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REVIEW FINDINGS OF THE DISTRIBUTION LOSS FACTORS (DLFs) PROPOSED BY THE VICTORIAN ELECTRICITY DISTRIBUTORS FOR THE 2009-10 FINANCIAL YEAR

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CONTENTS

1 INTRODUCTION

1.1 Purpose of this report

The role for the approval of Distribution Loss Factors (DLFs) for the Victorian Jurisdiction has been transferred from the Commission to the Australian Energy Regulator (AER) as of 1 January 2008.

The AER advised the Victorian electricity distributors on 26 November 2008 that:

- Distributors must determine their DLFs for the 2009-10 financial year in accordance with their respective published methodologies and provide the DLFs to the AER together with an independent positive assurance/certification that the DLFs have been calculated by the application of the relevant published methodology.
- The AER considers that a positive assurance/certification provided to the distributors by either an auditor/consultant or the Jurisdictional Regulator (where the Jurisdictional Regulator agrees to provide this) will be acceptable.

This report is prepared on behalf of the Victorian electricity distributors for the purpose of their submissions to the AER as part of the assurance process.

1.2 Background of the Victorian approach to allocation of DLFs prior to 1 January 2008

DLFs are used to adjust customers' metered consumption data to allow for energy losses in the electricity distribution network. They are applied to the consumption of second tier customers[1] in the National Electricity Market. The local retailer[2] is responsible for paying for distribution losses that are not allocated to second tier customers.

DLFs are also used to adjust the price paid to an embedded generator[3] to allow for the cost of energy losses in the distribution networks. This provides a price signal

[1] A second tier customer is one who does not purchase electricity directly and in its entirety from the local retailer.

[2] A local retailer is the retailer who is responsible under the laws relevant to the participating jurisdiction (in this case Victoria) for the supply of electricity to first tier customers in the supply area of each distribution business.

[3] An embedded generator is a generating unit that is connected to the distribution network.

to potential embedded generators to encourage them to take network losses into account when making decisions about where to establish new generation.

Due to the vast number and diversity of customers connected to electricity networks, it is not practical to measure or accurately calculate the distribution losses caused by each individual customer. The Rules require that DLFs should be allocated to:

- each embedded generator of actual generation of more than 10 MW — individual site-specific DLFs are to be determined according to the generator's actual location within the network
- each large customer consuming more than 40 GWh per annum or with a peak demand of 10 MW — individual site-specific DLFs are to be determined according to the customer's actual location within the network
- all other customers and embedded generators — network average DLFs are to be allocated according to the type of connection points within the distribution network.

The Commission published the *Guidance Paper: Calculation Methodology for Distribution Loss Factors (DLFs) for the Victorian Jurisdiction* (DLF Calculation Methodology), which specifies the methodology for calculating and assigning DLFs to customers and embedded generators in Victoria prior to 1 January 2008.[4]

The DLF Calculation Methodology specifies that, the network average DLFs should be grouped into five major segments of the distribution network. Customers should pay for the losses based on which of the five segments are used to supply their power.

The five network segment categories are:

- Category A: Sub-transmission feeders operating at 66 kV or 22 kV (note: 1 kV = 1000 Volts)
- Category B: Zone substations operating at 22 kV, 11 kV or 6.6 kV
- Category C: High voltage (HV) distribution feeders operating at 22 kV, 11 kV or 6.6 kV
- Category E: Distribution substations operating at 240/415 V
- Category E: Low voltage (LV) feeders operating at 240/415 V.

A customer connected to the low voltage network utilises all upstream assets, causing electrical energy losses in each network segment upstream of its

[4] The DLF Calculation Methodology is available from www.esc.vic.gov.au/public/Energy/Regulation+and+Compliance/Codes+and+Guidelines/Calculation+methodology+for+DLFs/Calculation+Methodology+for+Distribution+Loss+Factors+%28DLFs%29+for+the+Victorian+Jurisd.htm

connection point. Customers connected to sub-transmission feeders, however, only cause losses on the sub-transmission network.

Separate DLFs must also be calculated for each of the DLF categories A to E depending on whether the length of the sub-transmission line supplying the customer is 'short' or 'long'.[5] This creates a total of ten DLFs per distributor.

1.3 Distributors' proposals

The Victorian distributors — Jemena Electricity Network (Vic) Limited, CitiPower Pty, Powercor Australia Limited, SPI Electricity Pty Ltd[6] and United Energy Distribution Pty Ltd — have provided their proposed DLFs for the 2009-10 financial year to the Commission for review. These DLFs are summarised in Tables 2.1, 2.2 and 2.3 in Chapter 2.

1.4 Basis of the Commission's analysis

The Commission assessed distributors' proposed DLFs based on the assessment criteria stated in the DLF Calculation Methodology. These assessment criteria are shown in section 3.1.

1.5 Structure of this Draft Decision

The remainder of this paper is structured as follows:

- Chapter 2 provides the details of the DLFs proposed by the distributors for the 2009-10 financial year.
- Chapter 3 provides the details of the Commission's assessment of the proposed DLFs.

[5] A short sub-transmission line is defined as either a radial sub-transmission line where the route length of the line is less than 20 km, or a sub-transmission line in a loop where the total route length of all lines in the loop is less than 40 km. All other sub-transmission lines are classified as 'long sub-transmission'

[6] SPI Electricity Pty Ltd trades under the name of SP AusNet.

2 PROPOSED DLFs FOR THE 2009-10 FINANCIAL YEAR

The distributors' proposed DLFs for the 2009-10 financial year are shown in Tables 2.1, 2.2 and 2.3. All distributors stated that the proposed DLFs have been calculated based on the Commission's DLF Calculation Methodology.

2.1 Proposed site-specific DLFs for large embedded generators

The proposed DLFs for large embedded generators producing more than 10 MW of energy for 2008-09 are shown in Table 2.1.

Table 2.1 **Proposed DLFs for large embedded generators for the 2009-10 financial year**

Distributor	Generator	National Metering Identifier	Proposed DLF for 2009-10
Jemena	Somerton Power Station	6001264751	0.9875
Powercor	Challicum Hills Windfarm	6203661632	1.0100
	Codrington Windfarm	6203008781	1.0328
	Yambuk Windfarm	6203690629	1.0328
SPI Electricity	Clover Power Station	VMBTWZCLG1	0.9882
		VMBTWZCLG2	
	Alinta No.1 generator at Bairnsdale	6305010110	1.0394
	Alinta No.2 generator at Bairnsdale	6305651897	1.0394
	Esso Longford Generator	VBBB002342	1.0600
	Rubicon Group of Generators	VTTSWZRUBX	1.0415
	Toora Windfarm	6305656070	1.0880
	Wonthaggi Windfarm	6305721689-9	1.0778
United Energy	Energy Developments Ltd Clayton Generator	6407649172	1.0121

2.2 Proposed site-specific DLFs for large customers

The proposed DLFs for large load customers, those consuming more than 40 GWh per annum or with a peak demand of more than 10 MW, for 2009-10 are shown in Table 2.2.

Table 2.2 **Proposed site-specific DLFs for large load customers for the 2009-10 financial year**

Distributor	National Metering Identifier of customer	DLF for 2009-10
Jemena	6001280255	1.0048
	VDDD000134	1.0147
	VDDD000136	1.0038
	VDDD000224	1.0131
	VDDD000244	1.0123
	VDDD000286	1.0110
	VDDD000495	1.0066
CitiPower	VAAA000673	1.0181
	VAAA000577	1.0152
	VAAA000574	1.0146
	VAAA000431	1.0166
Powercor	VCCCAF0002	1.0011
	VCCCAF0001	1.0062
	VCCCDA0031	1.0006
	VCCCGD0001	1.0012
	VCCCGJ0001	1.0029
	VCCCDA0022	1.0014
	VCCCRD0007	1.0134
	VCCCDA0025	1.0087
	VCCCAB0003	1.0158
	VCCCAD0001	1.0110
	6203764760	1.0134
	VCCCSE0004	1.0582
	VCCCGE0019	1.0098
	VCCCBC0025	1.0313
	VCCCTE0002	1.0593
	VCCCSB0012 [a]	1.0569
SPI Electricity	VBBB000073	1.0045
	VBBB000058	1.0294
	VBBB000161	1.0080
	VBBB000096	1.0813
United Energy	VEEE0PD8AD	1.0118
	VEEE0TF39Q	1.0138
	VEEE0BG4Q3	1.0229
	VEEE0NDNEX	1.0230
	VEEE08KH3V	1.0095
	VEEE0C8AW1	1.0070

[a] previously on network average DLF (short sub-transmission DLF-C)

2.3 Proposed network average DLFs for other customers and embedded generators with less than 10 MW output

The proposed DLFs for network average customers and embedded generators smaller than 10 MW proposed by the distributors for 2009-10 are shown in Table 2.3.

Table 2.3 Proposed network average DLFs for the 2009-10 financial year

Distributor	Distribution Loss Factors					
	Type	DLF-A	DLF-B	DLF-C	DLF-D	DLF-E
Jemena	Short sub-transmission	1.0055	1.0115	1.0293	1.0445	1.0516
	Long sub-transmission	1.0235	1.0295	1.0473	1.0609	1.0673
CitiPower	Short sub-transmission	1.0034	1.0118	1.0174	1.0409	1.0460
Powercor	Short sub-transmission	1.0048	1.0115	1.0371	1.0634	1.0721
	Long sub-transmission	1.0369	1.0436	1.0692	1.0955	1.1042
SP AusNet	Short sub-transmission	1.0050	1.0128	1.0372	1.0588	1.0664
	Long sub-transmission	1.0367	1.0444	1.0688	1.0905	1.0980
United Energy	Short sub-transmission	1.0062	1.0135	1.0212	1.0455	1.0609
	Long sub-transmission	1.0294	1.0367	1.0444	1.0687	1.0841

Notes:

- DLF-A is the distribution loss factor to be applied to a second tier customer or market customer connected to a sub-transmission line at 66 kV or 22 kV.
- DLF-B is the distribution loss factor to be applied to a second tier customer or market customer connected to the lower voltage side of a zone substation at 22 kV, 11 kV or 6.6 kV.
- DLF-C is the distribution loss factor to be applied to a second tier customer or market customer connected to a distribution line from a zone substation at voltage of 22 kV, 11 kV or 6.6 kV.
- DLF-D is the distribution loss factor to be applied to a second tier customer or market customer connected to the lower voltage terminals of a distribution transformer at 240/415 V .
- DLF-E is the distribution loss factor to be applied to a second tier customer or market customer connected to a low voltage line at 240/415 V.
- Separate DLFs are also calculated for each DLF category A to E depending on whether the length of the sub-transmission line supplying the customer upstream of the customer's connection point is 'short' or 'long'.

A short sub-transmission line is defined as:

- a radial sub-transmission line where the route length of the line is less than 20 km, or
- a sub-transmission line in a loop where the total route length of all lines in the loop is less than 40 km.

All other sub-transmission lines are defined as 'long sub-transmission'

3 COMMISSION'S ASSESSMENT FINDINGS

3.1 Assessment of the proposed DLFs

The DLF Calculation Methodology specifies that the Commission will assess the distributors' proposed DLFs based on the following considerations:

- For load customers — that the price impact on customers due to changes in DLFs represents no greater than a one per cent increase in energy cost. The Commission may allow for increases in site-specific DLF of more than one per cent for some large customers if the change would better reflect their share of network losses.
- For embedded generators — that the calculated DLFs are based on sound assumptions about the operations of the generators.
- That distributors have taken into consideration their previous forecast errors in overall loss levels by examining the trend of reconciliation errors over time.
- That the overall levels of network losses of each distributor are reasonable.[7]

The following sections summarise the Commission's analysis of the information provided by the distributors.

3.1.1 Price impact on load customers

Tables 3.1 and 3.2 present the changes in DLF values for the 2009-10 financial year for large load customers and network average customers from the current (2008-09) financial year respectively, based on the proposed DLFs. The tables show that the impact on all customers due to the proposed DLFs for 2009-10 does not result in price increases of greater than one per cent.

[7] The Commission undertook a review of the loss levels of other countries in 2000. Based on the findings of the review, the Commission considers that the economic levels of losses for Victorian distributors should be in the range of 3 to 5 per cent of sales for urban-based networks and could be as high as 10 per cent of sales for distributors with predominantly rural networks.

Table 3.1 **Proposed site-specific DLFs for large load customers for the 2009-10 financial year (showing changes from the current financial year)**

Distributor	National Metering Identifier of customer	*Current year DLF*	DLF for 2009/10	Change
Jemena	6001280255	*1.0043*	1.0048	0.05%
	VDDD000134	*1.0143*	1.0147	0.04%
	VDDD000136	*1.0034*	1.0038	0.04%
	VDDD000224	*1.013*	1.0131	0.01%
	VDDD000244	*1.0124*	1.0123	-0.01%
	VDDD000286	*1.0112*	1.0110	-0.02%
	VDDD000495	*1.0059*	1.0066	0.07%
CitiPower	VAAA000673	*1.0189*	1.0181	-0.08%
	VAAA000577	*1.0172*	1.0152	-0.20%
	VAAA000574	*1.0157*	1.0146	-0.11%
	VAAA000431	*1.0179*	1.0166	-0.13%
Powercor	VCCCAF0002	*1.0011*	1.0011	0.00%
	VCCCAF0001	*1.005*	1.0062	0.12%
	VCCCDA0031	*1.0006*	1.0006	0.00%
	VCCCGD0001	*1.0012*	1.0012	0.00%
	VCCCGJ0001	*1.0028*	1.0029	0.01%
	VCCCDA0022	*1.0015*	1.0014	-0.01%
	VCCCRD0007	*1.0133*	1.0134	0.01%
	VCCCDA0025	*1.0086*	1.0087	0.01%
	VCCCAB0003	*1.0167*	1.0158	-0.09%
	VCCCAD0001	*1.0109*	1.0110	0.01%
	6203764760	*1.033*	1.0134	-1.90%
	VCCCSE0004	*1.0582*	1.0582	0.00%
	VCCCGE0019	*1.0097*	1.0098	0.01%
	VCCCBC0025	*1.0317*	1.0313	-0.04%
	VCCCTE0002	*1.0545*	1.0593	0.46%
	VCCCSB0012 [a]	*NA (previously a network average customer)*	1.0569	NA
SPI Electricity	VBBB000073	*1.0043*	1.0045	0.02%
	VBBB000058	*1.0227*	1.0294	0.66%
	VBBB000161	*1.0039*	1.0080	0.41%
	VBBB000096	*1.0833*	1.0813	-0.18%
United Energy	VEEE0PD8AD	*1.0128*	1.0118	-0.10%
	VEEE0TF39Q	*1.0158*	1.0138	-0.20%
	VEEE0BG4Q3	*1.0218*	1.0229	0.11%
	VEEE0NDNEX	*1.022*	1.0230	0.10%
	VEEE08KH3V	*1.0154*	1.0095	-0.58%
	VEEE0C8AW1	*1.0059*	1.0070	0.11%

[a] previously on network average DLF (short sub-transmission DLF-C)

Table 3.2 **Changes in network average DLFs value, 2009-10 from 2008-09, in percentage terms**

Distributor	Change in DLF (%)					
	Type	DLF-A	DLF-B	DLF-C	DLF-D	DLF-E
Jemena	Short sub-transmission	0.01%	0.09%	0.25%	0.44%	0.52%
	Long sub-transmission	0.69%	0.77%	0.93%	0.95%	0.95%
CitiPower	Short sub-transmission	-0.04%	-0.11%	-0.15%	-0.29%	-0.32%
Powercor	Short sub-transmission	0.01%	0.00%	-0.04%	-0.07%	-0.07%
	Long sub-transmission	0.37%	0.36%	0.31%	0.27%	0.27%
SP AusNet	Short sub-transmission	-0.09%	-0.09%	-0.23%	-0.34%	-0.36%
	Long sub-transmission	-0.62%	-0.63%	-0.75%	-0.84%	-0.87%
United Energy	Short sub-transmission	0.03%	0.06%	0.05%	0.11%	0.15%
	Long sub-transmission	0.28%	0.31%	0.30%	0.36%	0.39%

3.1.2 DLFs for embedded generators

The Commission has analysed the information provided by the distributors regarding the proposed DLFs for embedded generators for 2009-10 and found that the calculation method followed the following steps:

- Model the operations of the generator based on historical record, or other relevant information if historical records are not available.
- Determine the relevant forecast network losses by modelling the distribution network between the generator's connection point and the transmission network connection point for each modelled operating period of the generator.
- Calculate the annual overall DLF utilising a volume weighting factor based on the forecast average electrical energy loss for each modelled operating period of the generator in the financial year in which the DLF is to apply.

Table 3.3 summarises the proposed DLFs for large embedded generators for 2009-10 and the percentage changes from the DLFs for the current financial year.

The Commission concludes that all distributors adopted the Commission's published DLF Calculation Methodology.

Table 3.3 **Proposed DLFs for large embedded generators for the 2009-10 financial year**

Distributor	Generator	National Metering Identifier	Proposed DLF for 2009-10	Current DLF (for 2008-09)	Change
Jemena	Somerton Power Station	6001264751	0.9875	1.0460 [a]	-5.59%
Powercor	Challicum Hills Windfarm	6203661632	1.0100	1.0107	-0.07%
	Codrington Windfarm	6203008781	1.0328	1.0287	0.40%
	Yambuk Windfarm	6203690629	1.0328	1.0287	0.40%
SPI Electricity	Clover Power Station	VMBTWZCLG1	0.9882	0.9878	0.04%
		VMBTWZCLG2			
	Alinta No.1 generator at Bairnsdale	6305010110	1.0394	1.0444	-0.48%
	Alinta No.2 generator at Bairnsdale	6305651897	1.0394	1.0444	-0.48%
	Esso Longford Generator	VBBB002342	1.0600	1.0679	-0.74%
	Rubicon Group of Generators	VTTSWZRUBX	1.0415	1.0478	-0.60%
	Toora Windfarm	6305656070	1.0880	1.0801	0.73%
	Wonthaggi Windfarm	6305721689-9	1.0778	1.075	0.26%
United Energy	Energy Developments Ltd Clayton Generator	6407649172	1.0121	1.0113	0.08%

[a] Jemena advised that the significant change to Somerton Power Station's DLF for 2009-10 is due to network reconfiguration. At present, Somerton Power Station is connected to the TTS-SSS-ST-EPG-TTS 66kV Loop. As part of the South Morang 66 kV development, this loop will be re-arranged to form SMTS-SSS-ST-SMTS 66 kV loop by around mid-June 2009.

3.1.3 Reconciliation of previous forecast losses against actual

The Rules specify that DLFs applicable to each coming financial year are forward looking loss factors derived from historical data, forecast load growth and load distribution within the distribution network. However, actual losses incurred may vary as a result of actual consumption being different to the forecast consumption, and the pattern of usage and the way the load flows through the networks being different to network models used in calculations. Hence, DLFs based on forward-looking loss factors are unlikely to be identical to the actual losses incurred. The Rules therefore require the distributors to reconcile the calculated losses with the actual losses incurred in the previous year.

In determining the DLFs for the next financial year, distributors advised that they have undertaken reconciliation with the actual losses incurred in the previous financial year (2007-08) in accordance with the Commission's DLF Calculation Methodology. The result of the reconciliation process is shown in Table 3.4.

Table 3.4 shows that the distributors' forecast errors since the introduction of forward-looking DLF system have been generally less than 0.8 per cent in terms of the total energy distributed. The level of forecast errors fluctuates both in size as well as over/under recovery in overall network losses. The Commission concludes that:

- There is no indication that the distributors' forecasting methodology for overall network losses is inaccurate.
- The distributors' forecasting methods do not result in biased outcome.

Therefore, the Commission considers that the distributors have demonstrated that they have taken into account adequate reconciliation with actual losses in calculating the proposed DLFs for the 2009-10 financial year.

Table 3.4 **Reconciliation between actual and losses recovered through the application of DLFs in 2007-08**

	2007-08				2006-07	2005-06	2004-05	2003-04
Distributor	Total level of losses recovered through the application of DLFs MWh	Actual value of losses MWh	Difference Forecast vs. Actual Losses MWh	Forecast error as percentage of sales (positive number means over recovery)	Forecast error as percentage of sales (positive number means over recovery)	Forecast error as percentage of sales (positive number means over recovery)	Forecast error as percentage of sales (positive number means over recovery)	Forecast error as percentage of sales (positive number means over recovery)
Jemena	227,409	177,049	50,360	1.14	0.12	0.44	-0.50	–1.05
CitiPower	267,850	217,562	50,288	0.82	0.97	0.61	0.78	0.41
Powercor	713,931	658,096	55,835	0.53	–0.28	0.59	0.30	0.04
SP AusNet	588,306	525,001	63,305	0.79	–0.22	0.09	0.60	0.02
United Energy	377,362	398,465	-21,103	-0.27	–0.47	–0.33	0.36	0.47

3.1.4 Forecast overall losses for the 2009-10 financial year

As indicated in the DLF Calculation Methodology, the Commission considers that the economic levels of losses for Victorian distributors should be in the range of 3 to 5 per cent of sales for urban-based networks and could be as high as 10 per cent of sales for distributors with predominantly rural networks — Powercor and SP AusNet.

Table 3.5 shows the forecast overall loss levels of each distributor and the historical trend of the overall losses in each distributor's supply area since the introduction of the forward looking DLFs. The table shows that, for 2009-10:

- Jemena, CitiPower and United Energy — the urban-based distributors — forecasted overall network losses in the range of 4.15 to 5.22 per cent.[8]
- Powercor's and SP AusNet — the predominately rural networks — forecasted overall losses at 6.96 and 7.41 per cent respectively.

The table also shows that the levels of overall losses of each distributor have been relatively consistent over time.

Hence, the Commission is satisfied that the forecast overall losses for 2009-10 do not indicate significant network planning issues.

Table 3.5 **Overall loss levels**

Distributor	Overall loss as percentage of total energy sales					
	2004-05 (actual)	2005-06 (actual)	2006-07 (actual)	2007-08 (actual)	*2008-09 (forecast)*	*2009-10 (forecast)*
Jemena	4.70	5.05	3.67	4.02	*3.69*	*4.15*
CitiPower	4.32	4.29	3.92	3.54	*4.45*	*4.15*
Powercor	6.73	6.64	7.27	6.22	*7.07*	*6.96*
SP AusNet	7.51	7.87	7.96	6.59	*8.07*	*7.41*
United Energy	4.34	4.66	4.65	5.01	*5.03*	*5.22*

[8] The forecast level of losses of United Energy's network is slightly higher than 5 per cent, while this level is higher than the target band of 3-5 per cent for urban networks, the Commission considers that this level is not excessive because United Energy's supply network include some non-urban areas. The Commission, however, notes that United Energy's overall level of losses is increasing, signalling an increasing level of network utilization.

3.2 Conclusion

Based on the assessment findings of the distributors' proposed DLFs, the Commission concludes that:

- The price impact on all customers due to the proposed DLFs for 2009-10 represents no greater than one per cent increase in energy cost.
- The calculated DLFs for embedded generators are based on the Commission's DLF Calculation Methodology, which sets out the methods for the modelling of the supply network's configuration and the operations of the generators.
- The distributors have taken into consideration their previous forecast errors in overall loss levels as verified by the trend of reconciliation errors over time and that the levels of errors have been acceptable.
- The overall levels of network losses of each distributor are within acceptable limits.

The Commission is satisfied that the proposed DLFs are consistent with the DLF Calculation Methodology and meet the Rules' requirements.