



# Annual Benchmarking Report

## Electricity transmission network service providers

November 2018



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## 3 Industry productivity results

### Key points

- Industry-wide productivity, as measured by TFP, increased by 5.8 per cent over 2017.<sup>16</sup> This is the first year-on-year industry TFP increase since 2013. It is also a significant improvement relative to the long-term industry rate of a 1.3 per cent annual average decline in productivity.
- An improvement in network reliability (energy not supplied) for AusNet, ElectraNet and TransGrid drove the increase in TNSP productivity over 2017. This contributed 4.1 percentage points (ppts) of the 5.8 per cent industry TFP growth rate.<sup>17</sup> Growth in transformers and a decline in circuit length made the only negative contributions to industry TFP over 2017, at  $-0.3$  and  $-0.2$  ppts respectively.

This chapter presents the industry TFP results over the 2006–17 period, and for the 12 month reporting period of 2017. It also decomposes the observed changes in TFP into its constituent input and output drivers to show the changes in TNSP inputs and outputs that drove industry-wide productivity change over 2017.<sup>18</sup>

TFP relates total inputs to total outputs and provides a measure of overall productivity growth for a single entity, such as an individual TNSP, or the transmission industry.<sup>19</sup> It is also used to decompose productivity change into its respective drivers.

### 3.1 Overall industry results

Industry-wide transmission network productivity, as measured by TFP, increased by 5.8 per cent over 2017. This is the first year-on-year industry TFP increase since 2013, and is the biggest improvement in TFP over the last 12 years. It is also a significant improvement relative to the long-term industry rate of a 1.3 per cent annual average decline in productivity.

Figure 5 shows that electricity transmission productivity has outgrown the overall economy and the utilities sector (electricity, gas, water and waste services) productivity in 2010 and 2017.<sup>20</sup>

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<sup>16</sup> The 5.8 per cent increase in TFP over 2017 refers to the percentage change in productivity scores between the 2015–16 and 2016–17 financial years or the calendar years 2016 and 2017, as relevant. In this report, this change can be referred to as 'a change over 2017' or 'a change over 2016–17'.

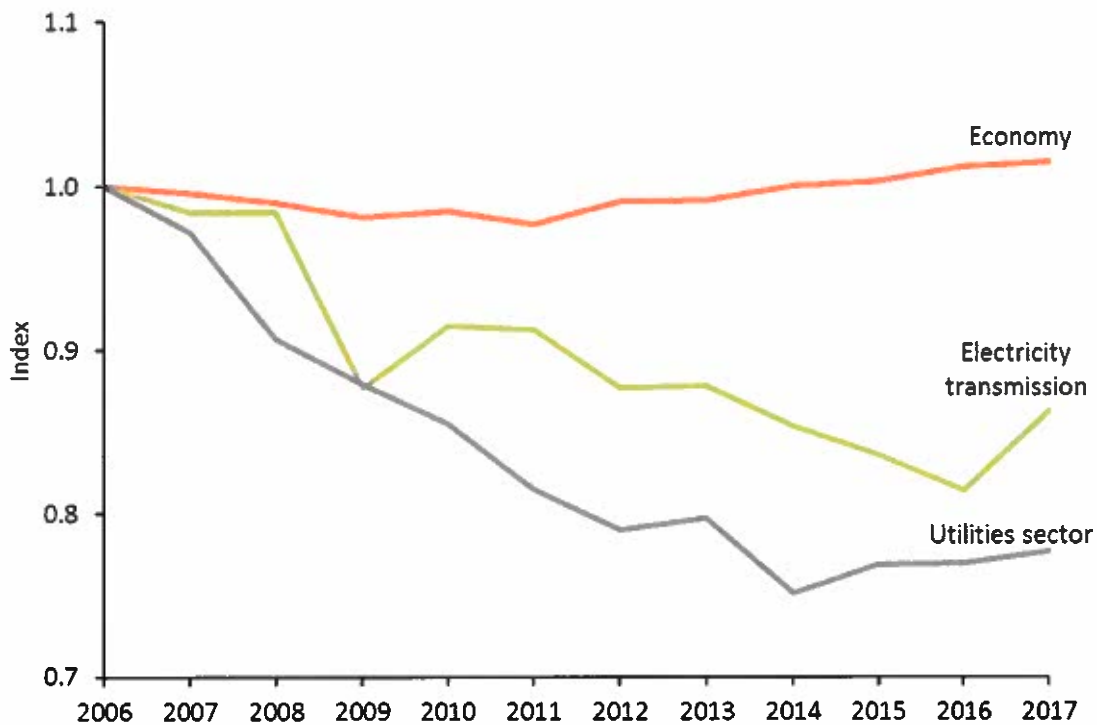
<sup>17</sup> That is, 4.1 of the 5.8 per cent increase in TFP is due to an increase in reliability.

<sup>18</sup> Appendix A includes a link to the methodology that allows us to decompose a given productivity change into its input and output components.

<sup>19</sup> A summary of the inputs and outputs we use are reported in Appendix B.2.

<sup>20</sup> Utilities include electricity, gas, water and waste services.

**Figure 5 Electricity transmission industry, utilities sector, and economy productivity indices, 2006–17**

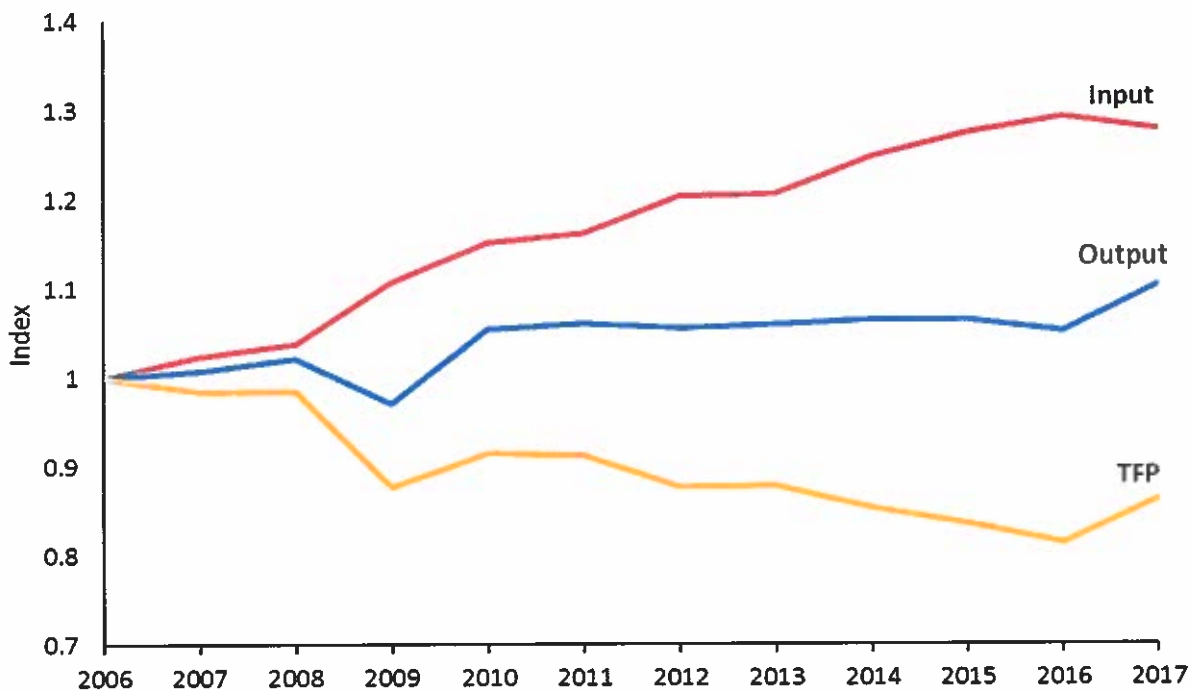


Source: Economic Insights; Australian Bureau of Statistics.

Note: The productivity of the Australian economy and the utility industry is from the ABS indices within 5260.0.55.002 Estimates of Industry Multifactor Productivity, Australia, Table 1: Gross value added based multifactor productivity indexes (a). We have rebased the ABS indices to one in 2006.

The TFP increase over 2016–17 is due to total inputs falling by one per cent and total outputs increasing by 4.8 per cent (Figure 6). In comparison, inputs grew faster than outputs over the 2006–17 period, resulting in a fall in long-term TFP. The factors contributing to the long-term input and output changes over the full 2006–17 period are reported in Appendix B.2.

**Figure 6 Electricity transmission input, output and productivity indices, 2006 to 2017**

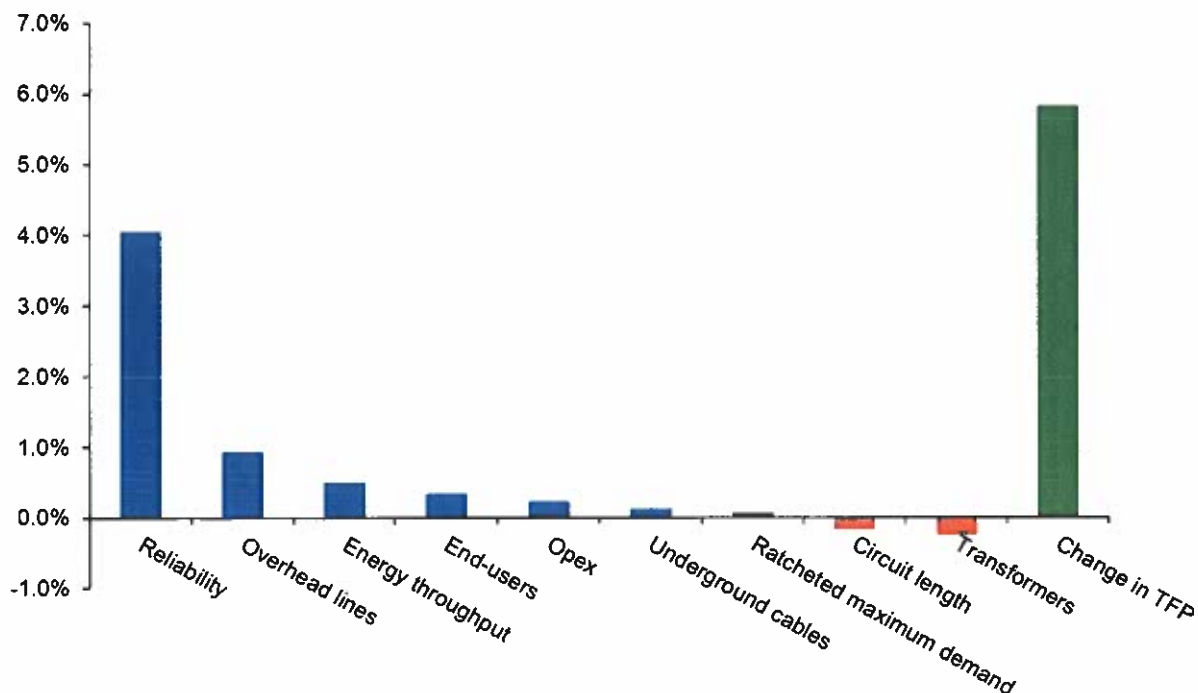


Source: Economic Insights.

### **Input and output contributions to changes in 2017 TFP**

Figure 7 shows each output's and input's contribution to the annual rate of TFP change over 2016–17. The contributions appear from the most positive on the left to the most negative on the right. If all the positive and negative contributions in Figure 7 are added together, they sum to the TFP change given by the green bar on the right of the figure.

**Figure 7 TNSP output and input percentage point contributions to annual TFP change, 2016–17**



Source: Economic Insights.

The primary driver of the reversal in declining TFP over 2016–17 was improved industry reliability. This contributed 4.1 ppts to the industry TFP growth rate of 5.8 per cent, and is discussed further below. A decline in overhead lines, and a growth in energy throughput further contributed 0.9 and 0.5 ppts to TFP, respectively. Growth in transformers and a decline in circuit length made the only negative contributions to industry TFP over 2017, at –0.3 and –0.2 ppts, respectively.

### Individual TNSP contributions to productivity growth

Table 2 presents a decomposition of each TNSP's productivity growth over 2017, which collectively drives industry input and output changes. We chose to focus on four components: reliability, overhead lines, energy throughput, and opex. This is due to the materiality of their positive contributions to industry TFP over 2017.<sup>21</sup>

<sup>21</sup> We have not presented end-user numbers because it has grown at a steady rate over the 2006–17 period, and has therefore made similar positive contributions to TFP each year.

**Table 2 Input and output contributions to individual TFP growth rates, by TNSP, 2017**

	2017				
	Annual change in TFP (%)	Reliability contribution (ppts)	Overhead lines contribution (ppts)	Energy throughput contribution (ppts)	Opex contribution (ppts)
<b>Industry</b>	<b>5.8</b>	<b>4.1</b>	<b>0.9</b>	<b>0.5</b>	<b>0.2</b>
AusNet (Vic)	7.2	7.7	-0.0	-0.5	1.0
ElectraNet (SA)	5.6	6.5	-0.1	0.5	-1.0
PowerLink (QLD)	-0.4	-0.4	0.5	0.6	-0.6
TasNetworks (Tas)	5.5	-0.4	0.0	1.5	4.1
TransGrid (NSW)	10.3	5.6	2.0	0.9	0.4

Source: Economic Insights, AER analysis.

AusNet, ElectraNet and TransGrid all reported higher reliability in 2017, which materially contributed to their TFP. AusNet reported the biggest improvement in reliability. AusNet stated this was due to it only experiencing one loss of supply event in 2017. This was comparatively smaller than the significant events it faced in 2015 and 2016 which impacted its large customers.<sup>22</sup>

In comparison, TasNetworks and Powerlink's reliability had a negative impact on their 2017 TFP. TasNetworks' 2017 TFP result was driven by its decrease in opex usage, which contributed 4.1 ppts, while Powerlink's increase in opex usage was one of the largest contributors to its TFP decline.

Overall, all five TNSPs achieved higher TFP growth in 2017 compared to the average annual industry-wide TFP decline of 1.3 per cent over 2006–17. The full set of input and output contributions to TFP over the 2006–17 and 2017 period can be found in the Economics Insights report online.<sup>23</sup>

<sup>22</sup> AusNet email response to AER questions, 6 June 2018.

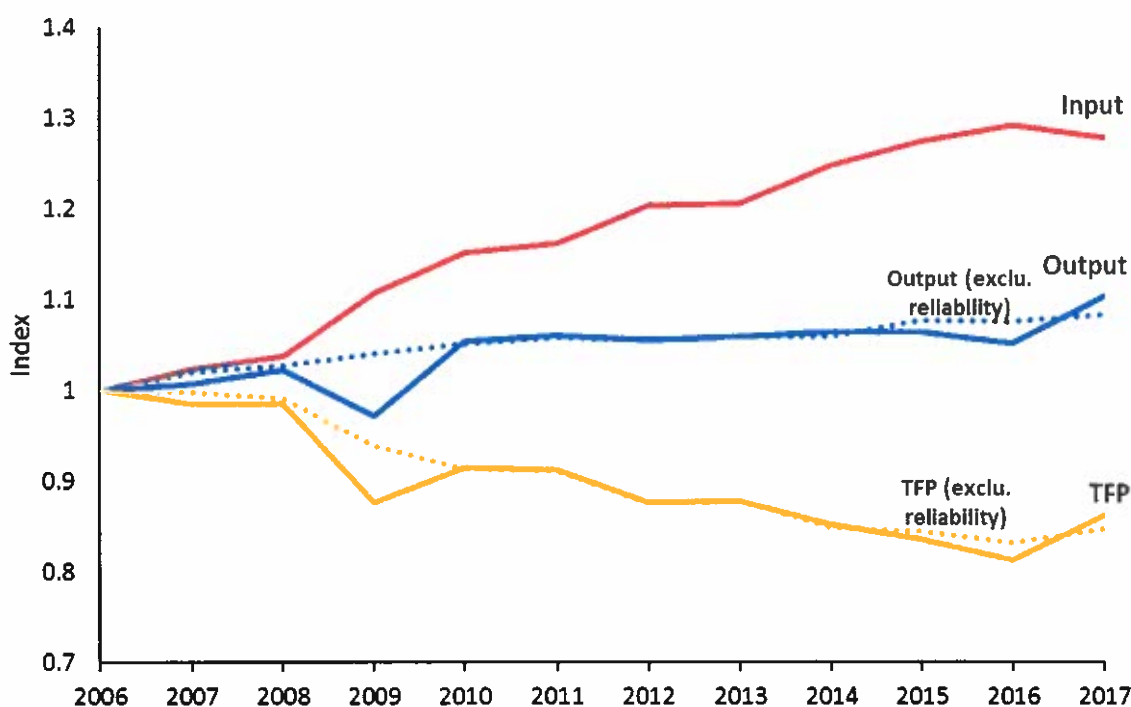
<sup>23</sup> Economic Insights, *Economic Benchmarking Results for the Australian Energy Regulator's 2018 TNSP Annual Benchmarking Report*.

## Reliability's contribution to TFP growth

The TFP results are relatively sensitive to reliability at the firm-specific level. As discussed above, reliability improvements over 2017 contributed to a large proportion of AusNet, ElectraNet and TransGrid's TFP growth in 2017.

There are also noticeable differences in output and TFP growth at the industry level depending on whether we include reliability in our output specification. However, industry TFP is less sensitive to reliability than firm-specific TFP because it is an average measure across all TNSPs. Figure 8 shows industry output and TFP over the 2006–17 period with and without the reliability measure.

**Figure 8 Electricity transmission input, output and productivity indices, with and without reliability, 2006 to 2017<sup>24</sup>**



Source: Economic Insights.

These differences reflect periods where rare but large impact network outages have occurred. It can be seen that worse than average reliability depressed both industry output and TFP in 2009 and 2016, while a return to better than average reliability in 2010 and 2017 boosted both output and TFP. However, industry TFP has increased over 2017 regardless of whether reliability is included.<sup>25</sup>

<sup>24</sup> The 2018 Economic Insights Transmission report further reports productivity results with and without reliability at the individual TNSP level.

<sup>25</sup> Industry TFP without the reliability output measure increased by 1.8 per cent over 2017.



In 2017, we reviewed the output specifications of our transmission benchmarking models. Among the issues we considered was the measure of network reliability. We decided to cap the impact of TNSP reliability on productivity due to stakeholder concerns that the weight we applied was too large.<sup>26</sup>

As part of our ongoing benchmarking development work, we will continue to monitor the appropriateness of this output, and whether any further changes are necessary.

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<sup>26</sup> A more detailed description of the updated TNSP benchmarking specifications, stakeholder comments and our rationale for the changes can be found in the TNSP Benchmarking Review documents listed in Appendix A of this document, and online here: <https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/annual-benchmarking-report-2017/initiation>.