Annual Benchmarking Report

Electricity transmission network service providers

November 2025

AUSTRALIAN ENERGY REGULATOR

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Executive summary

The National Electricity Rules (NER) require the AER to publish benchmarking results for the electricity transmission industry in an annual benchmarking report.[1]The productivity of the electricity transmission industry has an impact on the productivity of the overall economy due to electricity, supplied through transmission networks, being a key input used by households, businesses and industry.

Over 2023–24, we continue to observe declining productivity across the electricity transmission industry (–3.2%), marking the fourth straight year of declining productivity since 2021.[2] The productivity decline of the industry is reflective of declining productivity across transmission network service providers (TNSPs), with only TasNetworks recording a productivity increase. This decline in transmission industry productivity since 2021 (–1.6% average annual) followed an improvement in productivity between 2016–20 (1.4% average annual), with productivity now at a similar level to 2016. While we are able to identify increasing operating expenditure (opex) as the primary driver of productivity decline in 2024, there is no single driver of increasing opex identified by TNSPs, indicating the various developments in the industry and TNSPs' individual operating environments. Growth in transmission industry productivity has generally been below that of the overall Australian market economy.[3]

The key update that has occurred in preparing this year's results has been the update of non-reliability output weights.[4] This is the first update of the output weights we have carried out since 2020, in keeping with our approach of balancing accuracy and stability by updating output weights periodically. The size and impact of the output weight change was more muted in transmission than in distribution. Our distribution annual benchmarking report includes a detailed consideration of the updated output weights. Readers who are interested in the AER's consideration of issues raised in relation to this update can find relevant information and discussion in that report, and in the memoranda produced by our consultant, Quantonomics.

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1 NER, cll 6A.31(a) and 6A.31(c).

2 Noting that the 2025 Annual Benchmarking Report includes data up to and including 2023–24. Our report also refers to regulatory years. We further note that due to legacy ownership, AusNet's regulatory year refers to the April–March Singaporean financial year, and not the standard July–June financial year that applies to other TNSPs.

3 The performance of Australian market economy is measured by an index of quality adjusted hours worked across 16 market sector industries from 2006 – 2024. For more information on specific industries included in this measure, see: https://www.abs.gov.au/statistics/detailed-methodology-information/concepts-sources-methods/australian-system-national-accounts-concepts-sources-and-methods/2020-21/chapter-19-productivity-measures/data-sources-and-methods.

4 The weights placed on the four non-reliability outputs in our productivity index-based modelling (MTFP / MPFP).

This year we have made progress on our development work program. Primarily for transmission, we, along with Quantonomics, have responded to the recommendations of the 2024 independent review of non-reliability output weights in updating the output weights.[5]

[5] This year a focus of our benchmarking development work was to improve our opex econometric cost function models, which focus on distribution network service providers. We anticipate that this piece of development work will conclude in 2026.

Contents

1 Our benchmarking report

We report annually on the productive efficiency of transmission network service providers (TNSPs) individually, and the electricity transmission industry as a whole. The National Electricity Rules (NER) require us to publish network benchmarking results in an annual benchmarking report.[6] Distribution and transmission network costs together typically account for 35–45% of what consumers pay for their electricity in most jurisdictions (with the remainder covering generation costs, retailing costs, and environmental policies).[7]

This is our 12th annual benchmarking report for TNSPs. This report is informed by expert advice provided by our consultant, Quantonomics, and is intended to be read as a summary of the accompanying benchmarking report prepared by Quantonomics.[8]

National Electricity Rules reporting requirement

6A.31 Annual Benchmarking Report

(a) The AER must prepare and publish a network service provider performance report (an annual benchmarking report), the purpose of which is to describe, in reasonably plain language, the relative efficiency of each Transmission Network Service Provider in providing direct control services over a 12-month period.

Productivity benchmarking is a quantitative or data-driven approach used by governments and TNSPs around the world to measure how efficient firms are at producing outputs over time and compared with their peers.

Our benchmarking report considers productive efficiency. TNSPs are considered productively efficient when they produce their goods and services at the least possible cost of inputs, given their operating environments and prevailing input prices. We examine trends in productivity over the full period of our benchmarking analysis (2006–24), shorter sub-periods where relevant and between 2023 and 2024.[9]

Our 2025 Annual Benchmarking Report has been streamlined significantly compared to previous reports. This serves to remove duplication between our report and the more comprehensive Quantonomics report and provide a more accessible document for stakeholders. It includes a summary of key results and benchmarking development plans, and serves as a complement to the more comprehensive report produced by our consultant, Quantonomics.

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6 NER, cll. 6A.31(a) and 6A.31(c).

7 AEMC, *Residential electricity price trends 2021, Final Report*, November 2021; AER analysis.

8 The Quantonomics' report outlines the full set of results for this year's report, the data we use, the updates and our benchmarking techniques. It can be found on the AER's website – see the Annual Benchmarking Reports 2025 web page.

9 Throughout this report we refer to regulatory years. For example, for simplicity we use 2024 for 2023–24 which is April–March for AusNet, and July–June for all other TNSPs.

1.1 Why we benchmark electricity networks

Under the National Electricity Law and the NER, the AER regulates electricity network revenues with the goal of ensuring that consumers pay no more than necessary for reliable and safe delivery of electricity services. This is done through periodic (5-year) revenue determinations, in which the AER must assess networks' proposed expenditures and determine whether each proposal reflects prudent and efficient costs. As part of this function, the NER requires the AER to have regard to benchmarking results when assessing network expenditure. The benchmarking results we publish:

- provide network owners and investors with useful information on the relative efficiency of the electricity networks they own and invest in
- provide government policy makers (who set regulatory standards and obligations for networks) with information about the impacts of regulation on network costs, productivity and ultimately electricity prices
- provide consumers with accessible information about the relative productivity or efficiency of the electricity networks they rely on, allowing them to better participate in our regulatory process and broader debates about energy policy and regulation.

We note the importance of maintaining productivity in the electricity transmission industry in the context of the Australian Government's a renewed focus on economy-wide productivity growth as a driver of increasing living standards. The productivity of the electricity transmission industry has an outsized impact on the productivity of the overall economy due to electricity, supplied through transmission networks, being a key input used by households, businesses and industry. Productivity improvements in this industry, and broader sector, can therefore flow onto improved competitiveness, efficiency and growth across other sectors of the economy.[10]

1.2 Benchmarking techniques

Our benchmarking report presents results from two types of 'top-down' benchmarking techniques.[11] These essentially compare outputs and inputs as a means of measuring productivity. The key outputs measured in our TNSP benchmarking are customer numbers, circuit length, ratcheted maximum demand, energy delivered and reliability.[12] The inputs broadly cover opex and capital, the latter including powerlines, transformers and other assets that play a role in the provision of network services. Each technique uses a different method for relating outputs to inputs to measure and compare TNSP's efficiency:

- **Productivity index numbers (PIN).** These techniques use a mathematical index to measure the relationship between multiple outputs relative to multiple inputs, enabling

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10 Department of Climate Change, Energy, the Environment and Water, *Electricity and Energy Sector Plan*, 18 September 2025, p.15.

11 Top-down techniques measure a network's overall efficiency, based on high-level data aggregated to reflect a small number of key outputs and key inputs. They generally take into account any synergies and trade-offs that may exist between input components. Alternative bottom-up benchmarking techniques are more resource intensive in that they examine each input component separately. Bottom-up techniques do not take into account potential efficiency trade-offs that may exist between input components of a TNSP's operations.

12 Measured as 'energy not supplied'.

comparison of productivity levels and trends over time and between networks. We use these PIN techniques for our:

- Time-series multilateral total factor productivity (TFP) and capital and opex multilateral partial factor productivity (PFP). TFP and capital and opex PFP results are used in this report to measure and compare changes in the productivity level of a single entity over time (i.e. whether productivity of the transmission industry as a whole, or an individual TNSP, has increased or decreased over time).
- Panel data MTFP and capital and opex multilateral MPFP. MTFP and capital and opex MPFP results are used in this report to measure and compare changes in 'relative productivity' over time (i.e. whether a given TNSP has a higher or lower productivity level relative to other TNSPs at a point in time and over time).

- **Partial performance indicators (PPIs).** These simple ratio methods relate one input to one output. In this respect they are partial efficiency measures. We use PPIs to examine relative performance across TNSPs.

Being top-down measures, each benchmarking technique cannot readily incorporate every possible exogenous factor that may affect a TNSP's performance. For example, certain factors in a TNSP's operating environment are beyond its control and not all of these have been captured in the benchmarking models. Therefore, the performance measures reflect, but do not precisely represent, the underlying efficiency of TNSPs. For this benchmarking report, our approach is to derive 'raw' benchmarking results and where possible, explain drivers for the performance differences and changes.

To assist with the ability to understand these inputs and outputs, as well as how they are used in the benchmarking analysis, we have provided some further detail in relation to these variables.

1.3 Updates in this benchmarking report

1.3.1 Updated report format

The 2025 Annual Benchmarking Report (ABR) uses the same methods set out in previous reports. However, we have updated the format of the report and its contents, opting for a shorter report to complement the benchmarking report drafted by our consultant, Quantonomics.[13]

The new format primarily focuses on:

- discussing qualitative updates to the benchmarking methodology, data and accounting treatments.
- outlines priorities and progressed issues from our benchmarking development program, which aims to incrementally refine elements of benchmarking methodology and data.
- presenting key benchmarking findings.

[13] Quantonomics, *Economic Benchmarking Results for the Australian Energy Regulator's 2025 TNSP Annual Benchmarking Report*, 13 November 2025.

While we provide comment and insights on transmission industry productivity in this report, the detailed analysis and commentary is provided in the report by Quantonomics. This is consistent with our aim to reduce duplication between the two reports and develop the Annual Benchmarking Report into a shorter more accessible report for stakeholders. The report from Quantonomics will have a closer lens on technical matters, relating to:

- the underlying methodology and calculations to produce productivity measures (TFP, MTFP, PFP), as well as the limitations of benchmarking. This includes appendices on indexing methods, output weight calculations and sensitivity analyses.
- an in-depth analysis and commentary on the performance of the transmission industry and each of the five TNSPs, as well as the major contributors impacting productivity and trend growth rates.
- the trends of input and outputs of transmission networks over the 2006–24 period.

In our previous reports, we have presented Partial Performance Indicators (PPIs) as additional analysis, providing a general indication of comparative performance in delivering one type of output relative to input costs. As part of the updated format of this report, we now present the majority of the PPI charts in a spreadsheet on our website.

1.3.2 Non-reliability output weights update

We have applied an update to the non-reliability output weights used in the TFP and MTFP benchmarking techniques. The methodology used to calculate the weights was reviewed by University of Queensland's Centre for Efficiency and Productivity Analysis (CEPA), who have determined the methodology is robust and flexible for its purpose.[14]

The change from old to new output weights was moderate in magnitude for TNSPs, as shown in Table 1. As with the distribution report, transmission data updates occurred due to the inclusion of an additional five years of data (2019–2023), as well as our refinement of the calculation methodology of annual user cost (AUC) of capital in 2024. There have also been less data revisions to the transmission dataset when compared to distribution networks. In comparison to the output weight changes in our distribution report, the output weight changes for transmission are relatively small. This is due to the low impact of additional data on estimating output cost shares, where attribution of input costs to individual outputs have not exhibited a large change.

Further details can be found in our consultant's memorandum, published on our website.[15]

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[14] CEPA, *Final report - Review of AER's estimated non-reliability output weights used in the TFP and MTFP benchmarking models*, November 2024, pp.12–17

[15] The impact was more pronounced for distribution network service providers (DNSPs), and a more detailed discussion on the updated output weights is provided in the 2025 Annual Benchmarking Report for DNSPs.

Table 1 Output weight difference (pre-update vs. post-update)

Output	Pre-update (%)	Post-update (%)	Difference (p.p.)
Energy throughput	14.9	9.4	–5.5
Ratcheted maximum demand	24.7	28.7	4.0
End-user (customer) numbers	7.6	9.3	1.7
Circuit length	52.8	52.5	–0.3

Note: Figures may differ slightly from the source due to rounding. The total of the weights used adds up to 100%.

1.3.3 Data

In relation to benchmarking data, as in previous years, we have used adjusted data provided by AusNet in relation to its lease and Software as a Service (SaaS) non-recurrent implementation cost.[16] Accounting standards for these have changed over time, and not all TNSPs have adopted the new standard. Amending the data allows our benchmarking results to be consistent over time (i.e. not affected by accounting and capitalisation changes) and across TNSPs. AusNet provided this amended economic benchmarking RIN (EB RIN) data using legacy accounting standards and guidance.[17] Specifically, it provided lease costs as opex, rather than as reported on a capitalised basis, and SaaS implementation costs as capital expenditure (capex) rather than opex.[18]

In this year's report, Transgrid and ElectraNet indicated a change in their accounting treatment of leases and SaaS implementation costs. As a result, we requested amended data using legacy accounting standards and guidance. Although more networks are recording data under the new accounting standard over time, we believe it is appropriate to maintain the legacy accounting standard for the purposes of benchmarking as consistent treatment of leases and SaaS non-recurrent implementation costs enable comparability across the time series. The amendment of EB RIN data also ensures consistency with the reporting basis of the other TNSPs that have not adopted the new standard.

We are aware that our request for amended EB RINs may create extra workload for TNSPs. In the coming years, we will monitor and explore alternative methods of incorporating new EB RIN data into our benchmarking series. This includes consulting TNSPs on a preferred approach to future reporting of these costs for benchmarking purposes, once all or most TNSPs have transitioned to the contemporary accounting treatments.

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16 The adjusted data provided by AusNet presents SaaS implementation costs under the legacy accounting treatment.

17 AusNet, *Response to AER considerations on mid-period accounting changes (SaaS and leases)*, 3 May 2024.

18 AusNet's EB RINs for 2020, 2021, 2022 and 2023 reflect treatment of leases under accounting standard AASB16, which became effective on or after 1 January 2019, and require leases to be considered as capex. They also reflect guidance from the International Financial Reporting Standards (April 2021) that SaaS configuration costs, under some circumstances are considered as opex.

This report also includes several other minor updates in the benchmarking data. These updates reflect refinements to the current and historical TNSP dataset, consistent with previous years' benchmarking reports, and are set out in the consolidated benchmarking dataset published on our website.[19]

1.4 Benchmarking development program

We operate an ongoing transparent program to review and incrementally refine elements of the benchmarking methodology and data. Our benchmarking development program considers issues arising across both the distribution and transmission reports. There are a variety of factors which inform the development work we progress, including:

- feedback from stakeholders, which often contains a wide range of views on future development
- the materiality and impact of the development work on the robustness of the benchmarking
- the materiality and impact of the development work in relation to upcoming revenue determinations in which the benchmarking results will be used
- the ability to progress this work, including any sequencing issues and available data
- the resources available to undertake this work.

This year, we applied updated non-reliability output weights (used in the TFP and MTFP calculations), following our 5-yearly update cycle. The process and outcomes regarding non-reliability output weights, as well as future development work, are set out below.

1.4.1 Non-reliability output weights after CEPA independent review

An independent review of non-reliability output weights was facilitated last year, namely the review done by University of Queensland's Centre for Efficiency and Productivity Analysis (CEPA). The review found our current application of the Leontief method to likely be robust and flexible enough for its purpose.[20] However, it raised concerns on the numerical stability of the non-linear least square estimation method. If these concerns were to develop, CEPA suggested two possible modification options, which are linear or quadratic programming.

This year, we have undertaken further analysis with our consultant, Quantonomics, to compare our current approach (referred to as the 'Economic Insights method') with the suggested modifications from CEPA. Our consultant's memorandum[21] contains the output weight results under the three different methods, as well as the econometric calculations behind the results. In the memorandum, Quantonomics finds a reasonable degree of consistency between the methods, supporting the reliability of the output cost shares obtained under our current approach.[22] Given the above, we have continued the use of the 'Economic Insights' method and updated the non-reliability output weights in the analysis of our report this year.

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19 Refinements are outlined in the 'Data revisions' sheet of the consolidated benchmarking data file.

20 CEPA, *Final report - Review of AER's estimated non-reliability output weights used in the TFP and MTFP benchmarking models*, November 2024, pp.12–17.

21 Quantonomics, *Nonreliability Output Index Weights ABR25*, 17 June 2025.

22 Quantonomics, *Nonreliability Output Index Weights ABR25*, 17 June 2025, p.20-21.

1.4.2 Other development work

As noted previously, we are aware that substantial investments in transmission networks will change the landscape (through increasing connection of large-scale renewable generation) and potentially affect the potency of the benchmarking report. We recognise that while this new transmission network investment is likely to be largely captured through the current economic benchmarking model inputs (opex and capital), it is less clear that this is the case for all relevant outputs. We will closely monitor developments in the transmission network environment and consider the validity of current outputs, as well as any potential additions to the output variables. This will help to inform any future transmission benchmarking development work in relation to the appropriate model specification.

1.5 Consultation

In developing this report, we have consulted with external stakeholders in two main stages. First, in relation to the data submitted to the AER as part of the 2024 RIN. Second, in relation to a draft of Quantonomics' benchmarking report and results.

We made the decision to streamline our benchmarking process, by removing consultation on a draft version of this report (the AER report), noting there was a high degree of duplication in content and consultation across the AER report and the Quantonomics report. Our report provides a summary analysis of the key results, with detailed analysis and results contained in the attached Quantonomics report.

We highly value stakeholder feedback and believe these discussions help improve benchmarking over time. The feedback we received this year, and our responses, are as follows:

- Powerlink raised concerns[23] on the timeframe that the Energy Not Supplied (ENS) data is reported. It noted that 2023 ENS data should be used for the 2023–24 benchmarking period instead of 2022–23, which aligns with the data prepared as part of Annual Service Target Performance Incentive Scheme reports. We agree this issue should be considered further. Subject to other development priorities in benchmarking, we will consider possible options on how we can improve the reporting of ENS, as well as the limitations and implications of each option. Depending on our approach, we may consult with TNSPs further as the potential changes will apply to all transmission networks.
- Powerlink reiterated its view that there is merit in a broader review of the transmission economic benchmarking specification. It reasons that it is important to ensure the full range of TNSP services is captured in the midst of the energy transformation.[24] This has been raised by other TNSPs in previous benchmarking reports, and we consider this to be an important area to investigate. In our Annual Benchmarking Report (for distribution), we have committed to a further review of export services data in 2027, to determine if changes should be made to benchmarking models to ensure appropriate measurement of productivity. We will consider if the benchmarking specification review for transmission

[23] Powerlink, Submission to AER – Preliminary benchmarking results 2025 – *Electricity transmission network service providers*, 18 September 2025.

[24] Powerlink, Submission to AER – Preliminary benchmarking results 2025 – *Electricity transmission network service providers*, 18 September 2025.

should be conducted at the same time as that of distribution, while also accounting for the timing of the next Network Information Requirements Review.

- There were no stakeholder submissions or comments regarding the update of non-reliability output weights that was applied this year.

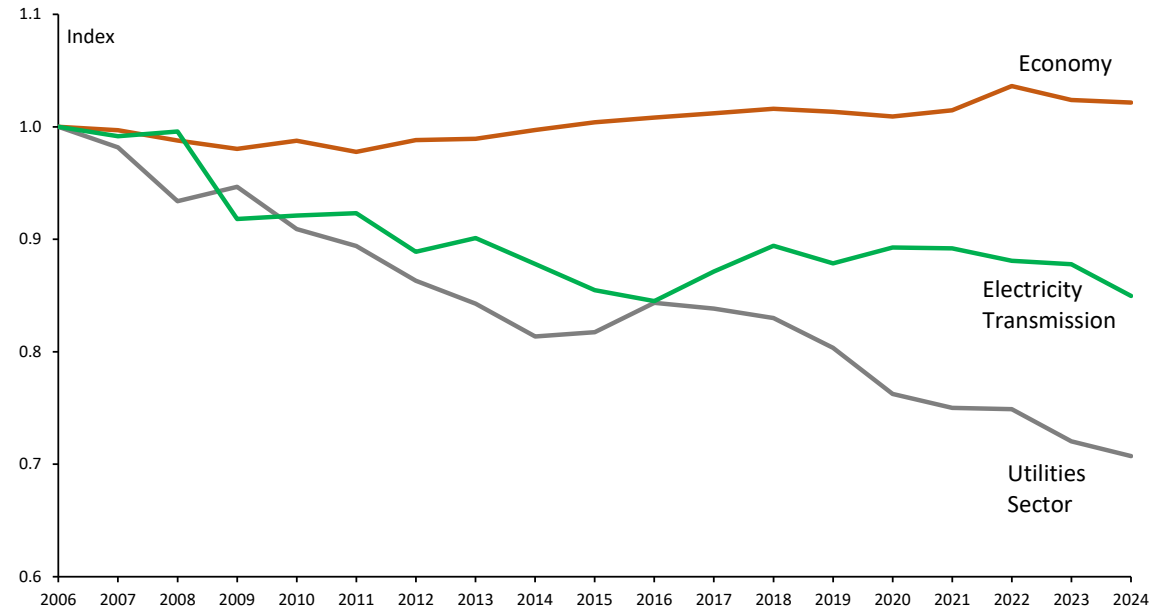
2 Benchmarking results

This section presents a summary of key 2025 benchmarking results, covering the entire benchmarking period from 2006–24. A broader, and more detailed set of benchmarking results can be found in the accompanying Quantonomics report and data files published alongside this report. We include updated results on the productivity of the electricity transmission industry, the relative productivity of individual electricity transmission networks, and our partial performance indicators (PPIs).

2.1 The productivity of the electricity transmission industry

Electricity transmission industry productivity as measured by the total factor productivity (TFP) index decreased over the 2006–24 period at an average annual rate of 0.9%. This declining trend can be seen in Figure 1. While there was a general improvement in transmission industry productivity between 2016–20, there has been a decline since 2020, and transmission productivity has decreased by a further 3.2% in 2024.

Figure 1 Electricity transmission industry, utility sector, and economy TFP, 2006–24



From 2006–24, average productivity in the transmission industry declined by 0.9% per year. This is better than the broader utilities sector's[25] decline of 1.9% per year on average, but below the overall Australian market economy, which saw a slight annual productivity growth on average over this period.

The divergence of transmission industry productivity from the broader utilities sector may to some extent be driven by measurement differences between our TFP index, and the ABS' MFP index. In particular, our functional output specification recognises a range of outputs such as energy throughput, customer numbers, reliability, circuit length and ratcheted

[25] The utilities sector, abbreviated as EGWWS, includes Electricity, Gas, Water and Waste Services.

maximum demand, while the ABS's measure uses value-added output that may primarily consider energy throughput when measuring the productivity of the electricity supply subsector of utilities. As observed by the Productivity Commission (PC), the utilities sector has seen a long-term decline in productivity beginning in 1997–98 and predating our collection of benchmarking data for the industry.

This decline is a result of capital investment in anticipation of future demand, issues in output measurement, exogenous shifts to higher cost technologies, and unmeasured improvements in output quality such as reliability, safety, visual amenity or lower emissions.[26,27] Specifically, in the early 2000s, rapid growth in household air-conditioner use led to an increase in the ratio of peak to average electricity demand, lowering average rates of capacity utilisation. The rapid growth of consumer energy resources (CER) over the last 10-years and electricity-self supply from household solar installations has resulted in a decrease in average household electricity demand on the network throughout the day, with a large share of network assets only being utilised efficiently during a small number of hours, on a small number of days in the year. These structural changes in how consumers utilise electricity networks are, to a large extent, outside the control of transmission networks.

The decline in transmission productivity from 2006–16, is mainly due to the downward trend seen in capital PFP during this time, with opex PFP fluctuating and occasionally either counteracting or contributing to the decline in productivity. The downward trend in capital PFP until 2016 was due to higher expenditure in capital inputs, procuring new transformers and increasing total circuit length. This additional infrastructure was required to meet the growing number of end-users and to accommodate the increase in renewable generators in response to government policies, such as the increase of the Mandatory Renewable Target, at the time, to 20%.[28]

While there were improvements in the industry's outputs of energy delivered and end-users, the large investment in capital inputs resulted in the early period decline in productivity.

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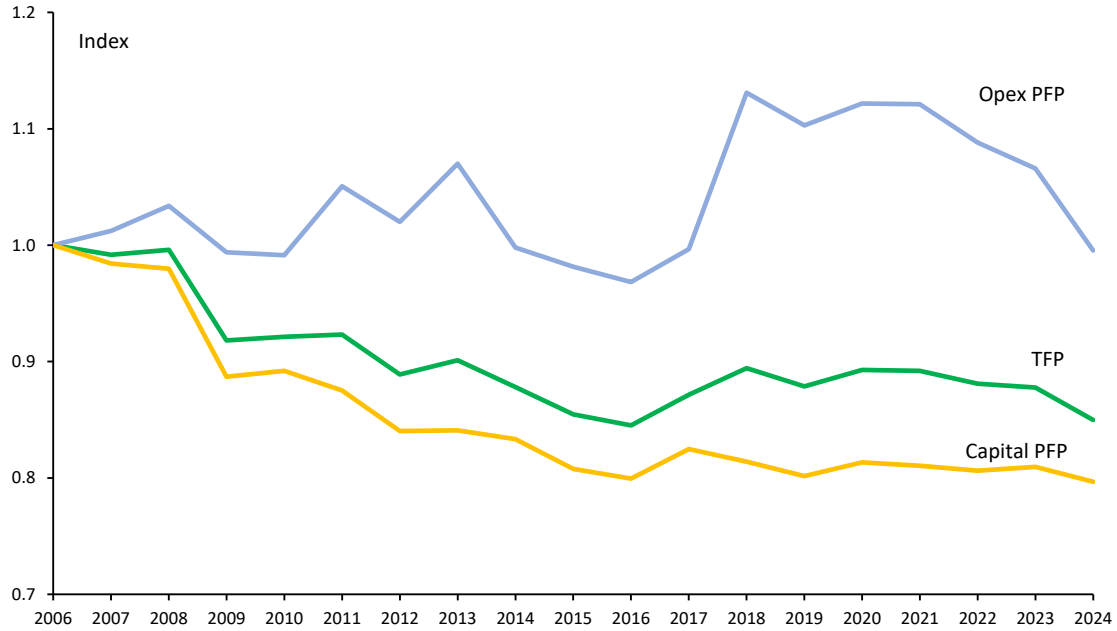
26 Productivity Commission, *Productivity in Electricity, Gas and Water: Measurement and Interpretation,* March 2012.

27 Productivity Commission, *Productivity Update*, May 2013, pp. 33–34.

28 Clean Energy Regulator, *Renewable Energy Target***,** March 4, 2025.

Figure 2 Transmission industry TFP, opex PFP and capital PFP over 2006–24

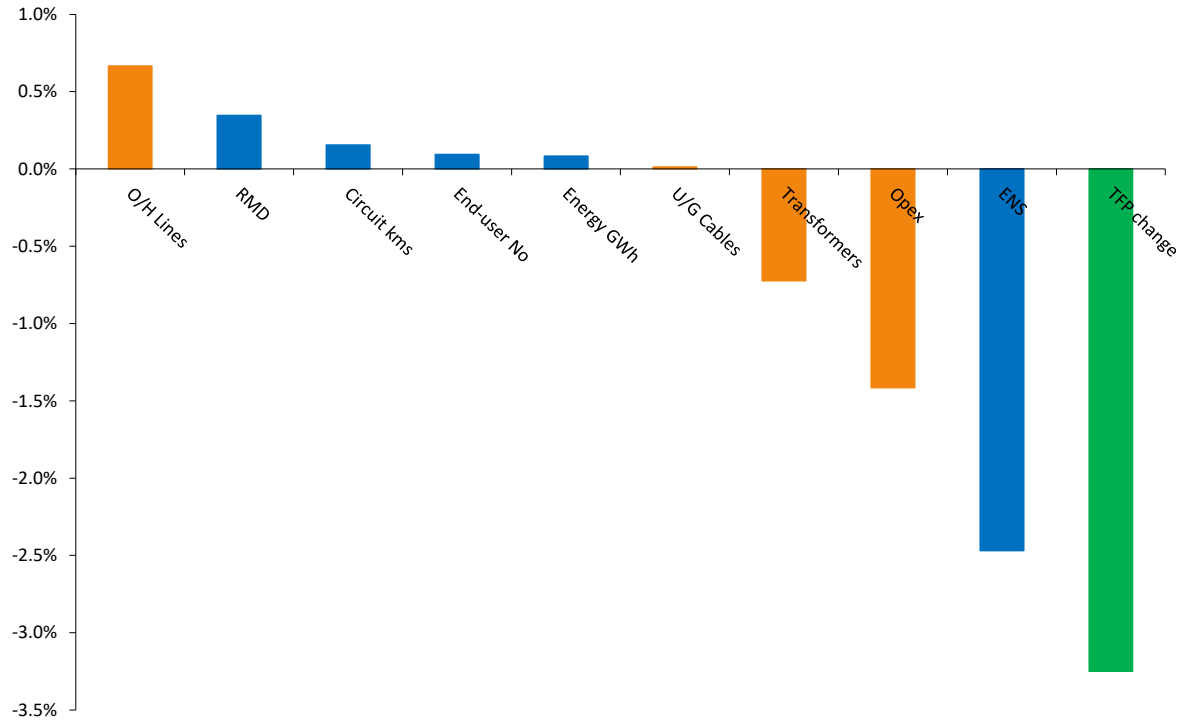


As the capital PFP largely stabilised after 2016, there was an improvement in transmission productivity from 2016–20. Since 2016 the growth of capital inputs slowed after its surge in earlier years. When combined with a reduction in opex input (higher opex PFP), transmission productivity trended positively over the 2016–20 period. Network outputs such as increased reliability (less outage events) and more end-users of the network contributed modestly to this trend.

Transmission productivity has displayed a downward trend since 2020. This is largely characterised by the declining opex PFP in this period, where opex inputs increased by an average of 2.8% in the past four years.

In 2024, transmission industry TFP saw a decline of 3.2% as a result of lower reliability (more outage events) relative to last year, as well as higher opex inputs across the industry, negatively contributing 1.4 and 2.5 percentage points respectively. Growth in the transformer capital input also negatively contributed 0.7 percentage points to TFP change. Partly offsetting this were a reduction in the overhead lines input (contributing 0.7 percentage points) and increases to ratcheted maximum demand and circuit length outputs. These two outputs positively contributed 0.3 and 0.2 percentage points, respectively. The TFP contributions of individual inputs and outputs in 2024 are visualised in Figure 3 below.

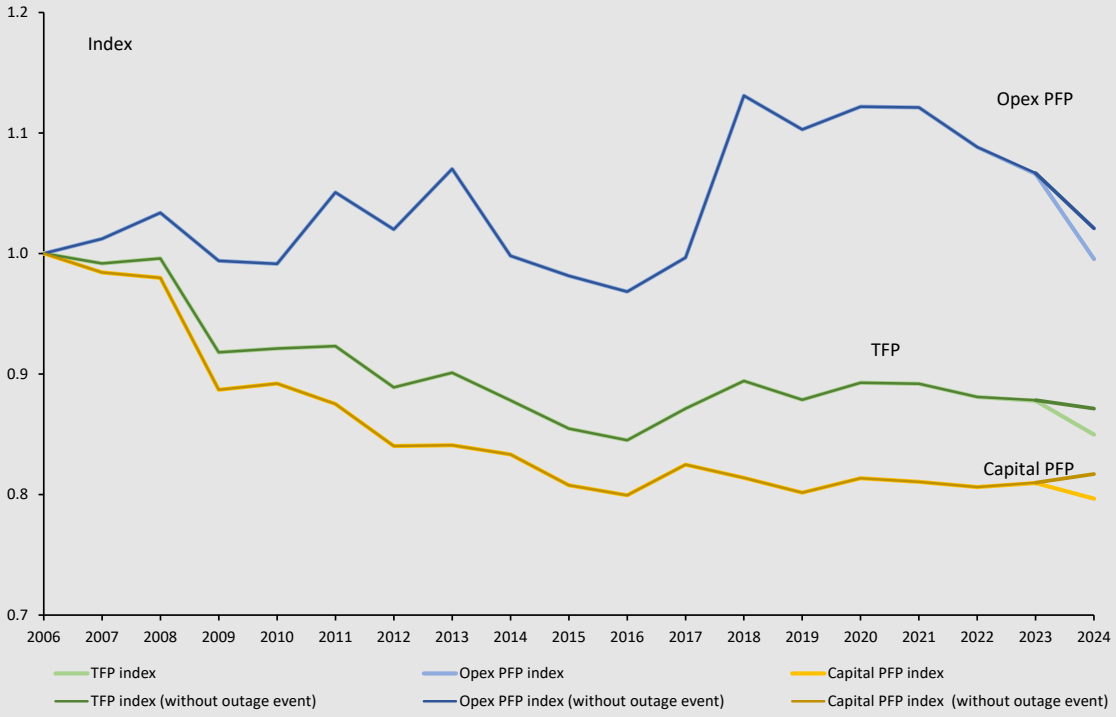
Figure 3 Electricity transmission output and input percentage point contributions to annual TFP change, 2023–24



Single outage event in the NSW network was a major contributor to the TFP decline in 2024

In October 2024, an outage event in Transgrid's network reported a large amount of unsupplied energy, resulting in lower reliability captured in our benchmarking calculations. The outage event is responsible for a substantial portion of the negative productivity seen in 2024, where transmission productivity would have been −0.8% had the outage event not occurred.

The graph below shows the hypothetical productivity performance (TFP, opex and capital PFP) in the absence of any outage events. While the TFP remains in a downward slope, the decline is less material compared to when outage events are included.



Changes in data through network audit and peak demand reclassification

Other factors that have impacted this year's TFP results are the changes in average capacities (overhead lines, underground cables in MVA) of ElectraNet and Transgrid. At our initial consultation stage with TNSPs on their economic benchmarking (EB) RIN data, Transgrid and ElectraNet signalled material changes in their average capacity of capital inputs. ElectraNet noted that adjustments were made after line rating audits, while Transgrid's adjustments were due to shifts in peaking season from winter to summer.[29]

If the changes in ratings were absent, input growth would be higher and thus, industry TFP would be lower for this year. In a hypothetical scenario where there are no changes in average capacity, holding all other factors constant, 2024 industry TFP would be −4.3% rather than the −3.2% reported this year.

Our consultant's report considers this issue in detail. Quantonomics' report includes sensitivity analysis, time series data and relevant calculations. This report is available on our website and can be read for more detailed information about this year's benchmarking outcomes.[30]

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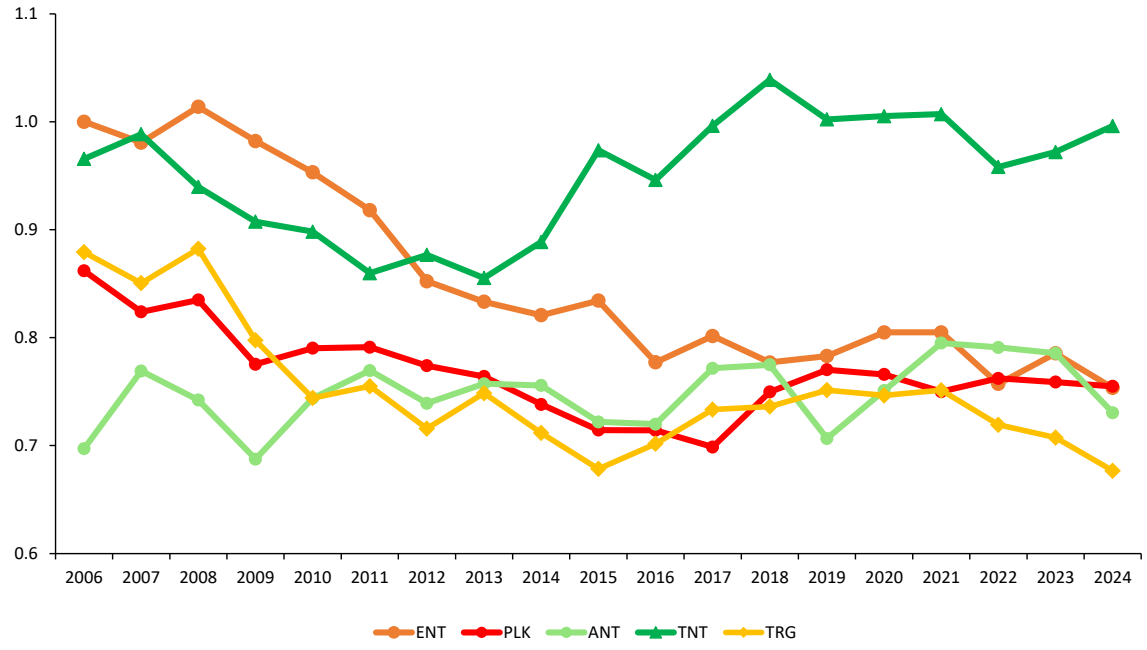
29 Average capacity for overhead lines and underground cables is measured in the season when maximum demand occurs, this prompted Transgrid to record data differently.

30 Quantonomics, *Economic Benchmarking Results for the Australian Energy Regulator's 2025 TNSP Annual Benchmarking Report*, 13 November 2025, p.56.

2.2 Relative productivity of individual transmission networks

There are five transmission networks in the National Electricity Market (NEM), one in each state. Their relative productivity as measured by panel data multilateral total factor productivity (MTFP) can be seen in Figure 4 highlights the variability in productivity observed for individual TNSPs over time and emphasises the importance of considering the changes in productivity in 2024 in the context of longer-term trends.

Figure 4 Electricity transmission MTFP indexes by TNSP, 2006–24



Over the 2006–24 period, there has been convergence in the productivity of all TNSPs except TasNetworks. The productivity of TasNetworks has improved significantly from 2013. This likely reflects efficiencies from the merger of distribution and transmission services in Tasmania, that resulted in the formation of TasNetworks as a combined distribution and transmission network service provider.[31] TasNetworks reported improved reliability (less outage events) and lowered opex inputs by an average of 13.4% for four years after the merger (2014–18). After 2018, TasNetworks' productivity stabilised through multiple years of peak and troughs but remained the top performer relative to other networks.

Over the 2006–24 period, the productivity of ElectraNet, Powerlink and Transgrid deteriorated, largely due to decreases in capital multilateral partial factor productivity (MPFP) during this period, reflecting increases in capital inputs faster than output growth. While the increase in capital inputs is relevant to all five TNSPs, it is more pronounced for ElectraNet,

[31] TasNetworks was formed on 1 July 2014 from a merger between Aurora and Transend.

Powerlink and Transgrid. The construction of transformers, overhead and underground lines during this period contributed to the lower MTFP scores of the three networks.

Conversely, AusNet had a slight increasing MTFP trend due to low or negative growth in capital inputs over the 2006–24 period. AusNet's low capital input growth, coupled with a small reduction in opex input, is a main factor for its MTFP trend, despite AusNet's output growth profile being similar to other TNSPs.

All TNSPs except for TasNetworks saw lower MTFP scores over in 2024 compared to the previous year, with AusNet having the largest decrease (−7.3%). Table 2 shows the main drivers of decreasing productivity for each network. The cause of lower productivity scores varies. A common theme is the increase in opex input over the past year, which has negatively impacted efficiency scores of most networks.

Table 2 Main contributors to lower MTFP scores for 2024

ElectraNet	AusNet	Powerlink	Transgrid
Overhead Lines, Transformers	Opex, Transformers, Reliability (ENS)	Opex	Reliability (ENS)

Source: AER analysis.

Our measure of reliability, Energy not supplied (MWh), had a substantial impact on Transgrid's MTFP performance and its influence is also apparent in the overall industry TFP. This is due to a prolonged, one-off outage event that occurred in its network, lowering its performance as high amounts of energy were not supplied to end users. It is worth noting that Transgrid's other inputs and outputs such as total energy delivered, opex and overhead line inputs all contributing to dampen the negative effect of the reliability decrease. The magnitude of the outage event more than offsets the positive contributions of other improved metrics.

TasNetworks' MTFP improved by 2.5%, as the network saw improved reliability and a reduction in transformer input. TasNetworks, like other networks, reported an increase in opex input but the increase was not large enough to offset the positive contribution of other inputs and outputs to its MTFP score.

While the input and output specification used in our benchmarking accounts for some operating environment factors (OEFs) such as density and service classifications, there are many OEFs that are no accounted for an may affect individual TNSPs' MTFP. The MTFP indexes may therefore only give a general view of network performance. The limitations of benchmarking are further discussed on our website.

2.3 Partial Performance Indicators

PPIs provide a simple representation of the input costs relative to a particular output. The PPIs used here support the MTFP analysis by providing a general indication of comparative performance in delivering one type of output. However, PPIs do not take into account the interrelationships between outputs. Therefore, PPIs are most useful when used in conjunction with other top-down benchmarking techniques, such as MTFP. Figure 5 is an

example of a PPI featuring total cost[32] per customer, after inflation adjustments. It describes the ratio of overall costs and end users, displaying an increase when growth of costs outpaces that of end users. Note this metric does not account for connection density of a network and the different geographical profiles across networks. Figure 6 shows the connection density of each transmission network, which provides relevant information on network characteristics.

Our full set of PPIs are available in spreadsheet form on the 2025 Annual Benchmarking Report page on our website.

Figure 5 Total cost per end user ($2024), 2006 to 2024

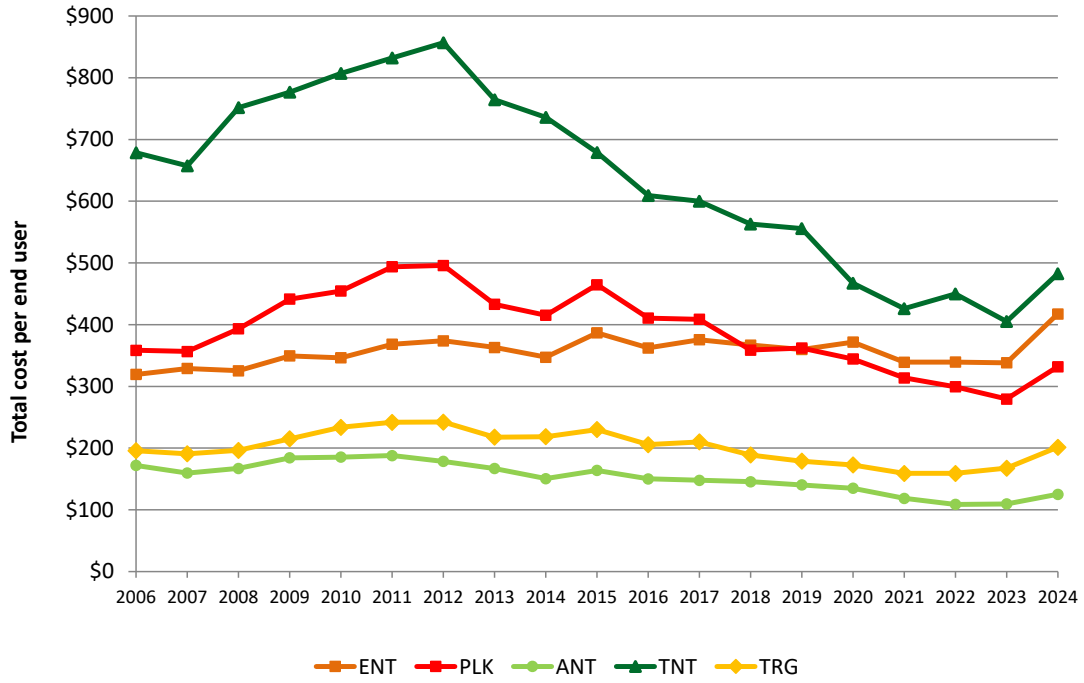
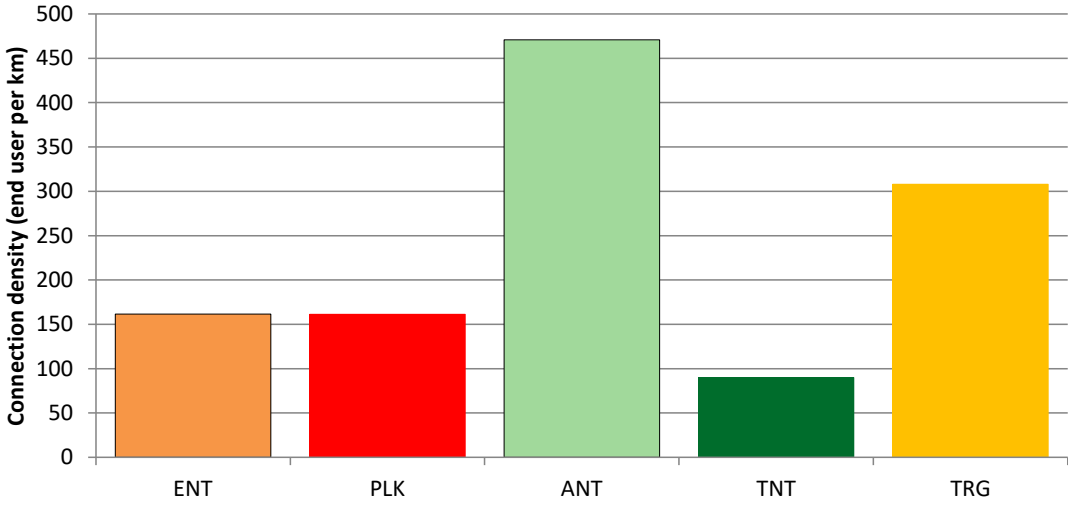


Figure 6 Connection density (end user per circuit km, 2020-24 average)



[32] Calculated by the network's operating and capital expenditure (actual additions to RAB) for the regulatory year.

Shortened forms

Shortened form	Description
AEMC	Australian Energy Market Commission
ABR	Annual Benchmarking Report
AER	Australian Energy Regulator
ANT	AusNet (transmission)
AUC	Annual user cost of capital
Capex	Capital expenditure
CCO	Capitalised corporate overheads
ENT	ElectraNet
ENS	Energy Not Supplied
MVA	Mega Volt Amp
NEL	National Electricity Law
NEM	National Electricity Market
NER	National Electricity Rules
Opex	Operating expenditure
PLK	Powerlink
RAB	Regulatory asset base
RIN	Regulatory Information Notice
STPIS	Service target performance incentive scheme
TNSP	Transmission network service provider
TNT	TasNetworks (Transmission)
TRG	Transgrid

Glossary

Term	Description
Inputs	Inputs are the resources TNSPs use to provide services.
Productive efficiency	Productive efficiency is achieved when networks produce their goods and services at least possible cost. To achieve this, networks must be technically efficient (produce a given level of outputs with the least possible inputs) while also selecting the lowest cost combination of inputs given prevailing input prices.
MPFP	Multilateral partial factor productivity is a PIN technique that measures the relationship between total output and one input. It allows both partial productivity levels and growth rates to be compared between entities (networks) and over time.
MTFP	Multilateral total factor productivity is a PIN technique that measures the relationship between total output and total input. It allows both total productivity levels and growth rates to be compared between entities (networks) and over time. These results are used in this report to measure and compare changes in 'relative productivity' over time.
Prescribed transmission services	Prescribed transmission services are the services that are shared across the users of transmission networks. These capture the services that TNSPs must provide under legislation.
OEFs	Operating environment factors are factors beyond a TNSPs control that can affect its costs and benchmarking performance.
Opex	Operation and maintenance expenditure
Outputs	Outputs are quantitative or qualitative measures that represent the services TNSPs provide.
PIN	Productivity index number techniques determine the relationship between inputs and outputs using a mathematical index.
PPI	Partial performance indicator are simple techniques that measure the relationship between one input and one output.
RMD	Ratcheted maximum demand is the highest value of maximum demand for each TNSP, observed in the time period up to the year in question. It recognises capacity that has been used to satisfy demand and gives the TNSP credit for this capacity in subsequent years, even though

Term	Description
	annual maximum demand may be lower in subsequent years.
TFP	Total factor productivity measures the relationship between total output and total input over time. It allows total productivity changes of a single entity (e.g. transmission industry or TNSP) to be compared over time.
VCR	Value of Customer Reliability. VCR represents a customer's willingness to pay for the reliable supply of electricity.

A. References and further reading

This benchmarking report is informed by several sources. This includes ACCC / AER research and expert advice provided by Quantonomics, and previously by Economic Insights as set out below.

Quantonomics publications

The following publications explains in detail how Quantonomics developed and applied the economic benchmarking techniques we used:

- Quantonomics Report – Economic Benchmarking Results for the Australian Energy Regulator's 2024 TNSP Benchmarking Report, October 2025.
- Quantonomics Report – Economic Benchmarking Results for the Australian Energy Regulator's 2023 TNSP Benchmarking Report, July 2024. (link)
- Quantonomics Report – *Economic Benchmarking Results for the Australian Energy Regulator's 2023 TNSP Benchmarking Report*, October 2023 (link)
- Quantonomics Report – Economic Benchmarking Results for the Australian Energy Regulator's 2022 *TNSP Benchmarking Report*, November 2022. (link)

Economic Insights publications

The following publications explain in detail how Economic Insights, our previous consultant, developed and applied the economic benchmarking techniques we used:

- Economic Insights *Report – Economic Benchmarking Results for the Australian Energy* Regulator's *2021 TNSP Benchmarking Report*, November 2021 (link)
- Economic Insights *Report – Economic Benchmarking Results for the Australian Energy Regulator's 2020 TNSP Benchmarking Report*, 15 October 2020 (link)
- Economic Insights, AER Memo Revised 2019 TNSP EB Results, 24 August 2020 (link)
- Economic Insights *Report – Economic Benchmarking Results for the Australian Energy Regulator's 2019 TNSP Benchmarking Report*, September 2019 (link)
- Economic Insights *Report – Economic Benchmarking Results for the Australian Energy Regulator's 2018 TNSP Benchmarking Report*, November 2018 (link)
- Economic Insights *Report – Economic Benchmarking Results for the Australian Energy Regulator's 2017 TNSP* Benchmarking *Report*, November 2017 (link)
- Economic Insights, *Memorandum – TNSP MTFP Results*, November 2016 (link).
- Economic Insights*, Memorandum – TNSP MTFP Results*, 13 November 2015 (link).
- Economic Insights, *Economic Benchmarking Assessment of Operating Expenditure for NSW and Tasmanian Electricity TNSPs*, 10 November 2014 (link).
- Economic Insights, *AER Response to HoustonKemp for TransGrid determination*, 4 March 2015 (link)

- Economic Insights, Economic *Benchmarking of Electricity Network Service Providers*, 25 June 2013 (link).

AER 2017 TNSP Benchmarking Review

All documents related to the AER's 2017 TNSP Benchmarking Review can be found on line here.

ACCC/AER publications

These publications provide a comprehensive overview of the benchmarking approaches used by overseas regulators:

- ACCC / AER, *Benchmarking Opex and Capex in Energy Networks – Working Paper no. 6*, May 2012 (link).
- ACCC / AER, *Regulatory* Practices *in Other Countries – Benchmarking opex and capex in energy networks*, May 2012 (link).
- WIK Consult, Cost Benchmarking in Energy Regulation in European Countries, 14 December 2011 (link).

AER transmission determinations

The AER uses economic benchmarking to inform its regulatory determination decisions. A full list of these decisions to date can be found on the AER's website here.