4. Historical Capital and Operating Expenditure

4.1 Introduction

This chapter provides an overview of Powerlink's performance against the Australian Energy Regulator's (AER's) allowances for capital and operating expenditure during the current and preceding regulatory periods and provides context for forecast expenditure in the 2023-27 regulatory period. Our cost performance under the AER's Annual Benchmarking Report is also discussed.

Key highlights

- Our forecast outcome for the current 2018-22 regulatory period is:
  - total capital expenditure of $891.3m. This is $1.8m (0.2%) lower than the AER's allowance of $893.1m; and
  - total operating expenditure of $1,035.6m. This is $9.5m (0.9%) higher than the AER's allowance of $1,026.1m. These figures are exclusive of debt raising costs.
- Our performance under the AER's economic benchmarking approach has improved over the course of the current regulatory period. This is primarily attributable to a 7% real reduction in operating expenditure compared to the previous regulatory period, and a reduction in events that result in loss of supply to our customers (refer Chapter 15 Service Target Performance Incentive Scheme).

4.2 Regulatory requirements

The National Electricity Rules (the Rules)[1] require that our Revenue Proposal provides information related to our actual/forecast operating and capital expenditure over the current and preceding regulatory periods. The Rules[2] also require that, when considering our proposed forecast expenditure, the AER also has regard to such expenditure.

4.3 Powerlink's efficiency focus

A key focus area for Powerlink in the 2018-22 regulatory period has been to deliver better value to our customers through increased efficiency while continuing to deliver our services. Our cost performance in both capital and operating expenditure has improved from the 2013-17 regulatory period, driven by several key factors:

- the realisation of efficiency benefits from a reduction in layers within the organisational structure;
- review and adjustment of resource levels within the business in response to reduced demand and related capital expenditure forecasts. Full-time equivalent employee numbers reduced by approximately 14% between 30 June 2015[3] and 30 June 2020[4]; and
- review and implementation of a cost-effective long-term arrangement for maintenance service delivery. We determined that Ergon Energy has the requisite knowledge and skills to undertake these activities and has skilled resources in the same geographic areas as our assets[5]. On 12 May 2020 the AER granted a ring-fencing waiver to permit Ergon Energy to provide field services to Powerlink directly until 30 June 2025[6]. The AER concluded that, in this instance, the potential costs associated with compliance with the Distribution Ring-Fencing Guidelines are not warranted. This is expected to deliver efficiency savings across both capital and operating expenditure.

While cost control will remain a focus for Powerlink in the 2023-27 regulatory period we will seek to leverage innovation to help us increase productivity and improve customer outcomes. In particular, our target of no real growth in operating expenditure over the 2023-27 regulatory period will require us to find new and innovative ways to meet emerging challenges without necessarily increasing costs.

Our asset management planning approach focuses on how the required levels of transmission network service can be appropriately met, regardless of the type of assets deployed. Under this approach, potential asset reinvestment decisions do not consider solely like-for-like replacement. We consider if assets can be retired without replacement, whether other assets can be reconfigured, or non-network alternatives procured, to meet the network need.

1 National Electricity Rules, schedule 6A.1, clauses S6A.1.1(6) and S6A.1.2(7).
2 National Electricity Rules, clauses 6A.6.7(e)(5) and 6A.6.6(e)(5).
3 Annual Report 2014/15, Powerlink Queensland, 2015.
4 Annual Report 2019/20, Powerlink Queensland, 2020.
5 Outside of southern Queensland.
6 Final Decision Ergon Energy Ring-Fencing Waiver, Australian Energy Regulator, May 2020.

This holistic approach to network asset management has contributed to a reduction in our Regulatory Asset Base (RAB) during the current regulatory period in both nominal and real terms[7], and will contribute to a reduction in both nominal and real terms in the 2023-27 regulatory period[8] (refer Chapter 8 Regulatory Asset Base). A decline in our RAB provides ongoing savings to customers.

We have adopted a structured Innovation Framework to guide the creation and trial of new innovative practices to assess their suitability for broader adoption across the business. Key initiatives that are currently under trial or development include:

- New helicopter work practices to improve productivity in insulator replacement works. In more remote parts of the network this has reduced the per unit cost of insulator replacements by up to 30%.
- Procurement of a mobile switching bay to facilitate outages in constrained parts of the network. With the rapid changes being experienced on the power system, there are diminished opportunities for extended outages of switching bays to facilitate equipment refurbishment or replacement. The deployment of a mobile switching bay will provide a temporary bypass within a switching bay to allow the network element to remain in service while the main switching bay equipment is replaced.
- The use of drones and artificial intelligence to provide increased throughput, accuracy and consistency of the assessment of corrosion levels on steel transmission towers. This work is still in its early stages.
- We are investigating the application of Phasor Monitoring Units (PMUs) to improve our ability to monitor and respond to the changing characteristics of the power system as more Inverter-Based Resources (IBR) connect to the network. PMUs can provide high-speed and time-synchronised measurement of voltage and current phasors that can be used in real-time for both monitoring and control applications. This capability is expected to give us greater flexibility to manage outages that impact system strength and help maximise the network capability to host IBR.

4.4 Historical capital expenditure

Consistent with the requirements of the Rules[9], this section summarises our historical capital expenditure for the 2013-17 and 2018-22 regulatory periods.

Expenditure for the 2012/13 to 2019/20 financial years are actuals while the 2020/21 and 2021/22 financial years are based on our current expenditure plans and forecasts. All expenditure has been converted to real 2021/22 dollars using actual Consumer Price Index (CPI) outcomes published by the Australian Bureau of Statistics (ABS) and the most recent inflation forecasts published by the Reserve Bank of Australia (RBA).

We have also converted the expenditure allowance in the previous AER Final Decision[10] from real 2016/17 to real 2021/22 dollars using the same approach. This has resulted in actual expenditures and expenditure allowances reducing slightly from those published in our draft Revenue Proposal in September 2020.

4.4.1 Historical capital expenditure summary

Table 4.1 shows our actual/forecast capital expenditure for the previous and current regulatory periods by expenditure category.

[7] Based on a comparison of 1 July 2017 opening RAB to 30 June 2022 closing RAB.
[8] Based on a comparison of 1 July 2022 opening RAB to 30 June 2027 closing RAB.
[9] National Electricity Rules, schedule 6A.1, clause S6A1.1(6).
[10] Final Decision Powerlink transmission determination 2017-22, Australian Energy Regulator, April 2017.

Table 4.1: Capital expenditure – actual/forecast ($m real, 2021/22)(1)

	2013-17 regulatory period						2018-22 regulatory period					
	2012/13	2013/14	2014/15	2015/16	2016/17	Total	2017/18	2018/19	2019/20	2020/21 (forecast)	2021/22 (forecast)	Total
Network capital expenditure												
Augmentations	182.1	112.7	(1.4)	0.8	0.3	**294.4**	1.3	5.6	3.9	6.1	4.3	**21.3**
Connections	6.8	8.6	1.0	(1.3)	0.1	**15.1**	-	0.1	-	-	-	**0.1**
Easements	14.8	12.4	7.0	3.1	9.2	**46.5**	(0.2)	0.8	2.0	2.5	0.3	**5.4**
Total: load-driven	**203.7**	**133.6**	**6.5**	**2.5**	**9.6**	**355.9**	**1.2**	**6.5**	**5.9**	**8.6**	**4.6**	**26.8**
Reinvestments	267.8	203.6	145.0	107.0	109.6	**833.1**	120.8	144.7	136.2	139.5	172.0	**713.1**
System Services(2)	-	-	-	-	-	**-**	-	-	-	3.5	14.5	**18.0**
Security/ compliance(3)	6.0	6.6	5.1	3.1	29.6	**50.4**	20.6	2.2	1.3	1.0	0.0	**25.0**
Other	14.3	7.0	2.4	2.1	2.8	**28.5**	(0.3)	1.0	3.3	3.4	-	**7.4**
Total: non load-driven	**288.0**	**217.3**	**152.4**	**112.2**	**142.0**	**912.0**	**141.1**	**147.8**	**140.8**	**147.4**	**186.5**	**763.6**
Non-network capital expenditure												
Business IT	9.3	6.2	10.9	20.2	24.8	**71.4**	11.9	12.6	20.2	17.8	9.6	**72.1**
Support the Business(4)	20.0	3.5	7.1	8.3	3.3	**42.2**	4.6	8.1	5.7	4.8	5.7	**28.8**
Total: non-network	**29.4**	**9.7**	**17.9**	**28.5**	**28.1**	**113.6**	**16.5**	**20.7**	**25.9**	**22.6**	**15.3**	**101.0**
Total(5)	**521.0**	**360.6**	**176.9**	**143.3**	**179.7**	**1,381.6**	**158.7**	**175.0**	**172.6**	**178.6**	**206.4**	**891.3**

(1) All figures are expenditure incurred in the provision of prescribed transmission services, consistent with our Cost Allocation Methodology (CAM) approved by the AER in 2008.

(2) System Services is a new capital expenditure investment driver. It covers investments required to meet power system performance standards such as voltage control, inertia and system strength to support prescribed transmission services.

(3) Within the Security/Compliance category, we made significant investments in upgrading physical security at substations during 2016/17 and 2017/18.

(4) The office refit project that was proposed to be undertaken during the 2018-22 regulatory period has been deferred and is now forecast for early in the 2023-27 regulatory period.

(5) All figures are net of vehicle disposals.

There are no margins paid or expected to be paid to related parties in the actual/forecast expenditure reported above.

4.4.2 Performance against allowance

An allowance for the prudent and efficient capital expenditure needed to achieve the capital expenditure objectives is one of the building-block inputs to the AER's Final Decision for our current regulatory period. It is an overall allowance within which we manage and prioritise investments during the course of a regulatory period, and should not be interpreted as constraining expenditure within the specific categories identified.

At this time, we forecast our total capital expenditure to be $1.8m (0.2%) lower, than the AER's total capital expenditure allowance for the 2018-22 regulatory period. This is discussed further in Section 4.4.3.

Table 4.2 summarises our total actual capital expenditure compared to the AER's allowance in its Final Decision for the current regulatory period. Expenditure for 2020/21 and 2021/22 is based on our current forecast.

Table 4.2: Capital expenditure – AER allowance vs actual/forecast ($m real, 2021/22)[1]

	2017/18	2018/19	2019/20	2020/21 (forecast)	2021/22 (forecast)	Total
Allowance	175.7	176.3	179.6	186.8	174.7	**893.1**
Actual/forecast	158.7	175.0	172.6	178.6	206.4	**891.3**
Difference ($m)	(17.0)	(1.3)	(6.9)	(8.3)	31.7	**(1.8)**
Difference (%)	(9.7)	(0.7)	(3.9)	(6.6)	18.1	**(0.2)**

(1) This table is net of disposals.

4.4.3 Network capital expenditure

COVID-19 impacts on project delivery

The COVID-19 pandemic has caused some delays in the delivery of network capital expenditure in 2019/20 and this is expected to result in further delays into 2020/21. There have been disruptions or delays to specialist equipment and resources brought in from overseas, as well as necessary changes to some of our field work practices. At this time we anticipate that we will be able to catch-up some of this delay during 2021/22, which we have reflected in our current forecast expenditure for that year, although this is not certain.

The reintroduction of restrictions in response to localised outbreaks in Sydney and Brisbane in December 2020 and January 2021 highlight the difficulty in confidently planning project delivery across the whole of Queensland at this time. We will update the AER on any material changes to our actual/forecast capital expenditure as part the AER's review of our Revenue Proposal and we will update our actual/forecast capital expenditure in our Revised Revenue Proposal to be submitted in December 2021.

Load-driven capital expenditure

We forecast our load-driven capital expenditure for the 2018-22 regulatory period will be $15.2m (132%) higher than the AER's indicative allowance.

The main driver of the additional expenditure is ground clearance rectification works. These works increase the rating of our overhead transmission lines from what they would otherwise be rated, which is why they are classified as augmentation. Ground clearance rectification addresses a range of vegetation, building or ground encroachments along our 14,500km of transmission circuits. These works are being undertaken progressively over the current and next regulatory periods.

Work is underway to acquire easements to allow for replacement of a section of the Woree to Kamerunga 132kV transmission line in the Cairns area. Together with a planned second stage of easement acquisition in 2021/22, this accounts for much of the increase in expenditure in this category.

In addition, some network augmentation works that were forecast to occur late in the 2013-17 regulatory period were delayed until early in the 2018-22 regulatory period to co-ordinate with planned generator outages.

Non load-driven capital expenditure

We currently forecast that we will invest $7.4m (1.0%) less than the AER's indicative allowance for network non load-driven capital expenditure.

This forecast underspend in the current regulatory period is primarily due to increased complexity in the delivery of our extensive replacement and refit projects. This has been driven by two key changes in our operating environment:

- a low demand growth environment – this influences the scope of reinvestment projects; and
- the emergence of low system strength as a risk to secure operation of the power system – this affects how we deliver reinvestment projects.

Low demand growth

There has been a significant change in the scope of network reinvestment projects in the current regulatory period compared to those undertaken in earlier periods when there was significant forecast demand growth.

Under high demand growth conditions, the most efficient reinvestment option often includes provision for additional capacity at modest additional cost. For example, in earlier regulatory periods, we found that in many circumstances the replacement of existing assets with new assets at different substation sites, or along new transmission line easements, was the most efficient option to meet the asset condition needs as well as cater for forecast demand growth.

In contrast, when there is little or no forecast demand growth, it is critical that we focus on those assets where there is an enduring need to provide the required level of transmission services. In these circumstances the most efficient asset reinvestment is often targeted in-situ asset life extension or replacement, which is more complex than greenfield replacement options.

Low system strength

The rapid shift towards IBR, such as wind and solar photovoltaic (PV), and the displacement of traditional synchronous generation sources, has altered the performance characteristics of the transmission network. Adequate system strength levels are critical to the secure operation of the power system. Outages on the transmission network, whether planned or unplanned, can have widespread impacts on generators and customers, and can result in significant constraints on the operation of IBRs.

We are increasingly required to perform replacement activities while adjacent assets remain in service i.e. in proximity to live electrical equipment, to limit impact on the reliability and security of the network. This has necessitated new contracting, delivery and supervision models, as well as additional and more complex staging of works, to ensure the safety of our staff and contractors. This has extended some project delivery timeframes and contributed to delays in expenditure from early in the current regulatory period to the later years of the period. This has also impacted our performance under the Market Impact Component (MIC) of the Service Target Performance Incentive Scheme (STPIS) which is discussed further in Chapter 15 Service Target Performance Incentive Scheme.

The overall effect of both low demand growth and low system strength has been to extend the timeframe for reinvestment project delivery and to increase the cost per unit, though the total reinvestment expenditure is reduced compared to the 2008-12 and 2013-17 regulatory periods.

Emerging investment drivers

To ensure we can continue to adapt to the changing energy landscape, we have commenced the Next Generation Network Operations (NGNO) program to ensure we have future-ready and contemporary systems.

Our network operations are central to navigating the challenges of the energy transition and the core of our network operations is the Energy Management System (EMS). The EMS receives real-time data from thousands of measurement points from across the transmission network. It processes this data to provide situational awareness to operators in our control centre and supports the real-time operation of the power system in a safe, secure and reliable manner. Our current EMS has reached its end-of-life and is being replaced. We expect this replacement to be largely completed within the current regulatory period.

In addition to our NGNO program, system services (e.g. response to system strength, inertia and fault level issues) is an emerging driver of capital investment. We have proposed System Services as a new category of capital expenditure that was not identified at the time of our 2018-22 Revenue Proposal. The need for this additional category has emerged in the current regulatory period due to the challenges presented by our changing energy market (refer Chapter 2 Business and Operating Environment).

One such challenge is increased penetration of rooftop solar PV. This has meant that the demand for electricity supply from the transmission network during daylight hours is now often lower than the minimum demands that previously occurred overnight. These new low minimum demands lead to high voltages in certain parts of the network, which requires additional reactive power equipment to maintain voltages within their prescribed limits.

During the current 2018-22 regulatory period, we have also identified the need for additional investment to improve environmental compliance in the management of transformer oil on substation sites, as well as facilities to ensure ongoing safe systems of work for Powerlink staff and contractors within our substations.

4.4.4 Non-network capital expenditure

Our current forecast is that we will invest $9.6m (8.7%) less than the AER's indicative allowance for non-network capital expenditure in the 2018-22 regulatory period.

Within Business Information Technology (IT), renewal of our Enterprise Resource Planning and Geographical Information System platforms has been brought forward to provide more efficient integration with other initiatives within the current regulatory period. This has advanced approximately $7.0m of capital expenditure that was expected to occur in the 2023-27 regulatory period into the current 2018-22 regulatory period.

This is offset by deferral of our proposed office building refit project, which was included in the Support the Business category. This project has been deferred to the next regulatory period. The provision of office accommodation that facilitates contemporary work practices remains important for our business. However, we determined that it was more important to defer this project and focus on enhancing our network analysis, project planning and other work practices to meet the emerging technical challenges of our energy market in the short-term. In light of this decision, we intend to return the revenue attributable to the capital expenditure allowance for the office refurbishment project to customers in 2021/22.

4.5 Historical operating expenditure

Consistent with the requirements of the Rules[11], this section summarises our historical operating expenditure for the 2018-22 regulatory period. In addition to the requirements of the Rules, we have also provided our operating expenditure for the 2013-17 regulatory period, for reference.

Expenditure for the 2012/13 to 2019/20 financial years are actuals while the 2020/21 and 2021/22 financial years are based on our current expenditure plans and forecasts. All expenditure has been converted to real 2021/22 dollars using actual CPI outcomes published by the ABS and the most recent inflation forecasts published by the RBA.

We have also converted the expenditure allowance in the previous AER Final Decision[12] from real 2016/17 to real 2021/22 dollars using the same approach. This has resulted in actual expenditure and expenditure allowances reducing slightly from those published in our draft Revenue Proposal in September 2020.

4.5.1 Historical operating expenditure summary

Table 4.3 shows our actual/forecast operating expenditure for the previous and current regulatory period by expenditure category.

[11] National Electricity Rules, schedule 6A.1, clause S6A1.2(7).

[12] Final Decision Powerlink transmission determination 2017-22, Australian Energy Regulator, April 2017

Table 4.3: Operating expenditure – actual/forecast ($m real, 2021/22)(1)

	2013-17 regulatory period						2018-22 regulatory period					
	2012/13	2013/14	2014/15	2015/16	2016/17	Total	2017/18	2018/19	2019/20	2020/21 (forecast)	2021/22 (forecast)	Total
Controllable operating expenditure												
Direct operating and maintenance expenditure												
Field maintenance	65.6	69.8	71.2	70.3	83.0	**359.8**	67.5	67.7	70.3	68.9	66.3	**340.8**
Operational refurbishment	36.4	37.4	41.6	37.1	36.0	**188.5**	36.6	39.1	38.5	37.9	38.4	**190.4**
Maintenance support	14.6	15.2	14.1	15.9	13.7	**73.5**	14.1	14.4	13.9	13.4	14.6	**70.5**
Network operations	15.2	15.4	16.8	16.1	15.4	**79.0**	15.7	16.3	15.9	15.7	16.1	**79.6**
Other controllable expenditure												
Asset management support	26.1	29.0	28.4	27.8	28.9	**140.2**	27.1	26.4	24.0	24.6	25.7	**127.7**
Corporate support	27.5	28.8	45.4	53.5	51.7	**206.9**	23.7	28.4	30.2	32.8	30.4	**145.6**
Total: controllable operating expenditure	**185.4**	**195.7**	**217.5**	**220.6**	**228.6**	**1,047.8**	**184.7**	**192.3**	**192.8**	**193.2**	**191.6**	**954.5**
Non-controllable operating expenditure												
Other operating expenditure												
Insurance premiums	7.4	7.5	7.4	7.4	6.8	**36.6**	7.0	7.1	7.9	9.2	10.6	**41.9**
Self-insurance	1.7	1.7	1.9	1.8	1.9	**9.0**	1.6	1.6	1.6	1.6	1.6	**7.9**
Australian Energy Market Commission (AEMC Levy	-	-	4.2	4.4	4.5	**13.1**	4.9	5.7	6.0	5.8	5.9	**28.2**
Network support	-	-	2.9	3.9	1.9	**8.7**	-	-	-	3.1	-	**3.1**
Debt raising costs	0.6	0.6	0.6	0.5	0.6	**2.9**	0.5	0.7	0.6	0.6	0.6	**2.9**
Total: non-controllable operating expenditure	**9.7**	**9.8**	**17.0**	**18.0**	**15.8**	**70.3**	**14.0**	**15.0**	**16.1**	**20.2**	**18.6**	**84.0**
Total operating expenditure	**195.1**	**205.5**	**234.5**	**238.6**	**244.4**	**1,118.1**	**198.7**	**207.3**	**208.9**	**213.4**	**210.2**	**1,038.5**
Total operating expenditure (less debt raising costs)	194.5	204.9	233.9	238.0	243.8	1,115.2	198.1	206.6	208.3	212.9	209.6	1,035.6

(1) All figures are expenditure incurred in the provision of prescribed transmission services, consistent with our CAM approved by the AER in 2008.

4.5.2 Performance against allowance

We expect total operating expenditure to be $1,035.6m, which is $9.5m (0.9%) higher than the AER's total allowance for the 2018-22 regulatory period. These figures are exclusive of debt raising costs.

Overall, operating expenditure has been relatively steady over the 2018-22 regulatory period. We have experienced cost increases in several controllable and non-controllable operating expenditure categories as outlined in the following sections.

Table 4.4 outlines the annual trend in allowed and actual operating expenditure over the 2018-22 regulatory period.

Table 4.4: Operating expenditure – AER allowance vs actual/forecast ($m real, 2021/22)(1)

	2017/18	2018/19	2019/20	2020/21 (forecast)	2021/22 (forecast)	Total
Allowance	206.8	205.9	205.0	204.3	204.2	**1,026.1**
Actual/forecast	198.1	206.6	208.3	212.9	209.6	**1,035.6**
Difference ($m)	(8.7)	0.7	3.3	8.6	5.5	**9.5**
Difference (%)	(4.2)	0.4	1.6	4.2	2.7	**0.9**

(1) Figures are exclusive of debt raising costs.

COVID-19 impacts on operating expenditure

The full extent of the COVID-19 pandemic is not yet known. To date, in 2019/20, we adjusted maintenance practices in response to COVID-19, with some reallocation of resources, particularly in areas where travel was possible. In this way, the main impact from COVID-19 on operating practices so far has been in the balance of expenditure between categories. Several variations from typical operation include:

- modified work methodologies for field and office-based staff to respond to physical distancing requirements. This included travel limits for field staff to only faults, emergencies and critical maintenance, and the need to provide additional vehicles to ensure physical distancing requirements were met while travelling to and from work sites;
- replanning of work where COVID-19 distancing requirements could not be met, for example, the deferral of some routine maintenance activities and an increase in condition-based and corrective maintenance to prioritise staff safety while performing relevant works; and
- additional costs for management of Powerlink's COVID-19 response, for example cleaning, sanitisation and signage.

We will continue to monitor the COVID-19 situation as it evolves and ensure that we continue to operate our network in a prudent and efficient manner, consistent with our regulatory and customer obligations.

Controllable operating expenditure

Controllable operating expenditure is expected to be $1.2m (0.1%) higher in the 2018-22 regulatory period compared to the AER's allowance. Direct operating and maintenance activities comprise the largest component of controllable operating expenditure. This includes all field activities, such as maintenance, to ensure plant can perform its required functions, and network control activities to ensure the safe, secure, reliable and cost-effective operational management of the transmission network. This work is largely recurrent in nature.

A priority area over the current regulatory period has been our insulator replacement program. We identified an early life failure risk for polymer insulators, which could lead to significant safety, reliability and security risks if not addressed. We prioritised work to replace these insulators, and target those most at risk of premature failure and along major transmission flow paths such as the Queensland/New South Wales Interconnector (QNI).

Emerging operating expenditure drivers

Several key emerging drivers of expenditure have been identified in the current regulatory period.

In network operations, outage management complexities associated with the growth in IBR, and an increased focus on cyber security, have been identified as key drivers of operating expenditure in the 2023-27 regulatory period. These have had a limited impact on operating expenditure within the current regulatory period, but have been considered closely in the development of operating expenditure forecasts for the 2023-27 regulatory period (refer Chapter 6 Forecast Operating Expenditure).

A third driver is increased decommissioning activities. As assets reach the end of their service life, we look at the most efficient reinvestment approach to meet current and future capacity needs. This may include replacement of assets, reconfiguration of the network, network support arrangements or decommissioning of assets where it is economically viable to do so and we can continue to meet our reliability standards. We expect to undertake decommissioning works of approximately $9.6m on a nearly 60 year old inland transmission line between Clare and Townsville[13], and three transformers across the state, in 2021/22.

13 This approach is in line with the preferred solution identified in the November 2019 Project Assessment Conclusions Report for the Maintaining Reliability of Supply Between Clare South and Townsville South Regulatory Investment Test for Transmission (RIT-T).

We have proactively sought to manage increased costs within our current regulatory period allowance by re-prioritising our work and by partially offsetting cost increases through efficiency improvements. These improvements include rationalised support functions and a targeted program to reduce Information Technology (IT) and Operating Technology (OT) licence costs.

Non-controllable operating expenditure

We expect to spend $8.3m (11.4%) more on non-controllable operating expenditure in the current 2018-22 regulatory period relative to the AER's allowance. This excludes debt raising costs.

Australian Energy Market Commission (AEMC) Levy

The main driver of the increase in non-controllable operating expenditure is the AEMC Levy, for which we have incurred an additional $5.8m (25.7%) above the AER's allowance for the 2018-22 regulatory period to date.

The AEMC's budget is set by Energy Ministers and is funded through a cost sharing agreement between the States and Territories. In Queensland, this cost is recovered by the Queensland Government through energy utilities including Powerlink, and is not within our control (refer Chapter 6 Forecast Operating Expenditure).

Network Support

Network support refers to costs associated with non-network solutions used as an efficient alternative to network investment, such as local generation, cogeneration, or demand side response. As the need for network support was uncertain before the start of the period, an allowance of $0 was sought and approved for the 2018-22 regulatory period. Any costs that are incurred within period are managed through the cost pass through mechanism for network support in the Rules[14].

In April 2020 AEMO declared a fault level shortfall in North Queensland, which requires Powerlink to remove the shortfall condition by August 2021. At this stage we forecast to spend approximately $3.1m for network support in the year 2020/21 to address the fault level shortfall. An application to the AER to approve the pass through of these network support costs will be made in early 2021/22.

Insurance

Insurance premiums for the 2018-22 regulatory period are forecast to be in line with the AER's allowance. We have experienced a material increase in real terms of approximately 16% in our insurance premiums for 2020/21 and expect to see a further 15% increase in real terms in 2021/22. These increases are driven by a hardening global insurance market and are anticipated to continue into the 2023-27 regulatory period, which is discussed further in Chapter 6 Forecast Operating Expenditure.

4.6 Benchmarking performance

This section provides an overview of our historical benchmarking performance based on the AER's 2020 Annual Benchmarking Report for electricity transmission. This covers capital and operating expenditure and we expect it will inform the AER's assessment of our forecast operating expenditure.

We engaged HoustonKemp to provide an independent review of our relative performance based on the information in the AER's 2020 Annual Benchmarking Report. HoustonKemp's report concluded that the AER's most recent benchmarking results for Powerlink, both in absolute and trend terms, show that we are operating relatively efficiently when compared to our Transmission Network Service Provider (TNSP) peers and have been responding to the incentives in the regulatory framework. In particular, our operating expenditure performance across major expenditure categories has been improving over time and is consistent with the key characteristics of our network relative to other stand-alone TNSPs.

We will target improvements in our productivity in the 2023-27 regulatory period to continue to drive our business hard and deliver positive customer outcomes.

We also engaged HoustonKemp to provide an independent view on the efficiency of our proposed 2018/19 operating expenditure base year and an appropriate operating expenditure productivity target. As these items relate to our forecast operating expenditure, they are discussed in more detail in Chapter 6 Forecast Operating Expenditure.

HoustonKemp's report is provided in Appendix 4.01 Efficiency of Powerlink's Base Year Operating Expenditure Report.

[14] National Electricity Rules, clause 6A.7.2.

4.6.1 Regulatory requirements

The Rules[15] require the AER to prepare and publish an annual benchmarking report that describes the relative efficiency of each TNSP. The AER must have regard to the most recent annual benchmarking report when assessing whether operating and capital expenditure forecasts provided by a TNSP within its Revenue Proposal represent efficient expenditure[16].

4.6.2 Our approach

We have had regard to benchmarking as part of the calculation of the trend parameter of our operating expenditure base-step-trend model. This includes consideration of our benchmarking results and industry-wide productivity trends.

The AER focuses on multilateral productivity measures in its annual benchmarking report for TNSPs. This measures how efficiently a business transforms a 'basket' of physical and financial inputs into a 'basket' of outputs. Inputs to the AER's benchmarking model for transmission include both physical inputs, such as the capacity of the network, as well as financial inputs, such as operating expenditure. It is not solely related to the cost to customers. The AER's annual benchmarking report also considers Partial Performance Indicators (PPIs), which are ratios of total costs to specific outputs such as cost per customer.

Economic benchmarking of electricity transmission businesses is impacted by the small number of TNSPs in Australia. The AER acknowledges this limitation in applying its benchmarks to TNSPs. In particular, it acknowledges that not all external factors arising from a TNSP's operating environment can be captured in the benchmark models[17].

There are also potential Operating Environment Factors (OEFs) that may be specific to one or a subset of TNSPs, which can influence outcomes. For example:

- application of different capitalisation policies i.e. instances where a TNSP incorporates expenditure into operating expenditure where another would capitalise it;
- differences in network terrain, that may influence expenditure necessary to maintain the network; and
- differences in the geographic nature of networks, which may mean some TNSPs need to invest in particular infrastructure that another TNSP would not.

We have previously raised these factors with the AER such as within our 2018-22 Revenue Proposal[18] and discussed them with our Customer Panel and Revenue Proposal Reference Group (RPRG). We have not had specific regard to them here, other than to note that differences do exist.

Updates in the AER's 2020 TNSP Economic Benchmarking Report

We note that several adjustments have been made to the benchmarking specification in 2020 by the AER's independent consultant Economic Insights. Some of these adjustments have resulted in relatively significant changes to benchmarking results between the AER's 2019 and 2020 TNSP Economic Benchmarking Reports and rankings of TNSPs relative to each other.

One key update is a correction to the weightings applied to the non-reliability outputs to correct an error in the calculation method in previous reports. These same weightings are used in the operating expenditure base-step-trend model as part of the rate of change calculation.

The update to the weightings has placed greater importance on circuit length (its weight increased from 37.6% to 52.8%) and ratcheted maximum demand (increased from 19.4% to 24.7%) and less weight on energy throughput (reduced from 23.1% to 14.9%) and end-user customer numbers (reduced from 19.9% to 7.6%). These changes, as noted by the AER and Economic Insights, highlight that TNSPs' primary function is the transport of bulk electricity from generators to load centres[19].

The correction of this error has impacted the benchmarking results, in particular the ranking of individual TNSPs under Multilateral Total Factor Productivity (MTFP) measure, specifically:

- Powerlink and ElectraNet's MTFP results were relatively unchanged;
- TransGrid and AusNet Services have relatively lower MTFP results and rankings; and
- TasNetworks has a relatively higher MTFP result and ranking.

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15 National Electricity Rules, clause 6A.31.
16 National Electricity Rules, clauses 6A.6.6(e)(4) and 6A.6.7(e)(4).
17 Annual Benchmarking Report – Electricity transmission network service providers, Australian Energy Regulator, November 2020, page 16.
18 2018-22 Revenue Proposal, Powerlink, January 2016, Section 4.6, page 28.
19 Annual Benchmarking Report – Electricity transmission network service providers, Australian Energy Regulator, November 2020, page 11.

Overall, Powerlink's relative performance compared to TransGrid and AusNet Services has therefore improved significantly. Where the 2019 TNSP Economic Benchmarking Report showed Powerlink ranked fifth out of five TNSPs for 10 of the 12 years of data displayed, the 2020 results (refer Figure 4.1) show Powerlink ranked fifth for only three of the 13 years displayed.

This correction in the benchmarking methodology demonstrates how sensitive the benchmarking model is to changes in approach or inputs. While we consider benchmarking to be a useful tool that can provide insight into a business' productivity changes over time, it is not suitable to compare absolute levels of productivity between TNSPs.

4.6.3 Independent assessment of performance

We engaged HoustonKemp to provide an independent review of our relative performance based on the information in the AER's 2020 Annual Benchmarking Report for electricity transmission, and to advise on the efficiency of our proposed base year (2018/19) to forecast operating expenditure in the 2023-27 regulatory period. The key elements of that review focused on:

- Multilateral productivity index measures such as:
  - MTFP;
  - Capital Multilateral Partial Factor Productivity (capital expenditure MPFP); and
  - Operating expenditure Multilateral Partial Factor Productivity (operating expenditure MPFP);
- PPIs that measure the ratio of total input costs to a single output, such as number of end users, circuit line length, maximum demand served and energy transported; and
- Analysis of operating expenditure category measures such as overheads per end user and maintenance costs per circuit line length.

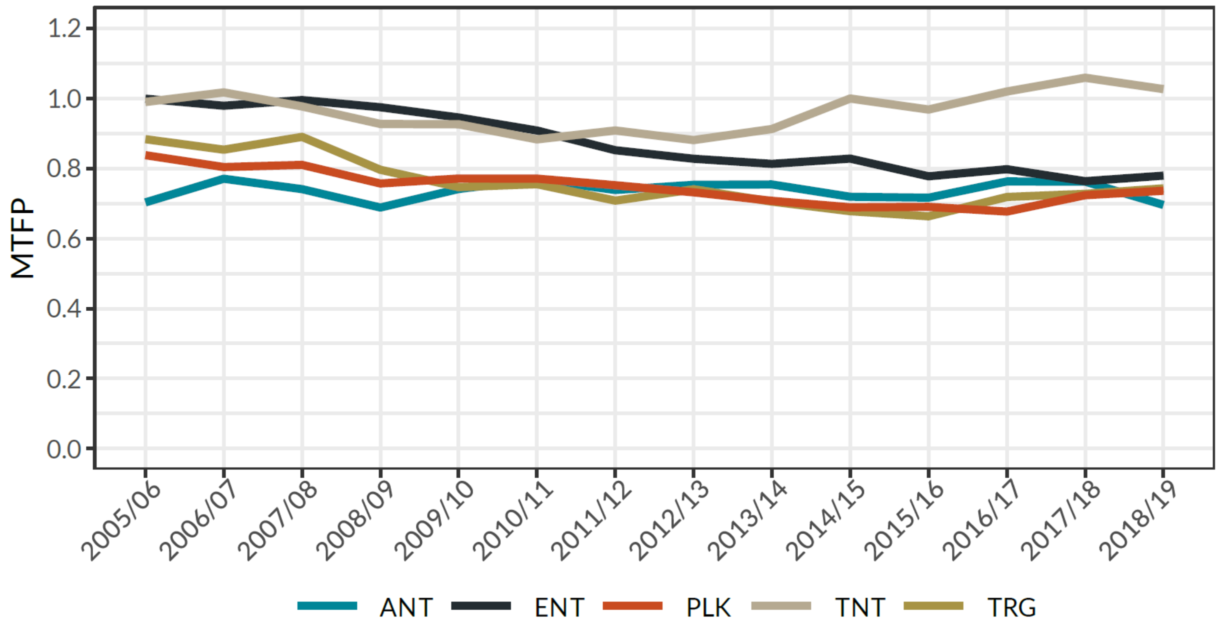
Multilateral Total Factor Productivity (MTFP)

HoustonKemp noted that our MTFP measure improved modestly in 2018/19 and that, in absolute terms, our ranking improved from fifth in 2017/18 to fourth in 2018/19 (refer Figure 4.1). The AER noted that Powerlink was one of only two TNSPs to record MTFP improvements over the last two consecutive years[20].

Our MTFP trend over time (refer Figure 4.2) shows improvement since 2016/17, which indicates that Powerlink has continued to respond to efficiency incentives in the regulatory framework, including the Efficiency Benefit Sharing Scheme (EBSS). Our significant improvement from 2016/17 to 2017/18 can largely be attributed to our 7% reduction in operating expenditure between the 2013-17 and 2018-22 regulatory periods, as acknowledged by the AER in its benchmarking report[21]. This is discussed further in the operating expenditure MPFP section.

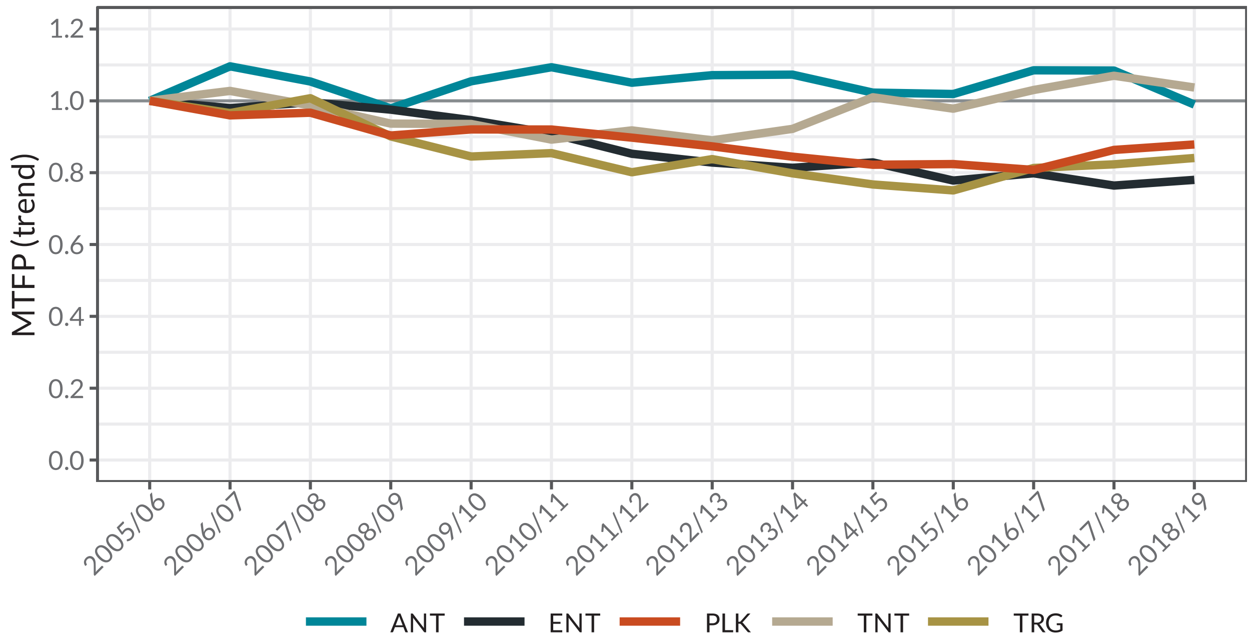
[20] *Ibid*, page. iv.
[21] *Ibid*, page 25.

Figure 4.1: Multilateral total factor productivity (absolute)



Source: Efficiency of Powerlink's base year operating expenditure, HoustonKemp, December 2020

Figure 4.2: Multilateral total factor productivity (trend)



Source: Efficiency of Powerlink's base year operating expenditure, HoustonKemp, December 2020

HoustonKemp summarised the AER's MTFP analysis as follows:

> *Powerlink's relative MTFP performance therefore places it within relatively close proximity to the outcomes for other TNSPs (with the exception of TasNetworks, whose performance reflects the outcome of the merger of transmission and distribution business and is therefore not representative of the outcomes for a stand-alone TNSP – as discussed further below), and shows improvement over time consistent with the incentives it faces under the regulatory framework*[22].

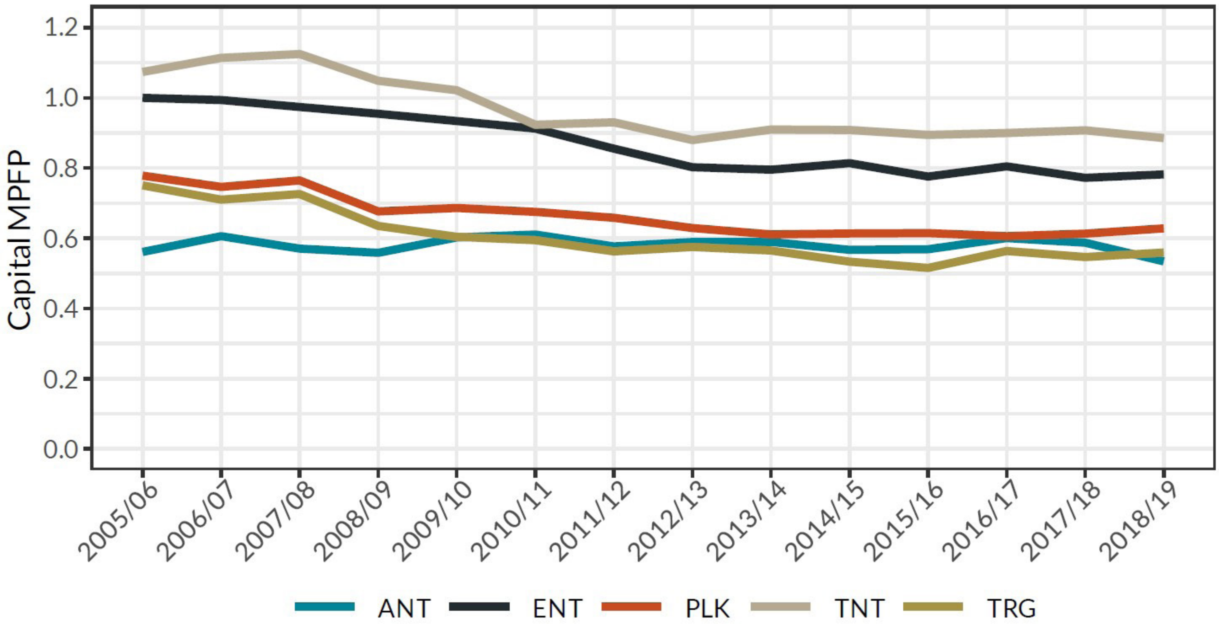
[22] Efficiency of Powerlink's base year operating expenditure, HoustonKemp, December 2020, page 14.

Capital Expenditure Multilateral Partial Factor Productivity (Capital MPFP)

The capital MPFP measure uses the quantity of physical network capacity as the capital input measure, and does not measure the value of the capital assets deployed. The inputs are the quantity of overhead lines and underground cables, measured as MVA.km, and the quantity of transformers and other assets, measured as transformer MVA.

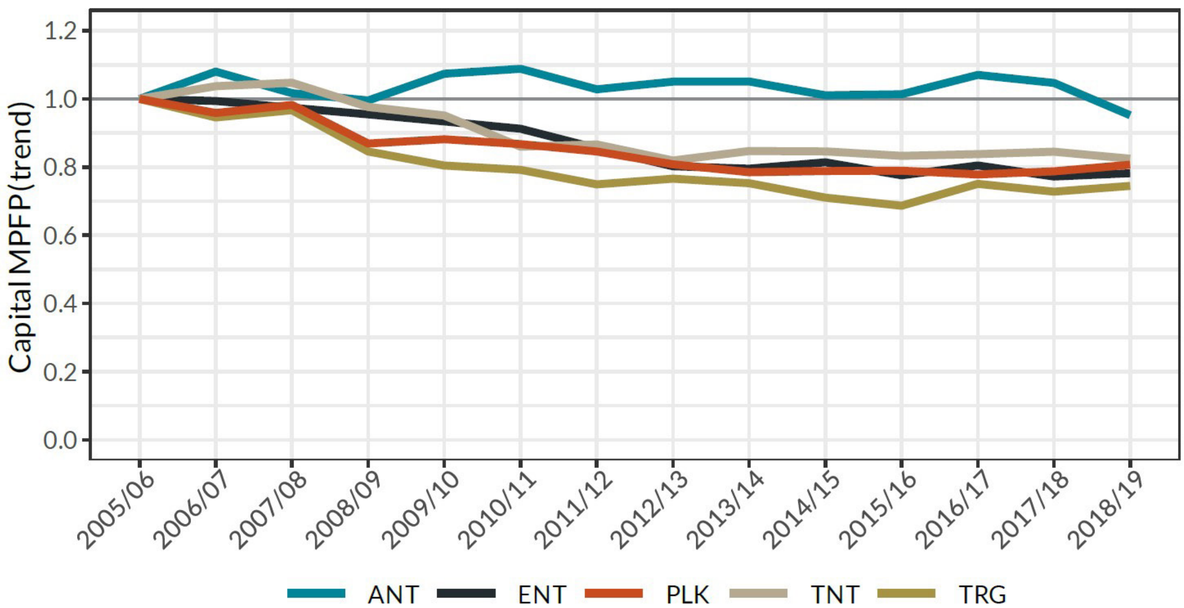
Our MPFP measure for capital improved marginally in 2018/19. However, our overall performance has been relatively flat over the last five years (refer Figure 4.3). This is primarily due to minor increases in the output measure, while the capital input measure has remained fairly constant.

Figure 4.3: Capital multilateral partial factor productivity (absolute)



Source: Efficiency of Powerlink's base year operating expenditure, HoustonKemp, December 2020

Figure 4.4: Capital multilateral partial factor productivity (trend)



Source: Efficiency of Powerlink's base year operating expenditure, HoustonKemp, December 2020

In trend terms, HoustonKemp notes that the TNSPs are grouped closely with the exception of AusNet Services, which does not undertake augmentation expenditure in Victoria as part of its regulated activities, and its capital MPFP performance is therefore different to other TNSPs (refer Figure 4.4)[23].

HoustonKemp also considered the interaction of capital and operating MPFP performance, and how this may provide indications of the efficiency of potential capital/operating expenditure trade-offs made by TNSPs. With respect to our significant reduction in operating expenditure during the 2018-22 regulatory period, and any potential impact this may have had on capital expenditure efficiency, HoustonKemp concluded:

> *Powerlink's benchmark performance for capital MPFP is relevant to the assessment of the efficiency of 2018/19 opex only to the extent that it may provide indications of the efficiency of the capex/opex trade-off made by Powerlink relative to other TNSPs. There is nothing in the latest benchmarking analysis to suggest that there are any concerns with this trade-off, as evidenced by the generally consistent capital MPFP outcomes between Powerlink and the other TNSPs, and Powerlink's relative performance overall under the AER's MTFP analysis*[24].

We note our relatively flat capital benchmarking performance over the past five years does not measure the cost to customers of capital investments. However, the value of our RAB has declined and is forecast to continue to decline, which does provide ongoing cost reductions to customers. We consider this provides a reasonable indication of our prudent asset management and reinvestment approach. This is discussed further in Chapter 8 Regulatory Asset Base.

Operating Expenditure Multilateral Partial Factor Productivity (Operating MPFP)

Our MPFP measure for operating expenditure remained relatively flat in 2018/19, after a significant improvement achieved in 2017/18 (refer Figure 4.5). This improvement was primarily related to our operating expenditure reduction of approximately 7% between the 2013-17 and 2018-22 regulatory periods. None of the TNSPs showed significant growth (in trend terms) in 2018/19 (refer Figure 4.6).

Our ability to maintain this reduction and live largely within the AER's allowance throughout the current regulatory period demonstrates that efficiencies realised from our business restructure process in 2016/17 have been sustained. HoustonKemp stated that:

> *The recent improvement in Powerlink's MTFP discussed above is almost entirely due to its improvement in opex MPFP. This strongly supports the conclusion that Powerlink is responding to the incentives in the regulatory framework, and that revealed 2018/19 opex can be presumed to be efficient*[25].

It is also important to recognise TasNetwork's operating expenditure performance as a significant contributor to the industry productivity trend and that it is not a relevant comparator for Powerlink. The AER and HoustonKemp both noted that while TasNetworks has improved its operating expenditure MPFP performance significantly since 2014/15, these efficiency gains coincide with the merger of Tasmania's DNSP (Aurora Energy) and TNSP (Transend) to form TasNetworks[26,27]. As a result, HoustonKemp observed that:

> *The efficiency gains made by TasNetworks resulting from the merger, reflected in its TNSP benchmarking results, do not represent gains that are also available to a stand-alone TNSP such as Powerlink. As a consequence, it is most relevant to compare Powerlink's benchmarking outcomes to the other TNSPs excluding TasNetworks*[28].

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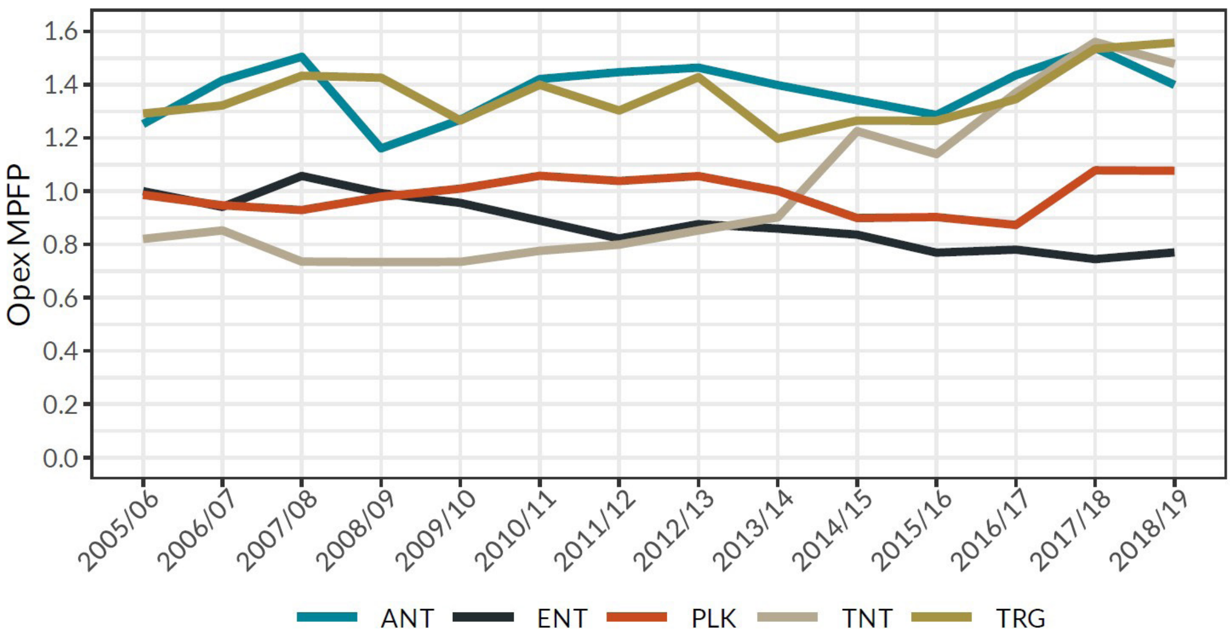
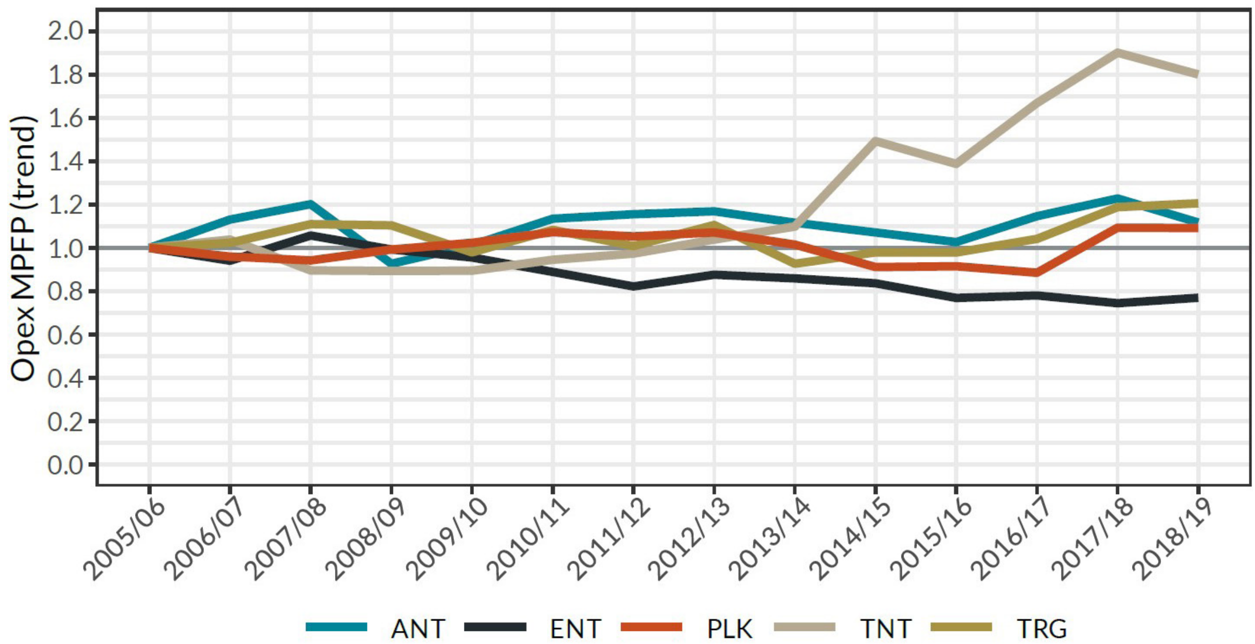
23 *Ibid*, page 17.
24 *Ibid*, page 18.
25 *Ibid*, page 14.
26 *Ibid.*
27 Annual Benchmarking Report – Electricity transmission network service providers, Australian Energy Regulator, November 2020, page 25.
28 Efficiency of Powerlink's base year operating expenditure, HoustonKemp, December 2020, page 15.

Figure 4.5: Operating expenditure multilateral partial factor productivity (absolute)



Source: Efficiency of Powerlink's base year operating expenditure, HoustonKemp, December 2020

Figure 4.6: Operating expenditure multilateral partial factor productivity (trend)



Source: Efficiency of Powerlink's base year operating expenditure, HoustonKemp, December 2020

HoustonKemp made the following concluding remarks on our operating expenditure MPFP results:

> *Consistent with its relative MTFP performance, Powerlink's relative opex MPFP performance places it within relatively close proximity to the outcomes for other TNSPs (with the exception of TasNetworks, whose performance is not representative of the outcomes for a stand-alone TNSP). Further, Powerlink's opex MPFP shows improvement over time, consistent with Powerlink responding to the incentives it faces under the regulatory framework*[29].

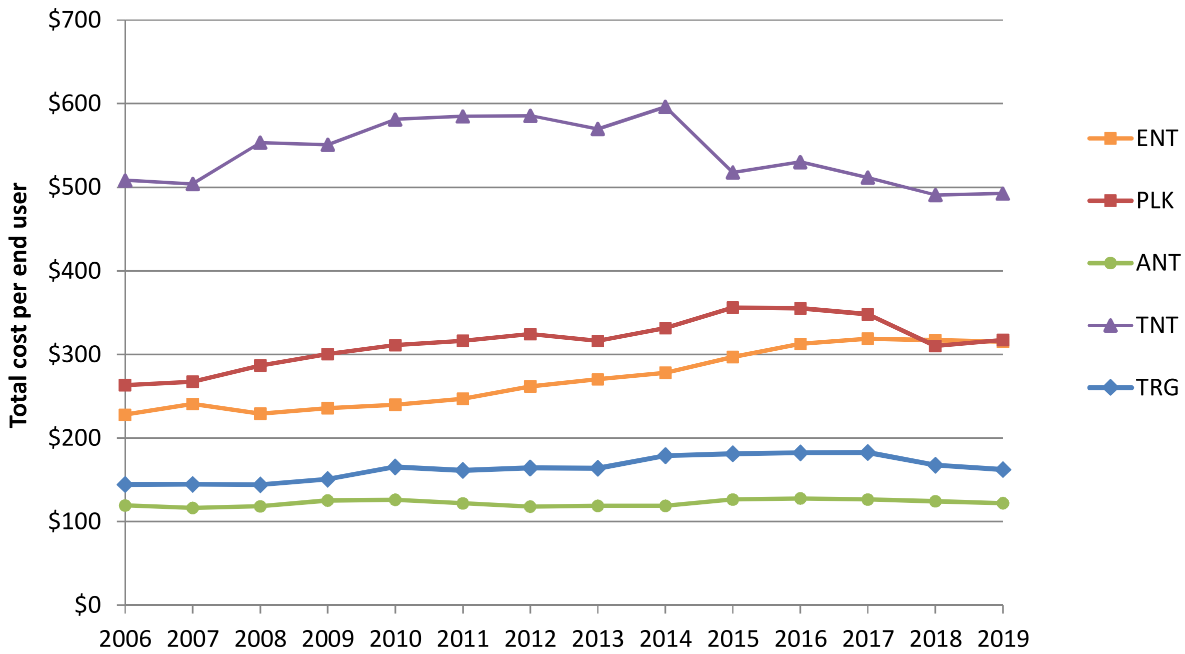
[29] Efficiency of Powerlink's base year operating expenditure, HoustonKemp, December 2020, page 16.

Partial Performance Indicators (PPIs)

In its Annual Benchmarking Report the AER publishes PPIs, which provide a simple representation of the input costs used to produce particular outputs by TNSPs, and can be used to provide a general indication of comparative performance in delivering one type of output. The AER notes that as PPIs do not take interrelationships between the different outputs into account, PPIs are most useful when used in conjunction with other top-down benchmarking techniques[30].

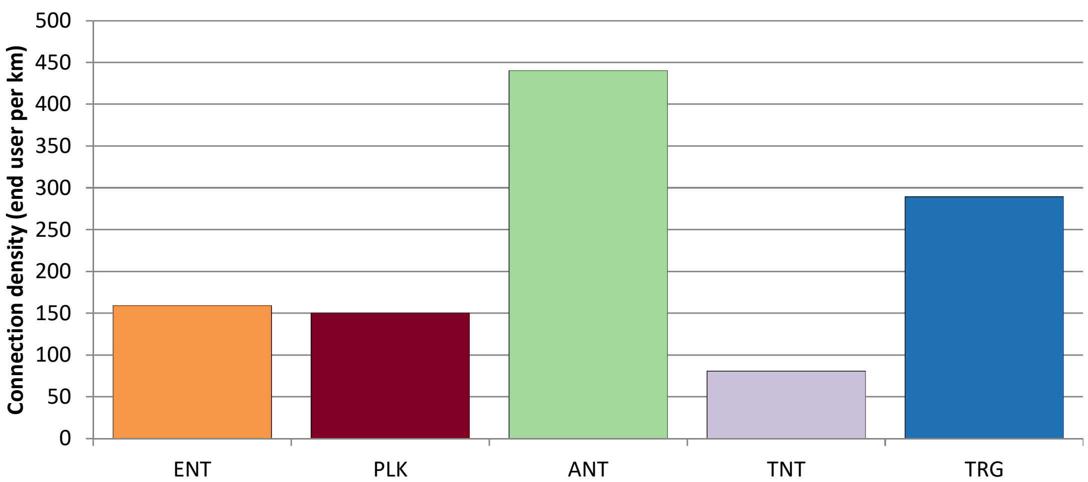
On the measure of total cost per end user Powerlink ranks equal with ElectraNet, behind AusNet Services and TransGrid but ahead of TasNetworks (refer Figure 4.7). These relative rankings are consistent with average connection density of the various TNSPs, measured as the number of end users per circuit kilometre (refer Figure 4.8). Our relative performance across a number of PPIs over time shows our performance in 2018/19 substantially improved over our 2014/15 results, which was our previous operating expenditure base year (refer Figure 4.9).

Figure 4.7: TNSP total cost per end user



Source: Annual Benchmarking Report – Electricity transmission network service providers, Australian Energy Regulator, November 2020

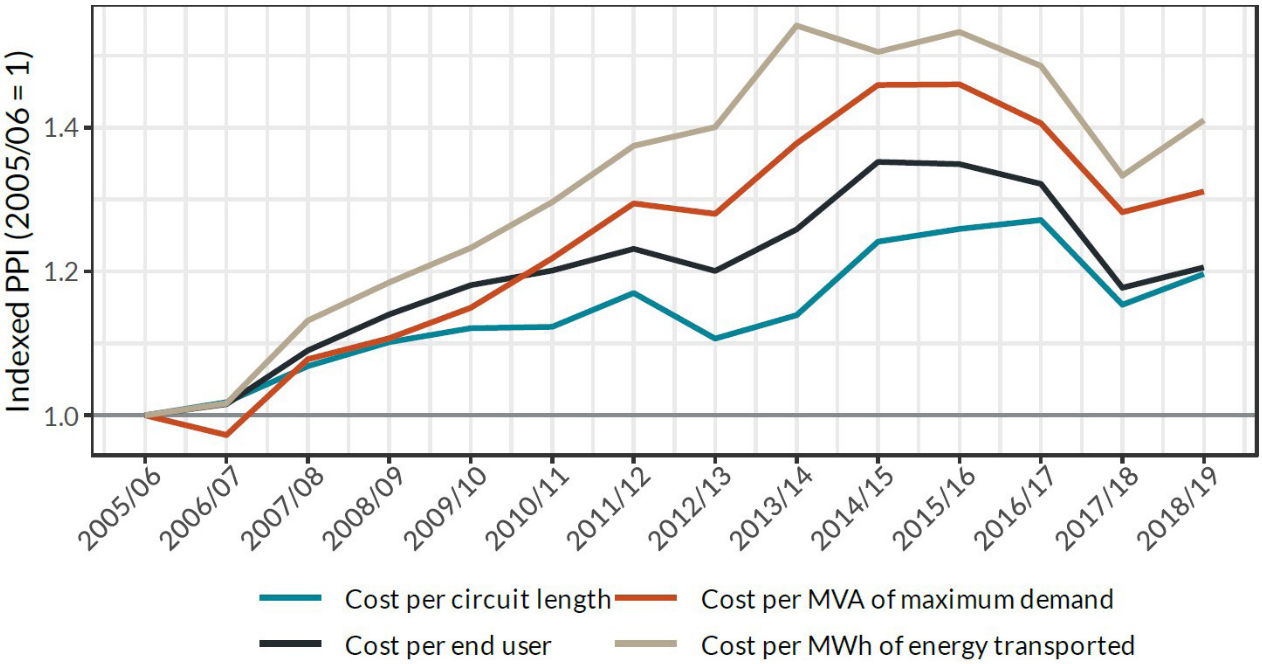
Figure 4.8: TNSP connection density (end users per km)



Source: Annual Benchmarking Report – Electricity transmission network service providers, Australian Energy Regulator, November 2020

30 Annual Benchmarking Report – Electricity transmission network service providers, Australian Energy Regulator, November 2020, page 29.

Figure 4.9: Powerlink's PPI performance over time, 2005/06 to 2018/19



Source: Efficiency of Powerlink's base year operating expenditure, HoustonKemp, December 2020

HoustonKemp also had regard to our PPIs and made the following observations in relation to PPI results. This was considered particularly with regard to our proposed 2018/19 base year.

> *The AER's PPI analysis shows that although Powerlink has the second-highest total cost per end user, this is consistent with it having the second lowest connection density (end users per circuit length), and therefore an unsurprising outcome. The PPI analysis also shows that Powerlink's total cost per end user has been falling since 2014/15, although it did increase slightly in 2018/19 (in the order of two per cent).*
>
> *Powerlink ranked third in total cost per circuit length and total cost per MVA of maximum demand served, improving its cost per MVA ranking in 2018/19. Its performance, once adjusted to reflect its network characteristics, is therefore not an outlier on either of these metrics.*
>
> *Powerlink has generally reduced its costs per MWh of energy transported since 2013/14, although there was a modest increase in this metric in 2018/19 (in the order of less than six per cent). Even with this change Powerlink's cost per MWh of energy has decreased by nine per cent since 2013/14*[31].

HoustonKemp then concluded:

> *To summarise, taken together [with Powerlink's MTFP and MPFP results], there is nothing in the AER's PPI analysis that would give rise to a concern that Powerlink's 2018/19 outturn opex is materially inefficient*[32]*, warranting further detailed analysis of revealed costs*[33].

4.6.4 Summary of benchmarking performance

HoustonKemp's review indicates that our capital and operating expenditure during the current regulatory period is in line with other TNSPs. Other performance metrics and PPIs explored by the AER in their 2020 Annual Economic Benchmarking Report also indicate that Powerlink's performance is in line with expected trends and does not suggest that we are operating inefficiently compared to other TNSPs.

HoustonKemp concluded the following with respect to the AER's benchmarking results:

> *Powerlink's productivity benchmarking results, both in absolute and trend terms, suggest that it is operating relatively efficiently when compared to other TNSPs in the NEM, particularly taking into account the non-comparability of TasNetworks' benchmarking outcomes*[34].

31 Efficiency of Powerlink's base year operating expenditure, HoustonKemp, December 2020, page 19
32 'Materially inefficient' reflects terminology used consistently by the AER.
33 Efficiency of Powerlink's base year operating expenditure, HoustonKemp, December 2020, page 20.
34 *Ibid.*

4.7 Summary

The analysis in this chapter demonstrates that we have reduced our costs and responded to changes in our operating environment. This has contributed to improvements in benchmarking performance during the current regulatory period.

We have adopted a structured Innovation Framework to provide a foundation for further productivity improvement and to improve customer outcomes.

Our capital expenditure reflects an environment with little or no demand growth where the majority of capital expenditure is reinvestment in assets that have reached reach the end of their technical and economic life. Total actual/forecast capital expenditure is forecast to be around 0.2% lower than the AER's allowance for the current regulatory period.

Total actual/forecast operating expenditure has reduced by 7% compared to the 2013-17 regulatory period excluding debt raising, and is expected to be within 0.9% of the AER's allowance for the current regulatory period.