Overview

Powerlink is proposing to adopt the Australian Energy Regulator's (AER) base-trend-step model to forecast our operating expenditure (opex) requirements in the next regulatory period. This is the AER's preferred approach for assessing most opex categories[1]. Under this approach, a rate of change is determined by calculating the forecast change in network output, real input costs (labour and non-labour) and productivity, as shown in Equation 1.

Equation 1 Forecast rate of change

Powerlink has considered the AER's preferred measures and weightings for the rate of change and considers that an alternative output growth measure may be more appropriate to represent the increasing complexity experienced by transmission network service providers (TNSP) in the current environment.

Powerlink proposes to align with the AER's preferred approach for real price change and productivity change.

Guidance from the AER – output change

The AER provides the following guidance in relation to the output change in their Expenditure Forecast Assessment Guideline for Electricity Transmission (October 2024):

- output measures should align with the National Electricity Law (NEL) and National Electricity Rules (NER) objectives, reflect the services provided to customers, be significant, and be the same measures as used to forecast productivity growth, and
- forecast output growth, changes in TNSP business conditions, technological change, benchmarking performance, historical productivity performance and industry average productivity are all considered when assessing productivity growth.

Additional specific guidance is provided in the AER's Better Resets Handbook, section 5.2.3, where they provide the criteria by which they expect a reasonable trend forecast would be consistent. For output growth this criterion includes:

- using the AER's preferred output specification, including output weights, as set out in the latest annual benchmarking report
- adopting the Australian Energy Market Operator's (AEMO) forecasts of consumption and demand, and
- forecasting customer number growth consistent with the historic trend.

The Annual Benchmarking Report for electricity transmission network service providers published in November 2024 utilises the non-reliability output measures and weightings (Table 1) to calculate the productivity of TNSPs. These are the current output measures and their respective weightings. The next report is expected to be published in November 2025.

[1] Australian Energy Regulator, Expenditure Forecast Assessment Guidelines for Electricity Transmission, October 2024, section 4.

Table 1 AER preferred output measures and weightings

Output measure	Weightings	Description
Energy throughput	14.9%	A measure of the amount of electricity that TNSPs deliver to their customers.
Ratcheted maximum demand (RMD)	24.7%	TNSPs endeavour to meet the demand for energy from their customers when that demand is greatest. RMD recognises the higher maximum demand that the TNSP has had to meet in the time period examined.
Number of customers	7.6%	The number of end users is a proxy for the complexity of the TNSPs network.
Circuit length	52.8%	Reflects the distances over which TNSPs transport electricity and is a significant driver of the services a TNSP must provide.

Review of output measures

Powerlink (and other TNSPs) have previously expressed the need for a broader review of the economic benchmarking specification for transmission. In the most recent review of the economic benchmarking specification in 2017 we argued that the use of end-user numbers is irrelevant for a TNSP, among other concerns.

At the time, Powerlink did not support the use of end–user numbers as an alternative because "it makes no difference whether a DNSP taking supply from a transmission network is supplying 100 x 1 MW customers or 100,000 x 1 kW customers, the output measure from the transmission system should look the same"[2].

Powerlink considers that the use of the number of customers as a proxy for complexity in transmission is misaligned. The number of Powerlink directly connected customers is quite small in comparison to the size of network and is generally stable during a period of transformation within the transmission industry. Powerlink considers that an alternative output measure will more appropriately represent the increasing complexity experienced by TNSPs in the current environment.

The changing transmission environment

We are forecasting a significant uplift over the next seven years in the type and number of connections to our network and increasing impact from the uptake of rooftop solar by consumers. This is consistent with assumptions included in AEMO's Electricity Statement of Opportunities 2025 and 2025 Inputs, Assumptions and Scenarios Report.

CSIRO consistently find renewables remain the lowest-cost option for new low-emission electricity generation, as identified in its annual GenCost report, the latest of which can be found here. While the energy transition is expected to present the lowest long-run cost to customers, it makes it more challenging to manage our network, with variable and unpredictable generation causing rapid changes in power flows, complicating real-time balancing and control to maintain system stability.

We need to operate our network more dynamically, with the development of schemes essential for maintaining a reliable network, such as Wide Area Monitoring, Protection and Control (WAMPAC). We also require the development of complex operating strategies and contingency plans to ensure installed capacity is optimised, specific customer arrangements are met, and we are prepared to respond under reasonably foreseeable circumstances.

[2] Economic Insights, Review of Economic Benchmarking of Transmission Network Service Providers – Position Paper, August 2017, p.10

Additionally, AEMO forecasts system strength shortfalls for Queensland, with Powerlink planning to install synchronous condensers and enter into network support arrangements with providers of system strength services to meet these needs. We will be required to activate these services to meet shortfalls as and when required.

In effect, the whole system is becoming more dynamic, rather than passively supplying predictable demand. There is an increase in outage planning and coordination and relationship management with significantly more generators connected to the transmission network than in the past. The way we deliver our work may also need to change, with more generators impacted by network outages needed to undertake maintenance.

Alternative options considered

This briefing note outlines three potential options for output measures:

1. Renewable generation supplied – option included in draft Revenue Proposal and discussed with RPRG in September 2025
2. Generation capacity – a new option not discussed to date with the RPRG but based on feedback received
3. Operating envelope – a new option not discussed to date with the RPRG but based on feedback received.

Renewable generation supplied

Most new entrant generators are renewables, in line with the CSIRO assessment that they provide the lowest-cost option. Hence, we have considered the use of renewable energy supplied to customers as an output growth measure and have sourced these forecasts from the 2024 AEMO Integrated System Plan. We have applied the forecast for Candidate Development Path 14 which is the scenario that AEMO have determined to be the Optimal Development Path. Forecast generation for hydro, utility storage, coordination Consumer Energy Resources (CER) storage, passive CER storage, offshore wind, wind, utility solar and distributed photo-voltaic (PV) solar have been included in the renewable generation forecast. The rate of change for this measure is shown in Table 2.

This measure is intended to broadly demonstrate the change in complexity from variable and unpredictable renewable generation and, in particular, the uptake of rooftop solar by consumers. This measure would replace the customers measure in the output growth calculation with the same weighting of 7.59% applied.

When considered in the context of industry benchmarking, this measure results in an industry average productivity factor of 0.9%, compared to the current (2024 Annual Benchmarking Report) industry average productivity factor of 0.3% using the standard approach.

Table 2 Renewable energy supplied forecast

Output Measure	2028	2029	2030	2031	2032	Data Source
Renewable Generation (GWh)	43,500	45,100	61,300	65,800	76,000	2024 AEMO Integrated System Plan
Renewable generation % change	10.41%	3.68%	35.92%	7.34%	15.50%	2024 AEMO Integrated System Plan

This option was included in our draft Revenue Proposal in September 2025 and discussed at the September 2025 RPRG meeting. The RPRG expressed concern of 'double-dipping' in relation to the energy throughput measure, the measures alignment to renewable energy sources and broader price implications of a different measure being adopted when considered for all network businesses.

Powerlink notes that while there is some overlap between the energy throughput and renewable generation measures, the renewable generation supplied includes rooftop solar which impacts the complexity of the network but is not included in the energy throughput measure. We considered this feedback and continued to explore other alternatives.

Generation capacity

We have considered the use of generation capacity as an output growth measure and have sourced these forecasts from the 2024 AEMO Integrated System Plan. Again, we have applied the forecast for Candidate Development Path 14 which is the scenario that AEMO have determined to be the Optimal Development Path but have sourced the forecast generation capacity for Queensland for all generation types. The rate of change for this measure is shown in Table 3.

This measure is intended to broadly demonstrate the change in complexity as the mix and number of connected generators changes over time. This measure would replace the customers measure in the output growth calculation with the same weighting of 7.59% applied.

When considered in the context of industry benchmarking, this measure results in an industry average productivity factor of 0.5%, compared to the current (2024 Annual Benchmarking Report) industry average productivity factor of 0.3% using the standard approach.

Table 3 Generation capacity forecast

Output Measure	2028	2029	2030	2031	2032	Data Source
Generation Capacity (GWh)	30	29	35	37	38	2024 AEMO Integrated System Plan
Generation capacity % change	6.90%	-3.39%	18.81%	5.56%	2.67%	2024 AEMO Integrated System Plan

This option has not been presented previously to the RPRG and was developed following their feedback in September.

Operating envelope

We have considered the use of operating envelope (the gap between maximum and minimum demand) as an output growth measure. Forecasts have been sourced from the 2025 AEMO Electricity Statement of Opportunities (ESOO), using the step change scenario. The rate of change for this measure is shown in Table 4.

This measure is intended to demonstrate the change in complexity as the operating range of the network increases. Deep storage, advanced energy management and demand response systems will be key to managing this complexity in the future, while we also manage security of supply challenges during minimum load scenarios in the near term. Given maximum demand is already included as an output measure, we would replace the customers measure in the output growth calculation with minimum demand (inverse) and apply the same weighting of 7.59%.

We have been unable to consider the impact to industry benchmarking for this measure as our current data source does not extend back to 2006, which is the start of the benchmarking period.

Table 4 Minimum demand forecast

Output Measure	2028	2029	2030	2031	2032	Data Source
Minimum demand	2,234.90	2,153.49	1,904.69	1,751.97	1,843.39	2024 AEMO Integrated System Plan
Minimum demand % change (inverse)	10.35%	3.71%	12.28%	8.36%	-5.09%	2024 AEMO Integrated System Plan

This option has not been presented previously to the RPRG as it has been considered following their feedback in September.

Impact of change to output measures

We developed forecasts based on the standard output growth approach and three alternative measures as detailed in Table 5. Where an alternative measure has resulted in a different industry average productivity, we have included this in the calculation for total opex.

Table 5 Output change (% and $million, real 2026/27) (August forecast)

Output change measures	Total opex ($)	Variance from standard approach ($)
Total output change –Energy & RMD (AEMO ESOO), customers (EQ Proposal), circuit length (PQ) [0.3% productivity factor]	1,831.30	-
Alternative 1 Energy & RMD (AEMO ESOO), **renewable generation (AEMO ISP)**, circuit length (PQ) [**0.9% productivity factor**]	1,850.95	+19.65
Alternative 2 Energy & RMD (AEMO ESOO), **generation capacity (AEMO ISP)**, circuit length (PQ) [**0.5% productivity factor**]	1,839.84	+8.54
Alternative 3 Energy & RMD (AEMO ESOO), **minimum demand (AEMO ESOO)**, circuit length (PQ) [retain 0.3% productivity factor]	1,855.53	+24.23

Analysis of alternative output growth approaches

We consider that an alternative output measure better reflects the role that the transmission network plays during the energy transition. We also consider that an alternative approach may offer a potential trade-off with some proposed step changes, thereby limiting the impact on the operating expenditure within the 2027-32 regulatory period.