AEMC

INFORMATION

Fact sheet - Marginal loss factors

What are marginal loss factors?

In an electricity system, as electricity flows through transmission and distribution networks towards end customers, a portion of that electricity is 'lost' due to physical factors such as electrical resistance. These losses increase as more generation connects in locations that are distant from load centres.

Marginal loss factors (MLFs) reflect the impact of electricity losses along the network and are applied to market settlements in the National Electricity Market (NEM), and so affect generator revenues. They represent electricity losses along the transmission network between a connection point and the regional reference node (RNN), which is used to represent the regional centre of the transmission network.

Who sets them?

The Australian Energy Market Operator (AEMO) calculates and publishes MLFs every year by 1 April as required under clause 3.6 of the National Electricity Rules ahead of commencing on 1 July. These figures are forward-looking projections based on expectations of the demand and dispatch patterns of that upcoming year, as well as the network flows and losses that are expected to occur during that year. AEMO periodically consults with participants and interested parties regarding its MLF calculation processes.

How are they set?

The MLF at the RRN is set at 1.0 by default. For the purposes of dispatch and settlement in the NEM, the local price of electricity at a connection point is equal to the regional price multiplied by the MLF. From a generator's perspective, the higher the marginal losses required to supply the RRN, the lower the relevant MLF that is set by AEMO. Conversely, the relevant MLF is set at a higher value by AEMO if the marginal losses required to supply the RRN are low. Calculations of loss factors vary from location to location, and so provide some locational signals to generators and reflect the distance between a generator and the RNN.

Because the MLF is a marginal rather than an average figure, the MLF represents the electricity losses that occur between the generator dispatching electricity and the delivery of that electricity to customers at the RRN for one additional unit (1 MW) of electricity.

How often do they change?

AEMO sets MLFs for the upcoming financial year prior to the start of that financial year. These figures are sometimes revised during the year to incorporate new data. For all connection points within a region, including generators, a loss factor is fixed for a given financial year, but this figure is adjusted from one financial year to the next.

This approach of adjusting the MLF periodically is a trade-off between: charging the same 'postage stamp' price across a region regardless of locations or losses, which while relatively simple, does not account for all losses; and using fully dynamic nodal pricing (pricing that reflects transmission constraints in real time), which is more mathematically pure but considerably more complicated.

How do they impact generator revenues?

A higher MLF is beneficial for a generator's revenue because it means that more of the generator's electricity reaches customers, while a lower MLF reduces a generator's

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revenue for the electricity that they produce. Therefore, generation that has MLFs with lower values will also appear to be more expensive at the RRN, which can lead to electricity from this generator being dispatched to customers behind another generator that offers the same price for its electricity but has higher MLFs. As a result, changes in the MLF can affect the commercial viability of a generator.

Some examples of factors that could lead to a low or decreasing MLF include:

- the generation of electricity further away from the RNN
- a surplus of local generators supplying electricity in a single area
- a high supply of electricity being generated during times when demand is low.

For renewable generators, their revenue is affected by MLFs not only in terms of the electricity market transactions they participate in, but also due to the large-scale generation certificates that are created if the generator is accredited under the federal Large-scale Renewable Energy Target. This is because MLFs are a factor used to determine how many large-scale generation certificates such a generator can receive for the power that it generates.

A generator's revenue is equal to the product of the volume of the energy generated, the RRP and the MLF. For example, if a generator's loss factor is 0.9, the generated energy is 50 MWh and the RRP is $100/MWh, then the generator's revenue would be $4500.

Related work

The Australian Energy Market Commission has received two rule change requests from Adani Renewables regarding the MLF framework. One of these is a request for changes to the way that Intra-Regional Settlement Residue Reallocation is accommodated in the National Electricity Rules, a process which is impacted by MLFs. This process entails payments that TNSPs pay to AEMO or receive from AEMO as part of the market settlements process which represent the difference between what consumers owe to AEMO and what AEMO owes to market participants.

In a separate rule change request, Adani Renewables is seeking to have the marginal loss factors methodology that is currently used replaced by an average loss factor methodology. Adani Renewables expressed the view that this change would lead to fewer losses for generators and customers, as well as a more accurate reflection of the cost of generation.

These rule changes will need to be considered in the context of the changes to access that are being considered by the AEMC through the *Coordination of generation and transmission investment implementation - access and charging review*.

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