Appendix 5 – Assessment of Potential EDCM Volatility

Introduction

1. This appendix provides an assessment of the potential volatility within the EDCM methodology and a forecast of charges for each customer over the next 5 years.

2. The volatility analysis provides an estimate of charges for each customer under 8 different scenarios and aims to produce a range of charges that represent the likely spread for each customer. It should be noted that the spread of charges is an indication of the likely range and does not represent the extreme price scenarios for every customer.

3. The Authority has requested that DNOs publish the EDCM model to allow customers to understand their charges and the impact of changing their consumption pattern. It has not been possible to publish the EDCM model as it contains individual data for every EHV customer and would be a breach of the confidentiality clause within DCUSA. DNOs are investigating ways of engaging with EHV customers to make this data available and will provide more information once an approach is agreed.

Sources of Volatility

4. Within the EDCM methodology there are a large number of inputs which impact the end charge to customers. These can be split into two high level categories:

   - Internal Volatility - Inputs which a customer can influence and have a direct impact on their charge. The variables which are used to derive charges and can be altered by a customer are listed below:
     - Consumption in the super-red timeband (for demand customers)
     - Authorised Supply Capacity (demand & generation customers)
     - Units generated within the super-red timeband (generation only)
   - External volatility – Inputs over which a customer has no influence, but which has an impact on their charge.

5. There are a large number of variables within the EDCM which have an impact on customer's charges and consequently can create volatility. To assess this volatility, DNOs have used a scenario approach to determine charges for customers using a number of different assumptions. These scenarios have been constructed to test the largest sources of volatility: demand scaling and the loadflow modelling.

Assessment of Volatility

6. To assess the volatility of EDCM, 8 scenarios have been created that enable DNOs to produce a set of 8 charges for each customer. The scenarios used are shown in table 1 below:

Scenario	Description
Scenario 1	A 3% increase in the demand loadings in the load flow analysis (FCP/LRIC).
Scenario 2	A 3% decrease in the demand loadings in the load flow analysis (FCP/LRIC).
Scenario 3	The Allowed Revenue increased by 7%
Scenario 4	The Allowed Revenue decreased by 7%
Scenario 5	The historical peak-time kW divided by historical agreed kVA in Super-red timeband for each customer increased by an increment of 0.15, on an individual customer basis.
Scenario 6	The historical peak-time kW divided by historical agreed kVA in Super-red timeband for each customer decreased by 0.15, on an individual customer basis.
Scenario 7	The network use factor for each customer increased by an increment of 0.18, on an individual customer basis.
Scenario 8	The network use factor for each customer decreased by 0.18, on an individual customer basis.

Table 1: Variables used to create volatility analysis scenarios

7. Scenarios 1 and 2 provide an assessment of the volatility that is due to changes in the LRIC/FCP model. Under these scenarios the LRIC or FCP loadflows are increased and decreased by 3% to determine the impact on a customer's end charge. The two scenarios represent a high growth scenario where new customers connect and existing customers increase consumption and a negative growth scenario which represents a "double dip" recession. Under these scenarios, the impact of the marginal charges that is produced by changing the LRIC/FCP loadflows is mitigated by the revenue target under the demand scaling methodology. The +/- 3% parameter was set following an analysis of the variance in year on year units distributed across all DNO areas.

   It should be noted where, as a result of the additional demand where demand data is scaled up by 3%, reinforcements are identified in yr 0 (or 'negative years to reinforcement' are identified in LRIC in the base case) then these branch reinforcements shall be ignored in the production of marginal costs (on the assumption that 'reinforcement' would have already been carried out).

8. Scenarios 3 and 4 provide an assessment of the volatility that is due to the under or over-recovery by a DNO of their Allowed Revenue. The parameter has been set at +/-7% following an analysis of the year on year over/under recovery of DNOs as a percentage of allowed revenue over the period 2000 – 2010. The level has been set to capture 90% of observations

9. Scenarios 5 and 6 provide an assessment of the volatility that is due to a customer changing their consumption during the super-red timeband. The parameter has been set at an increment of +/-0.15 following an analysis of how this variable changes year on year. The parameter is updated for each individual customer and then reset to its original value before the next customer is updated.

10. Scenarios 7 and 8 provide an assessment of the volatility that is due to a change in the network usage factor of individual customers. These factors represent the degree to which a customer uses each network level and will be impacted by the customers own consumption pattern and other customers who use the same part of the network. The parameter has been set at an increment of +/-0.18 following an analysis of how this variable changes year on year. The parameter is updated for each individual customer and then reset to its original value before the next customer is updated

11. The charges determined under the 8 scenarios have been produced for each individual customer and can be viewed in the spreadsheet provided alongside this appendix (appendix 5a).

Impact Analysis

12. The tables below provides a summary of the data collated for all customers across all DNOs, split by demand and generation:

EDCM Variable	Change Applied	Average Percentage Impact	Maximum Percentage Impact	Minimum Percentage Impact
LRIC/FCP Demands Scaled by:	3%	3%	373%	-84%
	-3%	0%	112%	-42%
Allowed Revenue scaled by:	+7%	6%	41%	0%
	-7%	-6%	0%	-41%
Historical peak-time kW divided by historical agreed kVA in Super-red timeband	+15% increment	28%	214%	0%
	-15% increment	-20%	33%	-100%
Network Use Factors	+18% increment	5%	27%	0%
	-18% increment	-4%	0%	-22%

Table 2: Impact analysis for demand customers

EDCM Variable	Change Applied	Average Percentage Impact	Maximum Percentage Impact	Minimum Percentage Impact
LRIC/FCP Demands Scaled by:	3%	-11%	1985%	-3131%
	-3%	14%	3808%	-1836%
Allowed Revenue scaled by:	+7%	0%	0%	0%
	-7%	0%	0%	0%
Historical peak-time kW divided by historical agreed kVA in Super-red timeband	+15% increment	0%	0%	0%
	-15% increment	0%	0%	0%
Network Use Factors	+18% increment	0%	0%	0%
	-18% increment	0%	0%	0%

Table 3: Impact analysis for generation customers

13. For demand customers the driver of the most volatile element of a customer's charge is the historical peak-time kW divided by historical agreed kVA in the super-red timeband. This element had an average impact of between -20% and +28% on a customer's charge. It should be noted that this element is derived individually for each customer based on their historical consumption pattern.

14. For generation customers the only variable that affects the charge is the demand data used within the powerflow model. The other variables only impact on demand scaling and are therefore not relevant for generation.

15. Table 4 below shows the average range of charges across all 8 scenarios. This is derived from the range that is calculated in appendix 5a for each individual customer.

	Average Lowest Charge across the 8 scenarios as % of Base Case charge	Average Highest Charge across the 8 scenarios as % of Base Case charge
Demand Customers	-23%	32%
Generation Customers	-21%	38%

Table 4: Average range of charges expected for demand and generation customers.

16. The range of charges for demand customers is -23% to +32%. It should be noted that this is an average value and can vary dependent on the individual circumstances of the customer. In addition this includes the volatility due to the customer's consumption in the super-red timeband which is a source of volatility that can potentially be managed by the customer.

5 Year Forecast of Charges

17. DNOs looked at a number of different options for the provision of illustrative charges over a 5 year period. These included creating a different network model for each year within the forecast and re-running the powerflow model to create a different set of LRIC/FCP prices for each year and changing some of the key parameters within the EDCM model.

18. DNOs have agreed to provide a forecast of 5 year prices based on varying the allowed revenue in each of the 5 years. The forecast of allowed revenue used by DNOs is consistent with the data provided by DNOs on a quarterly basis as required under DCP066. The use of multiple network models was disregarding over concerns that the accuracy would be compromised by the large number of assumptions required and the resultant prices could be misleading.

19. The 5 year forecast of charges for each customer is contained within the spreadsheet attachment that is provided alongside this appendix (appendix 5b).