TRANSMISSION LOSS FACTORS

STAKEHOLDER WORKSHOP

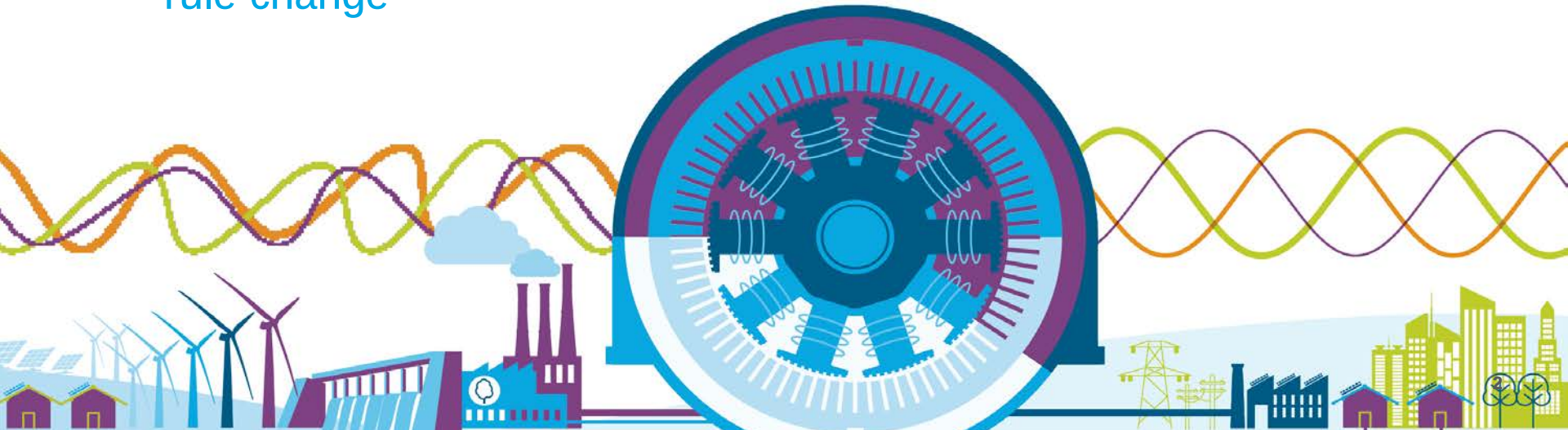
ALLISON WARBURTON, AEMC COMMISSIONER

AEMC

Purpose of today

Seek initial views from stakeholders on

- What do you see as the problems with current transmission loss factor framework
- Proposed rule changes by Adani Renewables
- What are other complimentary or alternative solutions to the proposed rule change



Agenda

1.	AEMC rule change process and scope of this rule change - Meredith Mayes, AEMC
2.	What are MLFS/IRSR and how did we get here - Julian Eggleston, AEMC
3.	Explanation of calculation methodology and what AEMO can do without a rule change - Mark Stedwell/James Lindley, AEMO
4.	Questions
4.	Proposed rule change by Adani Renewables - Derek Chapman, Adani Renewables
5.	Stakeholder discussion proposed rule changes, the problem and things to consider - Richard Owens/Andrew Splatt, AEMC
6.	Next Steps - Allison Warburton, AEMC

PROCESS & SCOPE

MEREDITH MAYES, AEMC

Standard rule change process

Collaboration is the key to success as it will deliver workable and lasting change.

The national electricity objective (NEO)

"…to promote efficient investment in, and efficient operation and use of, electricity services for the long term interests of consumers of electricity with respect to:

- **price, quality, safety, reliability and security of supply of electricity, and**
- **the reliability, safety and security of the national electricity system"**

Scope of rule change process

Consider the transmission loss factor framework generally, as the proposed rule change relates to two parts in the transmission loss factor framework.

- Address the proposed rule changes specifically
- The issues that gave rise to the rule change requests being submitted to the AEMC
- Any proposed solutions that are complimentary to or are alternatives to the proposed solutions
- While still considering other AEMC related works of:
  - COGATI review
  - Transparency of new projects rule change

WHAT ARE MARGINAL LOSS FACTORS
HOW DID WE GET HERE
WHAT ARE INTRA-REGIONAL SETTLEMENT RESIDUES

Julian Eggleston, AEMC

Scope and context of losses

Value of generation dependent on its proximity to the load

Two mechanisms that provide locational signals for generation & loads

1. Congestion:
   - being considered under the CoGaTI review

2. Losses or loss factors:
   - transmission loss factors subject of rule changes
   - value of energy depends on impact of losses

Marginal loss factors

Losses are real

- When transmitting electricity from one point to another a portion of energy is lost due to electrical resistance in the form of heat. The losses are a result of electricity flows and a function of physics and are unavoidable.

Terminology

Other terms are used for MLFs

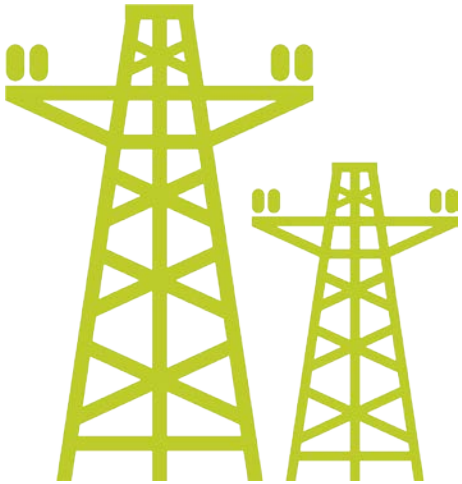
- Intra-regional loss factor/s
- Static loss factor/s (because a single unchanging value applies for a whole financial year)
- Transmission loss factor/s (because the factors or values apply to transmission connection points)

The reason intra-regional loss factors are commonly called MLFs is due to the marginal impact of losses considered when determining the value of the loss factor.

Marginal loss factor

An MLF value specifically represents the incremental losses between a connection point on the network and the regional reference node (RRN).

- These losses are factored into electricity prices paid to generators for the energy they dispatch.
- The MLFs are also used in dispatch to improve its efficiency.
- MLFs scale the spot prices – providing a price at the connection point.
- A generator with a relatively high loss factor (say 0.99) will receive a greater spot market revenue than a similar generator with a lower loss factor (say 0.85), all other things being equal.
- MLFs are a mechanism that provides a price signal for generators to locate nearer a load centre, and for a load to locate near a centre of generation.
- MLFs are calculated by AEMO annually using a forward-looking methodology.

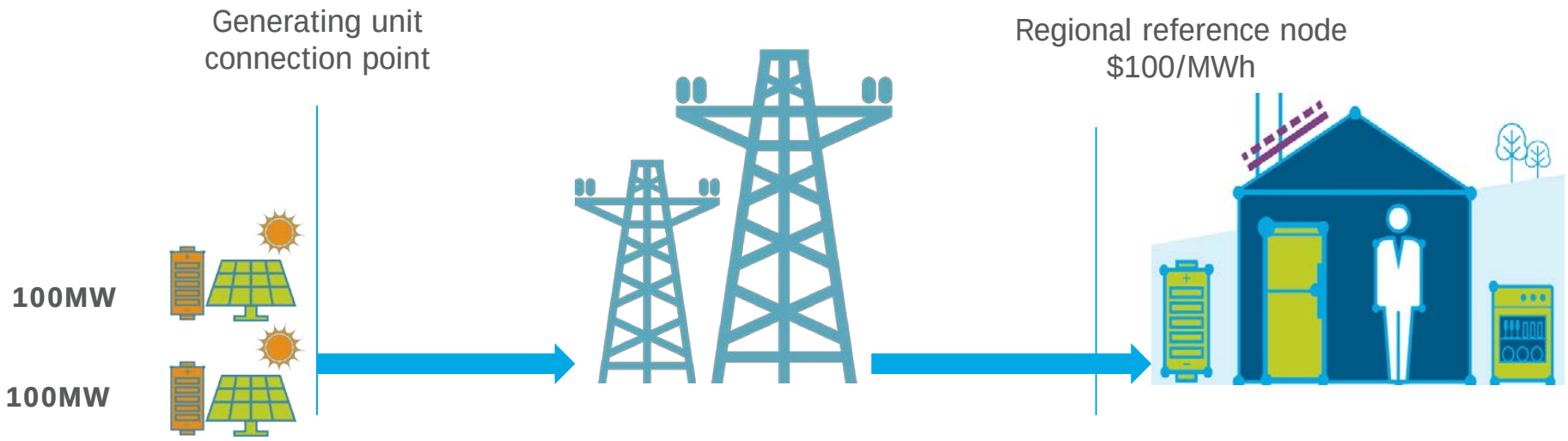


Generator settlement – 100MW generator

revenue = $9,400/hr **line loss = 3 MW** **MLF = 0.94**

- **MLF represents the additional impact of an increment of power transfer on losses**
- **an additional MW of generation would cause 0.06 MW of additional losses**

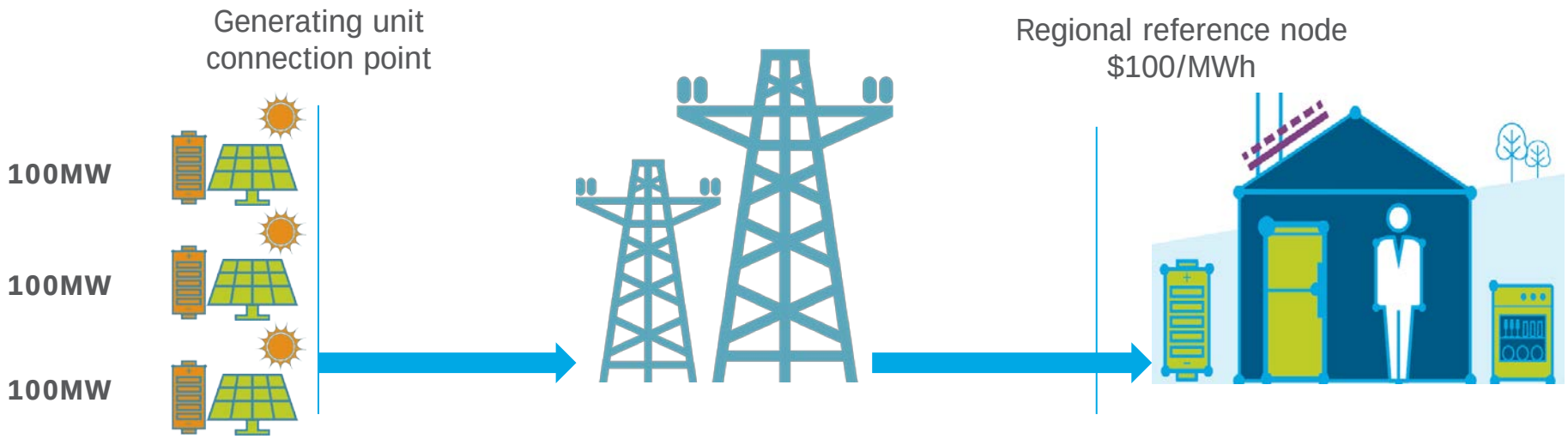
Generator settlement – 2 x 100MW generator



revenue = $9,400/hr each line loss = 3 MW MLF = 0.94

revenue = $8,800/hr each total loss = 12 MW MLF = 0.88

Generator settlement – 3 x 100MW generator

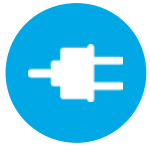


revenue = $9,400/hr each	line loss = 3 MW	MLF = 0.94
revenue = $8,800/hr each	total loss = 12 MW	MLF = 0.88
revenue = $8,200/hr each	**total loss = 27 MW**	**MLF = 0.82**

What makes an MLF value rise and fall

- Transmission lines: greater the voltage and lower the resistance of transmission lines between generator and a load center, the lower the electrical losses

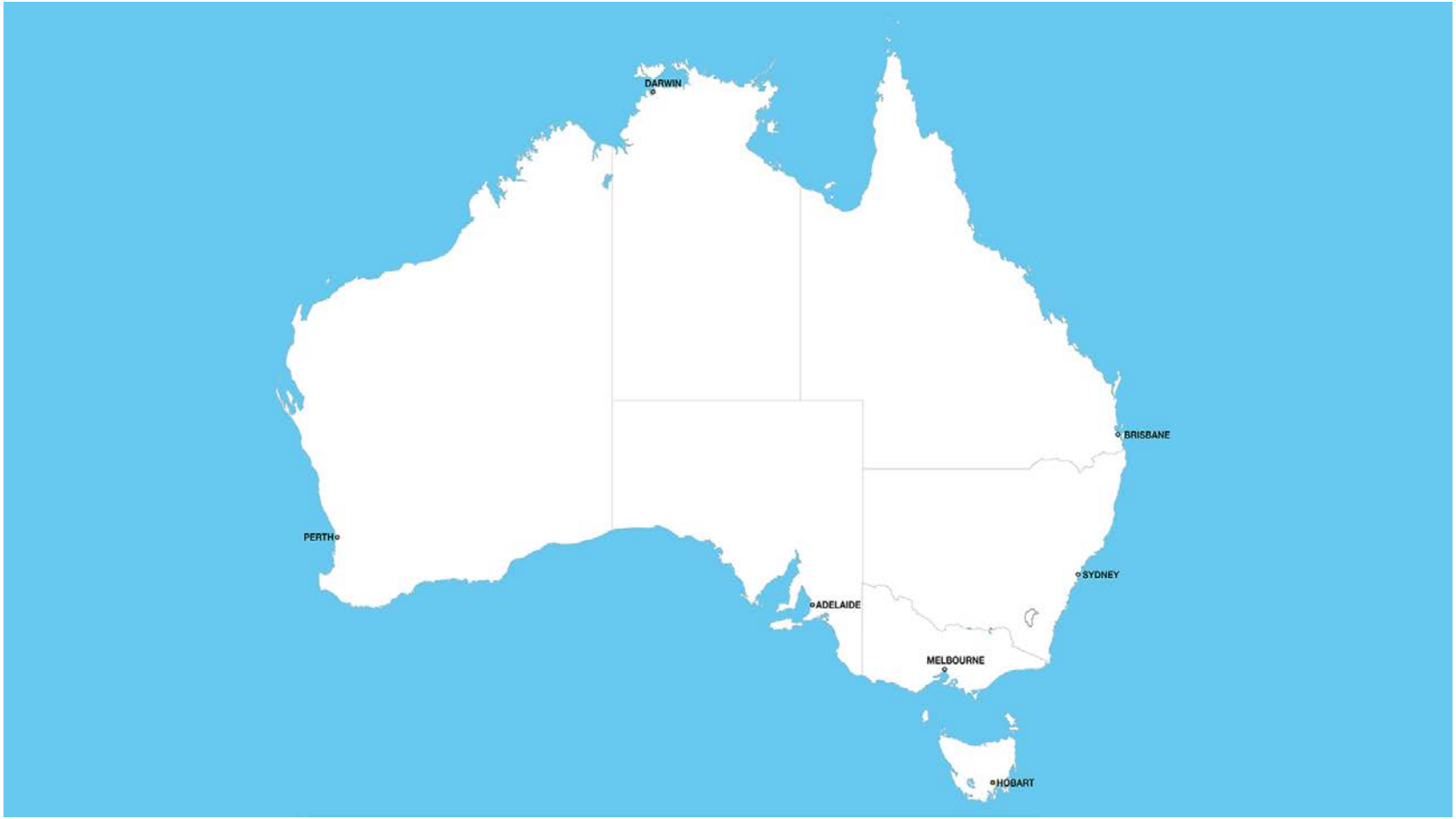
- Density and type of connections: greater number of generators relatively close to one another may be more likely to result in lower MLFs, particularly if the generators are of the same type and have similar generation dispatch patterns.



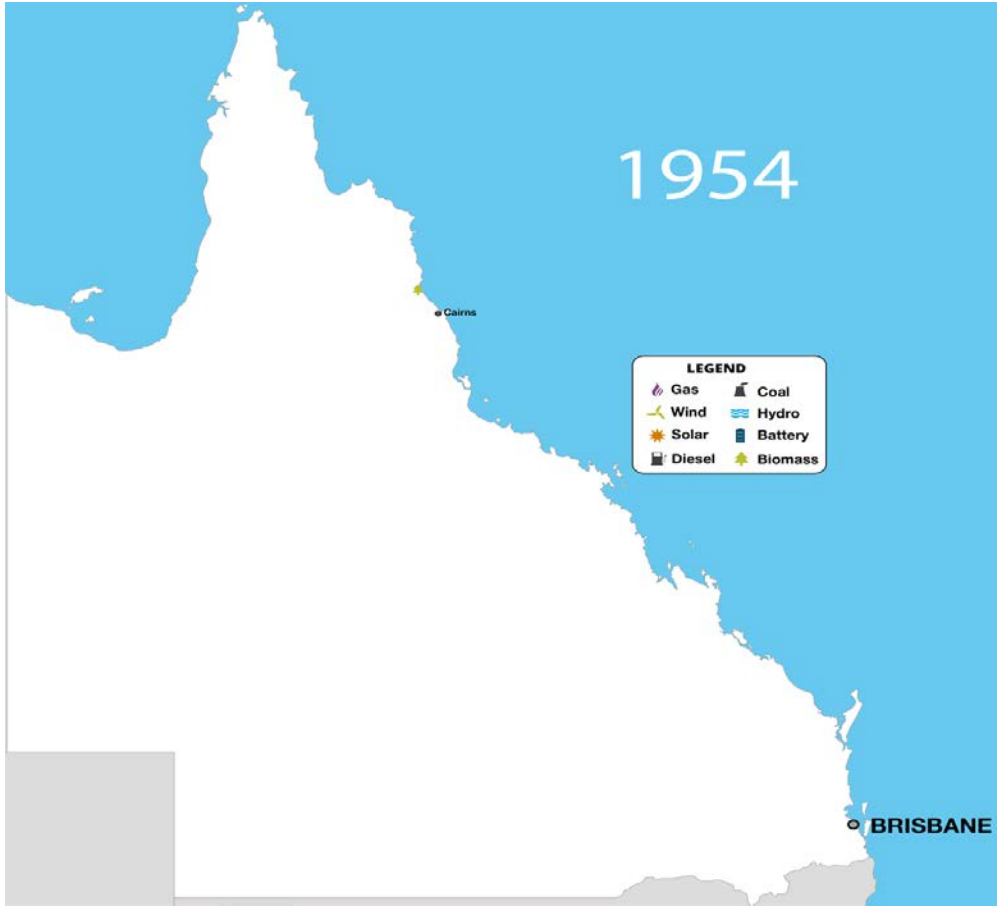
- Distance or geographical location: the greater the distance the greater the losses will be

- Network configuration: losses are generally lower when the network is more meshed

Change in generation – NSW/Vic/SA



Change in generation – QLD



Intra-regional settlement residue (IRSR)

- In the NEM the payments made by consumers of energy (market customers) do not match, and generally exceed, the payments made to providers of energy (generators).
- This leads to inter-regional settlement residues and IRSR.
- This rule change is related to IRSR as a result of over-recovery that occurs because of differences between marginal losses and actual losses.
- Currently the IRSR are distributed to the TNSP for the associated region and is used to off-set the transmission use of system (TUOS) charges.
- Effectively IRSR are returned to customers, as only customers currently pay TUOS.

DISCUSSION AND FEEDBACK

Andrew Splatt, AEMC

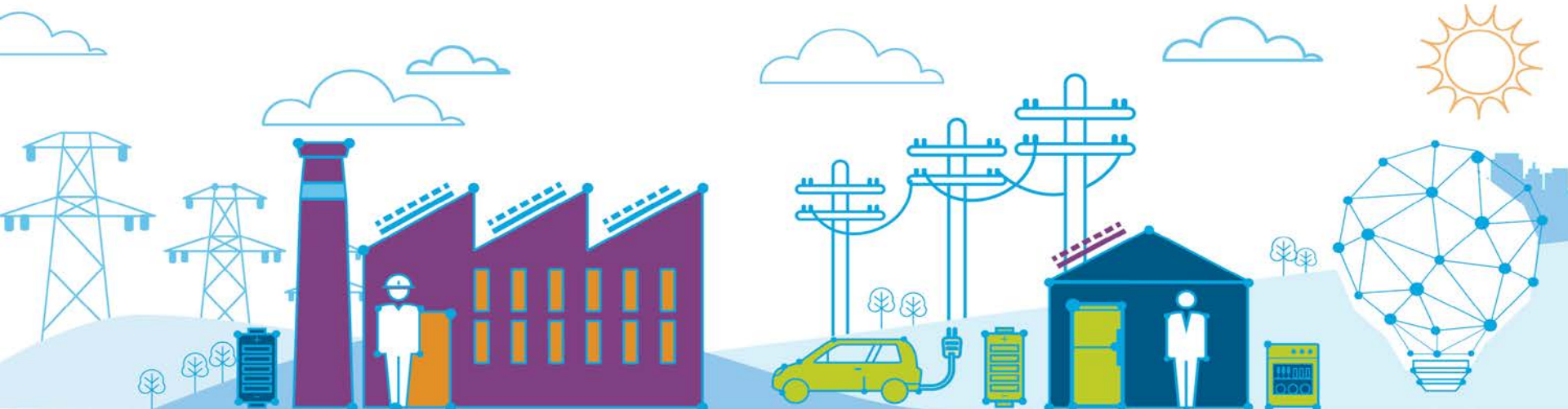
Assessment framework

The NEO: *To promote efficient investment in, and efficient operation and use of, electricity services for the **long term interests of consumers** of electricity with respect to -*

- **Impact on efficient investment**, this requires the calculated MLF values to send efficient locational signals for people considering investing in new generation (or load)
- **Impact on efficient operation of providing electricity services**, whether changes to the transmission loss factor framework will support, and be consistent with, providing electricity services efficiently.
- **Allocating of risk** arising from changing MLFs, desirable that the party that is allocated a risk has the incentive and ability to manage the risk because there is a clear link between that party's actions on the outcomes of the risk

Options for consideration

- **Proposed solutions by Adani Renewables**
  - **Reallocation of IRSR**
  - **Change in calculation methodology**
- Use of multiple loss factors
- Frequency of MLF calculations
- Amount of notice provided to market participants
- Forward-looking or backward-looking methodology
- Collar and cap
- Grandfathering of an assigned MLF



What to consider

IDENTIFYING THE PROBLEM

- Do you agree with the problems identified by Adani Renewables
- What are the impacts on the long-term interests of consumers?
- Are there other concerns not identified about the operation and impact of the transmission loss factor framework?

ASSESSING THE SOLUTION

- What is the impact on efficient investment?

- What is the impact on efficient operation of providing electricity services?

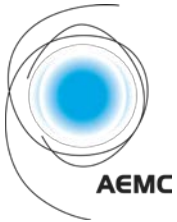
- Who is best placed to bear the risk?

Rule change project timeline

MILESTONE	DATE
~~Rule change initiated and consolidated, consultation paper published~~	~~6 June 2019~~
~~Stakeholder workshop~~	~~4 July 2019 (Brisbane)~~
Submissions close for consultation paper	**18 July 2019**
Draft determination published	26 September
Submission close for draft determination	7 November 2019
Final determination published	19 December 2019

Next Steps

- Submissions due **18 July 2019**
- Continued discussion and engagement – contact Andrew Splatt andrew.splatt@aemc.gov.au
- Thank you



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