12 March 2009

Mr Chris Pattas
General Manager
Network Regulation South
Australian Energy Regulator
GPO Box 520
Melbourne VIC 3001

energex
positive energy

Office of the
Chief Executive Officer

Dear Mr Pattas

ENERGEX Distribution Loss Factors for 2009-10

Under clause 3.6.3(i) of the National Electricity Rules, ENERGEX is required to provide distribution loss factors (DLFs) to NEMMCO for publication by 1 April each year. The clause requires these DLFs to be approved by the Australian Energy Regulator prior to receipt by NEMMCO.

Consistent with the requirements set out in your letter of 26 November 2008, please find attached:

- ENERGEX's 2009-10 Proposed DLF's;
- a copy of the published methodology with which ENERGEX DLFs were calculated; and
- a letter from independent consultants, Intelligent Energy Systems, to confirm that the DLFs calculated by ENERGEX are consistent with the published methodology.

If you have any futher questions concerning this matter, please contact Mick Ryan, Acting Regulatory Affairs Manager - Operations, on (07) 3407 4386.

Yours sincerely

T.J Effeney

Terry Effeney
Chief Executive Officer

NCS INTERNATIONAL
CERTIFIED QUALITY MANAGEMENT SYSTEM
ISO 9001

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2009-10 PROPOSED DISTRIBUTION LOSS FACTORS

TABLE ONE: DLFs for Individually Calculated Customers

NMI	DLF Code	DLF Applied In 2008/2009	DLF To Be Applied In 2009/2010	Change In DLF (%)
QB02572591	FAPM	1.02095	1.02307	0.21%
QB03674681	FCAL	1.01146	1.01224	0.08%
QB03675327	FICT	1.01260	1.01945	0.68%
QB00703630	FBCC	1.01384	1.01551	0.16%
QB13786415	FBOC	1.05435	1.02265	-3.01%
QB07156049	FBAC	1.04182	1.03200	-0.94%
3116941403	FAPB	1.03103	1.01954	-1.11%
3120007259	FLMD	N/A	1.02020	0.00%
QB03187888	FQCL	1.07518	1.03849	-3.41%
QB00011835	FCRL	1.06758	1.06753	0.00%
QB03674151	FRBH	1.01129	1.01049	-0.08%
3117239826	FNST	1.00470	1.00349	-0.12%
QB03674177	FQG	1.01708	1.02225	0.51%
QB09709916	FQBH	1.00144	1.00083	-0.06%
QB09750568	FQB	1.00500	1.00517	0.02%
QB05850851	FQBW	1.00277	1.00179	-0.10%
QB07417373	FQCB	1.00421	1.00040	-0.38%
QB03187390	FQC	1.00006	1.00027	0.02%
QB07480580	FQL	1.00131	1.00048	-0.08%
QB12757888	FQR	1.00068	1.00022	-0.05%
QB08485399	FQT	1.00269	1.00006	-0.26%
3115820840	FQW	1.00000	1.00097	0.10%
QB00703591	FRAF	N/A	1.03895	0.00%
QB14097800	FRPT	1.00083	1.00125	0.04%
QB10995285	FHPR	1.14785	1.16755	1.72%
QMRGW00156	FSWP	1.01242	1.01127	-0.11%
QB09455507	FSC	1.00576	1.00971	0.39%
QB07047011	FSTC	1.01648	1.01772	0.12%
QB08144664	FACI	1.07274	1.05577	-1.58%
3117267111	FAPM	1.00861	1.01386	0.52%
3116852575	FCAL	1.00825	1.00968	0.14%
3116852583	FICT	1.00874	1.01229	0.35%
QB12021814	FBCC	1.00886	1.00679	-0.21%

TABLE TWO: Average DLFs for Non-ICC Customers

110 kV connected	FSSS	1.0046	1.0047	0.01%
33 kV connected	F3CL	1.0142	1.0147	0.05%
11 kV bus connected	F1ZH	1.0194	1.0201	0.07%
11 kV line connected	F1CH	1.0282	1.0287	0.05%
LV bus connected	F1CL	1.0497	1.0463	-0.32%
LV line connected	FLCL	1.0786	1.0701	-0.79%

ENERGEX's Distribution Loss Factor Methodology

Introduction

Section 3.6.3 of the National Electricity Rules (NER) requires that Distribution Network Service Providers each year calculate Distribution Loss Factors (DLFs) for their networks. Distribution Loss Factors (DLFs) are defined in the National Electricity Rules as a notional description of the average electrical energy losses incurred by the transmission of electricity on a distribution network between the Transmission Network Connection Point (TNCP) and the Distribution Network Connection Point (customer's point of connection) for the financial year period. They are used in the settlement process as a notional adjustment the electrical energy metered at the distribution network connection point (customer billed energy) to the gross energy purchased at the transmission network connection points.

Methodology

In broad terms, the Rules require that site-specific DLFs are calculated for:

- embedded generators with greater than 10 MW of generation;
- all customers of greater than 10 MW demand or 40 GW.h annual consumption i.e. Individually Calculated Customers (ICCs); and
- generators of less than 10 MW or 40 GWh per annum capacity where the Generator meets reasonable costs for ENERGEX to perform the necessary calculations.

DLFs for all other customers may be calculated on an average basis, which effectively means determining DLFs for each voltage level of the network.

The methodology used by ENERGEX involves a full recalculation of all DLFs (both average and site specific) every three years. In the intervening years, site specific DLFs are calculated, but all average DLFs are simply reviewed, based on allocation of network losses in the same proportions as was determined at the last full recalculation.

The annual DLF review also requires that a reconciliation of the previous year's calculated distribution loss factors be completed. The DLFs of the previous financial year are used to calculate the losses on the distribution network for that year. These are then compared to historical metered data and reasons for discrepancies are explained/reconciled.

Site Specific Customer Calculations

Regardless of whether a full re-calculation of DLFs is being undertaken (every third year), or only a review, the methodology for determining DLFs for Site Specific Customers is identical.

Site specific DLFs are calculated using load flow analysis based on the customers forecast demand data and network load data for the year in which the DLFs are to be applied. The analysis involves load flow studies on the directly connected network between the customer connection point and the transmission network connection point. The directly connected network is defined as all network which will experience a change in power flow due to a change in customer loads. In addition, iron losses of the transformers included in the directly connected network are calculated and apportioned based on the ratio of customer load and network load flowing through the transformer.

ENERGEX uses the Marginal Loss Factor methodology to calculate site specific DLFs. This process involves determining the losses for the customer by assessing the relativity between the change in system load associated with a change in the customer's load.

Calculation of Average Loss Factors (for full recalculation)

Average DLFs are calculated for each significant supply level in the network, with DLFs for major customers being calculated individually in order to determine the losses directly attributable to their loads (as discussed above).

The average DLF categories applied by ENERGEX are:

- 132/110 kV Network;
- 33 kV Network;
- 11 kV bus;
- 11 kV line;
- LV bus; and
- LV line

The method used to calculate average DLFs is to carry out a series of load flow studies to determine the losses at the coincident network peak, followed by the application of calculated Loss Load Factors (LLFs) to obtain the actual losses.

The transmission and subtransmission systems are modelled using appropriate load flow packages. Losses on the 11 kV distribution system are calculated using forecast feeder peak demand data and feeder length data which is obtained from ENERGEX's corporate database. Losses at the LV bus are calculated based on the average impedance of distribution transformers, and losses in the LV network are calculated as the difference between the total losses (calculated by the difference between total purchases and total sales), and the losses resulting from the higher voltage network studies.

The DLFs for the network are then calculated based on the formula:

$$\text{DLF} = \frac{\text{Losses (GW.h) for section of Network - ICC Losses}}{\text{Sum of sales (GW.h) for all sectors downstream and including that sector (excluding sales to ICCs)}}$$

1.1 Calculation of Loss Load Factors

Loss Load Factors (LLFs) are calculated based on load duration curves, which are computed from half-hour average demands over a full year. The Load duration curve is squared and then averaged to obtain the LLF. The LLFs are then applied to the losses calculated at peak demands to determine the actual losses.

1.2 Transmission (132 and 110 kV) Network

Load flow studies are carried out down to the 33 kV or 11 kV busbar at all bulk supply points and direct transformation substations. The 132/33 kV, 110/33 kV, 132/11 kV and 110/11 kV transformer losses are subtracted from the transmission system losses. Losses calculated by these studies are converted to annual energy losses using the loss load factor for the system under consideration. The sum of the annual energy losses for all Transmission Network Connection Points (TNCPs) excluding ICC losses are then divided by the sum of all non-ICC energy sales through the 132 & 110 kV networks to obtain the DLF, viz:

$$\text{Transmission Average DLF} = \frac{\sum \text{Losses in GW.h - Transmission System ICC Losses}}{\sum \text{Energy Sales through the 110 kV Network in GW.h (excluding sales to ICCs)}}$$

1.3 Bulk Supply Networks

The bulk supply systems are modelled from the 33 kV busbar to the 11 kV busbar including 33/11 kV transformers. The peak losses in kW calculated from load flow studies is then converted to annual energy losses using the loss load factor. Losses attributed to the 132/33 kV, 110/33 kV, 132/11 kV and 110/11 kV transformers are to be added to the losses obtained from these load flows. The total energy supplied is taken from billed sales figures and the DLF derived by dividing the total losses excluding ICC losses by the total energy sales to non-ICC customers, viz:

$$\text{Bulk Supply + 11 kV Bus DLF} = \frac{\sum \text{Losses in GW.h} - \text{ICC losses in the system}}{\sum \text{Energy Sales through 33 kV network in GW.h (excluding sales to ICCs)}}$$

The bulk supply and 11kV bus DLFs are then to be separated from the total DLF using ratios. The ratios currently used by ENERGEX are 0.651358 for the Bulk Supply System DLF and 0.348642 for the 11kV Bus DLF. These ratios are based on the 2007-08 DLF report by Connell Wagner Consultants. However, these ratios are to be validated during each full review. If these ratios are found to be no longer appropriate, they are to be recalculated, subject to the latest network configurations and consumption patterns.

1.4 11 kV circuits

Losses on 11 kV feeders are calculated using the length of each feeder and forecast peak demand data. The formula for determining 11 kV losses is as follows:

Feeder losses = $(\text{Peak Demand})^2$ * Resistance * Branching Factor

The feeder lengths are obtained from ENERGEX's corporate database, and allow calculation of the resistance of each feeder based on average overhead and underground resistances per unit length. The peak demand is also obtained from a corporate database, and a load growth is applied to determine peaks during the forecast year. Average branching factors are calculated for urban, rural and high-density feeders based on losses obtained for each 11 kV feeder during each full review. This data allows losses to be calculated for each 11 kV feeder.

An annual loss energy is then produced for each feeder using loss load factors, which are then summed to produce the total 11 kV feeder losses. The DLF is thus:

$$\text{11 kV Circuit DLF} = \frac{\sum \text{11kV Feeder Losses in GW.h - ICC Losses in System}}{\sum \text{Energy Sales through 11 kV Feeders in GW.h (excluding sales to ICCs)}}$$

1.5 LV bus & LV circuits

LV losses are generally determined as being the remaining losses when all calculated losses for the higher voltage networks have been deducted from the total network losses (known from purchases - sales).

LV losses then just need to be appropriately allocated between the LV Bus and LV Line categories. Studies undertaken in 2007 by Connell Wagner Consultants for the 2007-08 full review determined appropriate ratios for splitting LV losses between these categories. The calculated ratios are LV Bus = 0.422574 and LV line = 0.577426 of total LV losses. However, these ratios are to be validated during each full review. If these ratios are found to be no longer appropriate, they are to be recalculated, subject to the latest network configurations and consumption patterns.

Procedure

Once the DLFs are calculated and reconciled, a report is prepared, detailing the calculated site specific DLFs, together with the average DLFs at each voltage level in the system. This report must be submitted for approval to the Australian Energy Regulator (AER). Once approved, the AER forwards the DLFs to NEMMCO. The approved DLFs are then published by NEMMCO on its website by 1 April each year.

IES
Intelligent Energy Systems

10 March 2009

Louise Dwyer
Group Manager Regulatory Affairs
Energex Limited
GPO Box 1461
QLD 4001

Dear Louise,

REVIEW OF ENERGEX DISTRIBUTION LOSS FACTORS FOR 2009/10

Intelligent Energy Systems Pty Ltd (IES) has undertaken a review (audit) of the Distribution Loss Factors (DLFs) for 2009/10 financial year calculated by Connell Wagner PPI (Connell Wagner) for Energex. The IES audit examined the proposed DLFs with regard to their consistency with Energex's published methodology which is the published methodology operating in Queensland as at 31 December 2008.

For its 2009/10 DLF calculations, Energex commissioned engineering consultants Connell Wagner. Connell Wagner has followed the methodology implemented by Energex in previous DLF reviews. It makes use of a well structured set of spreadsheets that clearly show the application of the approved methodology, the inputs, intermediate values and final DLF numbers. Energex provided IES with a document titled "2009/10 Distribution Loss Factor Review ENERGEX Distribution Loss Factor Study", dated 6 March 2009, outlining its proposed DLFs for 2009/10. The report also included the methodology for the calculation of DLFs, discussion of results and outcomes of its reconciliation of losses for 2007/08. Energex's submission was clear and concise, the calculations consistent with the published methodology and, DLF values correctly determined.

Energex has submitted proposed DLFs for 2009/10 that have changed slightly from those for 2008/09. The proposed DLFs for tariff class customers are shown in Table 1 and for Independently Calculated Customers (ICCs) in Table 2 along with the existing DLFs and the percentage changes based on the new calculated 2009/10 values.

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The changes in the DLFs proposed for tariff class customers compared to the current DLFs vary from between 0.07% and -0.79% from the 2008/09 values. The significant variations are decreases in DLFs which will reduce customer costs slightly. The proposed tariff class DLFs to apply in financial year 2009/10 should not have a significant impact on Energex's customer costs.

Any significant increases or decreases in DLF values for ICCs (greater than 1%) from last year's DLFs were explained by Energex to the satisfaction of IES. The changes in the main related to decreases in forecast demand and energy resulting in a decrease in load factor for the particular ICC. Also reconfiguration of some ICC networks has resulted in a more direct path to the connection point, resulting in a reduction in losses.

IES has examined the data provided by Energex (in the form of spreadsheets) and are of the opinion that they have estimated their projections in accordance with the published methodology.

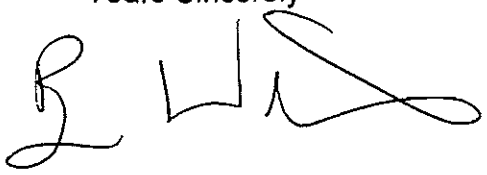
Energex uses a forward looking approach in the calculation of its DLFs. The forward looking approach uses projected loads and generation for the year the DLFs are to apply in, and these projections are based on the most recent historical and generation data available for a consecutive 12 month period, as specified by the Rules. For its current calculations, projections are based on historical data for 2007/08.

Energex states that "sales are forecast using a 'bottom-up' approach, which is based on the application of econometric and time series analysis to forecast energy consumption by large individual customers and market segments", employing a range of macro-economic and demographic factors, and that "purchases are forecast using a 'top-down' approach, which is based on an analysis of energy purchases from Powerlink". It states that the "two approaches are reconciled to ensure they meet certain reasonableness criteria with respect to a range of variables and output measures".

Energex has carried out a reconciliation of losses for financial year 2007/08 in accordance with the National Electricity Rules' requirements. Energex found that when applying the 2007/08 DLFs to its actual sales figures for 2007/8, reconciled purchases overstated actual energy purchased by only 0.41%. Considering a forward looking approach has been used, where forecasts of sales and purchase figures are utilised this is an excellent result.

In summary IES are of the opinion that the DLFs calculated by Energex for 2009/10 as shown in Tables 1 and 2 are consistent with the published methodology and, thereby correctly determined.

Yours Sincerely



Bryan Whitlock

Senior Energy Analyst

Table 1	Energex proposed 2009/10 DLFs for tariff classes			
Non-ICC Connection Categories	**DLF Code**	**Existing DLF 2008/09**	**Proposed DLF 2009/10**	**Change in DLF (%)**
110 kV connected	FSSS	1.0046	1.0047	0.01
33 kV connected	F3CL	1.0142	1.0147	0.05
11 kV bus connected	F1ZH	1.0194	1.0201	0.07
11 kV line connected	F1CH	1.0282	1.0287	0.05
LV bus connected	F1CL	1.0497	1.0463	-0.32
LV line connected	FLCL	1.0786	1.0701	-0.79

Table 2 Energex proposed 2009/10 DLFs for ICCs and Embedded Generators

Individually Calculated Customer	DLF Code	NMI	DLF Applied In 2008/2009	DLF To Be Applied In 2009/2010	Change In DLF (%)
Existing ICCs					
	FAPM	QB02572591	1.02095	1.02307	0.21%
	FCAL	QB03674681	1.01146	1.01224	0.08%
	FICT	QB03675327	1.01260	1.01945	0.68%
	FBCC	QB00703630	1.01384	1.01551	0.16%
	FBOC	QB13786415	1.05435	1.02265	-3.01%
	FBAC	QB07156049	1.04182	1.03200	-0.94%
	FAPB	3116941403	1.03103	1.01954	-1.11%
	FLMD	3120007259	n/a	1.02020	n/a
	FQCL	QB03187888	1.07518	1.03849	-3.41%
	FCRL	QB00011835	1.06758	1.06753	0.00%
	FRBH	QB03674151	1.01129	1.01049	-0.08%
	FNST	3117239826	1.00470	1.00349	-0.12%
	FQG	QB03674177	1.01708	1.02225	0.51%
	FQBH	QB09709916	1.00144	1.00083	-0.06%
	FQB	QB09750568	1.00500	1.00517	0.02%
	FQBW	QB05850851	1.00277	1.00179	-0.10%
	FQCB	QB07417373	1.00421	1.00040	-0.38%
	FQC	QB03187390	1.00006	1.00027	0.02%
	FQL	QB07480580	1.00131	1.00048	-0.08%
	FQR	QB12757888	1.00068	1.00022	-0.05%
	FQT	QB08485399	1.00269	1.00006	-0.26%
	FQW	3115820840	1.00000	1.00097	0.10%
	FRAF	QB00703591	n/a	1.03895	n/a
	FSWP	QMRGW00156	1.01242	1.01127	-0.11%
	FSC	QB09455507	1.00576	1.00971	0.39%
	FSTC	QB07047011	1.01648	1.01772	0.12%
	FACI	QB08144664	1.07274	1.05577	-1.58%
	FTD	3117267111	1.00861	1.01386	0.52%
	FUQ1	3116852575	1.00825	1.00968	0.14%
	FUQ2	3116852583	1.00874	1.01229	0.35%
	FVP	QB12021814	1.00886	1.00679	-0.21%
Embedded Generation:					
	FRPT	QB14097800	1.00083	1.00125	0.04%
	FHPR	QB10995285	1.14785	1.16755	1.72%