Marginal Loss Factor Forum

Friday 9 December 2022

We acknowledge the Traditional Owners of country throughout Australia and recognise their continuing connection to land, waters and culture.

We pay respect to their Elders past, present and emerging.

Agenda

1. Welcome, introductions and forum objectives (10 min, JL)
2. 2021-22 MLFs: Historical comparison insights (15 min, JM)
3. 2023-24 MLFs: Preliminary outcomes (15 min, DF)
4. MLF Publications and further information (5 min, JM)
5. Connection Assets (5 min, DF)
6. Forum close (5 min, JM)

Welcome, introductions and forum objectives

James Lindley

Forum Objectives

This forum is intended to support AEMO's objective of improving the transparency of the MLF process, the following topics will be presented:

2021-22 FY Historical Comparison

- Share insights on a comparison between published and historically-modelled MLF outcomes for the 2021-22 FY

Preliminary 2023-24 FY MLF Outcomes

- Share insights on forecast trends and preliminary MLF outcomes for the 2023-24 FY

2021-22 MLFs: Historical comparison insights

Johnny Mangala

Introduction

Methodology for historical comparison

While the historical comparison study has utilised inputs representative of historical outcomes (load/generation), there are limitations when performing historical MLF comparisons:

- A single system normal network model is implemented.
- DC interconnectors in parallel with AC interconnectors operate on a relationship derived from historical outcomes however will not result in exact alignment.
- Historic network outages are not captured in the model

Drivers of variation

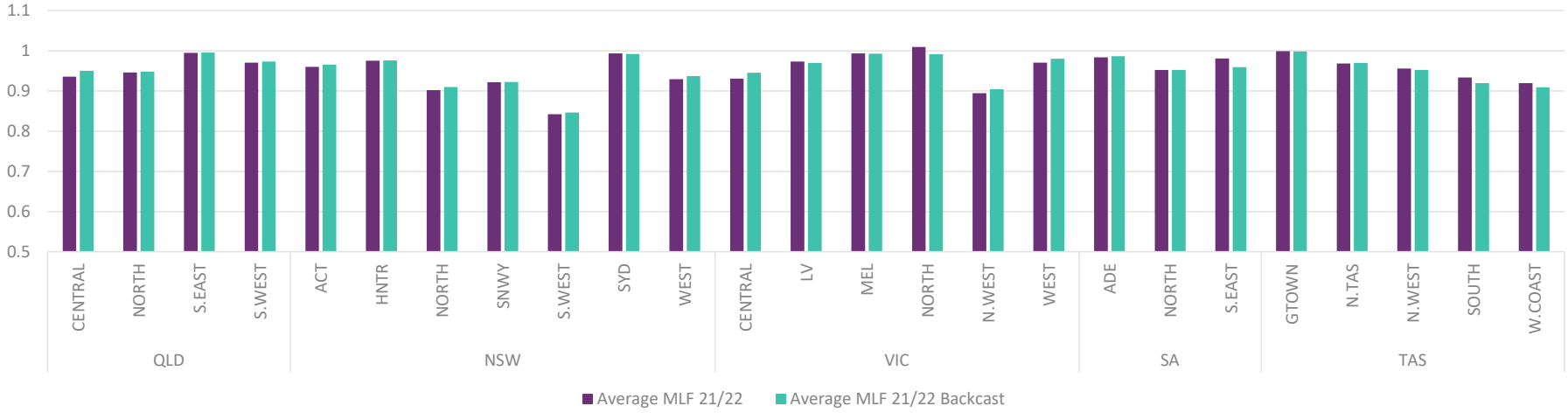
Generator connection/commissioning delays

- Timing of connection, commissioning and subsequently commercial operation of new generation capacity continues to be challenging.

Operational limits

- Several new system normal limits, and revisions to existing limits impacted on both generation and inter-regional transfers.
- Improvements have been made in this space, however difficult to forecast impact of limits up to 15 months in advance.

Regional average MLFs for Generators



Queensland

- Central Queensland MLFs higher than published, partially due to Callide generator outage which occurred in May 2021 which while prior to 2021-22 FY was post finalisation of the 2021-22 FY MLF outcomes.

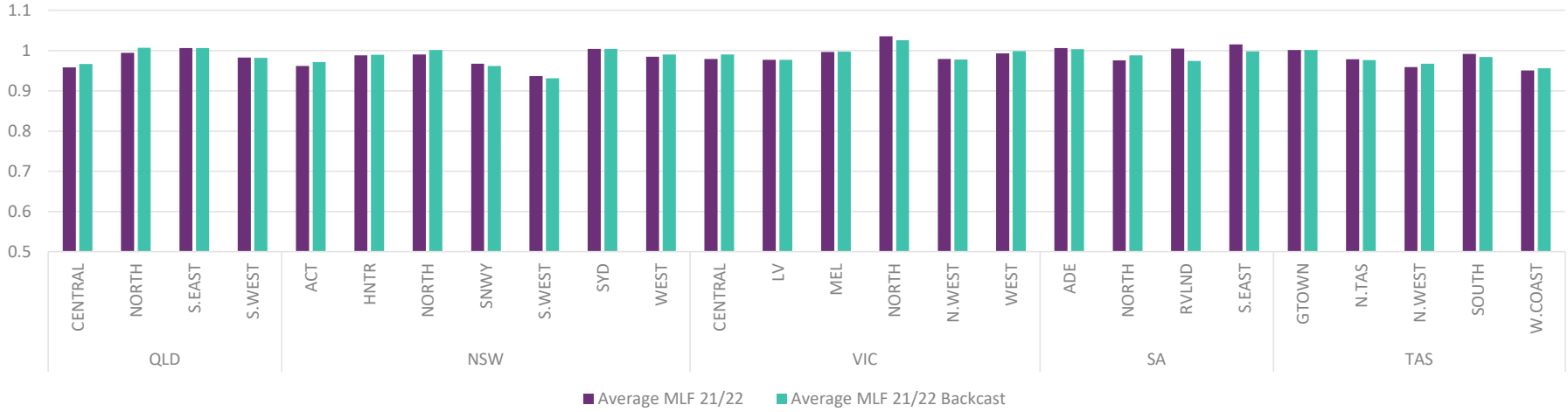
Victoria

- Northern Victoria MLFs lower than published, primarily due to reductions in exports to New South Wales.
- Central Victorian MLFs higher than published, primarily due to generation of recently added capacity operating at lower levels than anticipated.

South Australia

- South east South Australian MLFs lower than published, variation in Heywood flows where exports from South Australia have reduced.

Regional average MLFs for Loads



South Australia

- Riverland MLFs lower than published, primarily due to an increase in Murraylink flows from Victoria.
- South east SA lower than published, same drivers as generation.

Preliminary 2022-23 MLF results

Daniel Flynn

Preliminary MLF Methodology

Item	Preliminary	Final
New generation projects	Inclusion based on generator project status in October 2022 Generation Information page. Projects are included where the status is COM, COM* or COM[1].	Inclusion based on generator project status in January 2022 Generation Information page. Projects are included where the status is COM, COM* or COM[1].
Load profiles	Historical load profiles from 2021-22 FY scaled to meet target year forecasts.	Forecast load profiles for 2023-24 FY.
Network model	2022-23 MLF study network model.	Revised network model incorporating future augmentations that are committed and anticipated to be in operation prior to July 2024.
Intra-regional limit management	Intra-regional limits as identified and incorporated into the 2022-23 MLF study inclusive of new generators where applicable.	Intra-regional limits incorporated in the 2022-23 study will be reviewed and altered where required. Additional intra-regional constraints may also be identified and incorporated into the final study.
Inter-regional limit management	Inter-regional limits as per 2022-23 MLF study.	Inter-regional limits will be revised as required based on limit advice for the 2023-24 FY.

The primary drivers of change in recent years have been variations in,

- Increased semi-scheduled capacity and the associated diurnal impact of output
- Generator closures
- Generation shifting from electrically strong to electrically weak sections of network
- Increased diurnal variation in demand profile as a result of increased rooftop PV penetration

As generation has been the primary driver of change the preliminary study focused on changes to generation.

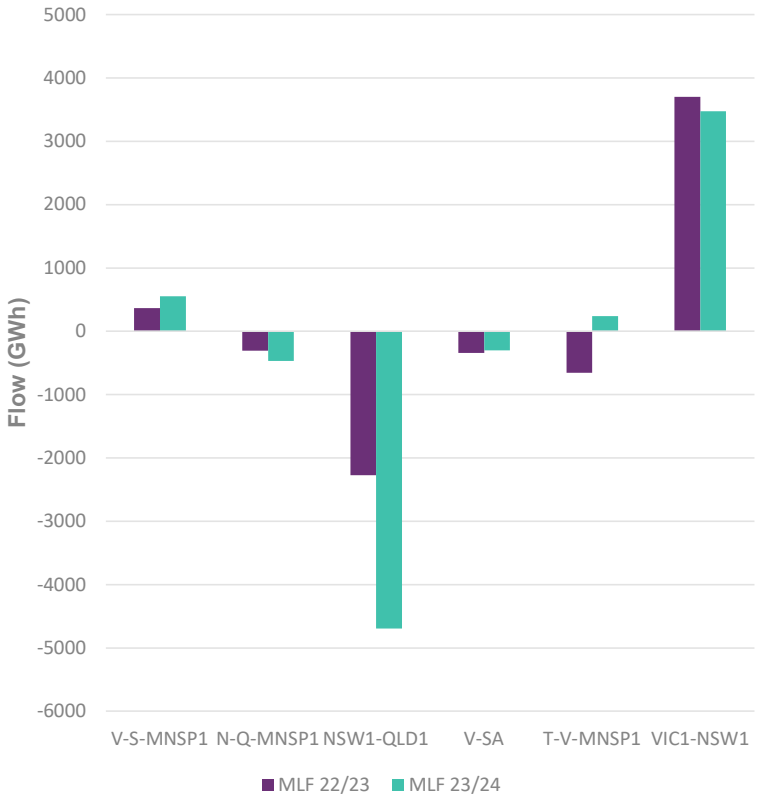
2022-23 vs 2023-24 Preliminary MLF Interconnector Flows

Forecast change in interconnector flows

- Material Increase in flows from QLD to NSW
- Decrease in flows from VIC to NSW
- Increase in flows from VIC to SA (Murraylink)
- Reversal of flows between TAS and VIC

Forecast change in NEM generation

- Material change in availability of existing generation in central Queensland.
- Complete closure of Liddell Power station to occur within target year.
- New generation capacity continuing northerly trend, large volumes of capacity in northern NSW and QLD.

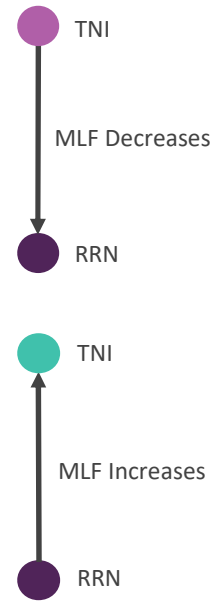


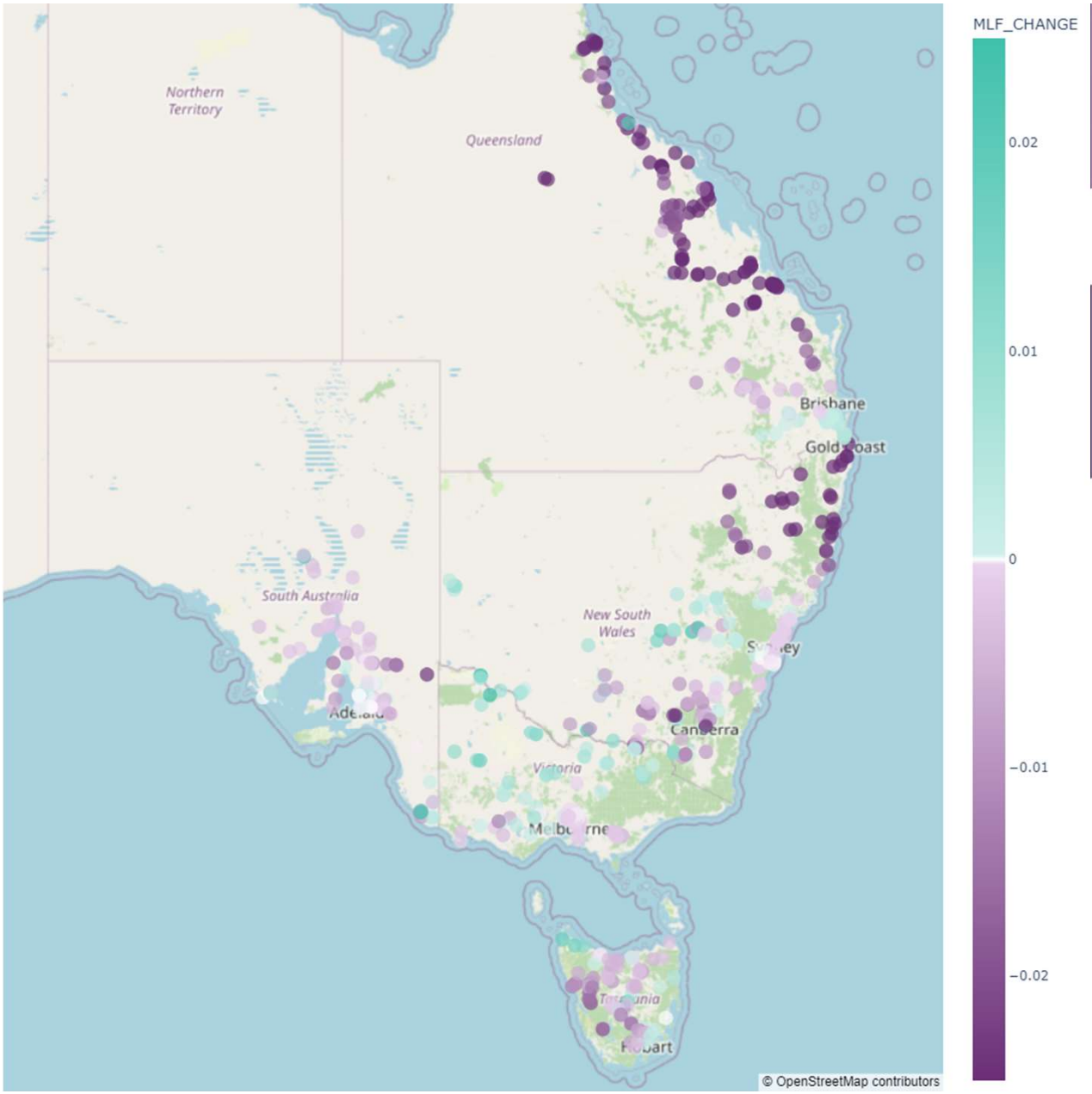
MLF Change Map

Changes in interconnector flows driven by changes in generation are currently the primary drivers of change

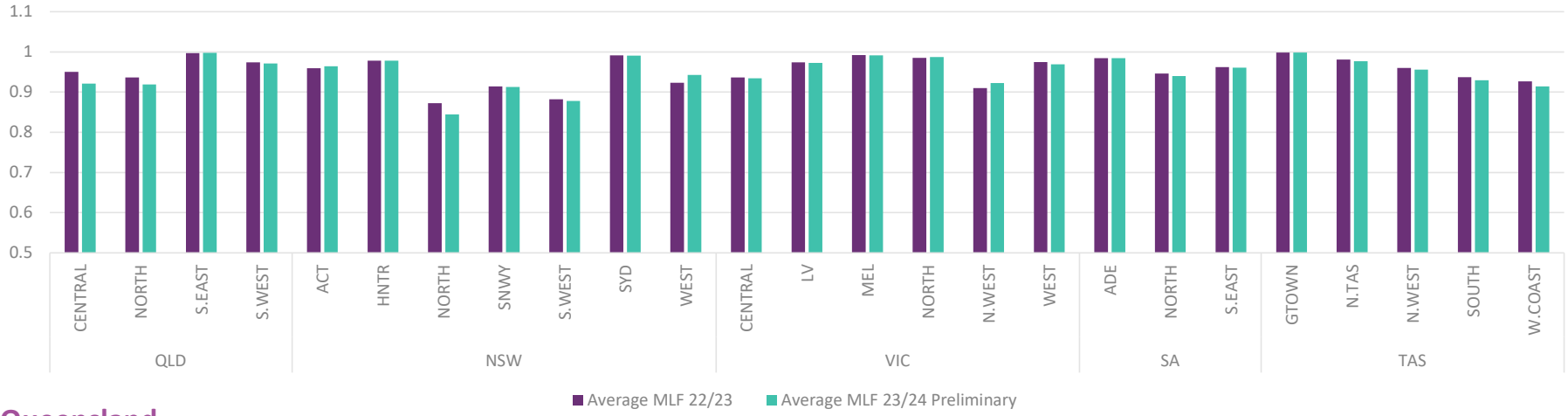
As flows increase from a TNI to the relevant RRN in general there will be a decrease in the MLF

As flows decrease from a TNI to the relevant RRN in general there will be an increase in the MLF





Generator MLF movements



Queensland

- Central and Northern forecast to be lower due to increased availability of thermal plant within central Queensland.

New South Wales

- Increased imports from QLD and new generation capacity in northern NSW offsetting impact from Liddell closure, hence material reduction in MLF outcomes for northern NSW.

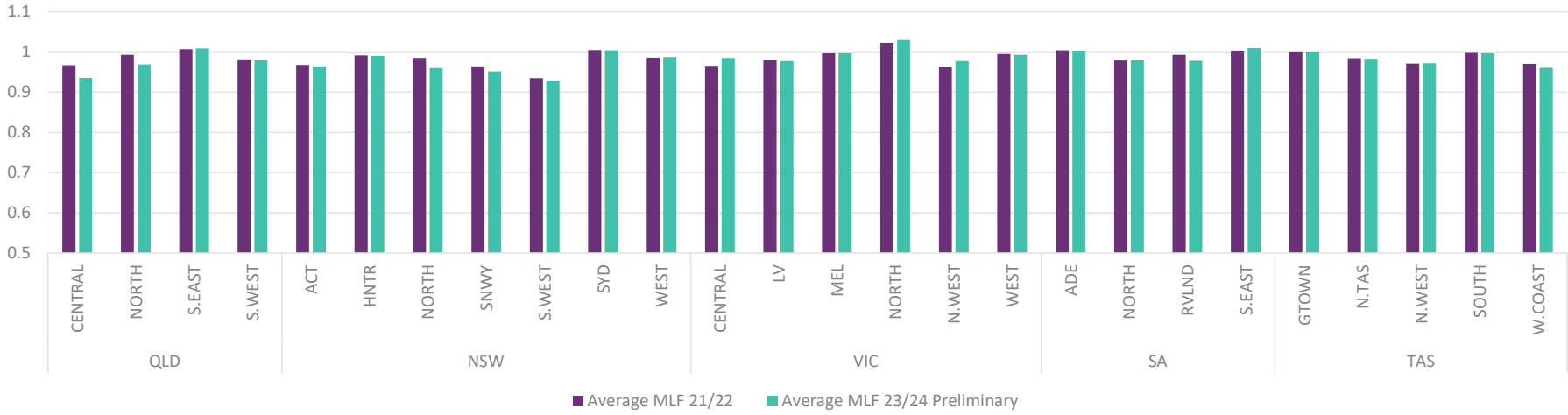
Victoria

- Mild increases in north west Victoria, partially driven by increased Murray link exports (volume low, but strong diurnal pattern aligning with material portion of local generation capacity).

South Australia

- Reduction in northern SA primarily due to additional capacity from existing generation.

Load MLF movements



Queensland/New South Wales/Victoria/Tasmania

- Same drivers as generation commentary. Note no material variations in Tasmania.

South Australia

- Reduction at Riverland due to increased imports from Victoria via Murraylink.

Potential for Change (Preliminary vs Final)

The following are some of the preliminary vs final related (method related) items we anticipate may result in a material change between the preliminary 2023-24 MLF results and the final 2023-24 MLF outcomes to be published on 1 April 2023.

Load Forecast

- The preliminary study has been based on load data that is scaled to meet forecast targets, but the scaling process implemented for the preliminary study is simplistic in nature. E.g. No consideration was made for increased rooftop PV penetration.
- The load reference year loads will be reviewed and adjusted further prior to publication of the draft and final 2023-24 MLF outcomes.

New Generation

- If new generation achieves COM/COM*/COM[1] status by the cut-off date, these will be incorporated for the 2023-24 FY which will have an impact on MLF outcomes.
- Current generation profiles for future generation and existing generation that were not commercially operational for the reference year.

Intra/Inter-Regional Limits

- The intra/inter-regional limits considered in the 2022-23 MLF study have implemented into this preliminary 2023-24 MLF study. While they have been revised to incorporate additional generation and revisions to limits further analysis is required prior to the publication of the final 2023-24 MLF outcomes.
- This analysis may result in additional constraints being considered, or further changes to constraints currently considered.

MLF publications and further information

Johnny Mangala

NEMWEB Report

AEMO has started publishing daily reports on NEMWEB, the reports can be found at,

http://nemweb.com.au/Reports/Current/Marginal_Loss_Factors/

These reports include not only the MLFs applicable at the time of publication, but also a historical record of any intra-year revisions.

AEMO will continue to update the MLF report on a quarterly basis to incorporate both intra-year revisions to existing MLFs and MLFs for new connection points.

MLF publication cadence

Current MLF application period

April	July	October	January	April	July
MLF report	**Revised MLF report** New/modified connection points since final report	**Revised MLF report** New/modified connection points since final report	**Revised MLF report** New/modified connection points since final report	**Revised MLF report** New/modified connection points since final report	**Revised MLF report** New/modified connection points since final report

Next MLF application period

December	March	1 April
Preliminary MLF report	**Draft MLF report** Draft version of the final report allowing participants to review and provide feedback	**Final MLF report**

Connection Assets and Implications

Daniel Flynn

Connection Assets

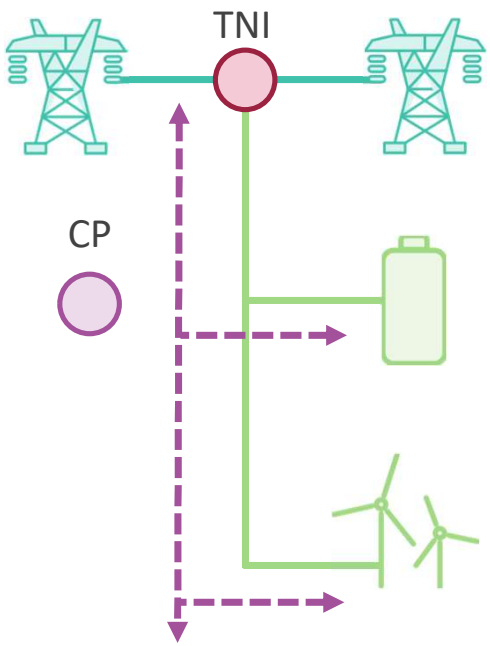
Over the past several years, there have been multiple revisions to the *National Electricity Rules* regarding the classification of connection assets.

Type	CP Location	TNI Location
Existing DCA	Negotiated	PoC to prescribed transmission network
DCA	PoC to prescribed transmission network	PoC to prescribed transmission network
DNA	Negotiated	Negotiated

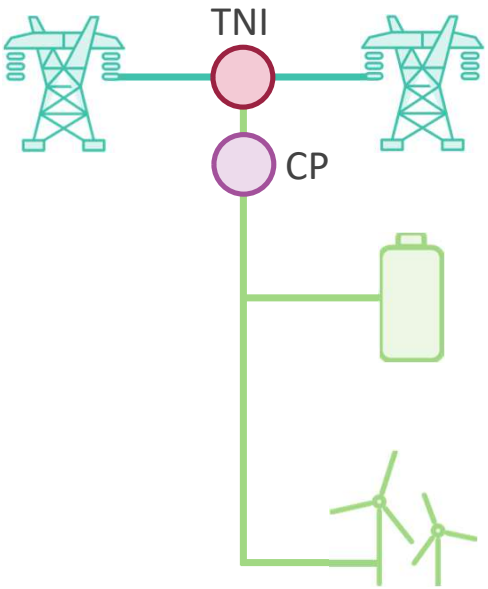
DCA = Dedicated Connection Asset
DNA = Designated Network Asset
PoC = Point of Connection

Connection Assets Types - Visualised

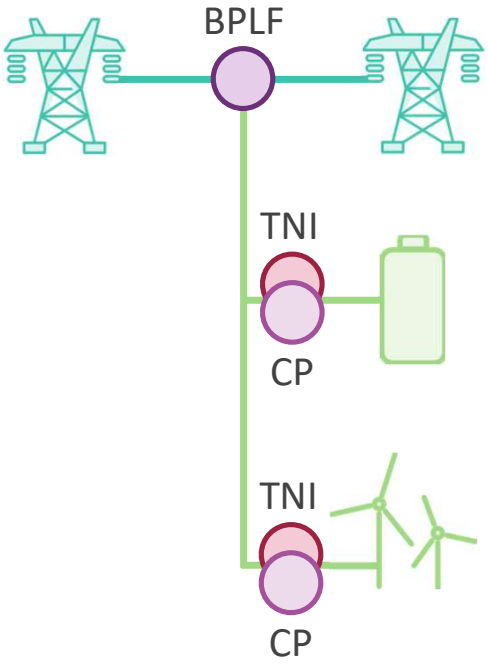
Existing Dedicated Connection Assets



Dedicated Connection Assets



Designated Network Assets



TNI = Transmission Node Identifier
CP = Connection Point

Boundary Point Loss Factors

Boundary point loss factors (BPLF) are calculated for each DNA.

The boundary point loss factors are for simplicity, an MLF calculated at the boundary of the DNA and the upstream network.

In general, this will be the point at which the DNA connects to the prescribed transmission network however may in some circumstances be sub to another DNA.

The BPLFs differs from MLFs in that it is not applied in dispatch or settlement (for energy) however is to be considered by the primary TNSP regarding allocation of intra-regional residues.

Registration Impacts

Due to the various classifications of connection assets, and in turn the implications from an MLF perspective the generator registration application form has been revised to request addition information pertaining to the classification.

For DNAs, information (single line diagram showing both boundary and connection points) on the DNA itself is required where the negotiated connection point is not at the same location as the boundary.

If you have questions or concerns regarding the calculation of BPLFs, please reach out to AEMO via the contact details provided at the end of this presentation.

If you have questions or concerns relating to the treatment of residues, please reach out to the primary TNSP for the relevant region.

Feedback & further information

- Feedback can be provided directly to:
  MLF_feedback@aemo.com.au

- Methodology and MLF publications can be found at:
  https://www.aemo.com.au/Electricity/National-Electricity-Market-NEM/Security-and-reliability/Loss-factor-and-regional-boundaries

For more information visit

aemo.com.au