LIST OF NEM REGIONS AND MARGINAL LOSS FACTORS FOR THE 2014-15 FINANCIAL YEAR

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Version Release History

Release date	Description
17 March 2014	Draft version
1 April 2014	Initial release. Marginal Loss Factors for Torrens Island PS Load, Whyalla Central and Whyalla Terminal updated from draft version.
5 June 2014	Added MLF value for new TNI Wotonga QWOT Revised values for Tangkem (Dalby) QTKM, Kurri NKUR and Liverpool (Jacks Gully) NLP11

Executive Summary

This report contains the 2014-15 Marginal Loss Factors (MLFs) that represent electrical losses across the five National Electricity Market (NEM) Regions – Queensland, New South Wales, Victoria, South Australia, and Tasmania. It also serves as the Regions Publication under the National Electricity Rules (Rules).

It provides the electricity industry with the following National Electricity Market data for 2014-15:

- Marginal Loss Factors.
- Inter-regional loss factor equations.
- Virtual Transmission Nodes.
- Connection point Transmission Node Identifiers.
- Regions, Regional Reference Nodes, and Region boundaries.

The report also summarises the Forward Looking Loss Factor methodology by which AEMO calculates the Marginal Loss Factors and inter-regional loss factor equations that influence regional dispatch and electricity prices.

Changes in load and generation patterns have characterised the NEM since July 2012. The demand forecast has reduced in all Regions except Queensland. Renewable generation has increased while thermal generation, mainly in central New South Wales and the Latrobe Valley, has reduced.

As a result of these changes in the Marginal Loss Factor calculation, net interconnector flows have increased in the easterly-northerly direction: from South Australia to Victoria, from Tasmania to Victoria, from Victoria to New South Wales, and from New South Wales to Queensland. This change in flows impacts electrical losses, and drives significant changes in Marginal Loss Factors in 2014-15 from 2013-14. Some significant changes in MLFs are:

- A reduction in MLFs at connection points in central and southern Tasmania.
- An increase in MLFs at connection points in the Riverland in South Australia, and an increase in MLFs at connection points in southeast South Australia.
- An increase in MLFs at connection points in northern Victoria.
- A reduction in MLFs at connection points in southern New South Wales, and an increase MLFs at connection points in northern New South Wales.

This report provides a detailed explanation of these changes. AEMO appreciates that the MLFs need to be as accurate as possible, as they have financial implications for participants. For this reason, each year AEMO's methods and data are benchmarked and verified by external energy market consultants.

The report is divided into three main sections with supporting data for 2014-15 in the appendices.

- Section 1 - Background to Marginal Loss Factors
- Section 2 - Marginal Loss Factor methodology.
- Section 3 - Changes in Marginal Loss Factors from 2013-14 to 2014-15.
- Appendix A - list of Regions, Regional Reference Nodes (RRNs), and Region boundaries.
- Appendix B - list of Virtual Transmission Nodes (VTNs).
- Appendix C - list of connection point Transmission Node Identifiers (TNIs) and associated MLFs.
- Appendices D, E, F, and G – inter-regional loss factor equations.

Acronyms

Term	Definition
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
DLF	Distribution Loss Factor
DNSP	Distribution Network Service Provider
EMS	Energy Management System
ESOO	Electricity Statement Of Opportunities
FLLF	Forward Looking Loss Factor
GWh	Gigawatt-hour
km	Kilometre
kV	Kilovolt
LNG	Liquefied natural gas
MLF	Marginal Loss Factor
MMS	Market Management System
MNSP	Market Network Service Provider
MVAr	Megavolt-ampere-reactive
MW	Megawatt
NEFR	National Energy Forecasting Report
NEM	National Electricity Market
NEMDE	National Electricity Market Dispatch Engine
PS	Power station
RRN	Regional Reference Node
TNI	Transmission Node Identifier
TNSP	Transmission Network Service Provider
VTN	Virtual Transmission Node

Contents

Section 1 Background to Marginal Loss Factors

This section summarises the method and interpretation AEMO uses to take account of electrical losses in the NEM Regions. It also specifies AEMO's Rules responsibilities related to Regions, calculation of MLFs, and calculation of inter-regional loss factor equations.

The National Electricity Market (NEM) uses marginal costs as the basis for setting electricity prices. Transmission electrical loss pricing involves expanding this method to electricity generation and consumption at different locations.

For electricity transmission, electrical losses are a transport cost that needs to be recovered. A feature of electrical losses is that they also increase with an increase in the electrical power transmitted. That is, the more a transmission line is loaded, the higher the percentage losses. Thus the price differences between the sending and receiving ends is not determined by the average losses, but by the marginal losses of the last increment of electrical power delivered.

The NEM trades electrical power through the spot market managed by AEMO. There are two basic components of the spot market: the central dispatch process and the Regional Reference Node (RRN) price. The central dispatch process schedules generators to meet demand in order to minimise the cost of meeting demand based on generator capacity and price offers.

Static Marginal Loss Factors (MLFs) represent intra-regional electrical losses of transporting electricity between a connection point, and the RRN. In the dispatch process, generator prices within each Region are adjusted by the MLFs to determine generator dispatch.

Dynamic inter-regional loss factor equations calculate the losses between Regions. Depending on the flows between Regions, the inter-regional losses also adjust the generator prices in determining generator dispatch to meet demand.

AEMO calculates a RRN price for each Region, and then calculates prices for customers' connection points with an adjustment for the MLFs between these points and the RRN.

1.1 Rules requirements for the Marginal Loss Factor calculation

Clause 2A.1.3 of the Rules requires AEMO to establish, maintain, review and by 1 April each year, publish a list of Regions, RRNs, and the market connection points (represented by Transmission Node Identifiers or TNIs) in each Region.

In addition, clause 3.6 of the Rules requires AEMO to calculate the MLFs and inter-regional loss factor equations by 1 April each year to apply for the next financial year.

Clauses 3.6.1, 3.6.2 and 3.6.2(A) specify the requirements for calculating the MLFs and inter-regional loss factor equations, and the data used in the calculation.

The Rules require AEMO to calculate and publish a single, volume weighted average, intra-regional MLF for each connection point. The Rules also require AEMO to calculate and publish dual MLFs for connection points where one MLF does not satisfactorily represent transmission network losses for active energy generation and consumption.

1.2 Interpretation of Marginal Loss Factors

Under marginal pricing the spot price for electricity is the incremental cost of additional generation (or demand reduction) for each spot market interval.

Consistent with this, the marginal losses are the incremental increase in total losses for each incremental additional unit of electricity. The MLF of a connection point represents the marginal losses to deliver electricity to that connection point from the RRN.

The tables in Appendix C show the MLFs for each Region in the NEM. The price of electricity at a TNI within a Region is the price at the RRN multiplied by the MLF between it and the RRN. Depending on network and loading configurations MLFs vary, ranging from below 1.0 to above 1.0.

1.2.1 Marginal Loss Factors greater than 1.0

At any instant at a TNI, the marginal value of electricity will equal the cost of generating additional supplies at the RRN and transmitting it to that point. Any increase or decrease in total losses is then the marginal loss associated with transmitting electricity from the RRN to this connection point. If the marginal loss is positive, this means that less power can be taken from this point than at the RRN, the difference having been lost in the network. In this case, the MLF is above 1.0. This typically applies to loads. However this would also apply to generators in areas where the local load is greater than the local level of generation.

For example, a generator supplying an additional 1 MW at the RRN may find that its customer at a connection point can only receive an additional 0.95 MW. Marginal losses are 0.05 MW, or 5% of generation, resulting in an MLF of 1.05.

1.2.2 Marginal Loss Factors less than 1.0

Losses increase with distance, so that the further the distance between the RRN and a connection point, the higher the MLF value. However additional line flow only raises total losses if it moves in the same direction as the existing net flow. At any instant, when the additional flow is against the net flow, total losses on the network is reduced. In this case, the MLF is below 1.0. This typically applies to generators. However, this would also apply to loads in areas where the local level of generation is greater than the local load.

Using the example above, if the net flow is in the direction from the connection point to the RRN, then a generator at the RRN is only required to supply an additional 0.95 MW to meet an additional load of 1 MW at the connection point. Marginal losses are then -0.05 MW, or 5% reduction in generation, resulting in an MLF of 0.95.

1.2.3 Marginal Loss Factors impact on National Electricity Market settlements

The value of electricity purchased or sold at a connection point is multiplied by the connection point MLF as part of the AEMO settlements process. For example:

- A customer at a connection point with an MLF of 1.05 purchases $1000 of electricity. The MLF of 1.05 multiplies the purchase value to 1.05 x 1000 = $1050. The higher purchase value covers the cost of the electrical losses in transporting electricity to the customer’s connection point from the RRN.
- A generator at a connection point with an MLF of 0.95 sells $1000 of electricity. The MLF of 0.95 multiplies the sales value to 0.95 x 1000 = $950. The lower sales value covers the cost of the electrical losses in transporting electricity from the generator’s connection point to the RRN.

It therefore follows that:

- Higher MLFs tend to benefit generator connection points in the settlements process, and vice-versa.
- Lower MLFs tend to benefit customer connection points in the settlements process, and vice-versa.

Section 2 Marginal Loss Factor methodology

This section outlines the principles underlying the Marginal Loss Factor calculation, the load and generation data inputs AEMO obtains and uses for the calculation and how AEMO checks the quality of this data. It also explains how networks and interconnectors are modelled in the Marginal Loss Factor calculation.

AEMO uses a “Forward-Looking Loss Factor” (FLLF) methodology for calculating MLFs[1]. The FLLF methodology uses the principle of “minimal extrapolation”. An overview of this methodology is:

- Develop a load flow model of the transmission network that includes committed augmentations for the year that the MLFs apply.
- Obtain connection point demand forecasts for the year that the MLFs apply.
- Estimate the dispatch of committed new generating units.
- Adjust the dispatch of new and existing generating units to restore the supply-demand balance using the rules in the FLLF methodology.
- Calculate the MLFs using the resulting power flows in the transmission network.

The following sections explain the MLF data requirements and calculation methods.

2.1 Load data requirements for the Marginal Loss Factor calculation

AEMO obtained the load data inputs described in this section before beginning the MLF calculation.

AEMO obtained from its settlements database a set of historical load real power (MW) and reactive power (MVAr) data for each Trading Interval (half hour) covering every load connection point in the NEM, for the period 1 July 2012 to 30 June 2013.

The following organisations used the historical load data to develop forecasts of connection point load traces for 2014-15:

- Transend developed the load traces for Tasmania.
- Powerlink provided connection point energy and maximum demand forecasts for Queensland, and AEMO then developed the connection point load traces.
- TransGrid, Ausgrid and Essential Energy provided load traces for New South Wales, and AEMO scaled the load traces to be consistent with the 2013 National Energy Forecasting Report (NEFR[2]).
- AEMO developed the load traces for South Australia and Victoria.

The annual energy targets used in load forecasting for the 2014-15 MLF calculation are in the table below.

Region	2014-15 forecast sent-out energy[3] (GWh)	2013-14 forecast sent-out energy (GWh)
New South Wales	69,574	70,887
Victoria	44,971[4]	48,012
Queensland	55,278	51,873
South Australia	12,598	13,226
Tasmania	10,462	10,494

[1] The FLLF methodology is available on the AEMO website.
[2] NEFR 2013 is available on the AEMO website.
[3] In 2013 NEFR report, the sent out energy for all regions is defined as Native energy that includes non-scheduled generators. For the MLF calculation process, the forecast sent-out energy was adjusted to ensure consistency between forecast load energy and generators being modelled.
[4] This figure accounts for the announced closure of the Point Henry aluminium smelter.

2.1.1 Historical data accuracy and due diligence of the forecast data

AEMO regularly verifies the accuracy of historical connection point data as part of the settlements process. As a part of the MLF calculation, AEMO calculated the losses from this historical data, by adding the summated generation values to the interconnector flow and subtracting the summated load values. These transmission losses were used to verify that there were no large errors in the data.

AEMO also performed due diligence checks of the connection point load traces to ensure that:

- The demand forecast is consistent with NEFR 2013.
- Load profiles are reasonable, and that the drivers for load profiles that changed from the historical data are identifiable.
- The forecast for connection points includes the relevant embedded generation, if any.
- Industrial and auxiliary type loads are not scaled.

2.2 Generation data requirements for the Marginal Loss Factor calculation

AEMO obtained the generation data inputs described in this section before commencing the MLF calculation.

AEMO obtained from its settlements database a set of historical generation real power (MW) and reactive power (MVAr) data for each Trading Interval (half hour) covering every generation connection point in the NEM, for the period 1 July 2012 to 30 June 2013.

AEMO also obtained the following data:

- Generation capacity data from the 2013 ESOO and the February 2014 Supply-Demand Snapshot.
- Historical generation availability and on-line/off-line status data from AEMO's Market Management System (MMS).

2.2.1 New generating units

For new generating units, AEMO calculates the initial estimate of the output by identifying similar technology and fuel type in accordance with 5.4.2 of the FLLF methodology.

For generating units with an incomplete year of historical data from the previous financial year, AEMO uses a combination of existing and estimated data.

2.2.1.1 Queensland new generating units

There are no committed generation projects in Queensland during 2014-15.

2.2.1.2 New South Wales new generating units

The proponents of Boco Rock Wind Farm and Taralga Wind Farm informed AEMO that they are intending to connect to the NEM in 2014-15. The generation outputs of these wind farms are modelled in the MLF calculation, but AEMO will not calculate an MLF for these wind farms until they have been formally registered as market generators.

2.2.1.3 Victoria new generating units

There are no committed generation projects in Victoria during 2014-15.

2.2.1.4 South Australia new generating units

There are no committed generation projects in South Australia during 2014-15.

2.2.1.5 Tasmania new generating units

There are no committed generation projects in Tasmania during 2014-15.

2.2.2 Generating unit auxiliary power consumption

In accordance with section 5.5.3 of the FLLF methodology, AEMO estimates the auxiliary requirements of scheduled generating units by measuring the generator terminal and metered sent-out capacities at periods of high output. From this estimate of the unit auxiliaries, and the generating unit capacity data, AEMO estimates the sent-out summer and winter generating unit capacities.

2.2.3 Embedded generating units

An embedded generator is one connected to a distribution network, which is in turn connected to the transmission network. An embedded generator can be market or non-market and scheduled or non-scheduled.

MLFs are only defined for market generators.

For a market generator, AEMO calculates a MLF for the transmission connection point where the distribution network it is embedded in takes power from the transmission network. Between this transmission connection point and the embedded generator, there are also distribution network losses. The DNSPs calculate these additional losses on an average basis and are represented by Distribution Loss Factors (DLFs). The AER approves the DLFs before the DNSPs submit them to AEMO for publication.

For dispatch purposes, the MLF of an embedded generator is adjusted by the DLF to reflect its offer price at the RRN. Similarly, the metered energy is adjusted by the DLF for settlement purposes.

The site specific DLFs for embedded generators (scheduled and non-scheduled) are published separately[5].

2.3 Network representation in the Marginal Loss Factor calculation

AEMO obtained the transmission network data inputs described in this section before commencing the MLF calculation.

An actual network configuration recorded by the AEMO Energy Management System (EMS) is used to prepare the NEM interconnected power system load flow model for the MLF calculation. This recording is referred to as a snapshot.

AEMO reviewed the snapshot and modified it where necessary to accurately represent all normally connected equipment. AEMO also checked the switching arrangement for the Victorian 220 kV and 500 kV networks in the Latrobe Valley to ensure that it reflects normal operating conditions.

AEMO added relevant network augmentations that will occur in the 2014-15 financial year. The snapshot is thus representative of the 2014-15 normally operating power system.

2.3.1 Network augmentations for 2014-15

The relevant TNSPs advised of the following network augmentations in 2014-15.

2.3.1.1 Queensland network augmentations

Powerlink provided the following list of network augmentations in 2014-15 in Queensland:

- Installation of a new 132/33 kV transformer at Mackay.
- Installation of three new 132 kV capacitors at Moranbah.
- Replacement of a new 132/33 kV transformer at Moranbah.
- Installation of a new reactor at Ross (-84 MVAr).
- Decommissioning of the two Alan Sherriff – Dan Gleeson 132 kV lines.
- Installation of 132 kV bus tie at Proserpine.
- Establishment of the new 132 kV Wotonga Rail substation.

[5] The DLFs are published on the AEMO website.

- Decommissioning of two 275 kV lines between Blackwall and Greenbank.
- Decommissioning of a 275 kV line between Goodna and Swanbank E.
- Modification of a 275 kV line between Swanbank E and Greenbank.
- Installation of a new 275 kV line between Swanbank E and Blackstone.
- Installation of two 275 kV lines between Blackstone and Greenbank.
- Installation of a new 275 kV line between Blackstone and Blackwall.

2.3.1.2 New South Wales network augmentations

Essential Energy advised there are no augmentations planned for 2014-15. TransGrid and AusGrid provided the following list of network augmentations in 2014-15 in New South Wales:

- Establishment of a new 132 kV connection point at Haymarket.
- Establishment of a new 132 kV connection point at Boggabri Coal Mine.
- Establishment of a new 132 kV connection point at Maules Creek.
- Decommissioning of a 132 kV line between Narrabri and Gunnedah.
- Installation of a new 132 kV line between Narrabri and Boggabri North.
- Installation of a new 132 kV line between Boggabri North and Boggabri East.
- Installation of a new 132 kV line between Boggabri East and Gunnedah.
- Replacement of three 132/33 kV transformers at Griffith.
- Replacement of a 132 kV capacitor at Canberra.
- Installation of a new 132 kV capacitor at Canberra.
- Installation of a new 132 kV capacitor at Yass.
- Replacement of a 132 kV line from Rozelle to Mason Park.
- Decommissioning of a 132 kV line from Peakhurst to Bunnerong.
- Installation of a new 132 kV line from Canterbury to Beaconsfield West.
- Installation of a new 132 kV line from Canterbury to Kogarah.
- Installation of a new 132 kV line from Beaconsfield West to Belmore Park.
- Installation of a new 132 kV line from Haymarket to Belmore Park.
- Establishment of the new 132 kV/11 kV Brandy Hill substation.
- Cutting two 132 kV lines between Stroud and Tomago into the new Brandy Hill substation.

2.3.1.3 Victoria network augmentations

AEMO Victorian Planning provided the following list of network augmentations in 2014-15 in Victoria.

- Replacement of two 220/66 kV transformers at Bendigo with a single transformer.
- Replacement of two 220/66 kV transformers at Geelong.
- Replacement of a 330/220 kV transformer at Dederang.
- Replacement of two 220/66 kV transformers at Glenrowan with a single transformer.
- Replacement of a 220/66 kV transformer at Morwell.

2.3.1.4 South Australia network augmentations

ElectraNet provided the following list of network augmentations in 2014-15 in South Australia:

- Replacement of 132/33 kV transformer at Neuroodla.

2.3.1.5 Tasmania network augmentations

Transend provided the following list of network augmentations to in 2014-15 in Tasmania:

- Modification of 110 kV line between Chapel Street, Creek Road and Risdon.
- Modification of two 110 kV lines between Tarraleah and Tungatinah.
- Decommissioning of two 110 kV lines between Tarraleah and New Norfolk.
- Decommissioning of a 110 kV line between Tarraleah and Meadowbank.
- Installation of two 110 kV lines Tungatinah, Meadowbank and New Norfolk.

2.3.2 Treatment of the Basslink interconnector

Basslink is a Market Network Service Provider that consists of a controllable network element that transfers power between the Tasmania and Victoria regions.

In accordance with sections 5.3.1 and 5.3.2 of the FLLF methodology, AEMO calculates the Basslink connection point MLFs using historical data. Appendix F outlines the loss model for Basslink.

2.3.3 Treatment of the Terranora interconnector

The Terranora interconnector is a regulated interconnector.

The boundary between Queensland and New South Wales located between Terranora and Mudgeeraba is north of Directlink. The Terranora interconnector is in series with Directlink and in the MLF calculation AEMO manages the Terranora interconnector limit by varying the Directlink limit when necessary.

Appendix F outlines the inter-regional loss factor equation for the Terranora interconnector.

2.3.4 Treatment of the Murraylink Interconnector

The Murraylink interconnector is a regulated interconnector.

In accordance with section 5.3 of the FLLF methodology, AEMO treats the Murraylink interconnector as a controllable network element in parallel with the regulated Heywood interconnector.

Appendix F outlines the inter-regional loss factor equation for Murraylink.

2.3.5 Treatment of Yallourn Unit 1

The Yallourn unit 1 can be connected to either the 220 kV or 500 kV network in Victoria.

AEMO used historical switching data for Yallourn 1 as the basis for modelling its generation output in the MLF calculation. Both the 220 kV connection points for Yallourn units 2-4 and the 500 kV connection points for the other Latrobe Valley power stations will have loss factors that reflect the time that Yallourn unit 1 would be in each configuration. AEMO then calculates a single volume weighted loss factor for Yallourn unit 1 based on the switching between the 220 kV and 500 kV networks.

2.3.6 Interconnector capability

In accordance with section 5.5.4 of the FLLF methodology, AEMO estimates nominal interconnector limits for summer peak, summer off-peak, winter peak and winter off-peak periods. These values are in the table below. AEMO sought feedback from the associated TNSPs to ensure that these limits are suitable.

From region	To region	Summer peak (MW)	Summer off-peak (MW)	Winter peak (MW)	Winter off-peak (MW)
Queensland	New South Wales	1078	1078	1078	1078
New South Wales	Queensland	400	550	400	550
New South Wales	Victoria	1900 minus Murray Generation	1900 minus Murray Generation	1900 minus Murray Generation	1900 minus Murray Generation
Victoria	New South Wales	3200 minus Upper & Lower Tumut generation	3000 minus Upper & Lower Tumut generation	3200 minus Upper & Lower Tumut generation	3000 minus Upper & Lower Tumut generation
Victoria	South Australia	460	460	460	460
South Australia	Victoria	460	460	460	460
Murraylink - Victoria	Murraylink - South Australia	220	220	220	220
Murraylink – South Australia	Murraylink - Victoria	188 minus Northwest Bend & Berri loads	198 minus Northwest Bend & Berri loads	215 minus Northwest Bend & Berri loads	215 minus Northwest Bend & Berri loads
Terranora - Queensland	Terranora – New South Wales	224	224	224	224
Terranora – New South Wales	Terranora - Queensland	107	107	107	107
Basslink - Tasmania	Basslink - Victoria	594	594	594	594
Basslink - Victoria	Basslink - Tasmania	478	478	478	478

The peak interconnector capability does not necessarily correspond to the network capability at the time of the maximum regional demand; rather it refers to average capability during the peak periods which corresponds to 7 AM to 10 PM on week days.

2.4 Calculation of Marginal Loss Factors

AEMO uses the TPRICE[6] software package to calculate the MLFs. The TPRICE MLF calculation method is as follows:

- AEMO converts the half hourly forecast load and historical generator data, generating unit capacity and availability data together with interconnector data into a format suitable for input to the TPRICE program.
- AEMO adjusts the load flow case to ensure a reasonable voltage profile in each Region at times of high demand.
- AEMO converts the load flow case into a format suitable for use in TPRICE.

[6] TPRICE is a transmission pricing software package. It is capable of running a large number of consecutive load flow cases quickly. The program outputs loss factors for each trading interval as well as averaged over a financial year using volume weighting.

- The half hourly generator and load data for each connection point, generating unit capacity and availability data, together with interconnector data feed into the TPRICE program one trading interval at a time. The TPRICE program allocates the load and generator values to the appropriate connection points in the load flow case.
- TPRICE iteratively dispatches generators to meet forecast demand and solves each half hourly load flow case and calculates the loss factors appropriate to the load flow conditions.
- The loss factors at each connection point in each Region are referred to the RRN.
- TPRICE averages the loss factors for each trading interval, and for each connection point, using volume weighting.

Typically, the MLF calculation weights generation loss factors against generator output and load loss factors against load consumption. However, where load and generation are connected to the same connection point and individual metering is not available for the separate components, the same loss factor is calculated for both generation and load.

In accordance with section 5.6.1 of the FLLF methodology, AEMO calculates dual MLF values at connection points where one MLF does not satisfactorily represent active power generation and consumption.

The MLFs that apply for the 2014-15 financial year are in Appendix C.

AEMO will also make the MLFs available in Comma Separated Value file format[7].

2.4.1 Inter-regional loss factor equations

Inter-regional loss factor equations describe the variation in loss factor at one RRN with respect to an adjacent RRN. These equations are necessary to cater for the large variations in loss factors that may occur between RRNs resulting from different power flow patterns. This is important in minimising the distortion of economic dispatch of generating units.

The inter-regional loss factor equations to apply for the 2014-15 financial year are provided in Appendix D. AEMO derives these equations by applying linear regression to the set of loss factor data for the RRNs. To meet the requirements of the AEMO dispatch algorithm the choice of variables and equation formulation is restricted:

- Only linear terms are permitted in the equation.
- Only the notional link flow between the reference nodes for which the loss factor difference is being determined is used.
- Region demands are allowed as equation variables.
- Other variables such as generator outputs are not used.

Graphs of variation in inter-regional loss factors with notional link flow are in Appendix D.

The inter-regional loss equations, obtained by integrating the (inter-regional loss factor – 1) function, are in Appendix E.

The inter-regional loss equations for Basslink, Terranora and Murraylink are in Appendix F.

The factors used to apportion the inter-regional losses to the associated regions for 2014-15 are in Appendix G.

2.4.2 Marginal Loss Factor calculation – quality control

As with previous years, AEMO engaged energy market consultants to ensure the quality and accuracy of the Marginal Loss Factor calculation. The consultants performed the following work:

- A benchmark study using independent data sources to calculate the MLFs. AEMO used the benchmark study to identify potential issues with the AEMO data inputs to the MLF calculation.
- A subsequent verification study using AEMO's input data to independently reproduce AEMO's calculation results. AEMO used the verification study to ensure that the AEMO MLF calculation methods and results are accurate.

[7] Available on the AEMO website in June 2014, when the MLFs are input to the Market Management System.

Section 3 Changes in Marginal Loss Factors

This section summarises the changes in MLFs in 2014-15 from 2013-14, and the trends that drive these changes.

The changes in MLFs in 2014-15 from 2013-14 are dictated by the following trends in the NEM:

- A reduction in forecast regional demand in New South Wales, Victoria, South Australia, and Tasmania.
- An increase in forecast regional demand in southern Queensland, in particular driven by new LNG load connections around Columboola.
- The announced closure of the Point Henry aluminium smelter in Geelong, Victoria.
- A reduction in market share of the traditional generation centres in central New South Wales, and the Latrobe Valley in Victoria.
- An increase in market share of generation centres in central and northern Victoria, southern New South Wales, and central and southern Tasmania.
- An increase in Basslink power transfers from Tasmania to Victoria.
- The decommitment of Wallerawang power station in New South Wales, and Swanbank E power station in Queensland.

As a result of these trends, the net direction of power transfers on NEM interconnectors in the MLF calculation increased in the easterly-northerly direction: from South Australia to Victoria, from Tasmania to Victoria, from Victoria to New South Wales, and from New South Wales to Queensland. These changes in interconnector flows have a consequent effect on MLF values, in particular at locations geographically close to an interconnector.

The following sections provide an overview of changes between the 2014-15 MLFs and 2013-14 MLFs, by Region.

3.1 Changes to Marginal Loss Factors in Victoria

The Victorian energy demand forecast for 2014-15 has reduced compared to 2013-14. In particular the energy forecast for Point Henry has reduced due to its announced closure in 2014-15.

Generation in northern Victoria has increased due to increased contributions from hydro-electric generation. Generation in central Victoria has increased, in part due to new wind farm connections. Generation in the Latrobe Valley has decreased.

As a result of these changes, along with the decommitment of Wallerawang power station in New South Wales, power transfers from Victoria to New South Wales have increased. In addition, Victoria is receiving increased power transfers from South Australia, and increased power transfers from Tasmania.

Power transfers from Basslink counteract generation reductions in the Latrobe Valley: therefore power transfers from the Latrobe Valley to Melbourne follow historical patterns, and Latrobe Valley MLFs are similar to the previous year. Power transfers from South Australia supply local load in western Victoria and have not changed power flows within Victoria; therefore MLFs in western Victoria are similar to the previous year. The significant MLF changes in Victoria are:

- MLFs at connection points near the Victoria-New South Wales interconnector have increased along with increased power transfers from Victoria.
- The Point Henry connection point MLF has reduced due to its announced closure.

3.2 Changes to Marginal Loss Factors in New South Wales

The New South Wales energy demand forecast for 2014-15 has reduced compared to 2013-14. Generation in central New South Wales has reduced. Generation in southern New South Wales has increased, driven in part by new wind farm connections, and increased hydro-electric generation. Wallerawang power station has been decommitted for 2014-15.

As a result of changes in Victoria and the decommitment of Wallerawang power station in New South Wales, power transfers from Victoria to New South Wales have increased. Increased demand in Queensland and the decommitment of Swanbank E power station has led to increased power transfers from New South Wales to Queensland. The significant MLF changes in New South Wales are:

- MLFs at connection points in southern New South Wales have decreased due to increased power transfers from Victoria, and increased generation in southern New South Wales.
- MLFs at connection points in northern New South Wales have increased due to increased power transfer to Queensland.

3.3 Changes to Marginal Loss Factors in Queensland

The southern Queensland energy demand forecast for 2014-15 increased compared to 2013-14, in particular driven by new LNG load connections around Columboola. Swanbank E power station has been decommitted from October 2014.

Increased demand in Queensland and the decommitment of Swanbank E power station has led to increased power transfers from New South Wales to Queensland.

In spite of the increase in northerly interconnector flows, Queensland connection point MLFs have not significantly changed. This in because much of the increased demand in Queensland is close to the Queensland-New South Wales interconnector and the power flows within Queensland have not changed.

3.4 Changes to Marginal Loss Factors in South Australia

The South Australian energy demand forecast for 2014-15 has reduced compared to 2013-14. Generation centres in South Australia remain at a similar level to the previous year. In comparison Victorian generation has reduced, leading to increased power transfers from South Australia to Victoria.

South Australia MLF values are mostly similar to the previous year. The significant MLF changes in South Australia are:

- Increased power transfers to Victoria have led to increased MLFs at connection points near the Murraylink interconnector.
- Increased power transfers to Victoria have led to increased MLFs at connection points near the Heywood interconnector.

3.5 Changes to Marginal Loss Factors in Tasmania

The Tasmanian energy demand forecast for 2014-15 has reduced compared to 2013-14. Generation in central and southern Tasmania has increased.

Basslink transfers from Tasmania to Victoria have increased, driven by increased generation in central and southern Tasmania. The significant MLF changes in Tasmania are:

- MLFs at connection points in central Tasmania have reduced due to increased generation.
- MLFs at connection points in southern Tasmania have reduced due to increased generation.

Appendix A - Regions and Regional Reference Nodes

Regions and Regional Reference Nodes

Region	Regional Reference Node
Queensland	South Pine 275kV node
New South Wales	Sydney West 330kV node
Victoria	Thomastown 66kV node
South Australia	Torrens Island Power Station 66kV node
Tasmania	George Town 220 kV node

Region boundaries

Physical metering points defining the region boundaries are located:

Between the Queensland and New South Wales regions

- At Dumaresq Substation on the 8L and 8M Dumaresq to Bulli Creek 330kV lines[8];
- 10.8km north of Terranora on the two 110kV lines between Terranora and Mudgeeraba (lines 757 & 758). Metering at Mudgeeraba adjusted for that point.

Between the New South Wales and Victorian regions

- At Wodonga Terminal Station (WOTS) on the 060 Wodonga to Jindera 330kV line;
- At Red Cliffs Terminal Station (RCTS) on the Red Cliffs to Buronga 220kV line;
- At Murray Switching Station on the MSS to UTSS 330kV lines;
- At Murray Switching Station on the MSS to LTSS 330kV line;
- At Guthega Switching Station on the Guthega to Jindabyne PS 132kV line;
- At Guthega Switching Station on the Guthega to Geehi Dam Tee 132kV line.

Between the Victorian and South Australian regions

- At South East Switching Station (SESS) on the SESS to Heywood 275kV lines.
- At Monash Switching Station (MSS) on the Berri (Murraylink) converter 132kV line.

Between the Victorian and Tasmanian regions

Basslink is not a regulated interconnector; rather it is an MNSP with the following metering points allocated:

- At Loy Yang 500 kV Power Station.
- At George Town 220 kV Switching Station.

[8] The metering at Dumaresq is internally scaled to produce an equivalent flow at the NSW/Queensland State borders.

Appendix B - Virtual Transmission Nodes

Virtual Transmission Nodes (VTNs) are aggregations of transmission nodes for which a single MLF is applied. The Australian Energy Regulator (AER) may approve the use of VTNs in NEM settlements.

The AER has approved six virtual transmission nodes (VTNs) for use in the NEM.

B.1 New South Wales Virtual Transmission Nodes

The AER approved Ausgrid's application to define the three VTNs listed in the following table.

VTN TNI code	Description	Associated transmission connection points (TCPs)
NEV1	Far North	Muswellbrook 132 and Liddell 33
NEV2	North of Broken Bay	Kurri 11, Kurri 33, Kurri 66, Kurri 132, Newcastle 132, Munmorah 330, Munmorah 33, Vales Pt. 132, Beresfield 33, Charmhaven 11, Gosford 33, Gosford 66, West Gosford 11, Ourimbah 33, Somersby 11, Tomago 33, BHP Waratah 132 and Wyong 11
NEV3	South of Broken Bay	Sydney North 132 (Ausgrid), Lane Cove 132, Meadowbank 11, Mason Park 132, Homebush Bay 11, Chullora 132 kV, Chullora 11, Peakhurst 132, Peakhurst 33, Drummoyne 11, Rozelle 33, Pyrmont 132, Pyrmont 33, Marrickville 11, St Peters 11, Beaconsfield West 132, Canterbury 33, Bunnerong 33, Bunnerong 132, Sydney East 132, Sydney West 132 (Ausgrid) and Sydney South 132, Macquarie Park 11, Rozelle 132 and Haymarket 132

B.2 South Australia Virtual Transmission Nodes

The AER approved South Australia Power Networks' (formerly ETSA Utilities) application to define the SJP1 VTN for South Australia. The South Australian VTN includes all South Australian load transmission connection points, excluding:

- Snuggery Industrial as nearly its entire capacity services an industrial facility at Millicent; and
- Whyalla MLF as its entire capacity services an industrial plant in Whyalla.

B.3 Tasmania Virtual Transmission Nodes

The AER approved Aurora's application to define the two VTNs listed in the following table:

VTN TNI code	Description	Associated transmission connection points (TCPs)
TVN1	Greater Hobart Area	Chapel Street 11, Creek Road 33, Lindisfarne 33, North Hobart 11, Risdon 33 and Rokeby 11.
TVN2	Tamar Region	Hadspen 22, Mowbray 22, Norwood 22, Trevallyn 22, George Town 22

Appendix C - Marginal Loss Factors by Region

C.1 Queensland Marginal Loss Factors

Queensland Loads

Location	Voltage (kV)	TNI	2014-15 MLF	2013-14 MLF
Abermain	33	QABM	0.9943	0.9968
Abermain	110	QABR	0.9915	0.9948
Alan Sherriff	132	QASF	1.0948	1.0942
Algester	33	QALG	1.0127	1.0123
Alligator Creek	33	QALC	1.0809	1.0813
Alligator Creek	132	QALH	1.0817	1.0836
Ashgrove West	33	QAGW	1.0270	1.0172
Ashgrove West	110	QCBW	1.0237	1.0164
Belmont	110	QBMH	1.0061	1.0057
Belmont Wecker Road	11	QMOB	1.0335	1.0380
Belmont Wecker Road	33	QBBS	1.0040	1.0093
Biloela	66/11	QBIL	0.9497	0.9489
Blackstone	110	QBKS	0.9927	0.9941
Blackwater	132	QBWH	1.0537	1.0620
Blackwater	66/11	QBWL	1.0548	1.0650
Bluff	132	QBLF	1.0555	1.0644
Bolingbroke	132	QBNB	1.0543	1.0553
Bowen North	66	QBNN	1.0748	1.0729
Boyne Island	132	QBOL	0.9998	0.9930
Boyne Island	275	QBOH	0.9999	0.9945
Braemer – Kumbarilla Park	275	QBRE	0.9510	0.9556
Bulli Creek (Essential Energy)	132	QBK2	0.9523	0.9615
Bulli Creek (Waggamba)	132	QBLK	0.9523	0.9612
Bundamba	110	QBDA	0.9938	0.9958
Burton Downs	132	QBUR	1.0845	1.0975
Cairns	22	QCRN	1.1148	1.1192
Cairns City	132	QCNS	1.1117	1.1168
Callemondah (Rail)	132	QCMD	0.9873	0.9880
Calliope River	132	QCAR	0.9836	0.9884
Cardwell	22	QCDW	1.1025	1.1131
Chinchilla	132	QCHA	0.9726	0.9806
Clare	66	QCLR	1.1110	1.1000
Collinsville Load	33	QCOL	1.0723	1.0761
Columboola	132	QCBL	0.9522	0.9547
Coppabella (Rail)	132	QCOP	1.0974	1.1297
Dan Gleeson	66	QDGL	1.1035	1.1117
Dingo (Rail)	132	QDNG	1.0333	1.0496
Duaringa	132	QDRG	1.0332	1.0330
Dysart	66/22	QDYS	1.0834	1.1079
Eagle Downs Mine	132	QEGD	1.1026	1.1167
Edmonton	22	QEMT	1.1188	1.1245
Egans Hill	66	QEGN	0.9838	0.9860
El Arish	22	QELA	1.1123	1.1203
Garbutt	66	QGAR	1.1026	1.1033
Gin Gin	132	QGNG	1.0020	0.9988
Gladstone South	66/11	QGST	0.9932	0.9903

Location	Voltage (kV)	TNI	2014-15 MLF	2013-14 MLF
Goodna	33	QGDA	1.0010	1.0010
Goonyella Riverside Mine	132	QGYR	1.1191	1.1405
Grantleigh (Rail)	132	QGRN	0.9941	1.0002
Gregory (Rail)	132	QGRE	1.0356	1.0416
Ingham	66	QING	1.1159	1.1169
Innisfail	22	QINF	1.1195	1.1257
Invicta Load	132	QINV	1.0877	1.0841
Kamerunga	22	QKAM	1.1178	1.1228
Kemmis	132	QEMS	1.0702	1.0793
King Creek	132	QKCK	1.0894	1.1084
Lilyvale	66	QLIL	1.0352	1.0425
Lilyvale (Barcaldine)	132	QLCM	1.0314	1.0384
Loganlea	33	QLGL	1.0099	1.0120
Loganlea	110	QLGH	1.0055	1.0051
Mackay	33	QMKA	1.0731	1.0744
Middle Ridge (Energex)	110	QMRX	0.9732	0.9731
Middle Ridge (Ergon)	110	QMRG	0.9732	0.9731
Mindi (Rail)	132	QMND	1.0406	1.0462
Molendinar	33	QMAL	1.0037	1.0064
Molendinar	110	QMAR	1.0042	1.0069
Moranbah (Mine)	66	QMRN	1.1070	1.1318
Moranbah (Town)	11	QMRL	1.1000	1.1235
Moranbah South (Rail)	132	QMBS	1.1087	1.1276
Moranbah Substation	132	QMRH	1.1058	1.1295
Moura	66/11	QMRA	0.9992	1.0044
Mt McLaren (Rail)	132	QMTM	1.1259	1.1649
Mudgeeraba	33	QMGL	1.0023	1.0073
Mudgeeraba	110	QMGB	1.0016	1.0067
Murarrie (Belmont)	110	QMRE	1.0071	1.0072
Nebo	11	QNEB	1.0388	1.0417
Newlands	66	QNLD	1.1173	1.1353
North Goonyella	132	QNGY	1.1225	1.1420
Norwich Park (Rail)	132	QNOR	1.0640	1.0755
Oakey	110	QOKT	0.9750	0.9755
Oonooie (Rail)	132	QOON	1.0899	1.0864
Orana	275	QORH	0.9517	0.9580
Palmwoods	132/110	QPWD	1.0155	1.0270
Pandoin	132	QPAN	0.9870	0.9894
Pandoin	66	QPAL	0.9854	0.9894
Peak Downs (Rail)	132	QPKD	1.1030	1.1288
Pioneer Valley	66	QPIV	1.0717	1.0733
Proserpine	66	QPRO	1.0956	1.1220
Queensland Alumina Ltd (Gladstone South)	132	QQAH	0.9921	0.9923
Queensland Nickel (Yabulu)	132	QQNH	1.0809	1.0805
Raglan	275	QRGL	0.9809	0.9897
Redbank Plains	11	QRPN	0.9978	0.9990
Richlands	33	QRLD	1.0137	1.0116
Rockhampton	66	QROC	0.9901	0.9871
Rocklands (Rail)	132	QRCK	0.9787	0.9814
Rocklea (Archerfield)	110	QRLE	1.0004	1.0037
Ross	132	QROS	1.0870	1.0883
Runcorn	33	QRBS	1.0135	1.0130

Location	Voltage (kV)	TNI	2014-15 MLF	2013-14 MLF
South Pine	110	QSPN	1.0071	1.0060
Stony Creek	132	QSYC	1.0962	1.1588
Sumner	110	QSUM	1.0027	1.0043
Tangkam (Dalby)	110	QTKM	0.9702	0.9673
Tarong	66	QTRL	0.9684	0.9703
Teebar Creek	132	QTBC	1.0126	1.0120
Tennyson	33	QTNS	1.0043	1.0080
Tennyson (Rail)	110	QTNN	1.0017	1.0059
Townsville East	66	QTVE	1.1046	1.1123
Townsville South	66	QTVS	1.1020	1.1100
Townsville South (KZ)	132	QTZS	1.1022	1.1016
Tully	22	QTLL	1.1317	1.1368
Turkinje	66	QTUL	1.1355	1.1370
Turkinje (Craiglee)	132	QTUH	1.1343	1.1360
Wandoan South	132	QWSH	0.9587	0.9562
Wandoo (Rail)	132	QWAN	1.0526	1.0468
Wivenhoe Pump	275	QWIP	0.9930	0.9942
Woolooga (Energex)	132	QWLG	1.0083	1.0057
Woolooga (Ergon)	132	QWLN	1.0083	1.0057
Woree	132	QWRE	1.1127	1.1164
Wotonga	132	QWOT	1.0950	1.0917
Wycarbah	132	QWCB	0.9859	0.9914
Yarwun – Boat Creek (Ergon)	132	QYAE	0.9842	0.9965
Yarwun – Rio Tinto	132	QYAR	0.9840	0.9878

Queensland Generators

Location	Voltage [kV]	DUID	Connection Point ID	TNI	2014-15 MLF	2013-14 MLF
Barron Gorge PS Unit 1	132	BARRON-1	QBGH1	QBGH	1.0883	1.0924
Barron Gorge PS Unit 2	132	BARRON-2	QBGH2	QBGH	1.0883	1.0924
Braemar PS Unit 1	275	BRAEMAR1	QBRA1	QBRA	0.9480	0.9533
Braemar PS Unit 2	275	BRAEMAR2	QBRA2	QBRA	0.9480	0.9533
Braemar PS Unit 3	275	BRAEMAR3	QBRA3	QBRA	0.9480	0.9533
Braemar Stage 2 PS Unit 5	275	BRAEMAR5	QBRA5B	QBRA	0.9480	0.9533
Braemar Stage 2 PS Unit 6	275	BRAEMAR6	QBRA6B	QBRA	0.9480	0.9533
Braemar Stage 2 PS Unit 7	275	BRAEMAR7	QBRA7B	QBRA	0.9480	0.9533
Callide PS Load	132	CALLNL1	QCAX	QCAX	0.9412	0.9396
Callide A PS Unit 4	132	CALL_A_4	QCAA4	QCAA	0.9365	0.9330
Callide A PS Unit 4 Load	132	CALLNL4	QCAA2	QCAA	0.9365	0.9330
Callide B PS Unit 1	275	CALL_B_1	QCAB1	QCAB	0.9525	0.9527
Callide B PS Unit 2	275	CALL_B_2	QCAB2	QCAB	0.9525	0.9527
Callide C PS Unit 3	275	CPP_3	QCAC3	QCAC	0.9525	0.9515
Callide C PS Unit 4	275	CPP_4	QCAC4	QCAC	0.9525	0.9515
Darling Downs PS	275	DDPS1	QBRA8D	QBRA	0.9480	0.9533
Gladstone PS (132 kV) Unit 3	132	GSTONE3	QGLD3	QGLL	0.9777	0.9761
Gladstone PS (132 kV) Unit 4	132	GSTONE4	QGLD4	QGLL	0.9777	0.9761
Gladstone PS (132kV) Load	132	GLADNL1	QGLL	QGLL	0.9777	0.9761
Gladstone PS (275 kV) Unit 1	275	GSTONE1	QGLD1	QGLH	0.9807	0.9821
Gladstone PS (275 kV) Unit 2	275	GSTONE2	QGLD2	QGLH	0.9807	0.9821
Gladstone PS (275 kV) Unit 5	275	GSTONE5	QGLD5	QGLH	0.9807	0.9821
Gladstone PS (275 kV) Unit 6	275	GSTONE6	QGLD6	QGLH	0.9807	0.9821
Kareeya PS Unit 1	132	KAREEYA1	QKAH1	QKYH	1.0870	1.0884
Kareeya PS Unit 2	132	KAREEYA2	QKAH2	QKYH	1.0870	1.0884
Kareeya PS Unit 3	132	KAREEYA3	QKAH3	QKYH	1.0870	1.0884
Kareeya PS Unit 4	132	KAREEYA4	QKAH4	QKYH	1.0870	1.0884
Kogan Creek PS	275	KPP_1	QBRA4K	QWDN	0.9493	0.9516
Koombooloomba	132	KAREEYA5	QKYH5	QKYH	1.0870	1.0884
Millmerran PS Unit 1 (Millmerran)	330	MPP_1	QBCK1	QMLN	0.9532	0.9612
Millmerran PS Unit 2 (Millmerran)	330	MPP_2	QBCK2	QMLN	0.9532	0.9612
Mt Stuart PS Unit 1	132	MSTUART1	QMSP1	QMSP	1.0041	1.0421
Mt Stuart PS Unit 2	132	MSTUART2	QMSP2	QMSP	1.0041	1.0421
Mt Stuart PS Unit 3	132	MSTUART3	QMSP3M	QMSP	1.0041	1.0421
Oakey PS Unit 1	110	OAKEY1	QOKY1	QOKY	0.9519	0.9472
Oakey PS Unit 2	110	OAKEY2	QOKY2	QOKY	0.9519	0.9472
Stanwell PS Load	132	STANNL1	QSTX	QSTX	0.9858	0.9740
Stanwell PS Unit 1	275	STAN-1	QSTN1	QSTN	0.9693	0.9740
Stanwell PS Unit 2	275	STAN-2	QSTN2	QSTN	0.9693	0.9740
Stanwell PS Unit 3	275	STAN-3	QSTN3	QSTN	0.9693	0.9740
Stanwell PS Unit 4	275	STAN-4	QSTN4	QSTN	0.9693	0.9740
Swanbank E GT	275	SWAN_E	QSWE	QSWE	0.9934	0.9963
Tarong North PS	275	TNPS1	QTNT	QTNT	0.9678	0.9692

Location	Voltage [kV]	DUID	Connection Point ID	TNI	2014-15 MLF	2013-14 MLF
Tarong PS Unit 1	275	TARONG#1	QTRN1	QTRN	0.9677	0.9697
Tarong PS Unit 2	275	TARONG#2	QTRN2	QTRN	0.9677	0.9697
Tarong PS Unit 3	275	TARONG#3	QTRN3	QTRN	0.9677	0.9697
Tarong PS Unit 4	275	TARONG#4	QTRN4	QTRN	0.9677	0.9697
Wivenhoe Generation Unit 1	275	W/HOE#1	QWIV1	QWIV	0.9891	0.9888
Wivenhoe Generation Unit 2	275	W/HOE#2	QWIV2	QWIV	0.9891	0.9888
Wivenhoe Pump 1	275	PUMP1	QWIP1	QWIP	0.9930	0.9942
Wivenhoe Pump 2	275	PUMP2	QWIP2	QWIP	0.9930	0.9942
Yabulu PS	132	YABULU	QTYP	QTYP	1.0292	1.0369
Yarwun PS	132	YARWUN_1	QYAG1R	QYAG	0.9837	0.9872

Queensland Embedded Generators

Location	Voltage [kV]	DUID	Connection Point ID	TNI	2014-15 MLF	2013-14 MLF
Barcaldine PS - Lilyvale	132	BARCALDN	QBCG	QBCG	0.9871	0.9985
Browns Plains Landfill Gas PS	110	BPLANDF1	QLGH3B	QLGH	1.0055	1.0051
Columboola - Condamine PS UN 1	132	CPSA	QCND1C	QCND	0.9519	0.9543
Daandine PS	110	DAANDINE	QTKM1	QTKM	0.9702	0.9673
German Creek Generator	66	GERMCRK	QLIL2	QLIL	1.0352	1.0425
Isis CSM	132	ICSM	QGNG1I	QTBC	1.0126	1.0120
Mackay GT	33	MACKAYGT	QMKG	QMKG	1.0305	1.0492
Moranbah Gen	11	MORANBAH	QMRL1M	QMRL	1.1000	1.1235
Moranbah North PS	66	MBAHNTH	QMRN1P	QMRN	1.1070	1.1318
Oakey Creek Generator	66	OAKYCREK	QLIL1	QLIL	1.0352	1.0425
Rochedale Renewable Energy Plant	110	ROCHEDAL	QBMH2	QBMH	1.0061	1.0057
Rocky Point Gen (Loganlea 110kV)	110	RPCG	QLGH2	QLGH	1.0055	1.0051
Roghan Road Generator	110	EDLRGNRD	QSPN2	QSPN	1.0071	1.0060
Roma PS Unit 7 - Columboola	132	ROMA_7	QRMA7	QRMA	0.9404	0.9347
Roma PS Unit 8 - Columboola	132	ROMA_8	QRMA8	QRMA	0.9404	0.9347
Southbank Institute Of Technology	110	STHBKTEC	QCBD1S	QCBW	1.0237	1.0164
Suncoast Gold Macadamias Co-Gen (Palmwoods)	110	SUNCOAST	QPWD1	QPWD	1.0155	1.0270
Ti Tree BioReactor	33	TITREE	QABM1T	QABM	0.9943	0.9968
Whitwood Rd Renewable Energy Plant	110	WHIT1	QSBK1	QBKS	0.9927	0.9941
Wivenhoe Small Hydro	110	WIVENSH	QABR1	QABR	0.9915	0.9948
Yabulu Steam Turbine (Garbutt 66kV)	66	YABULU2	QGAR1	QYST	1.0285	1.0444

C.2 New South Wales Marginal Loss Factors

New South Wales Loads

Location	Voltage (kV)	TNI	2014-15 MLF	2013-14 MLF
Albury	132	NALB	0.9420	1.0067
Alcan	132	NALC	0.9922	0.9924
Armidale	66	NAR1	1.0266	0.9799
Australian Newsprint Mill	132	NANM	0.9421	0.9999
Balranald	22	NBAL	0.9728	1.0411
Beaconsfield North	132	NBFN	1.0058	1.0075
Beaconsfield South	132	NBFS	1.0058	1.0075
Beaconsfield West	132	NBFW	1.0058	1.0075
Belmore Park	132	NBM1	1.0056	1.0072
Beresfield	33	NBRF	0.9958	0.9991
Beryl	66	NBER	1.0155	1.0140
BHP (Waratah)	132	NWR1	0.9919	0.9918
Boambee South	132	NWST	1.1322	1.0140
Brandy Hill	132	NBH1	0.9941	0.9979
Brandy Hill	11	NBHL	0.9941	0.9979
Broken Hill	22	NBKG	0.9978	1.0806
Broken Hill	220	NBKH	0.9901	1.0720
Bunnerong	132	NBG1	1.0054	1.0085
Bunnerong	33	NBG3	1.0089	1.0174
Burrinjuck	132	NBU2	0.9597	0.9956
Canterbury	33	NCTB	1.0090	1.0120
Carlingford	132	NCAR	1.0001	1.0038
Casino	132	NCSN	1.0907	1.0207
Charmhaven	11	NCHM	0.9933	0.9970
Chullora	132	NCHU	1.0065	1.0107
Coffs Harbour	66	NCH1	1.0631	1.0090
Coleambally	132	NCLY	0.9637	1.0216
Cooma	66	NCMA	0.9683	1.0156
Cooma (SPI)	66	NCM2	0.9683	1.0156
Cowra	66	NCW8	1.0040	1.0257
Dapto (Endeavour Energy)	132	NDT1	0.9883	0.9946
Dapto (Essential Energy)	132	NDT2	0.9883	0.9946
Darlington Point	132	NDNT	0.9593	1.0174
Deniliquin	66	NDN7	0.9833	1.0531
Dorrigo	132	NDOR	1.0507	1.0002
Drummoyne	11	NDRM	1.0101	1.0172
Dunoon	132	NDUN	1.1151	1.0204
Far North VTN		NEV1	0.9756	0.9674
Finley	66	NFNY	0.9752	1.0426
Forbes	66	NFB2	1.0517	1.0565
Gadara	132	NGAD	0.9652	1.0145
Glen Innes	66	NGLN	1.0672	1.0196
Gosford	33	NGSF	0.9992	1.0056
Gosford	66	NGF3	1.0001	1.0045
Green Square	11	NGSQ	1.0060	1.0077
Griffith	33	NGRF	0.9773	1.0465
Gunnedah	66	NGN2	1.0571	1.0383
Haymarket	132	NHYM	1.0055	1.0073

Location	Voltage (kV)	TNI	2014-15 MLF	2013-14 MLF
Heron's Creek	132	NHNC	1.0860	1.0686
Holroyd	132	NHLD	1.0008	1.0004
Homebush Bay	11	NHBB	1.0082	1.0147
Ilford	132	NLFD	0.9882	0.9880
Ingleburn	66	NING	0.9977	0.9983
Inverell	66	NNVL	1.0786	1.0387
Kemps Creek	330	NKCK	0.9943	0.9964
Kempsey	33	NKS3	1.0824	1.0556
Kempsey	66	NKS2	1.0803	1.0592
Koolkhan	66	NKL6	1.0839	1.0245
Kurnell	132	NKN1	1.0037	1.0043
Kurri	33	NKU3	0.9949	0.9951
Kurri	11	NKU1	0.9919	0.9921
Kurri	132	NKUR	0.9833	0.9879
Lake Munmorah	132	NMUN	0.9859	0.9904
Lane Cove	132	NLCV	1.0054	1.0137
Liddell	33	NLD3	0.9755	0.9675
Lismore	132	NLS2	1.1047	1.0217
Liverpool	132	NLP1	1.0004	1.0007
Macarthur	132	NMC1	0.9928	0.9966
Macarthur	66	NMC2	0.9950	0.9978
Macksville	132	NMCV	1.0735	1.0323
Macquarie Park	11	NMQP	1.0088	1.0166
Manildra	132	NMLD	1.0387	1.0407
Marrickville	11	NMKV	1.0113	1.0146
Marulan (Endeavour Energy)	132	NMR1	0.9772	0.9851
Marulan (Essential Energy)	132	NMR2	0.9772	0.9851
Mason Park	132	NMPK	1.0059	1.0120
Meadowbank	11	NMBK	1.0092	1.0212
Molong	132	NMOL	1.0330	1.0339
Moree	66	NMRE	1.1208	1.1059
Morven	132	NMVN	0.9419	1.0012
Mt Piper	132	NMPP	0.9696	0.9684
Mt Piper	66	NMP6	0.9696	0.9684
Mudgee	132	NMDG	1.0089	1.0080
Mullumbimby	132	NMLB	1.1416	0.9935
Mullumbimby	11	NML1	1.1466	1.0294
Munmorah	33	NMNP	0.9898	0.9934
Munyang	11	NMY1	0.9885	1.0279
Munyang	33	NMYG	0.9885	1.0279
Murrumbateman	132	NMBM	0.9656	0.9919
Murrumburrah	66	NMRU	0.9722	1.0115
Muswellbrook	132	NMRK	0.9757	0.9673
Nambucca Heads	132	NNAM	1.0721	1.0266
Narrabri	66	NNB2	1.1056	1.0936
Newcastle	132	NNEW	0.9900	0.9904
North of Broken Bay VTN		NEV2	0.9931	0.9950
Orange	132	NRG1	1.0396	1.0388
Orange	66	NRGE	1.0421	1.0412
Orange North	132	NONO	1.0406	1.0411
Ourimbah	33	NORB	0.9990	1.0035
Ourimbah	132	NOR1	0.9968	1.0012

Location	Voltage (kV)	TNI	2014-15 MLF	2013-14 MLF
Ourimbah	66	NOR6	0.9967	1.0005
Panorama	66	NPMA	1.0083	1.0274
Parkes	132	NPKS	1.0493	1.0546
Parkes	66	NPK6	1.0514	1.0561
Peakhurst	132	NPH1	1.0026	1.0032
Peakhurst	33	NPHT	1.0054	1.0065
Pt Macquarie	33	NPMQ	1.0931	1.0688
Pyrmont	132	NPT1	1.0056	1.0073
Pyrmont	33	NPT3	1.0061	1.0080
Raleigh	132	NRAL	1.0651	1.0162
Regentville	132	NRGV	0.9972	0.9982
Rozelle	132	NRZH	1.0064	1.0141
Rozelle	33	NRZL	1.0069	1.0142
Snowy Adit	132	NSAD	0.9612	1.0137
Somersby	11	NSMB	1.0012	1.0055
South of Broken Bay VTN		NEV3	1.0044	1.0082
St Peters	11	NSPT	1.0089	1.0113
Stroud	132	NSRD	1.0119	1.0145
Sydney East	132	NSE2	1.0041	1.0078
Sydney North (Ausgrid)	132	NSN1	1.0001	1.0038
Sydney North (Endeavour Energy)	132	NSN2	1.0001	1.0038
Sydney South	132	NSYS	1.0011	1.0018
Sydney West (Ausgrid)	132	NSW1	1.0026	1.0057
Sydney West (Endeavour Energy)	132	NSW2	1.0026	1.0057
Tamworth	66	NTA2	1.0044	0.9785
Taree (Essential Energy)	132	NTR2	1.0680	1.0647
Tenterfield	132	NTTF	1.0802	1.0241
Terranora	110	NTNR	1.0956	1.0394
Tomago	330	NTMG	0.9925	0.9932
Tomago (Ausgrid)	132	NTME	0.9911	0.9945
Tomago (Essential Energy)	132	NTMC	0.9911	0.9945
Top Ryde	11	NTPR	1.0066	1.0142
Tuggerah	132	NTG3	0.9933	0.9970
Tumut	66	NTU2	0.9666	1.0137
Vales Pt.	132	NVP1	0.9858	0.9903
Vineyard	132	NVYD	0.9998	0.9987
Wagga	66	NWG2	0.9533	1.0109
Wagga North	66	NWG6	0.9545	1.0107
Wagga North	132	NWGN	0.9545	1.0065
Wallerawang (Endeavour Energy)	132	NWW6	0.9691	0.9670
Wallerawang (Essential Energy)	132	NWW5	0.9691	0.9670
Wallerawang 66	66	NWW7	0.9700	0.9678
Wellington	132	NWL8	0.9875	0.9878
West Gosford	11	NGWF	1.0018	1.0063
Williamsdale	132	NWDL	0.9655	1.0005
Wyong	11	NWYG	0.9955	0.9998
Yanco	33	NYA3	0.9672	1.0270
Yass	66	NYS6	0.9661	0.9930
Yass	132	NYS1	0.9609	0.9860

New South Wales Generators

Location	Voltage [kV]	DUID	Connection Point ID	TNI	2014-15 MLF	2013-14 MLF
Bayswater PS Unit 1	330	BW01	NBAY1	NBAY	0.9656	0.9584
Bayswater PS Unit 2	330	BW02	NBAY2	NBAY	0.9656	0.9584
Bayswater PS Unit 3	500	BW03	NBAY3	NBYW	0.9650	0.9587
Bayswater PS Unit 4	500	BW04	NBAY4	NBYW	0.9650	0.9587
Blowering	132	BLOWERNG	NBLW8	NBLW	0.9368	0.9848
Broken Hill GT 1	22	GB01	NBKG1	NBKG	0.9978	1.0806
Burrinjuck	132	BURRIN	NBUK	NBUK	0.9481	0.9902
Capital Wind Farm	330	CAPTL_WF	NCWF1R	NCWF	0.9618	0.9880
Colongra PS Unit 1	330	CG1	NCLG1D	NCLG	0.9855	0.9896
Colongra PS Unit 2	330	CG2	NCLG2D	NCLG	0.9855	0.9896
Colongra PS Unit 3	330	CG3	NCLG3D	NCLG	0.9855	0.9896
Colongra PS Unit 4	330	CG4	NCLG4D	NCLG	0.9855	0.9896
Eraring 330 PS Unit 1	330	ER01	NEPS1	NEP3	0.9842	0.9863
Eraring 330 PS Unit 2	330	ER02	NEPS2	NEP3	0.9842	0.9863
Eraring 500 PS Unit 3	500	ER03	NEPS3	NEPS	0.9857	0.9875
Eraring 500 PS Unit 4	500	ER04	NEPS4	NEPS	0.9857	0.9875
Eraring PS Load	500	ERNL1	NEPSL	NEPS	0.9857	0.9875
Gullen Range Wind Farm	330	GULLRWF1	NGUR1G	NGUR	0.9667	0.9851
Guthega	132	GUTHEGA	NGUT8	NGUT	0.8987	0.9428
Guthega Auxiliary Supply	11	GUTHNL1	NMY11	NMY1	0.9885	1.0279
Hume (NSW Share)	132	HUMENSW	NHUM	NHUM	0.9232	0.9881
Kangaroo Valley – Bendeela (Shoalhaven) Generation - dual MLF	330	SHGEN	NSHL	NSHL	0.9737	0.9838
Kangaroo Valley (Shoalhaven) Pumps - dual MLF	330	SHPUMP	NSHP1	NSHL	0.9877	0.9952
Liddell 330 PS Load	330	LIDDNL1	NLDPL	NLDP	0.9663	0.9588
Liddell 330 PS Unit 1	330	LD01	NLDP1	NLDP	0.9663	0.9588
Liddell 330 PS Unit 2	330	LD02	NLDP2	NLDP	0.9663	0.9588
Liddell 330 PS Unit 3	330	LD03	NLDP3	NLDP	0.9663	0.9588
Liddell 330 PS Unit 4	330	LD04	NLDP4	NLDP	0.9663	0.9588
Lower Tumut Generation - dual MLF	330	TUMUT3	NLTS8	NLTS	0.9309	0.9729
Lower Tumut Pipeline Auxiliary	66	TUMT3NL3	NTU2L3	NTU2	0.9666	1.0137
Lower Tumut Pumps - dual MLF	330	SNOWYP	NLTS3	NLTS	0.9490	0.9875
Lower Tumut T2 Auxiliary	66	TUMT3NL1	NTU2L1	NTU2	0.9666	1.0137
Lower Tumut T4 Auxiliary	66	TUMT3NL2	NTU2L2	NTU2	0.9666	1.0137
Mt Piper PS Load	330	MPNL1	NMPPL	NMTP	0.9698	0.9680
Mt Piper PS Unit 1	330	MP1	NMTP1	NMTP	0.9698	0.9680
Mt Piper PS Unit 2	330	MP2	NMTP2	NMTP	0.9698	0.9680
Munmorah 330 Load	330	MMNL1	NMNPL	NMN1	0.9894	0.9926
Munmorah Unit 3	330	MM3	NMNP3	NMN1	0.9894	0.9926
Munmorah Unit 4	330	MM4	NMNP4	NMN1	0.9894	0.9926
Upper Tumut	330	UPPTUMUT	NUTS8	NUTS	0.9363	0.9783
Uranquinty PS Unit 11	132	URANQ11	NURQ1U	NURQ	0.8675	0.9189
Uranquinty PS Unit 12	132	URANQ12	NURQ2U	NURQ	0.8675	0.9189
Uranquinty PS Unit 13	132	URANQ13	NURQ3U	NURQ	0.8675	0.9189
Uranquinty PS Unit 14	132	URANQ14	NURQ4U	NURQ	0.8675	0.9189
Vales Point 330 PS Load	330	VPNL1	NVPPL	NVPP	0.9865	0.9894

Location	Voltage [kV]	DUID	Connection Point ID	TNI	2014-15 MLF	2013-14 MLF
Vales Point 330 PS Unit 5	330	VP5	NVPP5	NVPP	0.9865	0.9894
Vales Point 330 PS Unit 6	330	VP6	NVPP6	NVPP	0.9865	0.9894
Wallerawang 330 PS Load	330	WWNL1	NWWPL	NWWP	0.9729	0.9699
Wallerawang 330 Unit 7	330	WW7	NWW27	NWWP	0.9729	0.9699
Wallerawang 330 Unit 8	330	WW8	NWW28	NWWP	0.9729	0.9699
Woodlawn Wind Farm	330	WOODLWN1	NCWF2W	NCWF	0.9618	0.9880

New South Wales Embedded Generators

Location	Voltage [kV]	DUID	Connection Point ID	TNI	2014-15 MLF	2013-14 MLF
Awaba Renewable Energy Facility	132	AWABAREF	NNEW2	NNEW	0.9900	0.9904
Bankstown Sport Club	132	BANKSPT1	NSYS3R	NSYS	1.0011	1.0018
Broadwater PS	132	BWTR1	NLS21B	NLS2	1.1047	1.0217
Brown Mountain	66	BROWNMT	NCMA1	NCMA	0.9683	1.0156
Burrendong Hydro PS	132	BDONGHYD	NWL81B	NWL8	0.9875	0.9878
Campbelltown WSLC	66	WESTCBT1	NING1C	NING	0.9977	0.9983
Condong PS	110	CONDONG1	NTNR1C	NTNR	1.0956	1.0394
Copeton Hydro PS	66	COPTNHYD	NNVL1C	NNVL	1.0786	1.0387
Cullerin Range Wind Farm	132	CULLRGWF	NYS11C	NYS1	0.9609	0.9860
Eastern Creek	132	EASTCRK	NSW21	NSW1	1.0026	1.0057
Eraring 330 BS UN (GT)	330	ERGT01	NEP35B	NEP3	0.9842	0.9863
Glenbawn Hydro PS	132	GLBWNHYD	NMRK2G	NMRK	0.9757	0.9673
Glenn Innes (Pindari PS)	66	PINDARI	NGLN1	NGLN	1.0672	1.0196
Grange Avenue	132	GRANGEAV	NVYD1	NVYD	0.9998	0.9987
Gunning Wind Farm	132	GUNNING1	NYS12A	NYS1	0.9609	0.9860
HEZ Power Station	33	HEZ	NKU31H	NKU3	0.9949	0.9951
Jindabyne Generator	66	JNDABNE1	NCMA2	NCMA	0.9683	1.0156
Jounama PS	66	JOUNAMA1	NTU21J	NTU2	0.9666	1.0137
Keepit	66	KEEPIT	NKPT	NKPT	1.0571	1.0383
Liddell 33 – Hunter Valley GTs	33	HVGTS	NLD31	NLD3	0.9755	0.9675
Liverpool (Jacks Gully)	132	JACKSGUL	NLP11	NSW2	1.0026	1.0057
Lucas Heights II Power Plant	132	LUCASHGT	NSYS2G	NSYS	1.0011	1.0018
Lucas Heights Stage 2 Power Station	132	LUCAS2S2	NSYS1	NSYS	1.0011	1.0018
Nine Willoughby	132	NINEWIL1	NSE21R	NSE2	1.0041	1.0078
Redbank PS Unit 1	132	REDBANK1	NMRK1	NRED	0.9744	0.9510
Sithe	132	SITHE01	NSYW1	NSW2	1.0026	1.0057
St George Leagues Club	33	STGEORG1	NPHT1E	NPHT	1.0054	1.0065
Tallawarra PS	132	TALWA1	NDT13T	NTWA	0.9839	0.9860
Teralba Power Station	132	TERALBA	NNEW1	NNEW	0.9900	0.9904
The Drop Power Station	22	THEDROP1	NFNY1D	NFNY	0.9752	1.0426
West Nowra	132	AGLNOW1	NDT12	NDT1	0.9883	0.9946
Wests Illawara Leagues Club	132	WESTILL1	NDT14E	NDT1	0.9883	0.9946
Woodlawn Bioreactor	132	WDLNGN01	NMR21W	NMR2	0.9772	0.9851
Wyangala A PS	66	WYANGALA	NCW81A	NCW8	1.0040	1.0257
Wyangala B PS	66	WYANGALB	NCW82B	NCW8	1.0040	1.0257

C.3 Australian Capital Territory Marginal Loss Factors

Australian Capital Territory Loads

Location	Voltage (kV)	TNI	2014-15 MLF	2013-14 MLF
Canberra	132	ACA1	0.9642	0.9971
Queanbeyan (ACTEW)	66	AQB1	0.9752	1.0150
Queanbeyan (Essential Energy)	66	AQB2	0.9752	1.0150

Australian Capital Territory Embedded Generators

Location	Voltage [kV]	DUID	Connection Point ID	TNI	2014-15 MLF	2013-14 MLF
Capital East Solar Farm	66	CESF1	AQB21C	AQB2	0.9752	1.0150

C.4 Victoria Marginal Loss Factors

Victorian Loads

Location	Voltage (kV)	TNI	2014-15 MLF	2013-14 MLF
Altona	220	VAT2	0.9972	0.9968
Altona	66	VATS	1.0036	1.0057
Ballarat	66	VBAT	1.0239	1.0274
Bendigo	22	VBE2	1.0781	1.0665
Bendigo	66	VBE6	1.0784	1.0699
BHP Western Port	220	VJLA	0.9893	0.9900
Brooklyn (Jemena)	22	VBL2	1.0039	1.0054
Brooklyn (Jemena)	66	VBL6	1.0034	1.0049
Brooklyn (POWERCOR)	22	VBL3	1.0039	1.0054
Brooklyn (POWERCOR)	66	VBL7	1.0034	1.0049
Brunswick (CITIPOWER)	22	VBT2	0.9994	0.9991
Brunswick (Jemena)	22	VBTS	0.9994	0.9991
Cranbourne	220	VCB2	0.9878	0.9885
Cranbourne (SPI Electricity)	66	VCBT	0.9904	0.9909
Cranbourne (UE)	66	VCB5	0.9904	0.9909
East Rowville (SPI Electricity)	66	VER2	0.9916	0.9923
East Rowville (UE)	66	VERT	0.9916	0.9923
Fishermens Bend (CITIPOWER)	66	VFBT	1.0053	1.0033
Fishermens Bend (POWERCOR)	66	VFB2	1.0053	1.0033
Fosterville	220	VFVT	1.0800	1.0683
Geelong	66	VGT6	0.9982	1.0058
Glenrowan	66	VGNT	1.0799	1.0579
Heatherton	66	VHTS	0.9990	0.9980
Heywood	22	VHY2	0.9984	1.0050
Horsham	66	VHOT	1.0760	1.0812
Keilor (Jemena)	66	VKT2	1.0015	1.0032
Keilor (POWERCOR)	66	VKTS	1.0015	1.0032
Kerang	22	VKG2	1.1077	1.0944
Kerang	66	VKG6	1.1070	1.0944
Khancoban	330	NKHN	1.0826	1.0449
Loy Yang Substation	66	VLY6	0.9703	0.9684
Malvern	22	VMT2	0.9960	0.9958
Malvern	66	VMT6	0.9947	0.9945
Morwell TS	66	VMWT	0.9777	0.9780
Mt Beauty	66	VMBT	1.0539	1.0345
Portland	500	VAPD	1.0005	1.0073
Pt Henry	220	VPTH	0.9849	1.0112
Red Cliffs	22	VRC2	1.1260	1.1169
Red Cliffs	66	VRC6	1.1243	1.1139
Red Cliffs (Essential Energy)	66	VRCA	1.1243	1.1139
Richmond	22	VRT2	0.9969	0.9976
Richmond (CITIPOWER)	66	VRT7	0.9993	1.0045
Richmond (UE)	66	VRT6	0.9993	1.0045
Ringwood (SPI Electricity)	22	VRW3	0.9998	1.0013
Ringwood (SPI Electricity)	66	VRW7	0.9992	0.9990
Ringwood (UE)	22	VRW2	0.9998	1.0013
Ringwood (UE)	66	VRW6	0.9992	0.9990
Shepparton	66	VSHT	1.0869	1.0675
South Morang	66	VSM6	0.9992	0.9987

Location	Voltage (kV)	TNI	2014-15 MLF	2013-14 MLF
South Morang	66	VSMT	0.9992	0.9987
Springvale (CITIPOWER)	66	VSVT	0.9965	0.9964
Springvale (UE)	66	VSV2	0.9965	0.9964
Templestowe (CITIPOWER)	66	VTS2	0.9991	0.9991
Templestowe (Jemena)	66	VTST	0.9991	0.9991
Templestowe (SPI Electricity)	66	VTS3	0.9991	0.9991
Templestowe (UE)	66	VTS4	0.9991	0.9991
Terang	66	VTGT	1.0262	1.0284
Thomastown (Jemena)	66	VTTS	1.0000	1.0000
Thomastown (SPI Electricity)	66	VTT2	1.0000	1.0000
Tyabb	66	VTBT	0.9909	0.9920
Wemen TS	66	VWET	1.1240	1.1137
West Melbourne	22	VWM2	1.0026	1.0018
West Melbourne (CITIPOWER)	66	VWM7	1.0043	1.0044
West Melbourne (Jemena)	66	VWM6	1.0043	1.0044
Wodonga	22	VWO2	1.0756	1.0509
Wodonga	66	VWO6	1.0733	1.0489
Yallourn	11	VYP1	0.9564	0.9495

Victoria Generators

Location	Voltage [kV]	DUID	Connection Point ID	TNI	2014-15 MLF	2013-14 MLF
Banimboola	220	BAPS	VDPS2	VDPS	1.0097	0.9834
Basslink (Loy Yang Power Station Switchyard)	500	BLNKVIC	VLYP13	VTBL	0.9684	0.9683
Dartmouth PS	220	DARTM1	VDPS	VDPS	1.0097	0.9834
Eildon PS Unit 1	220	EILDON1	VEPS1	VEPS	1.0078	0.9944
Eildon PS Unit 2	220	EILDON2	VEPS2	VEPS	1.0078	0.9944
Hazelwood PS Load	220	HWPNL1	VHWPL	VHWP	0.9691	0.9673
Hazelwood PS Unit 1	220	HWPS1	VHWP1	VHWP	0.9691	0.9673
Hazelwood PS Unit 2	220	HWPS2	VHWP2	VHWP	0.9691	0.9673
Hazelwood PS Unit 3	220	HWPS3	VHWP3	VHWP	0.9691	0.9673
Hazelwood PS Unit 4	220	HWPS4	VHWP4	VHWP	0.9691	0.9673
Hazelwood PS Unit 5	220	HWPS5	VHWP5	VHWP	0.9691	0.9673
Hazelwood PS Unit 6	220	HWPS6	VHWP6	VHWP	0.9691	0.9673
Hazelwood PS Unit 7	220	HWPS7	VHWP7	VHWP	0.9691	0.9673
Hazelwood PS Unit 8	220	HWPS8	VHWP8	VHWP	0.9691	0.9673
Jeeralang A PS Unit 1	220	JLA01	VJLGA1	VJLG	0.9647	0.9633
Jeeralang A PS Unit 2	220	JLA02	VJLGA2	VJLG	0.9647	0.9633
Jeeralang A PS Unit 3	220	JLA03	VJLGA3	VJLG	0.9647	0.9633
Jeeralang A PS Unit 4	220	JLA04	VJLGA4	VJLG	0.9647	0.9633
Jeeralang B PS Unit 1	220	JLB01	VJLGB1	VJLG	0.9647	0.9633
Jeeralang B PS Unit 2	220	JLB02	VJLGB2	VJLG	0.9647	0.9633
Jeeralang B PS Unit 3	220	JLB03	VJLGB3	VJLG	0.9647	0.9633
Jindabyne pump at Guthega	132	SNOWYGJP	NGJP	NGJP	1.1865	1.1211
Laverton	220	LAVNORTH	VAT21	VAT2	0.9972	0.9968
Loy Yang A PS Load	500	LYNL1	VLYPL	VLYP	0.9704	0.9699
Loy Yang A PS Unit 1	500	LYA1	VLYP1	VLYP	0.9704	0.9699
Loy Yang A PS Unit 2	500	LYA2	VLYP2	VLYP	0.9704	0.9699
Loy Yang A PS Unit 3	500	LYA3	VLYP3	VLYP	0.9704	0.9699
Loy Yang A PS Unit 4	500	LYA4	VLYP4	VLYP	0.9704	0.9699
Loy Yang B PS Unit 1	500	LOYYB1	VLYP5	VLYP	0.9704	0.9699
Loy Yang B PS Unit 2	500	LOYYB2	VLYP6	VLYP	0.9704	0.9699
MacArthur Wind Farm	500	MACARTH1	VTRT1M	VTRT	0.9946	1.0042
McKay Creek / Bogong PS	220	MCKAY1	VMKP1	VT14	1.0083	0.9919
Mortlake Unit 1	500	MORTLK11	VM0P1O	VM0P	0.9922	0.9980
Mortlake Unit 2	500	MORTLK12	VM0P2O	VM0P	0.9922	0.9980
Morwell PS G1, 2 and 3	66	MOR1	VMWT1	VMWG	0.9682	0.9694
Morwell PS G4	11	MOR2	VMWP4	VMWP	0.9698	0.9649
Morwell PS G5	11	MOR3	VMWP5	VMWP	0.9698	0.9649
Morwell PS Load	66	MORNL1	VMWTL	VMWT	0.9777	0.9780
Mt Mercer Windfarm	220	MERCER01	VELT1M	VELT	1.0064	1.0124
Murray	330	MURRAY	NMUR8	NMUR	1.0178	0.9864
Newport PS	220	NPS	VNPS	VNPS	0.9953	0.9943
Valley Power PS	500	VPGS	VLYP7	VLYP	0.9704	0.9699
Waubra Wind Farm	220	WAUBRAWF	VWBT1A	VWBT	1.0157	1.0182
West Kiewa PS Unit 1	220	WKIEWA1	VWKP1	VWKP	1.0416	1.0279
West Kiewa PS Unit 2	220	WKIEWA2	VWKP2	VWKP	1.0416	1.0279
Yallourn W PS 220 Load	220	YWNL1	VYP2L	VYP2	0.9536	0.9481

Location	Voltage [kV]	DUID	Connection Point ID	TNI	2014-15 MLF	2013-14 MLF
Yallourn W PS 220 Unit 1	220	YWPS1	VYP21	VYP3	0.9538	0.9497
Yallourn W PS 220 Unit 2	220	YWPS2	VYP22	VYP2	0.9536	0.9481
Yallourn W PS 220 Unit 3	220	YWPS3	VYP23	VYP2	0.9536	0.9481
Yallourn W PS 220 Unit 4	220	YWPS4	VYP24	VYP2	0.9536	0.9481

Victoria Embedded Generators

Location	Voltage [kV]	DUID	Connection Point ID	TNI	2014-15 MLF	2013-14 MLF
Anglesea PS	220	APS	VAPS	VAPS	0.9849	1.0112
Bairnsdale Power Station	66	BDL01	VMWT2	VBDL	0.9745	0.9752
Bairnsdale Power Station Generator Unit 2	66	BDL02	VMWT3	VBDL	0.9745	0.9752
Ballarat Health Services	66	BBASEHOS	VBAT1H	VBAT	1.0239	1.0274
Brooklyn Landfill & Recycling Facility	66	BROOKLYN	VBL61	VBL6	1.0034	1.0049
Clayton Landfill Gas Power Station	22	CLAYTON	VSV21B	VSV2	0.9965	0.9964
Codrington Wind Farm	66	CODRNGTON	VTGT2C	VTGT	1.0262	1.0284
Corio LFG PS	22	CORIO1	VGT61C	VGT6	0.9982	1.0096
Glenmaggie Hydro PS	66	GLENMAG1	VMWT8G	VMWT	0.9777	0.9780
Hallam Mini Hydro	66	HLMSEW01	VER21H	VER2	0.9916	0.9923
Hallam Road Renewable Energy Facility	66	HALLAMRD1	VER22L	VER2	0.9916	0.9923
Hepburn Community WF	66	HEPWIND1	VBAT2L	VBAT	1.0239	1.0274
Hume (Victorian Share)	66	HUMEV	VHUM	VHUM	0.9912	0.9888
Longford	66	LONGFORD	VMWT6	VMWT	0.9777	0.9780
Mornington Landfill Site Generator	66	MORNW	VTBT1	VTBT	0.9909	0.9920
Mortons Lane Wind Farm	66	MLWF1	VTGT4M	VTGT	1.0262	1.0284
Oaklands Hill Wind Farm	66	OAKLAND1	VTGT3A	VTGT	1.0262	1.0284
Shepparton Waste Gas	66	SHEP1	VSHT2S	VSHT	1.0869	1.0675
Somerton Power Station	66	AGLSOM	VTTS1	VSOM	0.9927	0.9954
Springvale Power Plant	22	SVALE1	VSV22S	VSV2	0.9965	0.9964
Tatura	66	TATURA01	VSHT1	VSHT	1.0869	1.0675
Toora Wind Farm	66	TOORAWF	VMWT5	VMWT	0.9777	0.9780
Traralgon NSS	22	TGNSS1	VMWT1T	VMWT	0.9777	0.9780
William Horvell Hydro PS	66	WILLHOV1	VW061W	VWO6	1.0733	1.0489
Wollert Renewable Energy Facility	66	WOLLERT1	VSMT1W	VSMT	0.9992	0.9987
Wonthaggi Wind Farm	66	WONWP	VMWT7	VMWT	0.9777	0.9780
Wyndham Landfill Site Generator	66	WYNDW	VATS1	VATS	1.0036	1.0057
Yambuk Wind Farm	66	YAMBUKWF	VTGT1	VTGT	1.0262	1.0284
Yarawonga Hydro PS	66	YWNGAHYD	VSHT3Y	VSHT	1.0869	1.0675

C.5 South Australia Marginal Loss Factors

South Australia Loads

Location	Voltage (kV)	TNI	2014-15 MLF	2013-14 MLF
Angas Creek	33	SANC	1.0120	1.0111
Ardrossan West	33	SARW	0.9459	0.9567
Back Callington	11	SBAC	1.0155	1.0130
Baroota	33	SBAR	0.9918	0.9911
Berri	66	SBER	1.1204	1.0683
Berri (POWERCOR)	66	SBE1	1.1204	1.0683
Blanche	33	SBLA	1.0241	0.9981
Blanche (POWERCOR)	33	SBL1	1.0241	0.9981
Brinkworth	33	SBRK	0.9928	0.9886
Bungama Industrial	33	SBUN	0.9879	0.9872
Bungama Rural	33	SBUR	0.9880	0.9872
City West	66	SACR	1.0047	1.0041
Clare North	33	SCLN	0.9931	0.9895
Dalrymple	33	SDAL	0.9157	0.9141
Davenport	275	SDAV	0.9890	0.9803
Davenport	33	SDAW	0.9895	0.9812
Dorrien	33	SDRN	1.0048	1.0047
East Terrace	66	SETC	1.0050	1.0036
Happy Valley	66	SHVA	1.0070	1.0070
Hummocks	33	SHUM	0.9613	0.9752
Kadina East	33	SKAD	0.9680	0.9823
Kanmantoo	11	SKAN	1.0153	1.0124
Keith	33	SKET	1.0258	1.0133
Kilburn	66	SKLB	1.0030	1.0036
Kincraig	33	SKNC	1.0262	1.0096
Lefevre	66	SLFE	0.9995	0.9992
Leigh Creek	33	SLCC	1.0348	1.0005
Leigh Creek South	33	SLCS	1.0383	1.0036
Magill	66	SMAG	1.0050	1.0063
Mannum	33	SMAN	1.0176	1.0156
Mannum - Adelaide Pipeline 1	3.3	SMA1	1.0232	1.0205
Mannum - Adelaide Pipeline 2	3.3	SMA2	1.0224	1.0199
Mannum - Adelaide Pipeline 3	3.3	SMA3	1.0205	1.0183
Middleback	132	SMBK	0.9889	0.9833
Middleback	33	SMDL	0.9878	0.9834
Millbrook	132	SMLB	1.0047	1.0047
Mobilong	33	SMBL	1.0162	1.0148
Morgan - Whyalla Pipeline 1	3.3	SMW1	1.0540	1.0264
Morgan - Whyalla Pipeline 2	3.3	SMW2	1.0309	1.0127
Morgan - Whyalla Pipeline 3	3.3	SMW3	1.0093	0.9998
Morgan - Whyalla Pipeline 4	3.3	SMW4	0.9995	0.9938
Morphett Vale East	66	SMVE	1.0080	1.0084
Mount Barker South	66	SMBS	1.0078	1.0065
Mt Barker	66	SMBA	1.0077	1.0065
Mt Gambier	33	SMGA	1.0231	1.0002
Mt Gunson	33	SMGU	0.9747	0.9936
Murray Bridge - Hahndorf Pipeline 1	11	SMH1	1.0192	1.0176
Murray Bridge - Hahndorf Pipeline 2	11	SMH2	1.0200	1.0185
Murray Bridge - Hahndorf Pipeline 3	11	SMH3	1.0170	1.0167

Location	Voltage (kV)	TNI	2014-15 MLF	2013-14 MLF
Neuroodla	33	SNEU	1.0138	0.9975
New Osborne	66	SNBN	0.9992	0.9990
North West Bend	66	SNWB	1.0567	1.0281
Northfield	66	SNFD	1.0029	1.0032
Para	66	SPAR	1.0036	1.0036
Parafield Gardens West	66	SPGW	1.0024	1.0022
Penola West	33	SPEN	1.0194	0.9970
Pimba	132	SPMB	0.9845	0.9915
Playford	33	SPAA	0.9993	0.9792
Port Lincoln	33	SPLN	0.9726	0.9690
Port Pirie	33	SPPR	0.9906	0.9916
Roseworthy	11	SRSW	1.0092	1.0091
Snuggery Industrial	33	SSNN	1.0081	0.9636
Snuggery Rural	33	SSNR	1.0030	0.9708
South Australian VTN		SJP1	1.0049	1.0005
Stony Point	11	SSPN	0.9947	0.9867
Tailem Bend	33	STAL	1.0161	1.0132
Templers	33	STEM	1.0048	1.0037
Torrens Island	66	STSY	1.0000	1.0000
Waterloo	33	SWAT	0.9924	0.9901
Whyalla	33	SWHY	0.9986	0.9884
Whyalla Central	33	SWYC	0.9940	0.9884
Whyalla Terminal LMF	33	SBHP	0.9948	0.9883
Woomera	132	SWMA	0.9664	0.9944
Wudinna	66	SWUD	0.9905	0.9829
Yadnarie	66	SYAD	0.9777	0.9753

South Australia Generators

Location	Voltage [kV]	DUID	Connection Point ID	TNI	2014-15 MLF	2013-14 MLF
Cathedral Rocks Wind Farm	132	CATHROCK	SCRK	SCRK	0.8774	0.8777
Clements Gap Wind Farm	132	CLEMGPWF	SCGW1P	SCGW	0.9658	0.9645
Dry Creek PS Unit 1	66	DRYCGT1	SDCA1	SDPS	1.0022	1.0009
Dry Creek PS Unit 2	66	DRYCGT2	SDCA2	SDPS	1.0022	1.0009
Dry Creek PS Unit 3	66	DRYCGT3	SDCA3	SDPS	1.0022	1.0009
Hallet 2 WF	275	HALLWF2	SMOK1H	SMOK	0.9843	0.9778
Hallet PS	275	AGLHAL	SHPS1	SHPS	0.9869	0.9794
Hallet WF	275	HALLWF1	SHPS2W	SHPS	0.9869	0.9794
Ladbroke Grove PS Unit 1	132	LADBROK1	SPEW1	SPEW	0.9884	0.9674
Ladbroke Grove PS Unit 2	132	LADBROK2	SPEW2	SPEW	0.9884	0.9674
Lake Bonney Wind Farm	33	LKBONNY1	SMAY1	SMAY	0.9665	0.9426
Lake Bonney Wind Farm Stage 2	33	LKBONNY2	SMAY2	SMAY	0.9665	0.9426
Lake Bonney Wind Farm Stage 3	33	LKBONNY3	SMAY3W	SMAY	0.9665	0.9426
Leigh Creek Northern PS Load 2	33	NPSNL2	SLCCL	SLCC	1.0348	1.0005
Mintaro PS	132	MINTARO	SMPS	SMPS	0.9879	0.9819
Mt Millar Wind Farm	33	MTMILLAR	SMTM1	SMTM	0.8971	0.9036
North Brown Hill Wind Farm	275	NBHWF1	SBEL1A	SBEL	0.9795	0.9740
Northern PS Unit 1	275	NPS1	SNPA1	SNPS	0.9744	0.9746
Northern PS Unit 2	275	NPS2	SNPA2	SNPS	0.9744	0.9746
O.C.P.L. Unit 1	66	OSB-AG	SNBN1	SOCP	0.9990	0.9989
Pelican Point PS	275	PPCCGT	SPPT	SPPT	0.9994	0.9992
Playford Northern PS Load 1	132	NPSNL1	SPAAL	SPAA	0.9993	0.9792
Playford PS	275	PLAYB-AG	SPSD1	SPPS	0.9882	0.9767
Port Lincoln 3	33	POR03	SPL31P	SPL3	0.9108	0.8783
Port Lincoln PS	132	POR01	SPLN1	SPTL	0.9447	0.8772
Quarantine PS Unit 1	66	QPS1	SQPS1	SQPS	0.9939	0.9949
Quarantine PS Unit 2	66	QPS2	SQPS2	SQPS	0.9939	0.9949
Quarantine PS Unit 3	66	QPS3	SQPS3	SQPS	0.9939	0.9949
Quarantine PS Unit 4	66	QPS4	SQPS4	SQPS	0.9939	0.9949
Quarantine PS Unit 5	66	QPS5	SQPS5Q	SQPS	0.9939	0.9949
Snowtown WF Stage 2 - North	275	SNOWNTH1	SBLWS1	SBLW	0.9861	0.9867
Snowtown WF Stage 2 - South	275	SNOWSTH1	SBLWS2	SBLW	0.9861	0.9867
Snowtown Wind Farm	33	SNOWTWN1	SNWF1T	SNWF	0.9136	0.9272
Snuggery PS Units 1 to 3	132	SNUG1	SSGA1	SSPS	0.9944	0.9579
The Bluff wind Farm	275	BLUFF1	SBEL2P	SBEL	0.9795	0.9740
Torrens Island PS A Unit 1	275	TORRA1	STSA1	STPS	1.0004	0.9999
Torrens Island PS A Unit 2	275	TORRA2	STSA2	STPS	1.0004	0.9999
Torrens Island PS A Unit 3	275	TORRA3	STSA3	STPS	1.0004	0.9999
Torrens Island PS A Unit 4	275	TORRA4	STSA4	STPS	1.0004	0.9999
Torrens Island PS B Unit 1	275	TORRB1	STSB1	STPS	1.0004	0.9999
Torrens Island PS B Unit 2	275	TORRB2	STSB2	STPS	1.0004	0.9999
Torrens Island PS B Unit 3	275	TORRB3	STSB3	STPS	1.0004	0.9999
Torrens Island PS B Unit 4	275	TORRB4	STSB4	STPS	1.0004	0.9999
Torrens Island PS Load	66	TORNL1	STSYL	STSY	1.0000	1.0000
Waterloo Wind Farm	132	WATERLWF	SWLE1R	SWLE	0.9819	0.9783
Wattle Point Wind Farm	132	WPWF	SSYP1	SSYP	0.8218	0.8309

South Australia Embedded Generators

Location	Voltage [kV]	DUID	Connection Point ID	TNI	2014-15 MLF	2013-14 MLF
Amcor Glass UN 1	11	AMCORGR	SRSW1E	SRSW	1.0092	1.0091
Angaston Power Station	33	ANGAS1	SDRN1	SANG	0.9498	0.9554
Angaston Power Station	33	ANGAS2	SDRN2	SANG	0.9498	0.9554
Blue Lake Milling	33	BLULAKE1	SKET2B	SKET	1.0258	1.0133
Cummins Lonsdale PS	66	LONSDALE	SMVE1	SMVE	1.0080	1.0084
Highbury LFG PS	11	HIGHBRY1	SNFD2H	SNFD	1.0029	1.0032
Pedler Creek Landfill Gas Power Station	11	PEDLER1	SMVE5C	SMVE	1.0080	1.0084
Pt Stanvac Unit 1	66	STANV1	SMVE3P	SMVE	1.0080	1.0084
Pt Stanvac Unit 2	66	STANV2	SMVE4P	SMVE	1.0080	1.0084
Starfish Hill Wind Farm	66	STARHLWF	SMVE2	SMVE	1.0080	1.0084
Tatiara Meat Co	33	TATIARA1	SKET1E	SKET	1.0258	1.0133
Tea Tree Gully LFG PS	11	TEATREE1	SNFD2T	SNFD	1.0029	1.0032
Terminal Storage Mini-Hydro	66	TERMSTOR	SNFD1	SNFD	1.0029	1.0032
Wingfield 1 LFG PS	11	WINGF1_1	SKLB1W	SKLB	1.0030	1.0036
Wingfield 2 LFG PS	11	WINGF2_1	SNBN2W	SNBN	0.9992	0.9990

C.6 Tasmania Marginal Loss Factors

Tasmania Loads

Location	Voltage (kV)	TNI	2014-15 MLF	2013-14 MLF
Arthurs Lake	6.6	TAL2	0.9849	0.9991
Avoca	22	TAV2	0.9940	1.0287
Boyer SWA	6.6	TBYA	0.9891	1.0401
Boyer SWB	6.6	TBYB	0.9982	1.0412
Bridgewater	11	TBW2	0.9911	1.0359
Burnie	22	TBU3	0.9821	0.9861
Chapel St.	11	TCS3	0.9898	1.0351
Comalco	220	TCO1	1.0006	1.0005
Creek Road	33	TCR2	0.9891	1.0380
Derby	22	TDE2	0.9366	0.9642
Derwent Bridge	22	TDB2	0.9154	0.9497
Devonport	22	TDP2	0.9859	0.9918
Electrona	11	TEL2	1.0020	1.0513
Emu Bay	11	TEB2	0.9789	0.9840
Fisher (Rowallan)	220	TFI1	0.9645	0.9729
George Town	22	TGT3	1.0024	1.0035
George Town (Basslink)	220	TGT1	1.0000	1.0000
Gordon	22	TGO2	0.9530	1.0269
Greater Hobart Area VTN		TVN1	0.9902	1.0378
Hadspen	22	THA3	0.9789	0.9963
Hampshire	110	THM2	0.9782	0.9843
Huon River	11	THR2	1.0003	1.0478
Kermandie	11	TKE2	1.0028	1.0523
Kingston	11	TKI2	0.9942	1.0454
Kingston	33	TK13	0.9938	1.0430
Knights Road	11	TKR2	1.0040	1.0552
Lindisfarne	33	TLF2	0.9938	1.0393
Meadowbank	22	TMB2	0.9624	1.0188
Mornington	33	TMT2	0.9879	1.0466
Mowbray	22	TMY2	0.9766	0.9954
New Norfolk	22	TNN2	0.9828	1.0351
Newton	22	TNT2	0.9795	0.9811
Newton	11	TNT3	0.9616	0.9716
North Hobart	11	TNH2	0.9872	1.0368
Norwood	22	TNW2	0.9776	0.9951
Palmerston	22	TPM3	0.9626	0.9934
Port Latta	22	TPL2	0.9563	0.9663
Que	22	TQU2	0.9678	0.9811
Queenstown	22	TQT2	0.9658	0.9707
Queenstown	11	TQT3	0.9748	0.9818
Railton	22	TRA2	0.9853	0.9905
Risdon	33	TRI4	0.9890	1.0380
Risdon	11	TRI3	0.9889	1.0383

Location	Voltage (kV)	TNI	2014-15 MLF	2013-14 MLF
Rokeby	11	TRK2	0.9975	1.0382
Rosebery	44	TRB2	0.9710	0.9765
Savage River	22	TSR2	0.9982	0.9984
Scottsdale	22	TSD2	0.9554	0.9761
Smithton	22	TST2	0.9434	0.9524
Sorell	22	TSO2	0.9985	1.0447
St Leonard	22	TSL2	0.9780	0.9951
St. Marys	22	TSM2	1.0098	1.0535
Starwood	110	TSW1	1.0010	1.0011
Tamar Region VTN		TVN2	0.9811	0.9970
Temco	110	TTE1	1.0037	1.0039
Trevallyn	22	TTR2	0.9779	0.9951
Triabunna	22	TTB2	1.0018	1.0476
Tungatinah	22	TTU2	0.9210	0.9531
Ulverstone	22	TUL2	0.9830	0.9888
Waddamana	22	TWA2	0.9389	0.9718
Wayatinah	11	TWY2	0.9693	1.0074
Wesley Vale	22	TWV2	0.9765	0.9852

Tasmania Generators

Location	Voltage [kV]	DUID	Connection Point ID	TNI	2014-15 MLF	2013-14 MLF
Basslink (George Town)	220	BLNKTAS	TGT11	TGT1	1.0000	1.0000
Bastyan	220	BASTYAN	TFA11	TFA1	0.9396	0.9478
Bell Bay No.3	110	BBTHREE1	TBB11	TBB1	0.9999	0.9999
Bell Bay No.3	110	BBTHREE2	TBB12	TBB1	0.9999	0.9999
Bell Bay No.3	110	BBTHREE3	TBB13	TBB1	0.9999	0.9999
Bluff Point and Studland Bay Wind Farms	110	WOOLNTH1	TST11	TST1	0.8913	0.9037
Butlers Gorge	110	BUTLERSG	TBG11	TBG1	0.9142	0.9453
Catagunya	220	LI_WY_CA	TLI11	TLI1	0.9702	1.0055
Cethana	220	CETHANA	TCE11	TCE1	0.9593	0.9676
Cluny	220	CLUNY	TCL11	TCL1	0.9737	1.0095
Devils gate	110	DEVILS_G	TDG11	TDG1	0.9639	0.9710
Fisher	220	FISHER	TFI11	TFI1	0.9645	0.9729
Gordon	220	GORDON	TGO11	TGO1	0.9046	1.0037
John Butters	220	JBUTTERS	TJB11	TJB1	0.9405	0.9393
Lake Echo	110	LK_ECHO	TLE11	TLE1	0.9028	0.9538
Lemonthyme	220	LEM_WIL	TSH11	TSH1	0.9683	0.9752
Liapootah	220	LI_WY_CA	TLI11	TLI1	0.9702	1.0055
Mackintosh	110	MACKNTSH	TMA11	TMA1	0.9296	0.9370
Meadowbank	110	MEADOWBK	TMB11	TMB1	0.9644	1.0168
Musselroe	110	MUSSELR1	TDE11M	TDE1	0.8957	0.9203
Paloona	110	PALOONA	TPA11	TPA1	0.9657	0.9732
Poatina	220	POAT220	TPM11	TPM1	0.9681	0.9901
Poatina	110	POAT110	TPM21	TPM2	0.9571	0.9777
Reece No.1	220	REECE1	TRCA1	TRCA	0.9315	0.9400
Reece No.2	220	REECE2	TRCB1	TRCB	0.9319	0.9376
Repulse	220	REPULSE	TCL12	TCL1	0.9737	1.0095
Rowallan	220	ROWALLAN	TFI12	TFI1	0.9645	0.9729
Tamar Valley CCGT	220	TVCC201	TTV11A	TTV1	0.9990	0.9991
Tamar Valley OCGT	110	TVPP104	TBB14A	TBB1	0.9999	0.9999
Tarraleah	110	TARRALEA	TTA11	TTA1	0.9195	0.9513
Trevallyn	110	TREVALLN	TTR11	TTR1	0.9745	0.9901
Tribute	220	TRIBUTE	TTI11	TTI1	0.9339	0.9397
Tungatinah	110	TUNGATIN	TTU11	TTU1	0.9122	0.9427
Wayatinah	220	LI_WY_CA	TLI11	TLI1	0.9702	1.0055
Wilmot	220	LEM_WIL	TSH11	TSH1	0.9683	0.9752

Tasmania Embedded Generators

Location	Voltage [kV]	DUID	Connection Point ID	TNI	2014-15 MLF	2013-14 MLF
Midlands PS	22	MIDLDPS1	TAV21M	TAV2	0.9940	1.0287
Remount	22	REMOUNT	TMY21	TVN2	0.9811	1.0074

Appendix D - Inter-regional loss factor equations

Loss factor equation (South Pine 275 referred to Sydney West 330)

= 1.0014 + 2.3083E-04*NQt – 1.7458E-06*Nd + 1.1188E-05*Qd

Loss factor equation (Sydney West 330 referred to Thomastown 66)

= 1.0992 + 1.7932 E-04*VNt - 4.8004E-05*Vd + 1.1625E-05*Nd + 2.5112E-05*Sd

Loss factor equation (Torrens Island 66 referred to Thomastown 66)

= 1.0071 + 3.0352E-04*VSAt – 2.8227E-06*Vd + 7.555E-06*Sd
where,

Qd = Queensland demand

Vd = Victorian demand

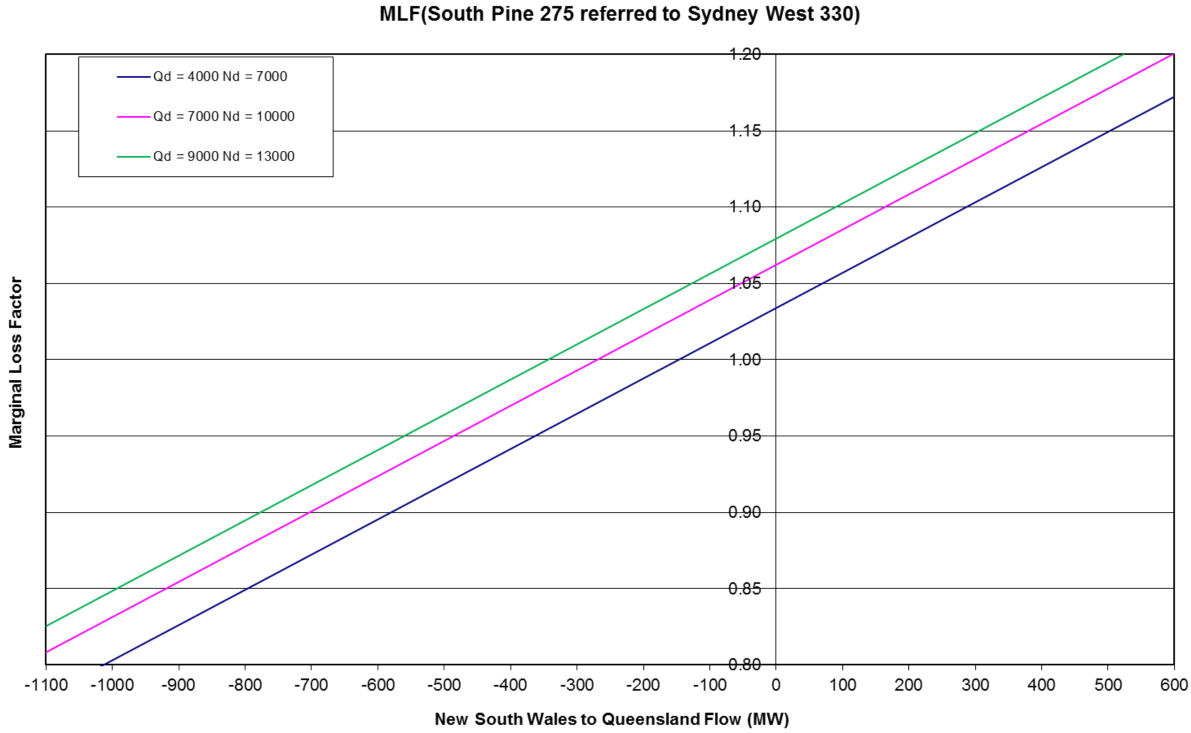
Nd = New South Wales demand

Sd = South Australian demand

NQt = transfer from New South Wales to Queensland

VNt = transfer from Victoria to New South Wales

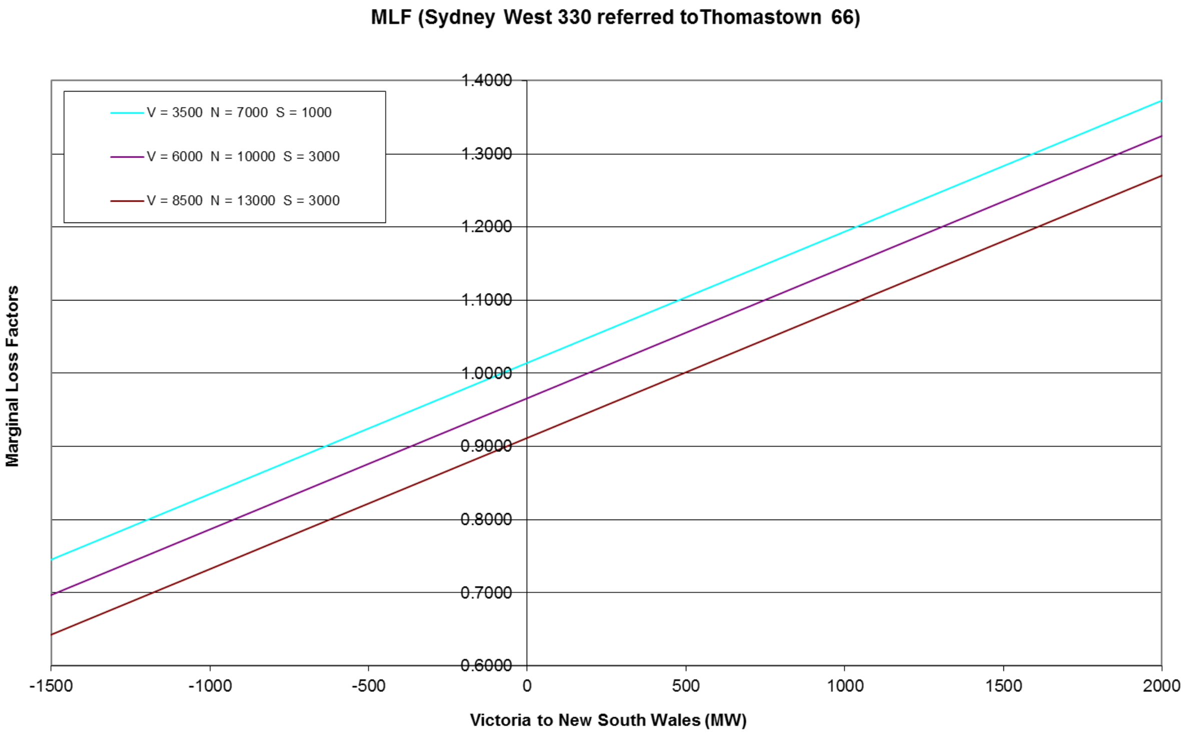
VSAt = transfer from Victoria to South Australia



South Pine 275 referred to Sydney West 330 marginal loss factor versus NSW to Qld flow

Coefficient statistics

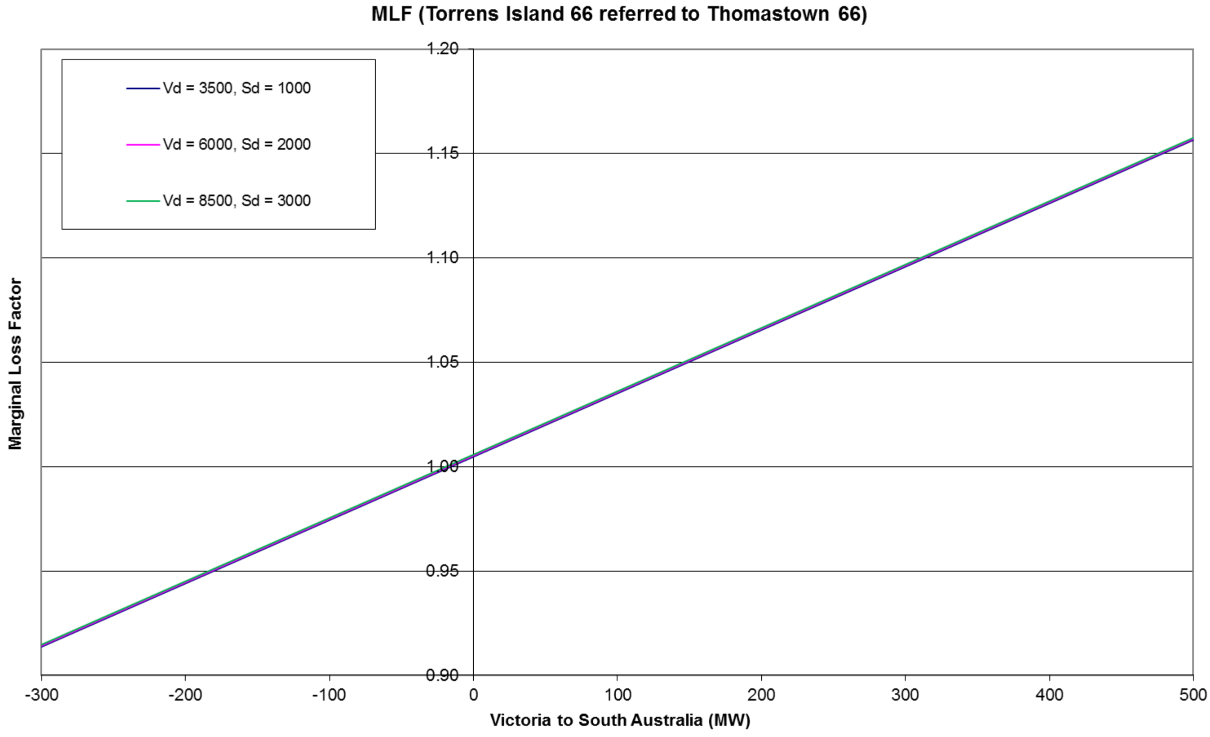
Coefficient	Q_d	N_d	NQ_t	CONSTANT
Coefficient value	1.1188E-05	-1.7458E-06	2.3083E-04	1.0014
Standard error values for the coefficients	3.0594E-07	1.8389E-07	5.8731E-07	1.0727E-03
Coefficient of determination (R2)	0.9315			
Standard error of the y estimate	0.0171			



Sydney West 330 referred to Thomastown 66 marginal loss factor versus Victoria to NSW flow

Coefficient statistics

Coefficient	S_d	N_d	V_d	VN_t	CONSTANT
Coefficient value	2.5112E-05	1.1625E-05	-4.8004E-05	1.7932E-04	1.0992
Standard error values for the coefficients	1.3968E-06	4.3482E-07	7.2803E-07	8.1462E-07	2.2255E-03
Coefficient of determination (R^2)	0.8660				
Standard error of the y estimate	0.0355				



Torrens Island 66 referred to Thomastown 66 marginal loss factor versus Victoria to SA flow

Coefficient statistics

Coefficient	S_d	V_d	VSA_t	CONSTANT
Coefficient value	7.555E-06	-2.8227E-06	3.0352E-04	1.0071
Standard error values for the coefficients	7.4228E-07	2.5808E-07	9.2541E-07	8.2629E-04
Coefficient of determination (R^2)	0.8737			
Standard error of the y estimate	0.0189			

Appendix E - Inter-regional loss equations

The inter-regional loss equations are derived by integrating the equation *(Loss factor – 1)* with respect to the interconnector flow, i.e.

Losses = ∫(Loss factor – 1) dFlow

South Pine 275 referred to Sydney West 330 notional link average losses

= (0.0014 – 1.7458E-06*Nd + 1.1188E-05*Qd)*NQt + 1.1542E-04*NQt^2

Sydney West 330 referred to Thomastown 66 notional link average losses

= (0.0992- 4.8004E-05*Vd + 1.1625E-05*Nd +2.5112E-05*Sd)*VNt + 8.9661E-05*VNt^2

Torrens Island 66 referred to Thomastown 66 notional link average losses

= (0.0071 -2.8227E-06*Vd + 7.5555E-06*Sd)*VSAt + 1.5176E-04*VSAt^2

where,

Qd = Queensland demand

Vd = Victorian demand

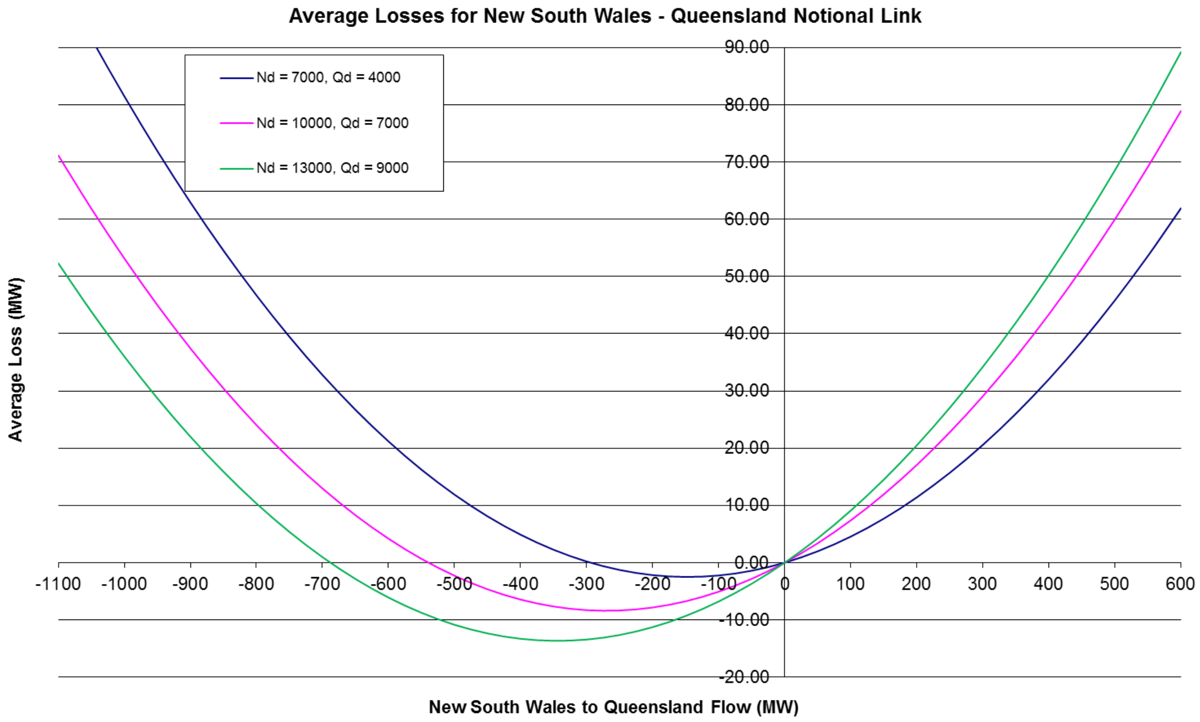
Nd = New South Wales demand

Sd = South Australia demand

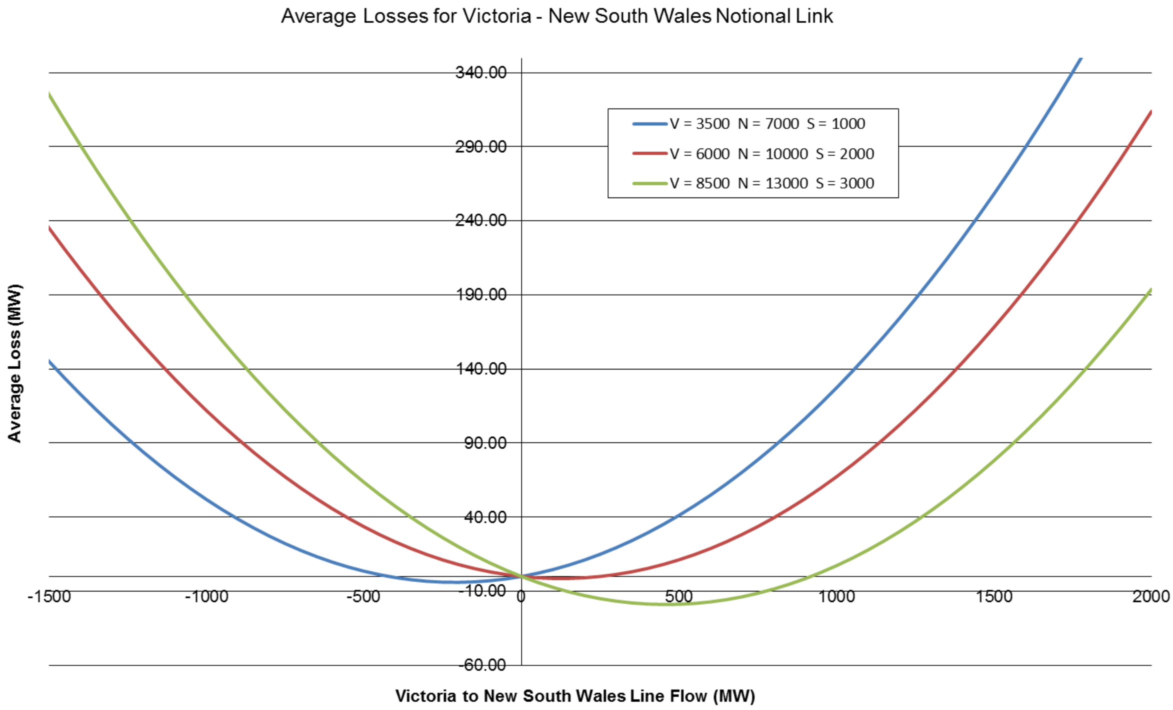
NQt = transfer from New South Wales to Queensland

VNt = transfer from Victoria to New South Wales

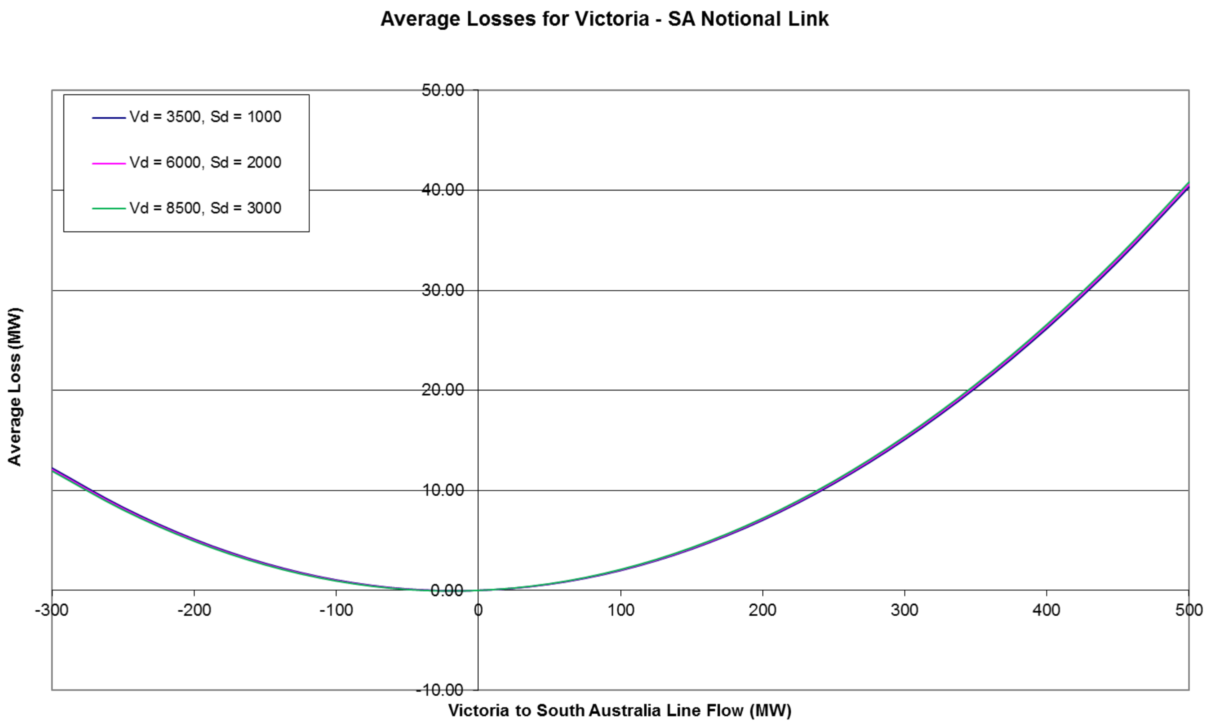
VSAt = transfer from Victoria to South Australia



NSW to Queensland notional link losses versus NSW to Queensland notional link flow



Victoria to NSW notional link losses versus Victoria to NSW notional link flow



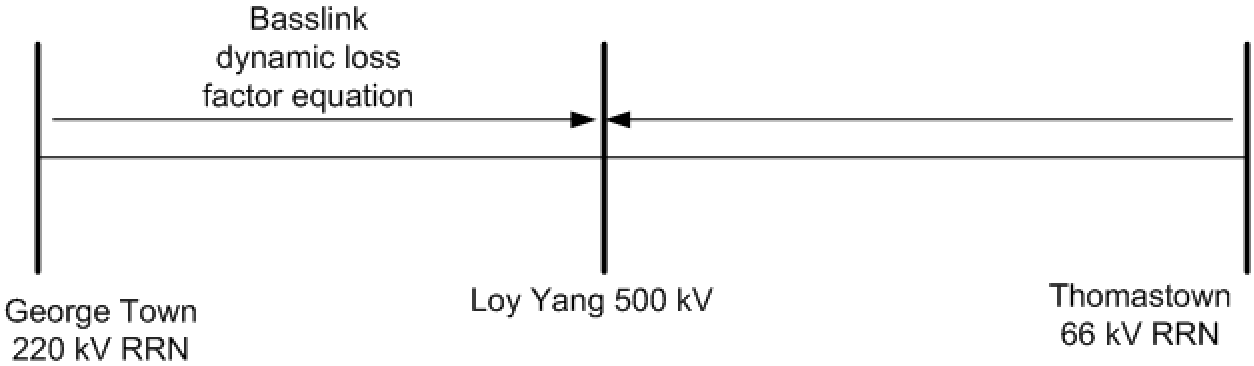
Victoria to SA notional link losses versus Victoria to SA notional link flow

Appendix F - Basslink, Terranora, Murraylink loss equations

Basslink

The loss factor model for Basslink is made up of the following portions:

- George Town 220 kV MLF referred to Tasmania RRN = 1.0000
- Basslink (Loy Yang Power Station Switchyard) 500 kV MLF referred to Victorian RRN = 0.9684.
- Receiving end dynamic loss factor referred to the sending end= 0.99608 + 2.0786* 10^{-4} * $P_{(receive)}$, where $P_{(receive)}$ is the Basslink flow measured at the receiving end.



The equation describing the losses between the George Town 220 kV and Loy Yang 500 kV connection points can be determined by integrating the (loss factor equation – 1), giving:

$$P_{(send)} = P_{(receive)} + [\ (-3.92x10^{-3}) * P_{(receive)} + (1.0393x10^{-4}) * P_{(receive)}^{2} + 4]$$

where:

$P_{(send)}$ – Power in MW measured at the sending end,

$P_{(receive)}$ – Power in MW measured at the receiving end.

The model is limited from 40MW to 630MW. When the model falls below 40MW, this is within the ±50 MW no-go zone requirement for Basslink operation.

Murraylink

Murraylink is a regulated interconnector. In accordance with Rules Clause 3.6.1(a), the Murraylink loss model consists of a single dynamic MLF from the Victorian RRN to the South Australian RRN.

For the purposes of the AEMO market systems the measurement point of the Murraylink interconnector is the 132 kV connection to the Monash converter. This effectively forms part of the boundary between the Victorian and South Australian Regions.

The losses between Red Cliffs 220 kV and Monash 132 kV connection points is given by the following equation:

$= (0.0039 * Flow_t + 2.8182 * 10^{-4} * Flow_t^{\ 2})$

AEMO determined the following Murraylink MLF model using regression analysis:

Murraylink MLF (Torrens Island 66 referred to Thomastown 66) = 2.3063E-03*$Flow_t$ +1.0990

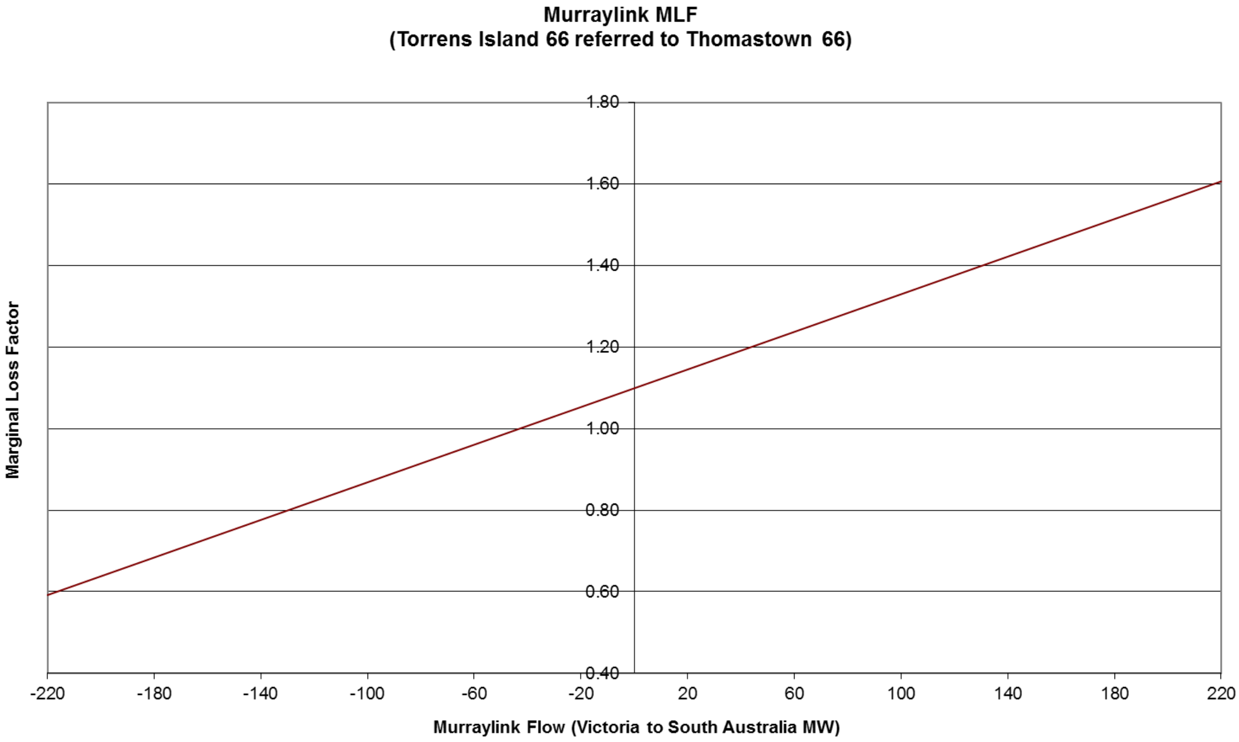
This model consisting of a constant and a Murraylink flow coefficient is suitable because most of the loss is due to variations in the Murraylink flow and other potential variables do not improve the model.

The regression statistics for this Murraylink loss factor model are presented in the following table.

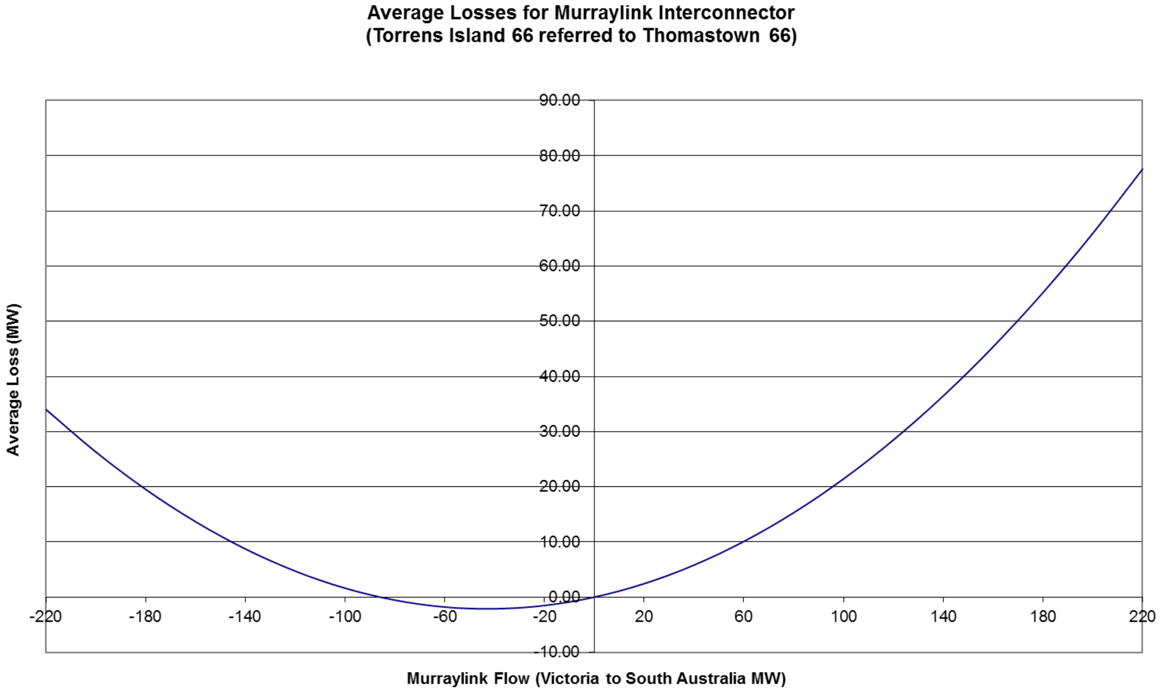
Coefficient	***$Flow_t$***	**CONSTANT**
Coefficient Value	2.3063E-03	1.0990
Standard error values for the coefficient	2.8885E-06	2.4123E-04
Coefficient of determination (R^2)	0.9733	
Standard error of the y estimate	0.0271	

The loss model for a regulated Murraylink interconnector can be determined by integrating (MLF-1), giving:

Murraylink loss = 0.0990*Flowt + 1.1531E-03*$Flowt^2$



Torrens Island 66 referred to Thomastown 66 marginal loss factor versus Murraylink flow (Victoria to SA)



Murraylink notional link losses versus Murraylink flow (Victoria to SA)

Terranora

Terranora is a regulated interconnector. In accordance with Rules Clause 3.6.1(a), the Terranora loss model consists of a single dynamic MLF from the New South Wales RRN to the Queensland RRN.

For the purposes of the AEMO market systems the measurement point of the Terranora interconnector is 10.8 km north from Terranora on the two 110 kV lines between Terranora and Mudgeeraba. This effectively forms part of the boundary between the New South Wales and Queensland Regions.

The losses between the Mullumbimby 132 kV and Terranora 110 kV connection points is given by the following equation:

$$= (-0.0013 * Flow_t + 2.7372 * 10^{-4} * Flow_t^{\ 2})$$

AEMO determined the following Terranora MLF model using regression analysis:

Terranora interconnector MLF (South Pine 275 referred to Sydney West 330) = 1.1496 + 2.8435E-03*Flowt

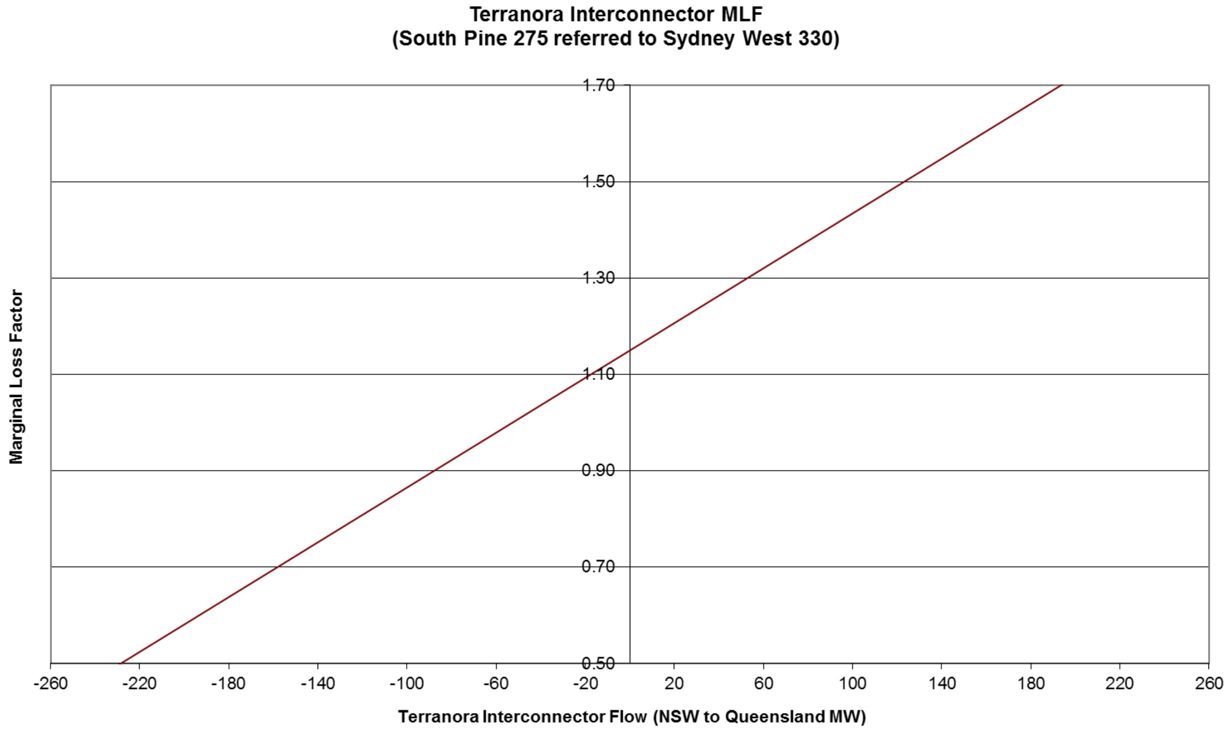
This model consisting of a constant and a Murraylink flow coefficient is suitable because most of the loss is due to variations in the Terranora flow and other potential variables do not improve the model.

The regression statistics for this Terranora loss factor model are presented in the following table.

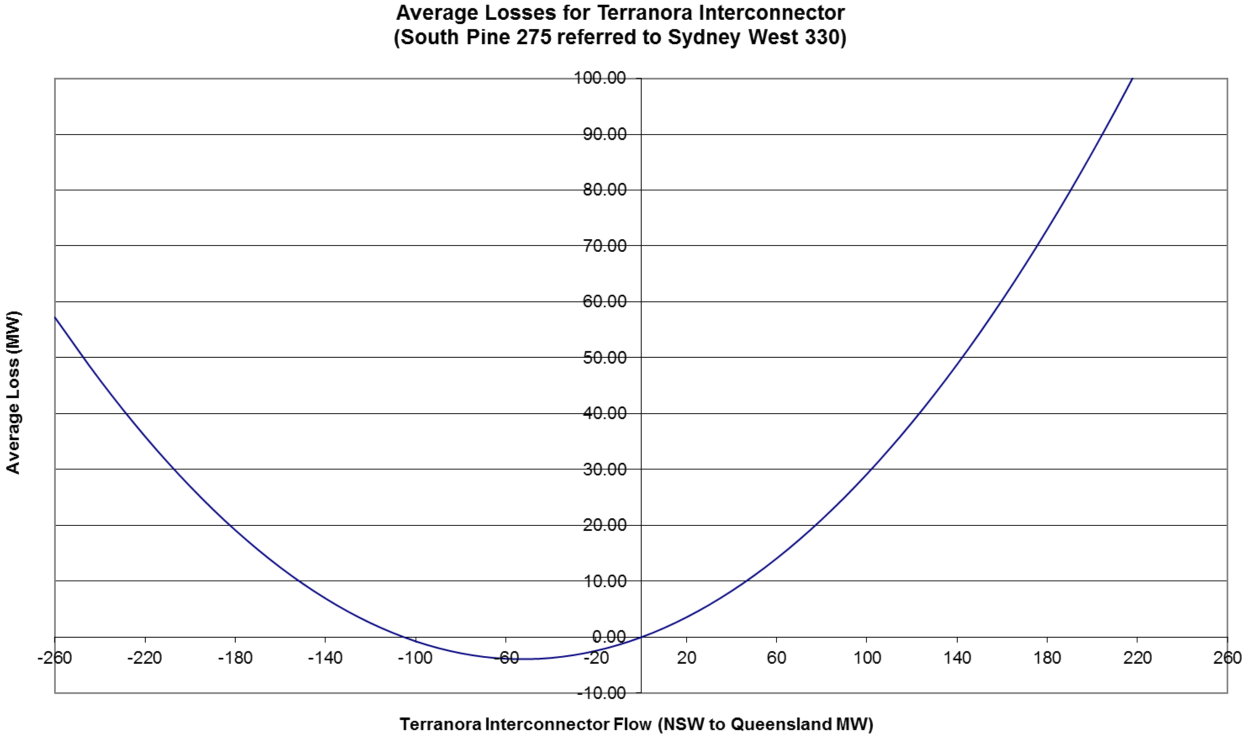
Coefficient	***$Flow_t$***	CONSTANT
Coefficient Value	2.8435E-03	1.1496
Standard error values for the coefficient	5.5774E-06	2.8752E-04
Coefficient of determination (R^2)	0.9369	
Standard error of the y estimate	0.0373	

The loss model for a regulated Murraylink interconnector can be determined by integrating (MLF-1), giving:

Terranora loss = 0.1496*Flowt + 1.4217E-03*Flowt^2



South Pine 275 referred to Sydney West 330 marginal loss factor versus Terranora interconnector flow (NSW to Queensland)



Terranora interconnector notional link losses versus flow (NSW to Queensland)

Appendix G - Proportioning of inter-regional losses to regions

The AEMO dispatch engine (NEMDE) implements inter-regional loss factors by allocating the inter-regional losses to the two regions associated with the notional interconnector.

The factors used to proportion the inter-regional losses to the two regions by an increment of load at one RRN from the second RRN. The incremental changes to the inter-regional losses in each Region are found from the changes to the interconnector flow and additional generation at the second RRN.

The average proportion of inter-regional losses in each Region constitutes a single static loss factor.

The following table provides the factors to proportion the inter-regional losses to the associated Regions for the 2014-15 financial year.

Notional interconnector	Proportioning factor	Applied to
Queensland – New South Wales (QNI)	0.44	New South Wales
Queensland – New South Wales (Terranora Interconnector)	0.51	New South Wales
Victoria – New South Wales	0.55	New South Wales
Victoria – South Australia (Heywood)	0.75	Victoria
Victoria – South Australia (Murrayink)	0.83	Victoria