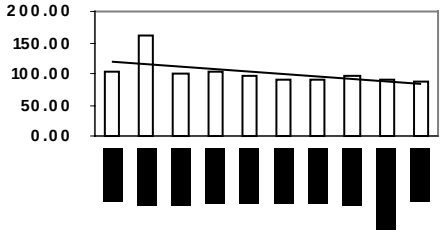
Northern



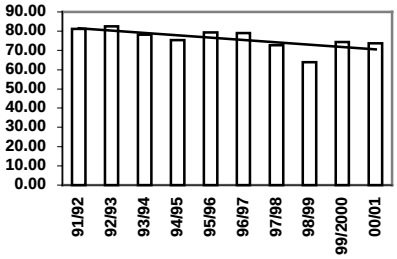
Norweb



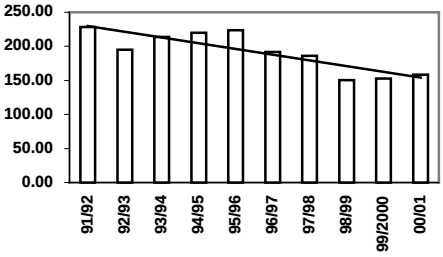
Seeboard



Southern



S Wales



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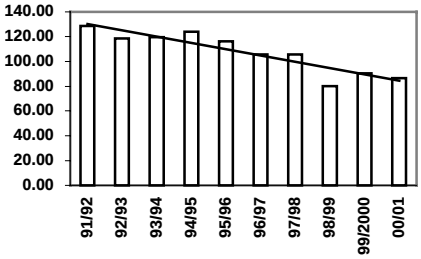
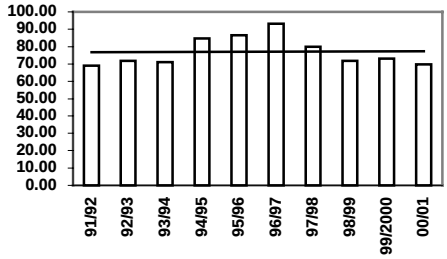
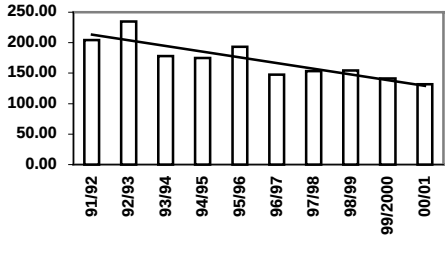


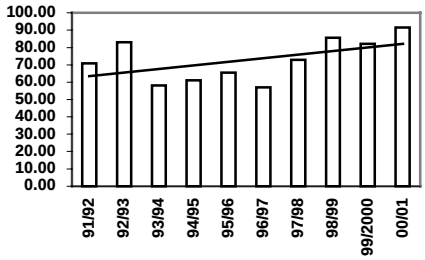
Yorkshire



Hydro Electric



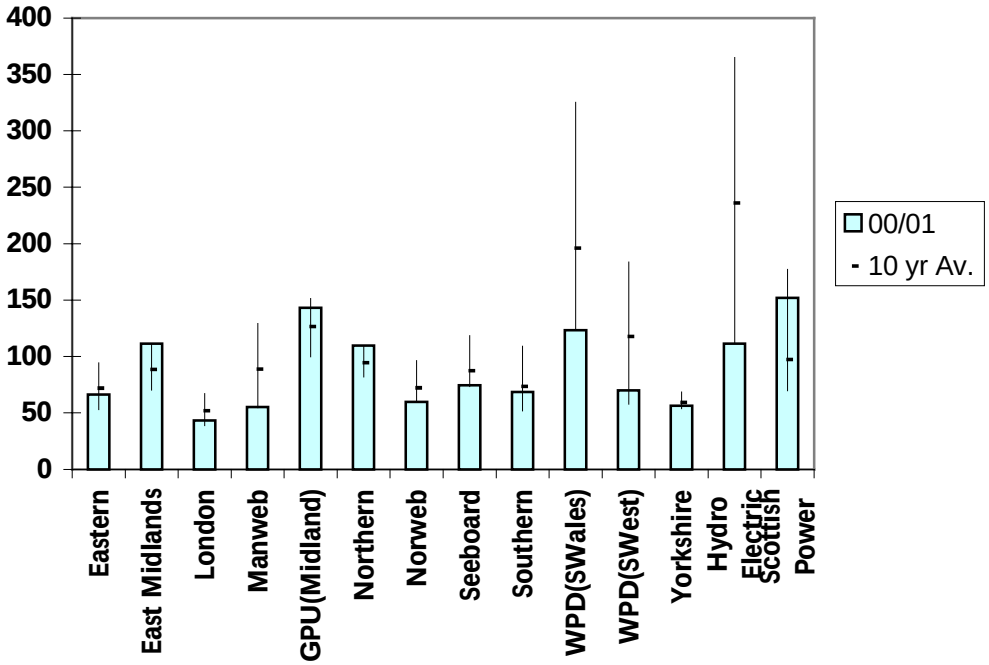
S Power



3. Availability

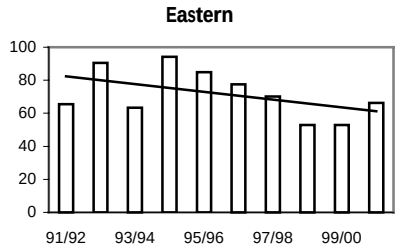
3.1 Information on the average number of minutes off supply experienced by consumers connected to the network of each distribution company is provided in Fig 4. This shows the average minutes lost in 2000/01, the average for the past 10 years, and the range of annual figures over the past 10 years. The data covers all interruptions, including those caused by bad weather, faults and pre-arranged shutdowns for maintenance and construction work. Minutes lost due to failures of other systems (e.g. generation and transmission) are included though these are relatively insignificant.

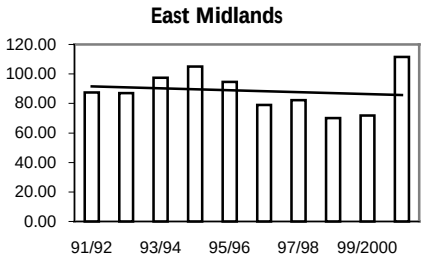
Fig 4 - AVAILABILITY - Minutes lost per consumer
10 yr range indicated by vertical line
GB average 86 minutes

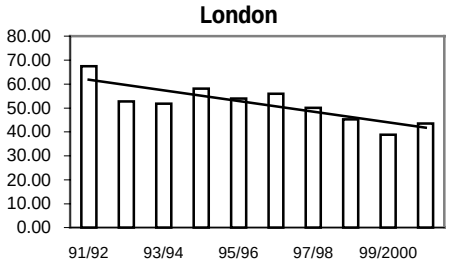


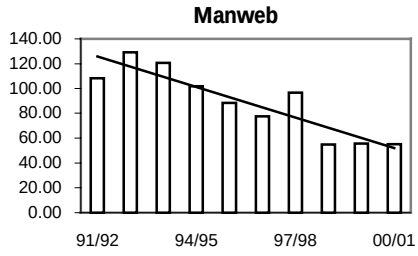
3.2 Fig 6 shows trends in availability of supply as measured by the minutes lost per connected consumer served by each company in the past 10 years.

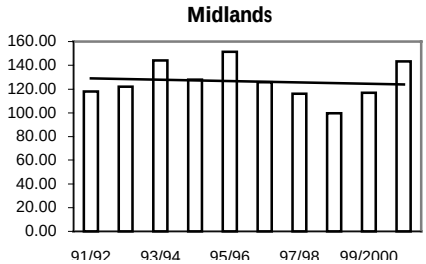
Fig 6 – Availability Trends

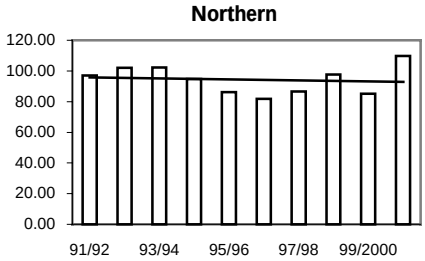


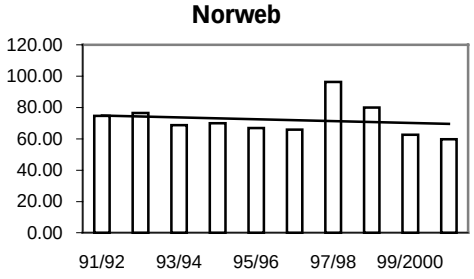


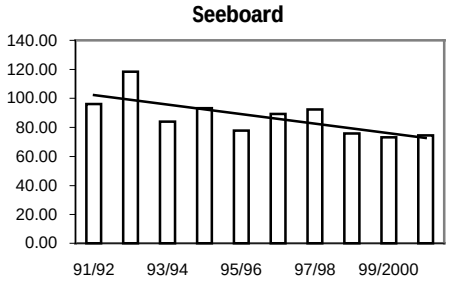


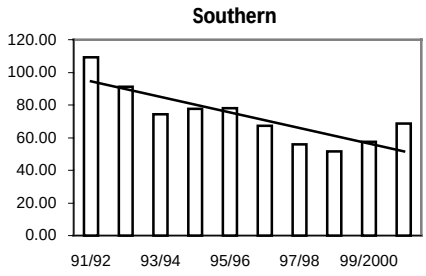


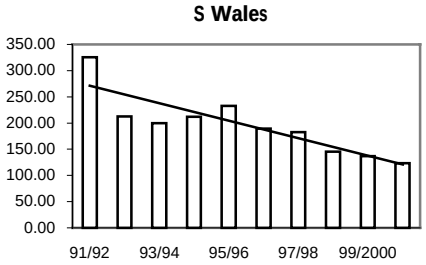


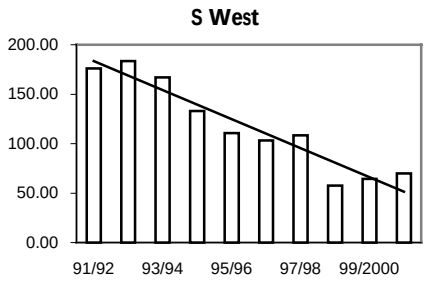


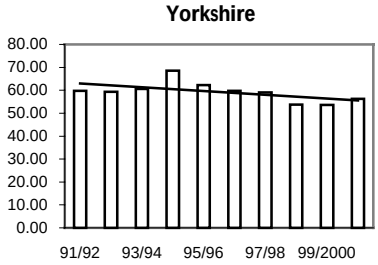


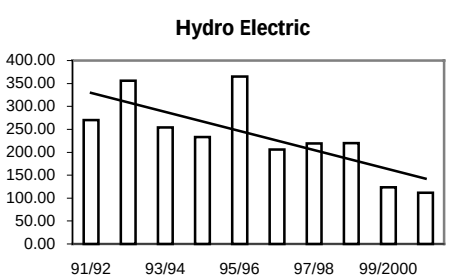


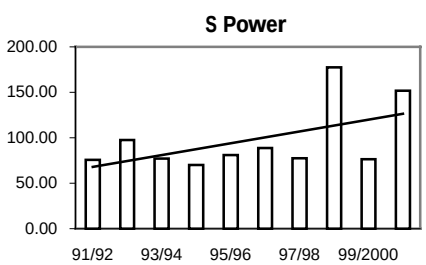












4. Restoration of Supply

4.1 Figures 7 and 8 show the companies' performance in restoring interruptions to supply within 3 hours and within 24 hours.

Fig 7 - RESTORATION OF SUPPLY- % of interruptions not restored within 3 hours
(10 yr range indicated by vertical line)

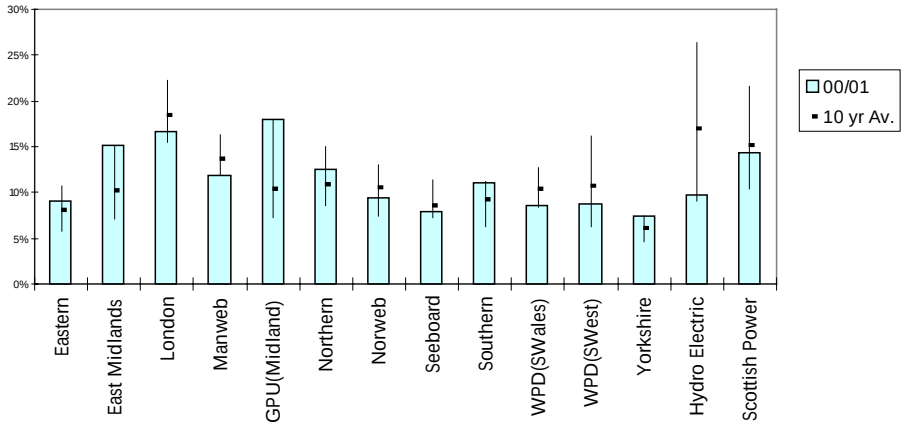
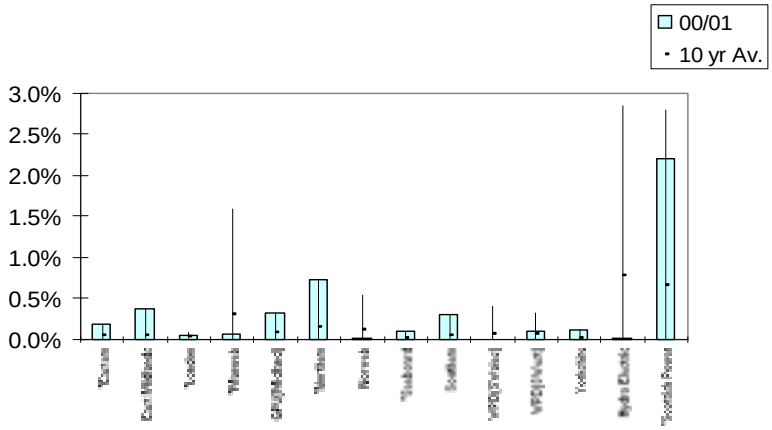


Fig 8 - RESTORATION OF SUPPLY- % of interruptions not restored within 24* hours
(10 yr range indicated by vertical line)

NB for 00/01 companies marked * have reported % of interruptions not restored within 18 hours



5. Source of Interruptions and Minutes Lost

5.1 Figures 9 and 10 show the average number of interruptions and overall minutes lost per consumer resulting from the lack of availability of different parts of the supply system. Generation shortfalls and transmission system failures are included in these figures, though together they account for only about I% of the shortfalls experienced by consumers. These charts are based on the average figures for the last 10 years for all companies. They illustrate the strong influence of distribution system performance, and especially HV (generally 11kV) circuit performance, on the security and availability of supply experienced by consumers. Planned interruptions generally occur as a result of work on LV and HV circuits while higher voltage circuits (33kV and above) generally provide duplicate circuits so interruptions do not generally result from failures and planned work at these voltage levels.

Fig 9 - Security 2000/01

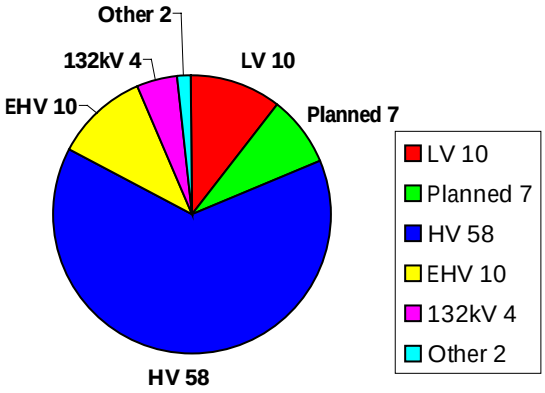
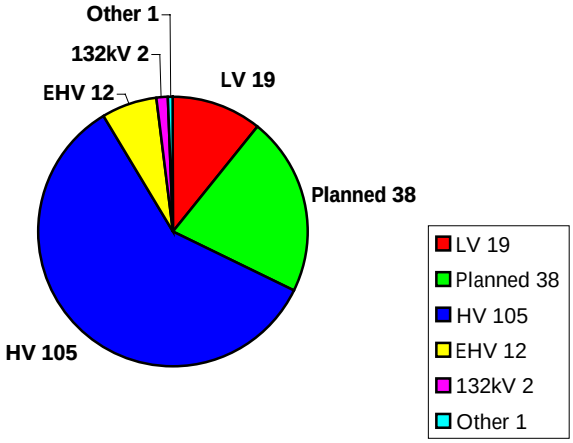


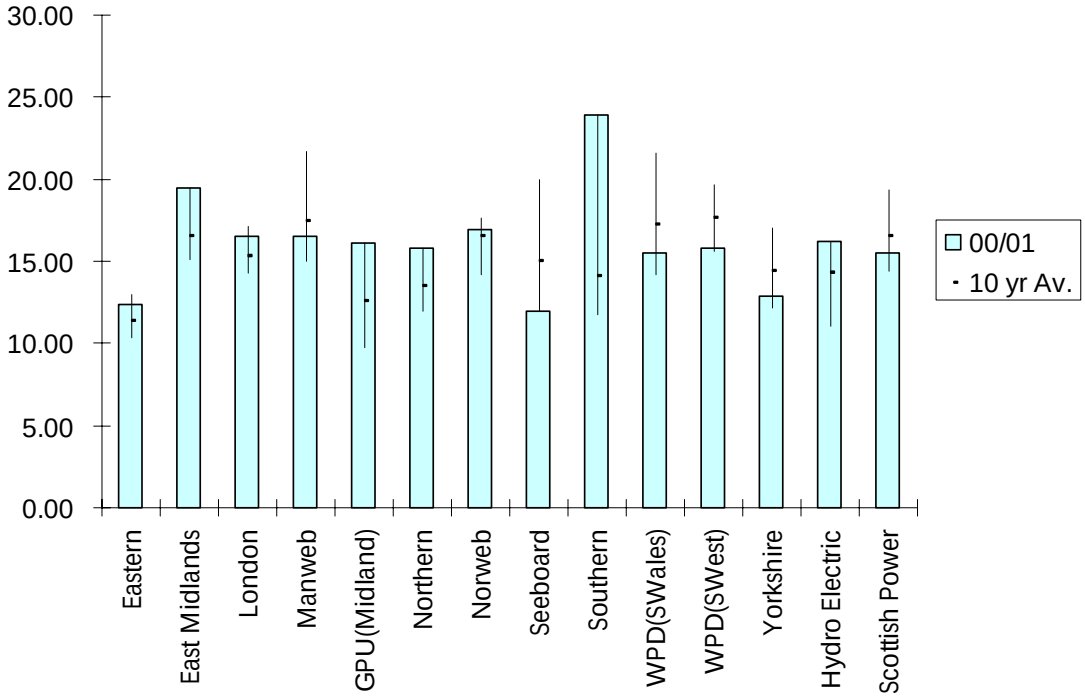
Fig 10 - Availability 2000/01



6. Distribution Systems - Overall Reliability

6.1 Fig 11 shows the overall reliability for each distribution company's network. Overall reliability of distribution system performance is defined as the number of faults per unit length of network. This length of the network is taken as being the length of the mains only, excluding the service cables that connect each customer to the mains. This is because reliable data on the length of service cables is not always available. The information on the mains, which is generally the network that supplies more than one customer, is more accurate. In making comparisons between companies it should be noted that the Scottish companies' 132kV circuits are classified as part of their transmission networks and are therefore not included in this analysis, whereas for distribution companies in England and Wales 132 kV circuits are part of their distribution networks.

Fig 11 - OVERALL RELIABILITY - Number of faults per 100km of distribution System (Mains only)



7. Distribution Systems – Interruptions from Underground and Overhead Circuit Failures

7.1 Figures 12 and 13 show for each company the average number of customer interruptions per circuit KM arising from faults on the underground and overhead distribution systems.

Fig 12 - SECURITY- HV Underground Networks

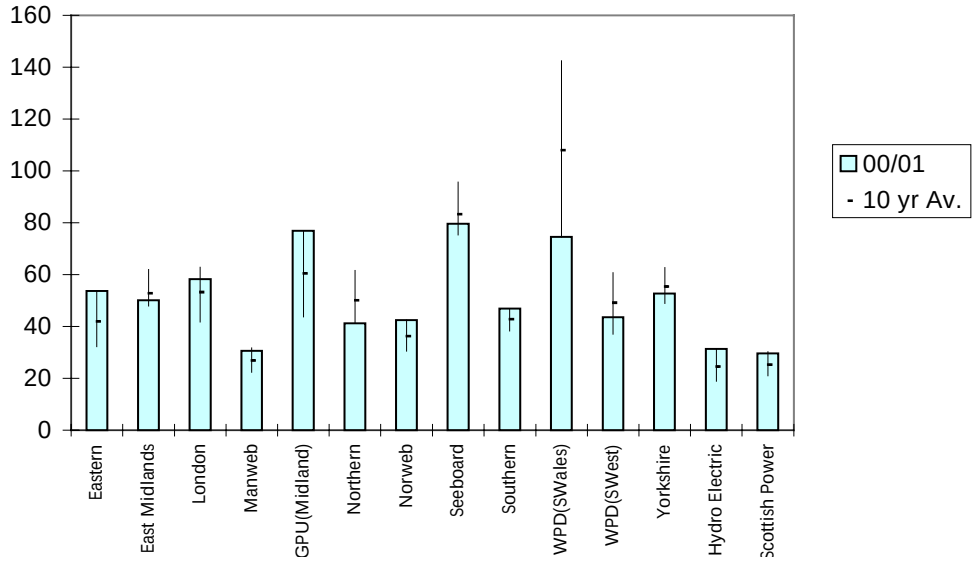
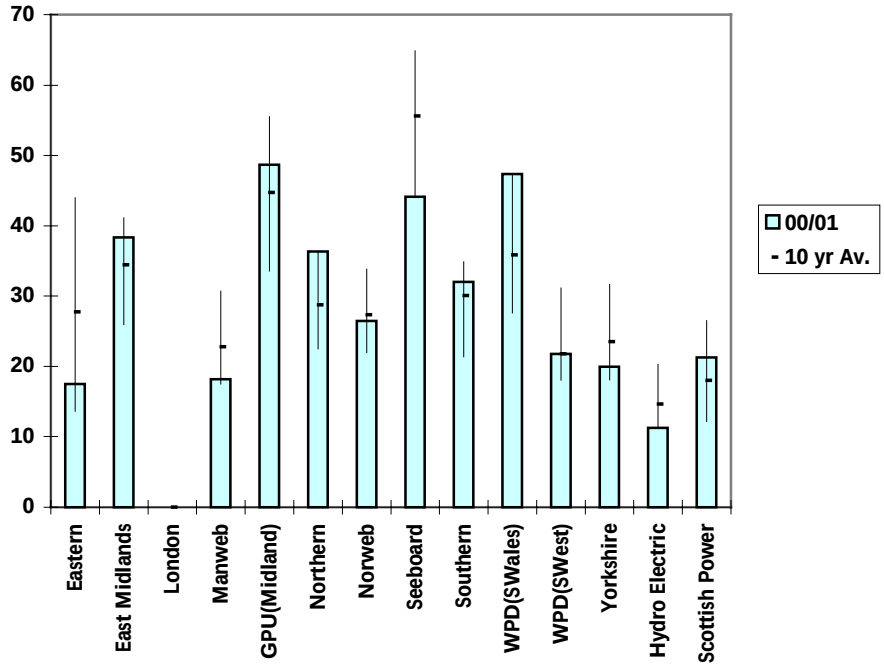


Fig 13 - Security - HV Overhead Networks



8. Distribution Systems – Minutes Lost due to Underground and Overhead Circuit Failures

8.1 Figures 14 and 15 show for each company the average number of customer minutes lost per circuit km arising from faults on the underground and overhead distribution systems.

Fig 14 - Availability - HV Underground Networks

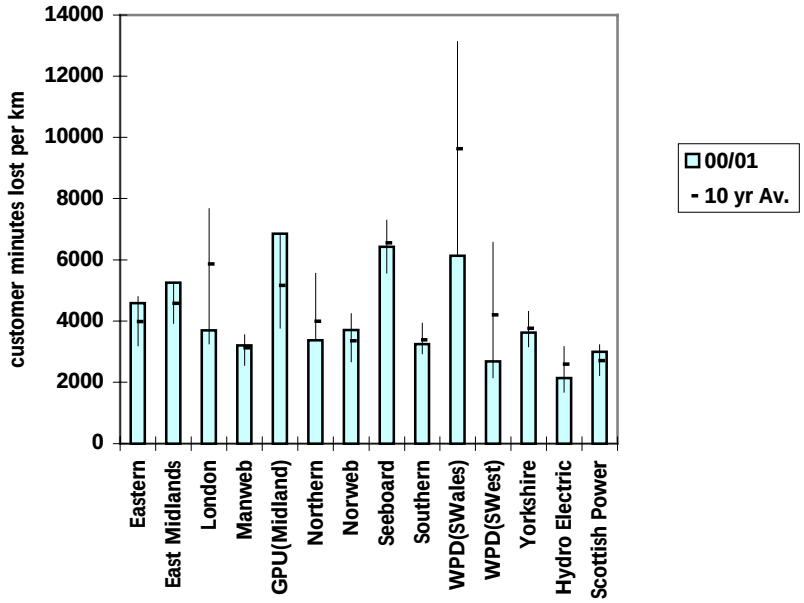
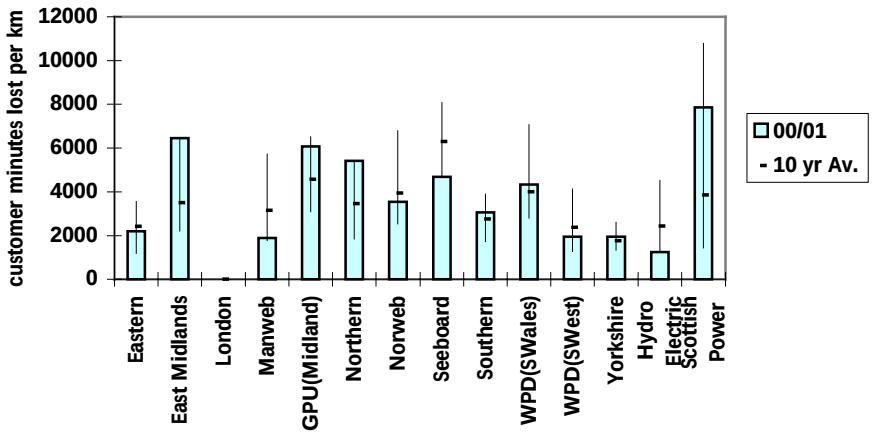


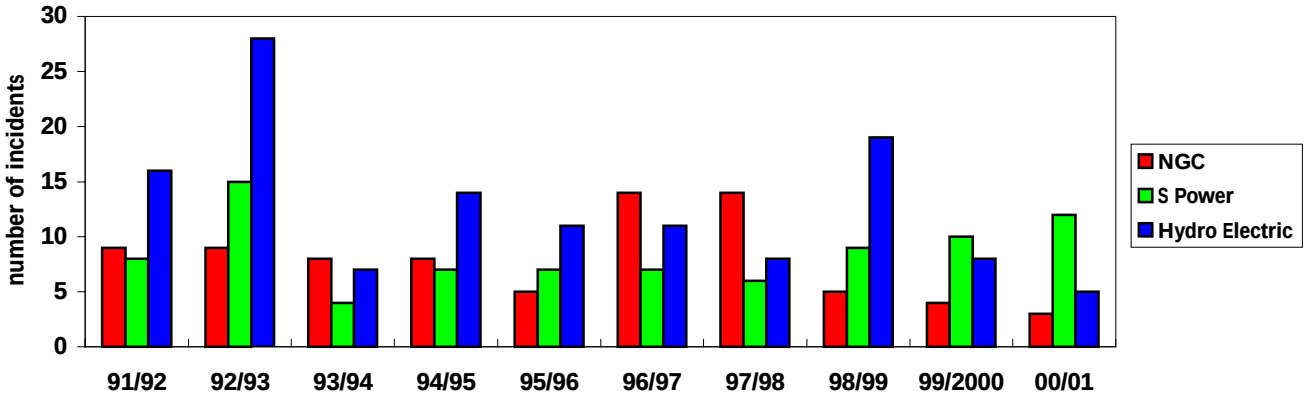
Fig 15 - Availability - HV Overhead Networks



9. Transmission Systems – Interruptions from Circuit Failures

9.1 Figure 16 shows the number of incidents for each transmission company where there was a loss of supply to one or more customers because of a fault on the transmission system.

Fig 16 - Incidents per year



10. Transmission Systems – Energy not supplied as a result of circuit failures.

10.1 Figures 17 & 18 show for each transmission company the average amount of energy that is not supplied as a result of the incidents recorded in Figure 16. Energy not supplied per incident is generally higher in England and Wales than in Scotland, primarily reflecting the differences in load density.

Fig 17 - Unsupplied Energy (MWh) per Incident - NGC

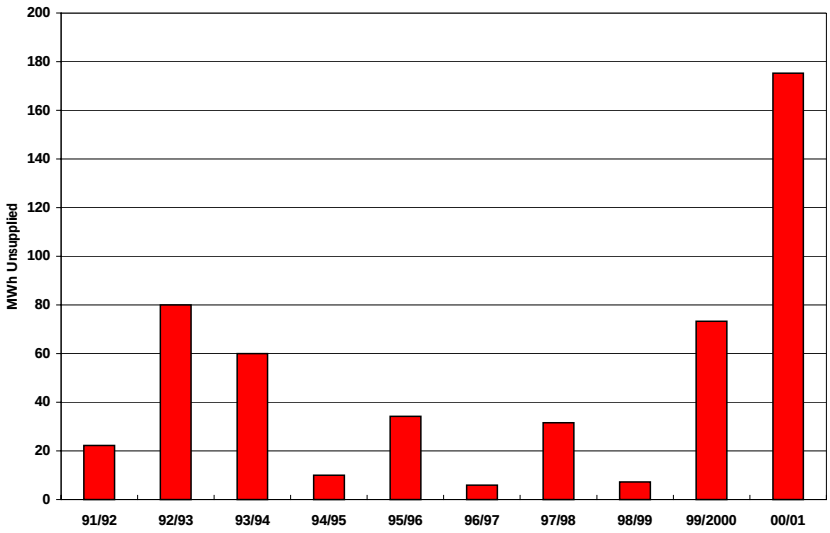
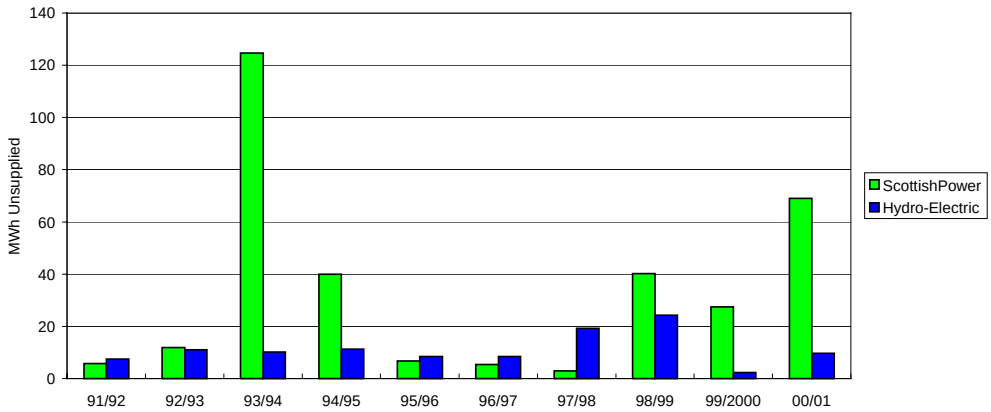


Fig 18 Unsupplied energy (MWh) per Incident - Scotland



11. Transmission Systems – Circuit Unavailability

11.1 Figure 19 shows the monthly pattern of the time for which transmission circuits are out of service. The highest unavailabilities occur during maintenance work, which is generally scheduled for the summer when overall electricity demand is at its lowest. Trends of annual unavailability are shown in Figure 20 below.

Fig 19 - Transmission System Unavailability

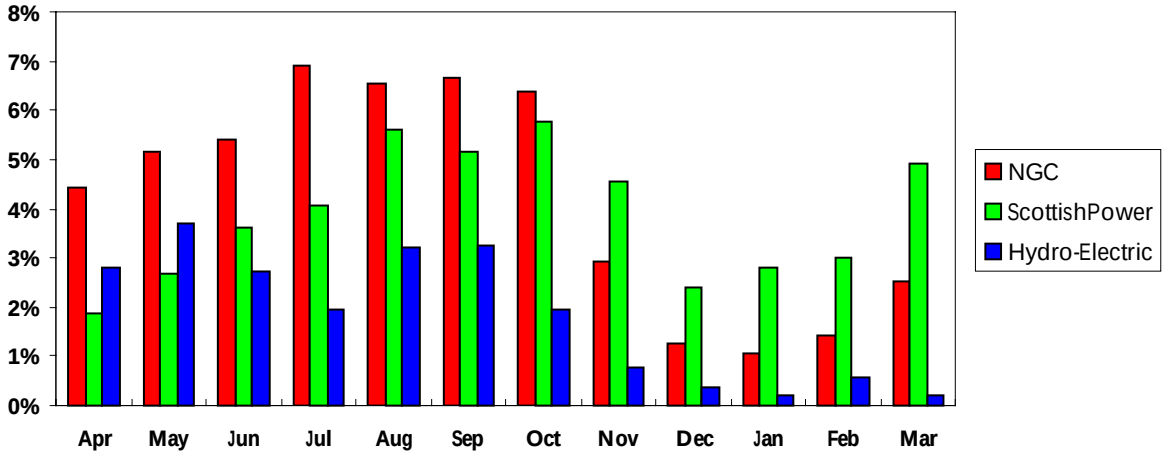
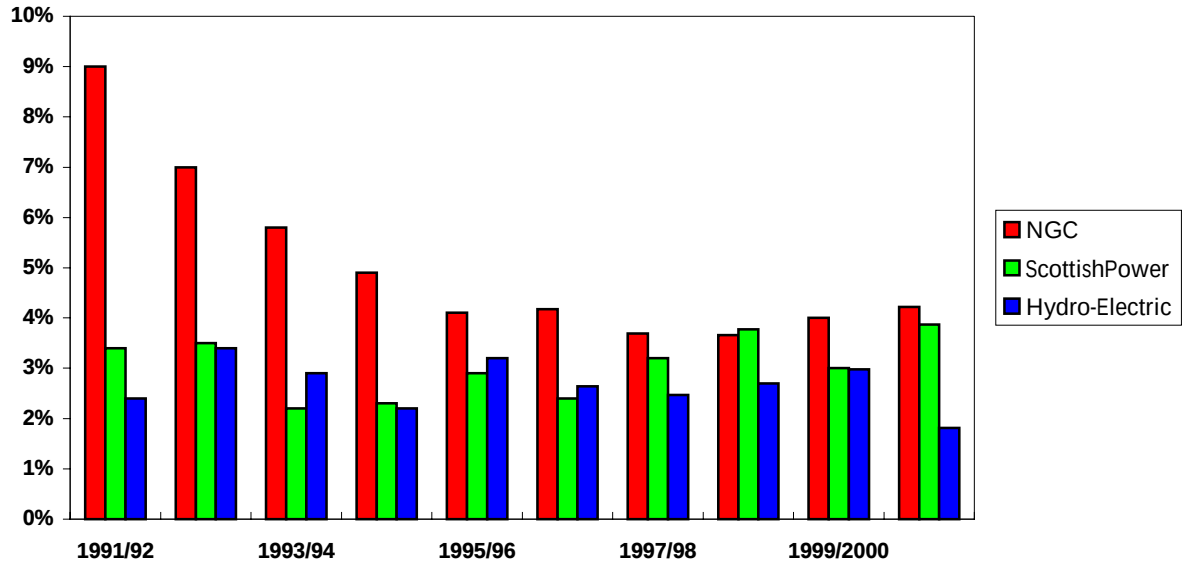


Fig 20 - Annual Unavailability



12. Transmission Systems – Reasons for Circuit Unavailability

12.1 Figures 21, 22 and 23 show the monthly unavailability for the transmission companies. These are categorised as follows:

Transmission System Maintenance

Transmission System Construction

User connection to the transmission system

(i.e. work on assets dedicated to one user)

Transmission System Faults

Most of the unavailability results from events that are planned and are within companies' control, and these causes of unavailability are reduced during the winter months.

Fig 21 - Transmission System Unavailability
Reason for Unavailability - NGC

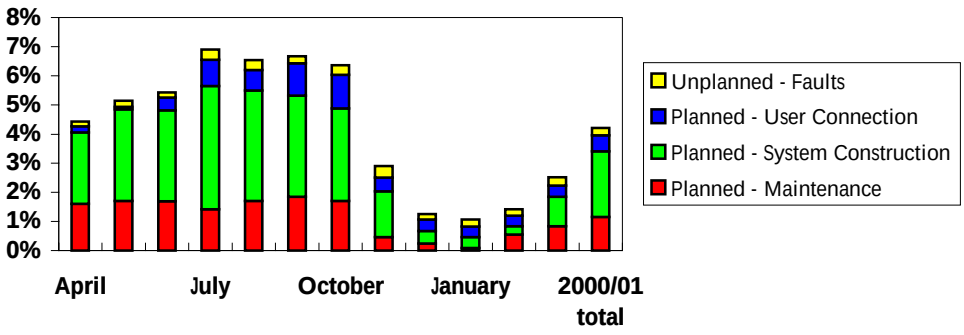


Fig 22 - Transmission System Unavailability
Reason for Unavailability - ScottishPower

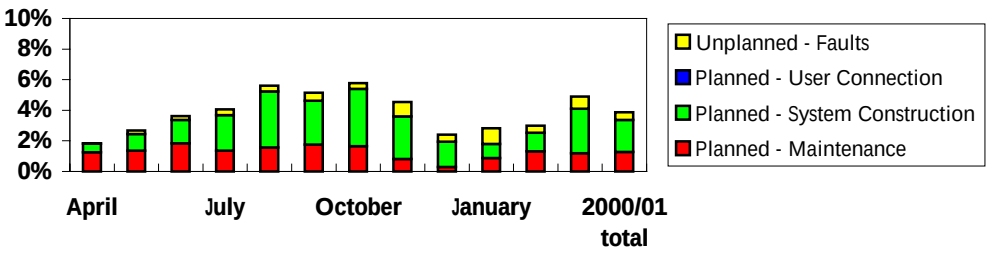
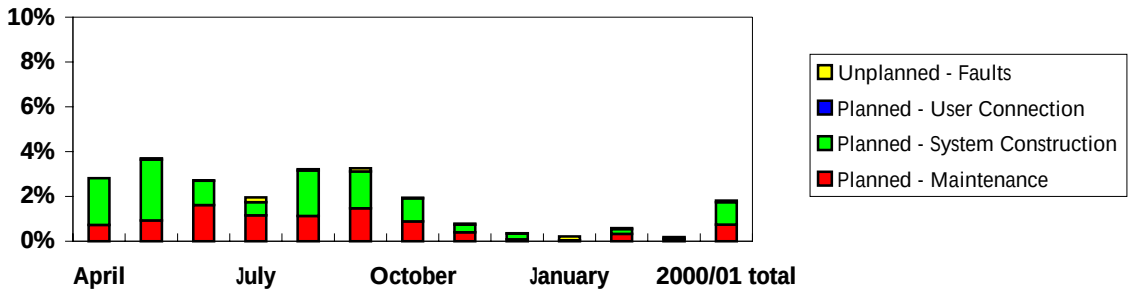


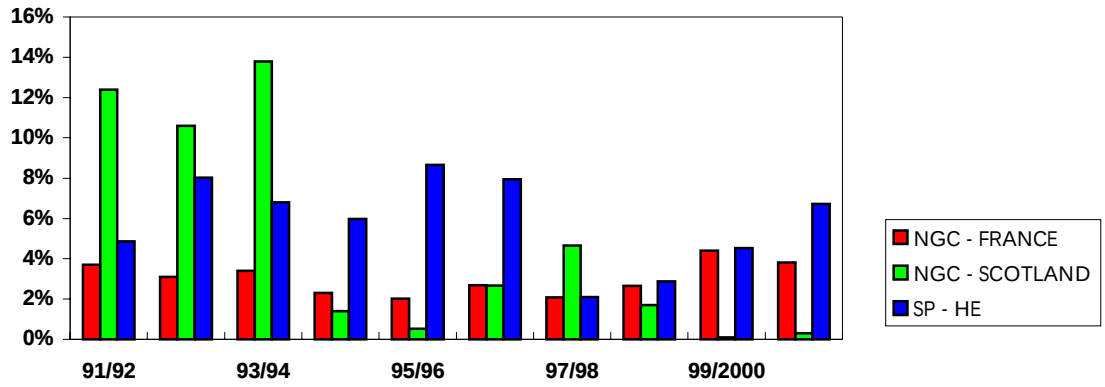
Fig 23 - Transmission System Unavailability
Reason for Unavailability - S & SE



13. Transmission Systems - Interconnector Unavailability

13.1 Figure 24 shows the levels of unavailability of the transmission system interconnectors at the geographic boundaries of the three transmission systems.

Fig 24 - Interconnector Unavailability



14. Standards of Supply Quality

Frequency

14.1 The electricity system in Britain is interconnected and all customers experience a common frequency. NGC is responsible for keeping system frequency within the statutory limits of ±1%. NGC reported that there were no frequency excursions outside statutory limits during 2000/2001.

Transmission System Voltage

14.2 Transmission system voltages must comply with limits of variation set out in the Electricity Supply Regulations and Grid Codes. NGC reported one occasion when voltage went outside prescribed limits in 2000/2001. Scottish Power and Hydro Electric have reported that there were no such voltage excursion in Scotland.

Distribution System Voltages

14.3 Figure 25 shows the number of voltage complaints which companies received during the year and which resulted from supply voltages being outside the statutory limits. From 1 January 1995, the nominal supply voltage in Britain changed from 240V +/- 6% to 230V, +10%, -6% (i.e. the permitted voltage range changed from 225.6V-254.4V to 216.2V-253V).

Fig 25 - Verified Voltage Complaints per 10,000 connected consumers
(10 year range indicated by vertical line)