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# Distribution Loss Factor Report

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January 2008



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# 1 Introduction

This report details the distribution loss factors calculated in response to the request from the Independent Market Operator (IMO) dated 10/08/2007 for all distribution loss factors to be recalculated for the 2007/08 financial year.

To comply with this request Western Power has recalculated:

- All average distribution loss factors;
- All individual distribution loss factors for customers with a CMD greater than 7,000 kVA;
- All individual distribution loss factors for customers with a CMD between 1,000 and 7,000 kVA located greater than 10 km from the electrically closest substation;
- For customers with a CMD between 1,000 and 7,000 kVA located less than 10 km from the electrically closest substation, Western Power has calculated the individual distribution loss factors as elected by the associated retailer; and
- All individual distribution loss factors for distribution connected generation customers.

## 2 Basis for calculation

The following sections detail the methodology used by Western Power in calculating distribution loss factors.

### 2.1 Average distribution loss factors

Western Power has calculated the average distribution loss factors in accordance with section 1.5A of the *Market procedure for determining loss factors*.

Western Power has followed the detailed methodology historically used by Western Power to calculate the average distribution loss factors. The methodology includes:

- Determining losses within the zone substation transformers;
- Determining HV feeder losses;
- Determining distribution transformer losses; and
- Determining LV feeder losses (allowing separately for residential and commercial losses)

Western Power allocates the average distribution loss factors based on the usage of the various components of the network. An appropriate basis for this allocation is the reference service and in accordance with the *Market procedure for determining loss factors* Western Power has determined an average loss factor for each reference service.

### 2.2 Individual distribution loss factors

Western Power has calculated the individual distribution loss factors in accordance with section 1.5A of the *Market procedure for determining loss factors*.

Specifically, Western Power has calculated the individual distribution loss factors using the formula and methodology detailed in Schedule 4 of the Electricity Distribution Regulations 1997. Schedule 4 of the Electricity Distribution Regulations 1997 is reproduced below:

- |     |   |
|-----|---|
| 1.  | To calculate the loss factor for a distribution connection which is an exit point a corporation must follow the following steps:  |
| (a) | the corporation must determine the line losses assuming the distribution connection was not there and assuming feeder maximum load;   |
| (b) | the corporation must determine the line losses assuming only the distribution connection was there and assuming feeder maximum load;  |
| (c) | the corporation must determine the total line losses assuming all the distribution connections are there (including the distribution connection for which the loss factor is being determined) and assuming feeder maximum load;                                    |
| (d) | the corporation must allocate a share of the total line losses calculated under step (c) to the distribution connection for which the loss factor is being determined based on the ratio of the result of step (b) and the sum of the results of steps (a) and (b); |
| (e) | the corporation must calculate the loss factor for the distribution connection by applying the following formula:   |

$$\text{LFExit} = 1 + \frac{A}{B}$$

where —

- A (in kW) is the share of the total line losses allocated to the distribution connection under step (d);
- B (in kW) is the contract maximum demand for the distribution connection.

2. To calculate the loss factor for a distribution connection which is an entry point a corporation must follow the following steps:

- (a) the corporation must determine the line losses assuming the distribution connection was not there and assuming feeder maximum load;
- (b) the corporation must determine the total line losses assuming all the distribution connections are there (including the distribution connection for which the loss factor is being determined) and assuming feeder maximum load;
- (c) the corporation must calculate the loss decrease or increase for the distribution connection for which the loss factor is being determined by subtracting the result of step (b) from the result of step (a);
- (d) the corporation must calculate the loss factor for the distribution connection by applying the following formula:

$$\text{LFEntry} = 1 + \frac{A}{B}$$

where —

- A (in kW) is the loss increase or decrease calculated for the distribution connection under step (c);
- B (in kW) is the declared sent-out capacity for the distribution connection.

Note: For sites supplied from multiple feeders the distribution loss factor has been determined as if the load is evenly split across the feeders. The resultant distribution loss factor is the average of the calculated distribution loss factors.

### 3 Average Distribution Loss Factors

Western Power has calculated the following average distribution loss factors for the 2007/08 financial year.

Table 1 - Average Distribution Loss Factors

<b>Distribution Loss Factor</b>			
<b>DLF Code</b>	<b>Description</b>	<b>Applied in 2006-07</b>	<b>To apply in 2007-08</b>
QRT1	A1 - Anytime Energy (Residential)	1.0835	1.0825
QRT2	A2 - Anytime Energy (Business)	1.0463	1.0461
QRT3	A3 - Time of Use Energy (Small)	1.0835	1.0825
QRT4	A4 - Time of Use Energy (Large)	1.0463	1.0461
QRT5	A5 - High Voltage Metered Demand	1.0211	1.0206
QRT6	A6 - Low Voltage Metered Demand	1.0333	1.0337
QRT9	A9 - Streetlighting	1.08151	1.0825
QR10	A10 - Un-metered Supplies	1.08151	1.0825
QR7Z	A7 - High Voltage Contract Maximum Demand (Zone Substation Connected)	1.0055	1.0055
QTHZ	Transition High Voltage Contract Maximum Demand (Zone Substation Connected)	1.0055	1.0055
QNLF	Transmission Connected (No DLF)	1.0000	1.0000
QAVG	Distribution System Wide Average Loss Factor	1.0540	1.0536

## 4 Individual Distribution Loss Factors

Western Power has calculated the following individual distribution loss factors for the 2007/08 financial year.

Table 2 - Individual Distribution Loss Factors

<b>Distribution Loss Factor</b>			
<b>DLF Code</b>	<b>Description</b>	<b>Applied in 2006-07</b>	<b>To apply in 2007-08</b>
QAAL	Air Liquide WA PTY LTD	1.0117	1.0070
QAAM	AMP ASSET MANAGEMENT AUSTRALIA L	1.0086	1.0103
QANP	West Australian Newspapers LTD	1.0373	1.0281
QBFS	Belmont Forum Shopping Centre	1.0172	1.0307
QBGC	BGC Australia PTY LTD	1.0071	1.0071
QBLB	Bristile LTD Bellevue	1.0186	1.0069
QBLC	Bristile LTD Cardup	1.0278	1.0097
QBLM	Bristile LTD Malaga	1.0135	1.0062
QBOC	BOC GASES (COMMONWEALTH INDUSTRIAL)	1.0070	1.0082
QBPA	BUNBURY PORT AUTHORITY	1.0116	1.0062
QBSB	Black Swan Nickel PTY LTD (Black Flag)	1.1270	1.1548
QBSN	Black Swan Nickel PTY LTD	1.1517	1.1767
QBTF	BTFM Limited SAS Trustee Corp (QV1)	1.0058	1.0058
QBUR	BURSWOOD RESORT CASINO	-	1.0064
QBWE	Bankwest	1.0114	1.0076
QCBH	Cooperative Bulk Handling LTD	1.0744	1.0576
QCBK	Cooperative Bulk Handling Limit	1.0095	1.0064
QCCL	Cockburn Cement Limited	1.0192	1.0274
QCPL	CENTRO PROPERTIES LTD (UPPSALA)	1.0077	1.0065
QCSW	CABLE SANDS WA PTY LTD	1.0120	1.0096
QCUR	CURTIN UNIVERSITY OF TECHNOLOGY	1.0209	1.0201
QDOD	Dept Of Defence - HMAS Stirling	1.0196	1.0150
QDPL	Donhad PTY LTD	1.0145	1.0186
QFFM	WESTERN AREAS NL - FLYING FOX MINESITE	-	1.0300
QFIE	FLETCHER INTERNATIONAL EXPORTS	-	1.0551
QFPA	Fremantle Port Authority	1.0055	1.0057
QGES	Govt Employees Superannuation	1.0066	1.0074
QGPA	Geraldton Port Authority	1.0074	1.0162
QHLG	Henderson Landfill Gas (Waste Gas Resources Pty Lt	1.0060	1.0067
QHMP	HIGGINSVILLE MINING PTY LTD	1.0215	1.0404
QHRO	HR Operations PTY LTD	1.0095	1.0083
QIDH	Iluka Depot Hill	1.0566	1.1101
QJJM	JUBILEE JUBILEE MINE & TREATMENT FACILITY	1.0626	1.0616
QKBG	Kanowna Belle Gold Mines Limited	1.0700	1.0629
QLGA	Red Hill	1.0286	1.0422
QLGB	Canning Vale (Landfill Gas & Power)	1.0493	1.0240
QLGC	Kalamunda (Landfill Gas & Power)	1.0794	1.0221
QLGD	Tamala Park (Landfill Gas & Power)	1.0248	1.0453



<b>Distribution Loss Factor</b>			
<b>DLF Code</b>	<b>Description</b>	<b>Applied in 2006-07</b>	<b>To apply in 2007-08</b>
QLJS	LAKESIDE JOONDALUP SHOPPING CITY	1.0122	1.0143
QMGS	Midland Gate Shopping Centre	1.0068	1.0067
QMHE	Mount Herron Engineering	1.0339	1.0409
QMID	MIDLAND BRICK COMPANY PTY LTD(Lot 82 Great Norther	1.0159	1.0173
QMIE	MIDLAND BRICK COMPANY PTY LTD(Lot 2 Bassett Road)	1.0304	1.0388
QNFM	National Foods Milk WA Limited	1.0083	1.0075
QPEA	LMS South Cardup	1.0400	1.0058
QPEB	Rockingham Landfill	1.0421	1.0656
QPEC	Gosnells Landfill	1.0482	1.0501
QPED	LMS Atlas	1.0133	1.0136
QPTC	PERPETUAL TRUSTEE COMPANY	1.0514	1.0243
QRCS	Rockingham City Shopping Centre	1.0163	1.0160
QROC	Rendezvous Observation City Hotel	1.0169	1.0110
QRPH	Royal Perth Hospital	1.0079	1.0078
QRRR	Royal Australian Air Force	1.1410	1.0817
QSBC	The Swan Brewery Company PTY LTD	1.0114	1.0118
QSMP	ST MARTINS PROPERTIES PTY	1.0078	1.0072
QTCL	Telstra Corporation Limited	1.0074	1.0071
QVPL	Vinidex PTY LTD	1.0072	1.0093
QWAC	WESTRALIA AIRPORTS CORPORATION P	1.0125	1.0118
QWCB	WATER CORP (Belmont)	1.0089	1.0081
QWCC	Water Corporation (Cunderdin)	1.0055	1.0055
QWCE	WATER CORP (BEENYUP WWTP)	1.0166	1.0067
QWCG	Water Corporation (Ghooli)	1.0245	1.0097
QWCS	WESTFIELD CAROUSEL SHOPPINGTOWN	1.0616	1.0360
QWCT	WATER CORPORATION SEWERAGE TREAT	1.0150	1.0122
QWCW	WATER CORP (WANNEROO GS)	1.0686	1.0326
QWES	WESFEEDS PTY LTD	1.0115	1.0071
QWGS	WESTFIELD GALLERIA SHOPPINGTOWN	1.0139	1.0157
QWHS	WHITFORD CITY SHOPPING CENTRE	1.0112	1.0152
QWLP	WALKERS LIMITED PERTH - Bradken Resources	1.0110	1.0180
QWMD	WESFI Manufacturing PTY LTD	1.0390	1.0276
QWMP	WESFI Manufacturing PTY LTD	1.0215	1.0218
QWPL	Wespine PTY LTD	1.0236	1.0464

## 5 Explanation for changes in loss factors

In accordance with section 1.3 (3) of the *Market procedure for determining loss factors* Western Power is required to provide an explanation for any changes of more than 0.025 in the distribution loss factors when compared to the previous year.

The following ten individual distribution loss factors have changed by more than 0.025 when compared to the previous year:

- QBSB - Black Swan Nickel PTY LTD (Black Flag)
- QBSN - Black Swan Nickel PTY LTD
- QIDH - Iluka Depot Hill
- QLGB - Canning Vale (Landfill Gas & Power)
- QLGC - Kalamunda (Landfill Gas & Power)
- QPEA - LMS South Cardup
- QPTC - PERPETUAL TRUSTEE COMPANY
- QRRA - Royal Australian Air Force
- QWCS - WESTFIELD CAROUSEL SHOPPINGTOWN
- QWCW - WATER CORP (WANNEROO GS)

Changes to the individual distribution loss factors list above are due to:

- Individual distribution loss factors have not been recalculated for several years;
- Changes in the customer's load and the load of other customers on the feeder since the last calculation will result in changes in the distribution loss factor; and
- Network re-configuration and the installation of new zone substations since the last calculation will result in changes in the distribution loss factor.

Increase in contracted maximum demand is a factor in the change in the following distribution loss factors:

- QBSB - Black Swan Nickel PTY LTD (Black Flag) (increased 28/9/2006)
- QBSN - Black Swan Nickel PTY LTD (increased 18/11/2005)
- QIDH - Iluka Depot Hill (increased 1/02/2007)

Correction of data stored within Western Power's systems on the network configuration of Iluka Depot Hill is also a factor in the change in the distribution loss factor.

## Appendix A - Individual Distribution Loss Factors by NMI

The individual distribution loss factors calculated for the 2007/08 financial year are associated with the following NMIs.

Table 3 - Individual Distribution Loss Factors by NMI for 2007/08

<b>NMI</b>	<b>DLF Code</b>	<b>Individual DLF Optional?</b>
8001000107	QCSW	Optional
8001000122	QPEB	Required
8001000123	QPEC	Required
8001000124	QLGB	Required
8001000158	QLGA	Required
8001000234	QLGD	Required
8001000268	QBOC	Required
8001000269	QJJM	Required
8001000270	QMID	Optional
8001000271	QWES	Optional
8001000280	QWCB	Optional
8001000282	QWCE	Optional
8001000284	QWCW	Required
8001000286	QAAL	Optional
8001000287	QFFM	Required
8001000300	QNFM	Optional
8001000304	QVPL	Optional
8001000310	QCCL	Optional
8001000311	QCCL	Optional
8001000325	QWMD	Required
8001000329	QBPA	Optional
8001000333	QDOD	Required
8001000371	QWMP	Required
8001000420	QDPL	Optional
8001000432	QCBK	Optional
8001000449	QBLC	Optional
8001000451	QHMP	Required
8001000474	QWCC	Optional
8001000495	QWPL	Optional
8001000503	QCUR	Required
8001000504	QCUR	Required
8001000505	QCUR	Required

<b>NMI</b>	<b>DLF Code</b>	<b>Individual DLF Optional?</b>
8001000510	QPTC	Required
8001000511	QPTC	Required
8001000514	QMIE	Required
8001000515	QMIE	Required
8001000519	QSMP	Optional
8001000520	QSMP	Optional
8001000521	QSBC	Optional
8001000527	QWCT	Optional
8001000528	QWCT	Optional
8001000533	QWAC	Required
8001000534	QWAC	Required
8001000535	QCPL	Optional
8001000536	QCPL	Optional
8001000539	QFIE	Required
8001000541	QBWE	Optional
8001000542	QBWE	Optional
8001000546	QGES	Optional
8001000547	QGES	Optional
8001000550	QGPA	Optional
8001000551	QGPA	Optional
8001000593	QBFS	Optional
8001000594	QBFS	Optional
8001000612	QFPA	Optional
8001000613	QFPA	Optional
8001000652	QBUR	Required
8001000653	QBUR	Required
8001000665	QRPH	Optional
8001000666	QRPH	Optional
8001000667	QLJS	Optional
8001000668	QLJS	Optional
8001000673	QAAM	Required
8001000674	QAAM	Required
8001000677	QWGS	Required
8001000678	QWGS	Required
8001000681	QMGS	Required
8001000682	QMGS	Required
8001000687	QRCS	Optional
8001000688	QRCS	Optional
8001000691	QWHS	Required
8001000692	QWHS	Required
8001000693	QWCS	Required
8001000694	QWCS	Required
8001000703	QBTF	Optional
8001000704	QBTF	Optional
8001000734	QBSN	Required

<b>NMI</b>	<b>DLF Code</b>	<b>Individual DLF Optional?</b>
8001000738	QLGC	Required
8001000780	QCBH	Required
8001000790	QWCG	Required
8001000791	QBLB	Optional
8001000804	QANP	Optional
8001000817	QIDH	Required
8001000824	QKBG	Required
8001000827	QWLP	Optional
8001000831	QTCL	Optional
8001000846	QBLM	Optional
8001000847	QROC	Optional
8001000863	QRRR	Required
8001000864	QBGC	Optional
8001000916	QPEA	Required
8001017256	QHRO	Optional
8001017257	QHRO	Optional
8001018080	QPED	Required
8001019473	QCUR	Required
8001019602	QMHE	Required
8001019750	QFPA	Optional
8001019994	QBSB	Required
8001383712	QHLG	Required

Note: Individual distribution loss factors have been assessed as either required or optional in accordance with section 1.8.2 of the *Market procedure for determining loss factors*.

The calculation of optional distribution loss factors is at the cost of the retailer.

## Appendix B - Alternative Presentation of Average DLFs

The following table presents the average distribution loss factors based on network level and is included for information purposes only.

Table 4 - Average Distribution Loss Factors by Network Level – For Information Only

Network Level	Distribution Loss Factor	
	Applied in 2006-07	To apply in 2007-08
6.6kV/11kV/22kV/33kV Bus Connected	1.0055	1.0055
6.6kV/11kV/22kV/33kV Line Connected	1.0211	1.0206
LV Bus Connected	1.0333	1.0337
LV Line Connected (Commercial)	1.0463	1.0461
LV Line Connected (Streetlighting/UMS)	1.08151	1.0825
LV Line Connected (Residential)	1.0835	1.0825
Transmission Connected (No DLF)	1.0000	1.0000
Distribution System Wide Average Loss Factor	1.0540	1.0536

Note: Average distribution loss factors are presented in this format to enable comparison with distribution loss factors within the NEM. However, for purposes of the WA market the average distribution loss factors are as per section 3.

## Appendix C - Redundant DLFs

The following table presents the distribution loss factors that existed in 2006/07 but are not required in 2007/08 and are therefore redundant.

Table 5 - Redundant Distribution Loss Factors

<b>DLF Code</b>	<b>Description</b>	<b>Reason</b>
QALL	Amcor Limited	An average DLF is applicable to the customer
QCCA	Coca Cola Amatil Aust PTY LTD	Retailer elected average DLF
QCPT	CPT CUSTODIAN PTY LTD	Retailer elected average DLF
QKEM	KING EDWARD MEMORIAL HOSPITAL	Retailer elected average DLF
QMDU	MURDOCH UNIVERSITY	Retailer elected average DLF
QMMS	METRO MADDINGTON SHOPPING CENT	Retailer elected average DLF
QPBF	PB Foods LTD	Retailer elected average DLF
QPIP	Perron Investments PTY LTD	Retailer elected average DLF
QPMA	Perth Market Authority	Retailer elected average DLF
QPMH	PRINCESS MARGARET HOSPITAL	Retailer elected average DLF
QPPP	Pharmacia Perth PTY Limited	Retailer elected average DLF
QSBS	Southlands Boulevard Shopping C	Retailer elected average DLF
QSCE	SOUTHERN CROSS ENERGY	Retailer elected average DLF
QSJC	St John Of God Health Care	Retailer elected average DLF
QSJH	St John of God Hospital	Retailer elected average DLF
QSKM	South Kal Mines PTY LTD	An average DLF is applicable to the customer
QSKP	SOUTH KAL MINES PTY LTD (Mt Marion)	An average DLF is applicable to the customer
QSWH	South West Health Campus	Retailer elected average DLF
QWMI	WESTON MILLING	An average DLF is applicable to the customer