Memorandum

From: Denis Lawrence, Tim Coelli and John Kain **Date:** 13 November 2015

To: Mark McLeish, Andrew Ley

CC: AER Opex Team

Subject: TNSP MTFP Results

Economic Insights has been asked to update the electricity transmission network service provider (TNSP) multilateral total factor productivity (MTFP) and multilateral partial factor productivity (MPFP) results presented in the Australian Energy Regulator's 2014 TNSP Benchmarking Report (AER 2014). The update involves including data for the 2013–14 financial year reported by the TNSPs in their latest Economic Benchmarking Regulatory Information Notice (EBRIN) returns. It also includes a small number of revisions to TNSP data, mainly relating to the entry and exit points output.

Specification used

The TNSP MTFP measure has five outputs included:

- Energy throughput (with 21.4 per cent share of gross revenue)
- Ratcheted maximum demand (with 22.1 per cent share of gross revenue)
- Voltage–weighted entry and exit connections (with 27.8 per cent share of gross revenue)
- Circuit length (with 28.7 per cent share of gross revenue), and
- (minus) Energy not supplied (with the weight based on current AEMO VCRs).

The illustrative TNSP MTFP measure includes four inputs:

- Opex (total opex deflated by a composite labour, materials and services price index)
- Overhead lines (quantity proxied by overhead MVAkms)
- Underground cables (quantity proxied by underground MVAkms), and
- Transformers and other capital (quantity proxied by transformer MVA).

In all cases, the annual user cost of capital is taken to be the return on capital, the return of capital and the tax component, all calculated in a broadly similar way to that used in forming the building blocks revenue requirement.

Data revisions

There have been a small number of data revisions included in the updated TNSP analysis. Most of these relate to calculation of the voltage–weighted entry and exit points output variable. ElectraNet has revised its numbers of entry and exit points for the whole period. And an exit point supplying more than one DNSP is now counted as one exit point rather than

separately for each DNSP as previously – this mainly affects AusNet Transmission and Transgrid.

Issues raised in TNSP submissions

Most TNSPs urged caution in the application and interpretation of TNSP benchmarking in their submissions. In the current context the AER is required to publish an annual TNSP benchmarking report as set out by the AEMC (2012, p.vii):

> 'The AER will be required to publish annual benchmarking reports, setting out the relative efficiencies of NSPs based on the information available to it.'

In Economic Insights (2014, p.2) we made the following observation:

> 'While economic benchmarking of distribution network service providers (DNSPs) is relatively mature and has a long history, there have been very few economic benchmarking studies undertaken of TNSPs. Economic benchmarking of transmission activities is in its relative infancy compared to distribution. As a result, in this report we do not apply the above techniques to assess the base year efficiency of TNSPs. We present an illustrative set of MTFP results using an output specification analogous to our preferred specification for DNSPs but caution against drawing strong inferences about TNSP efficiency levels from these results.'

We also note that economic benchmarking of TNSPs will be advanced by the publication and discussion of results using the best measures available at the time. This process promotes further discussion and refinement of comprehensive performance measures for TNSPs. Waiting for the perfect measure is a formula for indefinite inaction.

In its submission TransGrid requested more explanation of the output and input specification used in the MTFP analysis. The output and input specifications were developed following extensive consultation with stakeholders during 2013 and 2014. Background and details on the development of the specifications and their rationale can be found in Economic Insights (2013a,b,c,d,e and 2014).

Powerlink's submission raised the question of how network density differences are allowed for in the MTFP analysis. By including the main numerator and denominator components of network density ratios as outputs (energy transmitted, connections, maximum demand and line length) we are indirectly allowing for differences in the ratios. For example, a TNSP with a low energy density (energy per kilometre) will receive credit for having relatively more line kilometres than an otherwise equivalent TNSP with higher energy density. A more formal illustration of this can be seen (in a DNSP context) in Frontier Economics (2015, p.39).

Powerlink also noted that TNSPs had reported connection point numbers and voltages in different ways. Some TNSPs that had two DNSPs taking power from the same substation counted this as two connections instead of one. This has now been corrected. And ElectraNet had reported the higher transmission voltage for exit points rather than the lower voltage reported in the AEMO Marginal Loss Factor (MLF) reports. The MLF definition has now been consistently applied. We note that TNSPs have debated the best way of forming a measure of the connections output and this will be subject to future review and refinement.

AusNet Transmission noted that revenue from AEMO had been double counted in forming the Victorian TNSP revenue for 2014. This has now been corrected.

TasNetworks noted that TNSPs that have to connect more intermittent renewable generation to service demand will be at a relative cost disadvantage. We note this will offset in the MTFP analysis to some extent by those TNSPs having a higher connection output.

MTFP and MPFP results

TNSP MTFP and MPFP results are presented in the following figures.

Figure 1 **TNSP multilateral total factor productivity indexes, 2006–2014**

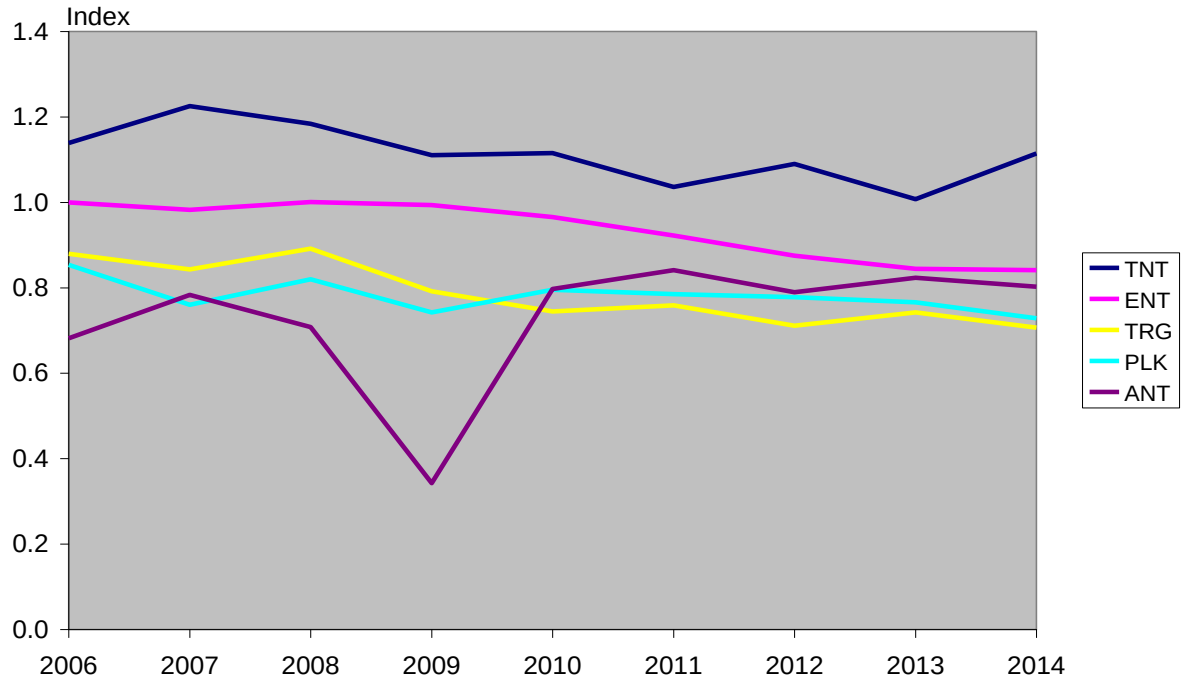


Figure 2 **TNSP multilateral opex partial factor productivity indexes, 2006–2014**

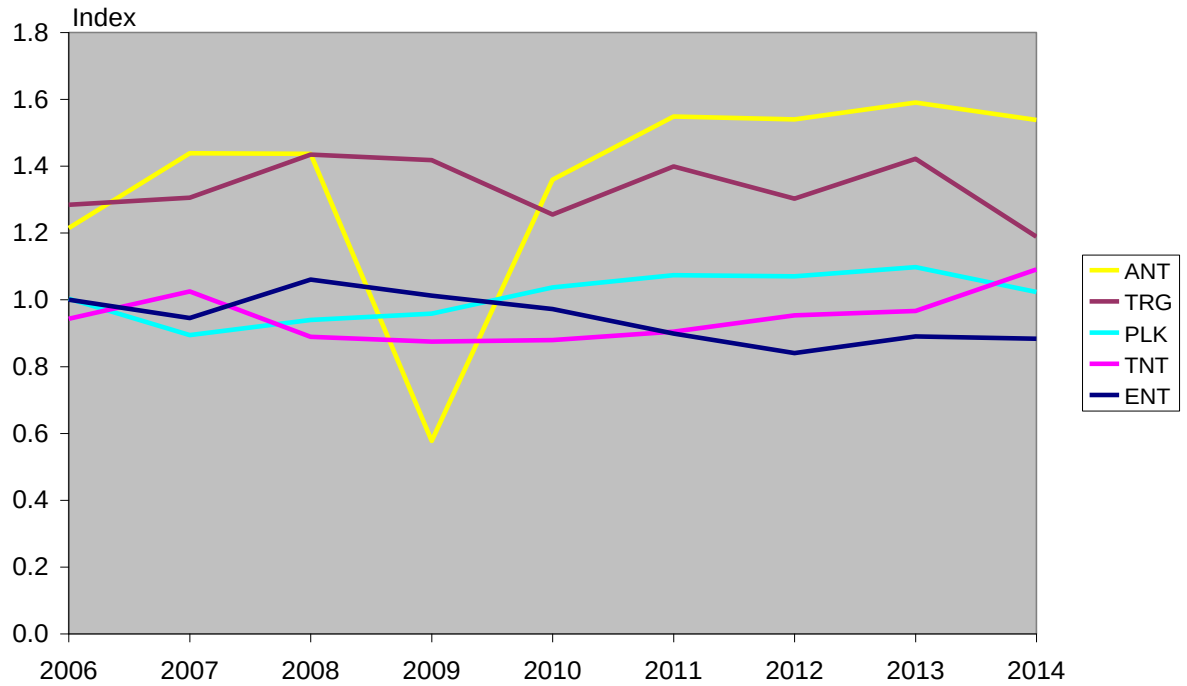
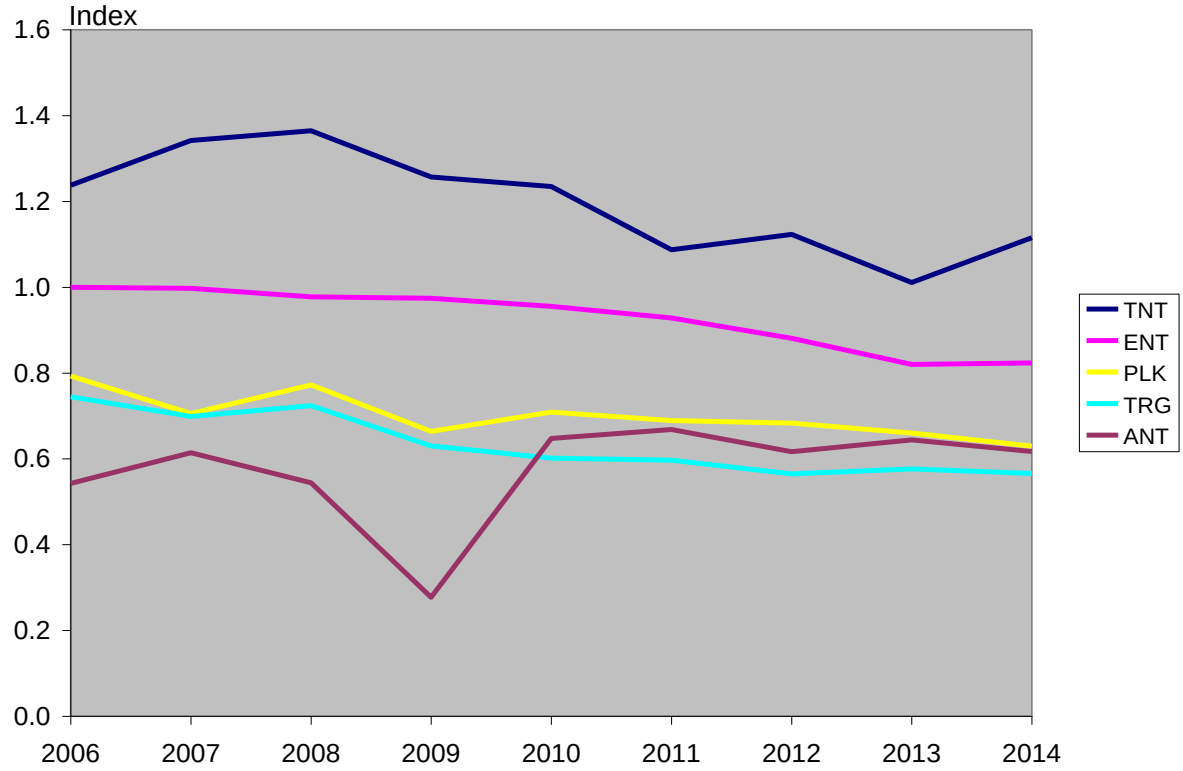
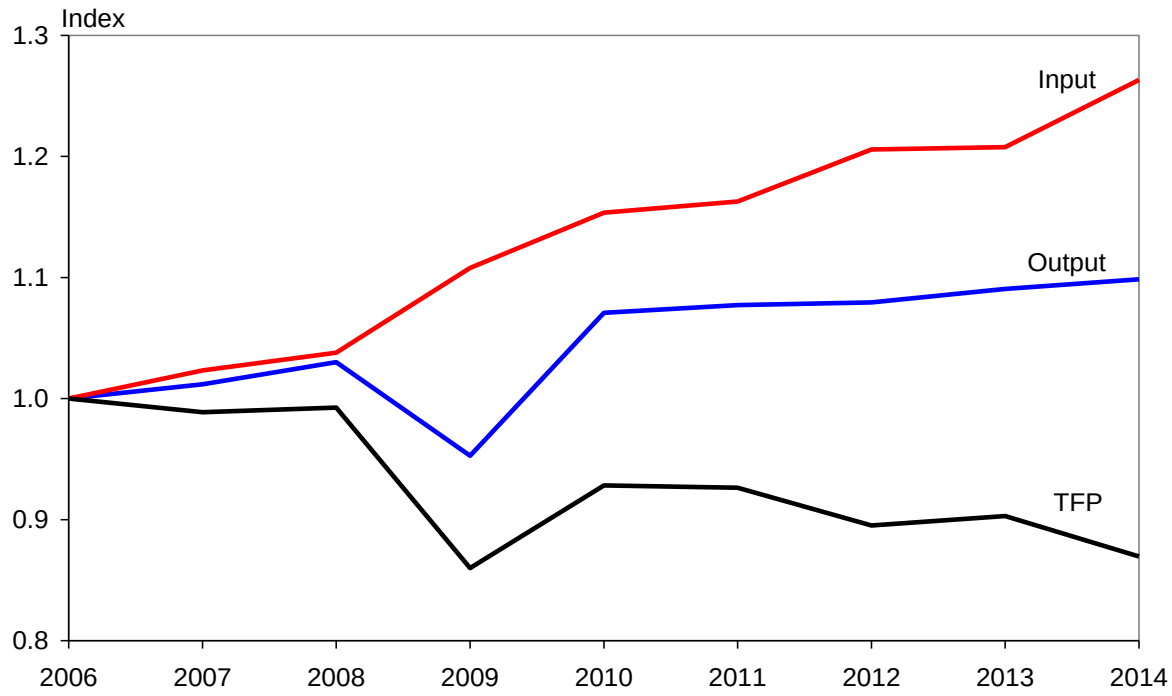


Figure 3 **TNSP multilateral capital partial factor productivity indexes, 2006–2014**



Transmission industry level output, input and TFP indexes are presented in the following figure.

Figure 4 **Industry–level transmission output, input and total factor productivity indexes, 2006–2014**



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