Assessment of Data Currently Available to Support TFP–based Network Regulation

Report prepared for
Australian Energy Market Commission

9 June 2009

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EXECUTIVE SUMMARY

Background

The Australian Energy Market Commission (AEMC) is undertaking a review into the possible uses of a total factor productivity (TFP) methodology for the regulation of prices and revenues in the national electricity and gas distribution and transmission networks.

The AEMC has engaged Economic Insights to provide an assessment of whether currently available data and current regulatory reporting requirements are sufficiently robust and relevant to adequately support the implementation of such a TFP methodology. The report evaluates the quality and consistency of currently available data and advises on possible courses of action to address identified gaps.

TFP data requirements

Productivity is a measure of the quantity of output produced from the use of a given quantity of inputs. To measure productivity performance we require data on the price and quantity of each output and input and data on key operating environment conditions.

Measuring the output of network businesses presents a number of challenges, especially where charging formats may not well reflect the cost of producing the various outputs. A major part of network infrastructure industries' output is providing the capacity to supply the product.

Most network TFP studies have included two broad input categories: operations and maintenance expenditure (opex) and capital. Different studies have adopted different approaches to measuring the capital input quantity with some studies using disaggregated physical quantities as a proxy and others using the constant price, depreciated aggregate asset value as a proxy.

The approach Economic Insights has adopted in this report is to examine the availability and quality of data which would cover both of the main network TFP specifications that have been used in Australia to date. An indicative minimum list of the variables required for TFP analysis covering both of the currently used specifications and likely extensions includes[1]:

- throughput by broad customer class or tariff category

- throughput by broad time of consumption

- customer numbers by broad class

- coincident peak demand

- non–coincident peak demand

- distribution related system average interruption frequency index (SAIFI)

- distribution related system average interruption duration index (SAIDI)

- line losses

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[1] List shown is for electricity networks – broadly analogous variables are required for gas networks.

- revenue from distribution service by broad customer class

- total operating and maintenance expenditure by category (excluding all capital costs, capital construction costs and transmission fees)

- line and cable length by voltage level

- installed transformer capacity (zone substation level by step and distribution level)

- regulatory asset base by nature of asset

- capital expenditure by nature of asset

- asset life by nature of asset (overall and residual).

Operating environment conditions can have a significant impact on network costs and productivity and in many cases are beyond the control of managers. Consequently, to ensure reasonably like–with–like comparisons it is desirable to 'normalise' for at least the most important operating environment differences. Differences in operating environment conditions are likely to affect achievable productivity growth rates as well as achievable productivity levels.

A key requirement for a robust and consistent TFP database is detailed and consistent definitions of the way key variables have to be reported. Without a high degree of consistency and comparability in the underlying output and input data, TFP estimates may be unfit for the purpose of being the primary determinant in the setting of regulatory price or revenue controls (although they may still provide useful information).

Another critical requirement for the introduction of a successful TFP–based regulatory regime is the availability in the public domain of consistent, objective and verifiable data on the value and quantity of all key outputs and inputs for all relevant network businesses. This allows interested parties to reach agreement on the veracity of the data used and to undertake their own TFP calculations, updates and sensitivity analyses.

Assessment criteria

Significant amounts of data have been collected in Australia for the four industries but not specifically for the purpose of productivity measurement. To assess whether the data that have been collected for other regulatory purposes would be fit for purpose for productivity–based regulatory decisions, we have to address the following questions:

- What is the coverage of currently collected data across the output and input prices and quantities required for robust productivity analysis as identified above and in appendix A?

- Have available data been supplied subject to clear and precise definitions?

- Have available data been supplied consistently through time for each business and consistently across jurisdictions?

- Are available data in the public domain or accessible by interested parties?

- Do both regulators and regulated businesses feel the data are robust and consistent and do all relevant parties have 'ownership' of the data as being an accurate and consistent record of actual outputs produced and inputs used?

It is important to recognise that the threshold for acceptance of available data as being fit for purpose for productivity–based regulation needs to be set relatively high. Regulatory pricing and revenue decisions for energy networks have significant consequences for regulated businesses and affect the supply of essential infrastructure to the community. Decisions therefore need to be made using data that are as robust and consistent as possible. Data that have been supplied subject to varying requirements and definitions may be suitable for use in productivity analysis that provides background for or 'informs' pricing and revenue decisions. But productivity analysis using such data is unlikely to be fit for the purpose of basing the entire pricing and revenue decision on.

Assessment

There are currently more regulatory data relevant for TFP analysis available for the electricity distribution industry than for the other three industries being examined in the AEMC Review. Gas distribution has the next most relevant regulatory data available, followed by electricity transmission with gas transmission having the least relevant data currently available. However, even for electricity distribution, the regulatory data currently available are not fit for the purpose of robust TFP analysis of the standard required to base regulatory pricing and revenue determinations on.

Coverage and definitions

The extent, quality, uniformity and continuity of currently available historical regulatory data are very variable both between jurisdictions and over time. Regulatory data have to date concentrated almost exclusively on financial variables with limited physical data being collected on system characteristics and output variables. Regulators have identified the absence of physical quantity data in their regulatory requirements as an important gap that has resulted from the need to obtain the financial data necessary to support building blocks regulation. Supplementing financial data with relevant physical quantity data and understanding the linkages between the two has been recognised as a high priority to improve regulators' understanding of network operations and to help reduce information asymmetries. It is precisely this type of information that is relevant for TFP analysis.

Even for financial data, there are significant gaps and changes in coverage over time and across jurisdictions. While some variables are subject to relatively uniform (if not well specified and tight) definitions, many have been less clearly and uniformly defined and many have been left to the regulated business to define. This compromises comparability across businesses, across jurisdictions and over time.

Consistency

Regulatory data consistency is also very variable. Even the coverage of key cost variables such as opex has varied over time as regulators have progressively tightened definitions and collection requirements in response to identified gaps and actions by the regulated businesses. In some cases regulators have unilaterally revised and altered data with a corresponding loss of ownership of the data and ensuing results by other stakeholders. And the coverage and treatment of a key opex component – the allocation of corporate overheads – has contained little clarity in the past.

Data requirements have in general evolved first and foremost to reflect jurisdictional

characteristics and priorities with the objective of national uniformity being recognised but not receiving the highest priority. The transfer of network regulation to the AER presents an opportunity to achieve greater uniformity going forward and but also makes it quite difficult to assemble consistent and robust historical databases. Jurisdictional regulators now have, understandably, less focus on network data issues. In many cases staff who formerly worked on network regulation have moved on and there has been a corresponding loss of the 'corporate memory' necessary to understand whether past data are consistent and comparable across jurisdictions. The difficulty in obtaining timely responses (and, in some cases, any response) about data availability in the current exercise is likely to be indicative of the much greater difficulty that would be encountered in attempting to compile a robust historical database. The difficulty the Australian Energy Regulator (AER) has had in attempting to backcast data in its initial distribution reviews confirms this.

Public domain

Much of the regulatory data currently collected is not in the public domain or else is only presented in aggregated format publicly. This impairs the transparency of any TFP exercise that was to draw heavily on current regulatory accounts that could not be made public. Transparency and the availability of all relevant data in the public domain are important requirements for a successful TFP–based regulatory regime. This allows stakeholders to test the veracity of the data and to undertake their own sensitivity analyses and updates of relevant TFP analysis.

Robustness

Both regulators and regulated businesses have expressed the view that currently available regulatory data are not sufficiently robust to support TFP analysis of the standard to base regulatory pricing and revenue determinations on. Our assessment of the available regulatory data supports this view. The coverage of currently available data is not adequate to support the range of currently used TFP specifications and likely future feasible refinements both over time and across jurisdictions. Definitions of the data required to be supplied have not been clearly set out in sufficient (if any) detail. The basis of reporting has varied over time in each jurisdiction with progressive refinement and across jurisdictions depending on jurisdictional priorities. And much of the available data is not in the public domain which impairs transparency and the ability to have multiple parties checking the veracity of the data.

The data gaps and inconsistencies currently existing would also limit attempts to normalise data for operating environment differences across businesses with sufficient robustness.

In submissions to the AEMC Review the Victorian Department of Primary Industries (DPI) and the Essential Services Commission (ESC) were the only ones who expressed the (somewhat guarded) view that currently available data were sufficiently robust to support TFP analysis suitable to base regulatory determinations on. This was thought to be the case in at least one jurisdiction and it was suggested that data from other jurisdictions could be progressively 'rolled in'. However, this view was predicated on the TFP specification used in the research sponsored by the ESC to date which relies on financial variables as the sole basis for determining input quantities. Our review of the available data has indicated that even key financial variables have been subject to progressive refinement and changes in coverage over time and differences across jurisdictions which compromise their use for TFP purposes. And,

as the AER noted in its submission, it is unwise to adopt and 'lock in' a TFP specification on the basis of current data availability as this is likely to be at the expense of accuracy and robustness.

The way forward

There is a strong case for developing a well specified and robust national TFP database for at least the electricity and gas distribution industries. Such a database would allow the potential application of an alternative method of regulation in the future and also assist with addressing the information asymmetry regulators face in applying building blocks regulation.

The benefits from establishing a robust national TFP database are significant both in terms of option value and in terms of improving the information available to base building blocks regulatory decisions on. As noted by regulators, the current focus on financial data needs to be supplemented by data on key quantity variables. This will enable regulators to better understand network businesses' operations, to better assess the quality of financial data supplied in a fuller context and to have a more stable information base that is less affected by changes in regulatory coverage and associated gaming. This will help address information asymmetries currently besetting regulators. It will also provide other stakeholders with a more complete information base with which to assess network businesses' performance.

While some network businesses have complained of the 'burden' that might be placed on them from extending reporting requirements to cover data necessary for TFP, the true cost of doing so is likely to be relatively small. The AER's draft Regulatory Information Order (RIO) could be extended to include more quantity information on both outputs and inputs and to ensure cost data consistent with TFP requirements were collected. The extra information required should not be onerous for network businesses to supply – it is basic information that any well run network business should readily have at hand.

The alternative approach would be to collect TFP data requirements in a separate instrument but this would seem to add little value and introduce scope for reporting inconsistencies compared to having all the necessary data collected in a (modestly) expanded RIO instrument. One advantage of a separate collection instrument though is that it might facilitate the relevant data being made available in the public domain – something that is an important requirement for a successful TFP–based approach.

The steps involved in forming a robust national TFP database are to commence consultation with network businesses and other stakeholders on the data variables required for TFP analysis and their detailed definition. The range of variables collected should be sufficient to cover the currently used TFP specifications and likely future extensions. It is important that definitions and collection methods remain unchanged for an extended period to allow formation of a robust database of sufficient length so it is necessary to devote sufficient time to the specification process at the outset.

Economic Insights is of the view that an important part of developing a robust TFP database for Australian energy network businesses is the use of currently available data in TFP studies. That is, it is only by actually using available data for TFP analysis that the full extent of inconsistencies and problems in that data are identified and can then be rectified. While this study has identified obvious gaps and inconsistencies in currently available data, it is only by

carrying out TFP studies that less obvious inconsistencies and gaps are fully identified and understood. There is, hence, an important element of 'learning by doing' in using available data for TFP analysis. The results of these preliminary TFP analyses could be used to inform regulatory determinations and be one aspect of benchmarking information the AER is able to draw on within the building blocks regime.

It needs to be recognised that establishment of a robust TFP database will take some time. After appropriate definitions and collection mechanisms have been developed, it will obviously take a number of years before there is a sufficiently long time series available to make TFP–based regulatory determinations on. If the process is commenced as soon as possible, it may be possible to start making TFP–based regulatory determinations in the next round of reviews or, more likely, the round after that. In the meantime, greater use of currently available data will develop stakeholders' familiarity with the method. It may be possible to use these results to inform building blocks decisions and to run 'paper trials' on what the impact of using TFP–based regulation instead of building blocks regulation would be likely to have been until such times as a sufficiently robust TFP database is in place.

1 INTRODUCTION

The Australian Energy Market Commission (AEMC) has initiated a review into the possible uses of a total factor productivity (TFP) methodology for the regulation of prices and revenues in the national electricity and gas distribution and transmission networks. The AEMC will report the outcomes of the review to the Ministerial Council of Energy (MCE) and make recommendations on potential changes that could be made to the National Electricity Rules ('the Rules') to provide for the adoption of a TFP approach in appropriate circumstances.

The objective of the review is to:

a) advise the MCE whether, at this stage of market development, any allowed application of a TFP method would contribute to either the national electricity objective (NEO) and/or national gas objective (NGO); and

b) if so, what amendments to the Rules should be made to enable the use of a TFP approach and in what circumstances.

The review stems from a narrower Rule Change Proposal submitted by the Victorian Government in June 2008.

The AEMC has prepared an issues paper for the review which notes:

'The Review is not considering whether a TFP based methodology should replace the existing framework but rather whether allowing the use of TFP in addition to the existing building block approach would provide benefits to customers, service providers and the AER in the relevant decision making processes.' (AEMC 2008, p.2).

It goes on to note:

'The success of a full TFP application would depend not only on the methodology for estimating the TFP growth rate but also on the design of the framework for its application and the quality of available data. The Review will assess the detailed design parameters relating to how a TFP based methodology could be applied in the energy markets and examine the availability of the required data.' (AEMC 2008, p.3).

The AEMC has engaged Economic Insights Pty Ltd ('Economic Insights') to provide an assessment of whether currently available data and current regulatory reporting requirements are sufficiently robust and relevant to adequately support the implementation of a TFP methodology for the determination of revenues and prices for electricity and gas transmission and distribution businesses in Australia.

Economic Insights' terms of reference for the data assessment are as follows:

- provide a description of the data requirements ideally needed for a TFP based methodology;

- provide a description of the current regulatory reporting requirements for each jurisdiction for each of the four sectors;

- assess whether the data requested are measured on a consistent and comparable basis across the jurisdictions;

- evaluate whether the available data current requirements are sufficient to support a TFP based methodology;

- identify any aspects in the current reporting requirements that would impede a successful application of a TFP based methodology; and

- advise on possible courses of action that could address any gaps in the existing arrangements.

The AEMC also requested Economic Insights to review the Australian Energy Regulator's (AER) proposed Regulatory Information Order (RIO) template for electricity distribution businesses in the context of TFP data requirements.

The importance of having a robust and consistent database to support the use of TFP has been recognised for some time. For instance, the Expert Panel on Energy Access Pricing (2006, p.106) noted that:

> 'The Panel considers that the criteria that should be considered in developing guidance on whether to adopt a TFP–based control setting method or to maintain an existing, building block approach should include:
>
> - the availability of robust, consistent and relevant data over a sufficient period to allow the derivation of TFP estimates. The required data includes:
>
>   - price and output information for each of the services that is subject to price control;
>
>   - cost information, distinguishing between operating costs, capital costs, depreciation, regulatory asset values and return on capital; and
>
>   - ideally, various physical input/output measures, such as employee numbers, line length, transformer capacity, number of customers, maximum demand, etc.'

In the following subsection we summarise the key findings from this data assessment. In section 2 we review the principal data requirements for undertaking robust and consistent TFP studies before reviewing current regulatory reporting requirements and assessing currently available data in sections 3 and 4, respectively. A detailed description of the data available in each of the Australian jurisdictions for each of the four sectors is provided in appendix B. In section 5 we review current reporting impediments before recommending a way forward to establish a robust national TFP database.

1.1 Key findings

The main finding of this report is that currently available regulatory data for the four industries – electricity and gas distribution and transmission – are not sufficiently robust to support TFP analysis of the rigour required to be the primary determinant of regulatory pricing and revenue decisions. The key problems include:

- current regulatory reporting is generally concerned with financial data whereas physical data on both outputs and inputs are of key importance for productivity measurement;

- current performance reporting usually concentrates on failures of some sort – interruption frequency and duration, response to telephone calls – rather than on delivery or capacity to deliver;

- definitions are often not specific enough, vary across jurisdictions or are left to the regulated business's discretion and exclusions or inclusions often change from one regulatory period to another;

- regulatory reporting requirements are not uniform between jurisdictions though migration to the AER may result in greater uniformity;

- there is now a low priority allocated to past data by state regulators who no longer have responsibility for network regulation as evidenced by the slow responses and non–responses to our questionnaire;

- regulatory reporting is often a matter of dispute between the utility and the regulator, with regulators on occasion making 'adjustments' (sometimes without explanation) so that the regulated business has little 'ownership' of the resulting data;

- regulatory reporting (as finally accepted by the regulators) may thus not be subject to independent audit;

- regulatory reporting is generally not available publicly or is available only in aggregated terms;

- the Steering Committee on National Regulatory Reporting Requirements (SCONRRR) reporting format for electricity distribution has been adopted by some jurisdictions but the data provided are often sparse and sometimes discrepancies arise when reporting officers change or business ownership changes; and

- current reporting generally does not allow consideration of differences in activities between utilities (eg differences in transmission/distribution boundaries and system structure).

There is a strong case for developing a well specified and robust national TFP database for at least the electricity and gas distribution industries. Such a database would allow the potential application of an alternative method of regulation in the future and also assist with addressing the information asymmetry regulators face in applying building blocks regulation. Key steps include:

- commence consultation with network businesses and other stakeholders on the data variables required for TFP analysis and their detailed definition;

- ensure the range of variables collected is sufficient to cover the currently used TFP specifications and likely future extensions;

- ensure the same range of services are reported on over time, regardless of what might happen to be classified as standard control, alternate control or negotiated services across regulatory periods;

- undertake TFP analyses using currently available data to identify the full extent of data gaps and inconsistencies; and

- examine scope for modest extensions to the AER's draft Regulatory Information Order to include more quantity information on both outputs and inputs and to ensure cost data consistent with TFP requirements are collected.

2 DATA REQUIREMENTS FOR A TFP METHODOLOGY

2.1 What is TFP?

Productivity is a measure of the quantity of output produced from the use of a given quantity of inputs. TFP measures total output quantity relative to the quantity of all inputs used while Partial factor productivity (PFP) measures the quantity of one or more outputs relative to one particular input quantity. Productivity studies can be used to measure either TFP levels between organisations or TFP growth over time for a given organisation or industry.

To operationalise the TFP growth concept we use index number theory to combine changes in diverse outputs and inputs into measures of change in total outputs and total inputs. Growth rates for individual outputs and inputs are weighted together using output cost or revenue shares and input cost shares, respectively.

TFP measures the productive efficiency of a firm or industry. Productive efficiency combines technical efficiency (producing as much output as feasible given current engineering knowledge from a given quantity of inputs) and allocative efficiency (ensuring inputs are used in cost minimising combinations).

The rationale for using TFP measures to set X in CPI–X network regulation lies in using CPI–X to mimic the outcomes that would be achieved in a competitive market. The process of competition normally leads to industry output prices reflecting industry unit costs, including a normal rate of return on the market value of assets. Output prices will normally change by the rate of growth in the industry's input prices less the industry's average rate of TFP growth. Because no individual firm can influence industry unit costs, each firm has a strong incentive to maximise its productivity performance to achieve lower unit costs than the rest of the industry. This will allow it to keep the benefit of new, more efficient processes that it may develop until such times as they are generally adopted by the industry. This process leads to the industry operating as efficiently as possible at any point in time and the benefits of productivity improvements being passed on to consumers relatively quickly.

2.2 Output and input prices and quantities

To measure productivity performance we require data on the price and quantity of each output and input and data on key operating environment conditions. We require quantity data because productivity is essentially a weighted average of the change in output quantities divided by a weighted average of the change in input quantities. Although the weights are complex and vary depending on the index technique used, they are derived from the share of each output in total revenue (in the case of competitive industries) or output cost shares (in the case of natural monopolies) and the share of each input in total costs. To derive output cost shares we require additional information on how cost drivers link to output components.

Measuring the output of network businesses presents a number of challenges, especially where charging formats may not well reflect the cost of producing the various outputs. A major part of network infrastructure industries' output is providing the capacity to supply the

product. This is in addition to the simple measure of the quantity of the product actually delivered to consumers. A number of distribution business representatives in Australia have drawn the analogy between an electricity distribution system and a road network. The distribution business has the responsibility of providing the 'road' and keeping it in good condition but it has little, if any, control over the amount of 'traffic' that goes down the road. Consequently, they argue it is inappropriate to measure the output of the distribution business by a volume of sales or 'traffic' type measure. Rather, the distribution business's output should be measured by the availability of the infrastructure it has provided and the condition in which it has maintained it.

To capture these multiple dimensions of network output most TFP studies have included three outputs: throughput, system capacity and connection numbers. System capacity has typically been measured either by a line capacity based measure or, in some cases, by using peak demand as a proxy.

TFP studies have used one of two alternative approaches to establishing the weights used in combining the various output quantity measures into a measure of total output. Some studies have used simple observed revenue shares while others have used estimated output cost shares on the grounds that pricing structures in many network industries have evolved on the basis of historical accident or convenience rather than on any strong relationship to underlying relative costs. In some cases important dimensions of network output are not explicitly charged for which means these outputs would not be included if observed revenue shares were used.

Most network TFP studies have included two broad input categories: operations and maintenance expenditure (opex) and capital. Some North American studies have separated opex into labour and materials and services. However, with the increase in contracting out, separate measures of labour input have become increasingly difficult to obtain and potentially unrepresentative.

Different studies have adopted different approaches to measuring the capital input quantity with some studies using disaggregated physical quantities as a proxy and others using the constant price, depreciated aggregate asset value as a proxy. Different approaches have important implications for the implied profile of the service potential of network assets over time. Using physical quantity measures to proxy the capital input quantity assumes that network assets display little deterioration in their service potential through their lifetime while using the constant price, depreciated asset value proxy implies either a geometric or straight–line decline in service potential over the asset's lifetime.

Operating environment conditions can have a significant impact on network costs and productivity and in many cases are beyond the control of managers. Consequently, to ensure reasonably like–with–like comparisons it is desirable to 'normalise' for at least the most important operating environment differences. Likely candidates for normalisation include energy density (energy delivered per customer), customer density (customers per kilometre of main), customer mix and climatic and geographic conditions. Differences in operating environment conditions are likely to affect achievable productivity growth rates as well as achievable productivity levels.

In an earlier report prepared for the Australian Competition and Consumer Commission

(ACCC), Lawrence (2004b) included extensive consideration of output and input data requirements for incentive regulation in electricity distribution and transmission. The study included key measures for each industry segment and included detailed segregation of the broad data classes. The list of variables considered in this report as being necessary for the construction of robust and consistent TFP measures draws on the earlier report for the ACCC as well as on earlier and subsequent TFP studies.

The major electricity distribution TFP studies undertaken in Australia have been a series of studies by Lawrence (2000, 2005) and Pacific Economics Group (PEG 2004, 2008a and ESC and PEG 2006). A report by Lawrence (2003) also formed the basis of productivity–based electricity distribution regulation in New Zealand. The results of this study were updated in Lawrence (2007b). The major study of gas distribution TFP in Australia is that of Lawrence (2007a) while PEG (2008b) undertook a less detailed gas distribution TFP study using a different approach. There have been no studies of electricity transmission TFP in Australia that we are aware of. Lawrence (2003) briefly examined electricity transmission TFP performance in New Zealand and Lawrence (2004a) compared gas transmission TFP performance of Australian and New Zealand pipeline businesses on a cross sectional basis.

The two broad approaches to measuring network outputs and inputs used in the series of reports by Lawrence and PEG can be summarised as follows. The Lawrence reports have favoured using:

- outputs covering throughput, customer numbers and system capacity (eg in MVAkms for electricity and pipe system standardised volumetric capacity for gas);

- individual outputs weighted together by output cost shares (usually derived from econometric cost functions and which place least weight on throughput reflecting its relatively low marginal cost once the system is in place); and

- capital input quantities proxied by physical measures reflecting the physical depreciation characteristics of the major network assets.

The PEG reports have favoured using:

- outputs covering throughput (possibly by time of use), customer numbers and peak demand (possibly contracted demand by that class of customer, or diversified – or undiversified – system demand);

- individual outputs weighted together by revenue shares (which have typically placed most weight on throughput); and

- capital input quantities proxied by constant price depreciated asset values.

The approach Economic Insights has adopted in this report is to examine the availability and quality of data which would cover both of the specifications that have been used in Australia to date. An indicative minimum list of the variables required for TFP analysis covering both of the currently used specifications and likely extensions includes[2]:

- throughput by broad customer class or tariff category

- throughput by broad time of consumption

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[2] List shown is for electricity networks – broadly analogous variables are required for gas networks.

- customer numbers by broad class

- coincident peak demand

- non–coincident peak demand

- distribution related system average interruption frequency index (SAIFI)

- distribution related system average interruption duration index (SAIDI)

- line losses

- revenue from distribution service by broad customer class

- total operating and maintenance expenditure by category (excluding all capital costs, capital construction costs and transmission fees)

- line and cable length by voltage level

- installed transformer capacity (zone substation level by step and distribution level)

- regulatory asset base by nature of asset

- capital expenditure by nature of asset

- asset life by nature of asset (overall and residual).

Complete lists of the variables required to support TFP analysis in each of the four sectors – electricity distribution, electricity transmission, gas distribution and gas transmission – are presented in appendix A. The availability of robust and consistent data over a sufficiently long period to support a range of likely TFP specifications is a prerequisite for the introduction of a TFP–based regulatory regime.

In addition to the specifications that have been used in previous studies, it is also important to recognise that satisfactory ways of including some important output characteristics in TFP measures have yet to be developed. The relevant areas include:

- continuity, reliability and quality of supply and speed of restoration (partly measured by SAIDI and SAIFI);

- responsiveness to requests for new or altered connections or for reporting and updating advice about interruptions;

- system security – redundancy which assists in the above performance, but which is not measured where not called upon for service but which nonetheless provides an important 'insurance' output; and

- allowance for different 'boundaries' between transmission and distribution and for systems structures which have evolved differently for reasons outside management control but which may impact on achievable productivity levels and growth rates.

As with any measurement system, the degree of sophistication of output measurement that can be included will evolve over time. This will also be influenced by changing circumstances and priorities over time – system security is only now being recognised as an important output dimension, particularly for electricity distribution businesses covering large central business districts. As ways of incorporating these dimensions of network output are

developed, the data requirements listed above and in appendix A may expand somewhat. The data assessment in this report has been undertaken based on the requirements for currently used specifications.

2.2 The importance of data consistency and comparability

As noted above, the availability of robust and consistent data to support a range of likely specifications is a prerequisite for the introduction of a TFP–based regulatory regime. A key requirement for a robust and consistent database is detailed and consistent definitions of the way key variables have to be reported. Without this, data may have been supplied inconsistently across electricity distribution businesses (EDBs) and also through time by each EDB. Even if each jurisdiction has its own detailed and consistent definitions, these may vary across jurisdictions leading to unlike–with–unlike comparisons being made and industry growth rates being formed from quite heterogeneous activities.

Using electricity distribution as an example, the following are illustrations of key issues that may affect data consistency over time and comparability across jurisdictions and utilities and which need to be identified:

- the extent of charges to operations and maintenance expenditure (opex) should be clearly and consistently defined, including reference to transfer or allocation of overhead costs or charges. Capitalisation policies, eg for pole replacement, should be explicit and consistent.

- excluded assets, such as street lighting or metering should be consistently treated, or allowance available for adjustment. Inclusion or exclusion of customer service connections (from street mains or pipes) to the customer's premises should be clear

- any mandated levels of security, eg N–1 or N–2, should be explicit

- the boundaries between the transmission and distribution systems vary across jurisdictions – mainly for historical reasons – with some EDBs taking supply from the transmission system at 132 kV and requiring several intermediate voltage transformations before reaching the end consumer while others take their supply at 44 kV and have a far simpler structure. Thus, transformer kVA or MVA capacity should allow identification of transformation capacity between various levels as well as final transformation to a utilisation voltage. It should also be clear whether installed capacity, or firm station capacity (possibly on an N–1 basis) is provided

- Distribution Use of System (DUoS) charges should specifically exclude – or include and allow identification of – pass through items

- Regulatory Asset Base values should be established and 'rolled forward' on a consistent basis

- contributed assets (by way of capital contributions or transfers in kind) should be consistently treated for capital input purposes but may need different treatment as far as annual revenue, inclusion for indexation, depreciation and as an element requiring maintenance by the utility are concerned

- sections of mains or pipelines should be segregated by voltage or pressure, and by capacity or diameter and possibly throughput

- reliability performance data (eg SAIDI) should allow segregation according to the level of system responsible for the interruption

- revenue and energy adjustments (eg for unread meters because of the reading cycle or for unaccounted–for–gas) should be clearly defined and consistent

- exclusion rules should be explicit, rather than subject to individual event judgement for exclusion of very major events in consideration of SAIDI and of call centre response performance.

Without a high degree of consistency and comparability in the underlying output and input data, TFP estimates may be unfit for the purpose of setting regulatory price or revenue controls (although they may still provide useful information). A key part of this study has, therefore, related to establishing whether data have been provided on a consistent basis both across businesses and through time.

2.3   The importance of public accessibility and verifiability

Another critical requirement for the introduction of a successful TFP–based regulatory regime is the availability in the public domain of consistent, objective and verifiable data on the value and quantity of all key outputs and inputs for all relevant network businesses. This allows interested parties to reach agreement on the veracity of the data used and to undertake their own TFP calculations and sensitivity analyses.

The current benchmark for good practice for data availability is the New Zealand Information Disclosure Data filings all network businesses are required to make. While not specifically established to support productivity measurement, these databases generally contain sufficient information to support the calculation of productivity measures. Interested parties can then verify the data used against the Information Disclosure Data filings and undertake sensitivity analyses on the specification used or, alternatively, form their own productivity estimates at any time from the Information Disclosure Data.

In undertaking this assessment we sought to establish whether the necessary available data are in the public domain, are not currently in the public domain but could be made publicly available, or are not currently in the public domain and are commercially sensitive.

3 CURRENT REGULATORY REPORTING REQUIREMENTS

To ensure we were fully informed on current regulatory reporting requirements, Economic Insights prepared questionnaires covering the four sectors – electricity distribution, electricity transmission, gas distribution and gas transmission – for jurisdictional regulators and the Australian Energy Regulator (AER) seeking their input on currently available data.

The questionnaires sought the regulators' input and views on the following questions for the variables listed in appendix A which are those required by a range of likely TFP specifications:

- what data are currently available for each of the identified items for each of the years since 1995

- whether the data are currently in the public domain, not currently in the public domain but could be made publicly available or not currently in the public domain and commercially sensitive

- whether detailed definitions of the data have been given to businesses supplying the information and, if so, whether these have changed over time

- whether the regulator is aware of changes in the way each data item may have been reported over time

- whether the regulator is aware of differences in the way each variable is reported in its jurisdiction compared to other Australian jurisdictions, and

- the regulator's views on the robustness of each data item available in its jurisdiction.

Only two completed responses were received by the requested date. Most of the remaining responses were received over the following two months, although not all were complete. One regulator said it did not have the resources to provide a written response but participated in a phone hook–up as a substitute and one regulator has yet to provide a response.

This section summarises the data availability and quality information obtained for each jurisdiction. A more detailed coverage is presented in appendix B based on regulatory reporting guidelines, the regulator's responses to our questionnaires and other sources of information.

Data based on currently available regulatory reporting requirements have not been purposely specified or collected for productivity analysis. For instance, regulatory reporting guidelines deal almost exclusively with financial matters required for building block regulation with little or no mention on any physical system data. Thus, while they examine the moneys received and spent, and the financial characteristics of assets used, created and depreciated, there is no quantification of *what* assets are built, maintained or operated to deliver the network service. Jurisdictional regulators noted that their efforts to date had almost exclusively been directed at obtaining the financial data required for building blocks regulation and they had had little time to assemble data on physical characteristics and outputs. However, they noted the need to fill this gap and to then link financial and system physical data.

3.1 Electricity distribution reporting

This sector has only relatively recently come under AER regulation having undergone, in most cases, two or three jurisdictional review cycles. This section considers reporting requirements and data availability responses from the jurisdictional regulators of the three largest states in the NEM, by way of example, as well as data gathering proposed by the AER. Consideration is also given to the proposals by the Utilities Regulators Forum (URF 2002) for national reporting requirements.

Victoria

Victorian regulatory reporting is against ESC (2006a) 'Guideline No 3: Electricity Industry – Regulatory Accounting Information Requirements' (and associated templates) which has been revised regularly to obtain further data or data segregation aimed at obtaining a better understanding of industry costs in an era of increasing contracting out of activities.

The ESC noted that opex is publicly available only in total with segregation only in the regulatory accounts. This was available from 1998 but EDBs often define their own segregation of expenditure according to their internal reporting requirements.

Changes in Issue 6 of the guidelines required segregation of operating expenditure, maintenance expenditure and capital expenditure into labour and non–labour costs. It required disclosures with respect to related party transactions to show the actual cost (net of any profit margin or management fee) incurred by the related party in providing services to the EDB.

Revenue segregation by charge type and by customer type is available from 2001 and is in the public domain while segregation by peak or off–peak time is available since 1995 or 1996 but is not publicly available. Customer numbers and consumption by various classes are available since 2001 and coincident demand since 2006.

Victorian circuit length data for underground and overhead has been separately available since 2006 while some segregated data by voltage and zone substation capacity is available since 2006 although it is as defined by the EDB.

Victorian regulatory asset bases are rolled forward from a Government valuation at vesting in 1995 but the valuation data is not publicly available. Replacement cost or optimised replacement cost data segregated by asset types is not kept by the ESC. Total capital expenditure (capex) is available publicly from 1996 but segregated only in the regulatory accounts. Capital contributions in cash or kind are available since 1998 but also only in the regulatory accounts.

New South Wales

In NSW the Independent Pricing and Regulatory Tribunal (IPART 1997) sets out requirements for regulatory accounting statements and the Department of Water and Energy (DWE 2009a) also requires performance reporting.

Revenue by charge type and customer type is available from 2004–05 while the segregation of energy as being peak or off–peak is available from 1999–00. Customer numbers split between domestic and other only are available from 2004–05 but not publicly. Opex and category segregation are available from 2000 but are similarly restricted.

Physical data for overhead and underground line lengths and transformer capacity are not available.

The basis for asset values derives from the roll forward of an initial DORC valuation in 1999. Capex is available from 1990–00, with some segregation, but is again not public.

Queensland

In Queensland the Queensland Competition Authority (QCA 2005b) has regulatory reporting guidelines for elasticity distribution but the focus of these guidelines in on financial information requirements and the reports are not publicly released.

The QCA approves an EDB's regulatory reporting principles and policies as part of each price determination to 'ensure on–going comparability in financial information' between EDBs. Service quality performance is required to be separately submitted in accordance with the QCA's service quality reporting guidelines.

DUOS is segregated by customer type (eg individually connected customers, connection asset customers, standard asset customers and franchise customers) and is further segregated into a matrix according to annual energy delivery bands (less than 100 MWh pa, 100 to 4,000 MWh pa, 4,000 to 40,000 MWh pa and over 40,000 MWh pa). Customer numbers and energy are similarly segregated.

Maintenance costs and operating costs are separately listed and segregated as common costs allocated, indirect expenses directly attributable to the EDB and direct costs. There is also segregation of the total according to task types.

The opening asset value of plant, property and equipment, additions and final value, together with accumulated depreciation is listed in aggregate and individually for various asset classes. Annual depreciation, expected and residual asset lives are listed.

Capex for the distribution network service provider (DNSP) is segregated by asset type and separated according to expenditure drivers (eg replacement, demand initiated and reliability improvement) and according to network type.

There is no indication of physical quantities (line length, transformer capacity, etc).

Utility Regulators Forum

The Utility Regulators Forum (URF 2002, p.1) recognised that:

> 'With the different jurisdictional legal frameworks, information requirements vary. In general, each jurisdiction has continued to collect information in the same form than before the creation of the NEM. … Such differing requirements have … made it difficult to compare performance across jurisdictions'.

The Steering Committee on National Regulatory Reporting Requirements (SCONRRR) was established to develop a core set of performance reporting requirements for the electricity industry that was nationally consistent and in 2002 published its discussion paper (URF 2002) with two suggested electricity distribution data templates.

The distribution quality of service reporting template includes a page of business descriptors which looks at supply points, energy delivered, line length and transformer details which is

potentially quite relevant for TFP analyses.

The distribution regulatory accounts template requires reporting of revenue from network charges and other sources, asset values and capex by classes for system assets and various non system assets as well as segregation by purpose. Depreciation and life and age of asset classes are sought and operating costs are separated from network maintenance and other costs. Related party transactions are also to be disclosed.

This SCONRRR format has been adopted in several jurisdictions (generally as only part of the reporting) but the data provided seems to have been of varying quantity and quality. For example, the ESC presents data for the Victorian EDBs from 2001. Early years, prior to 2004 generally show only aggregated data for revenue, assets, capex, asset life and opex while varying levels of segregation are apparent from 2004.

Australian Energy Regulator

The AER has initiated discussions on its future reporting requirements. It has released an issues paper – Electricity DNSPs annual information reporting requirements (AER 2008) – in anticipation of its publication of a regulatory information order (RIO) setting out a nationally consistent framework for annual information reporting by EDBs. In the interim, the review of NSW and ACT EDBs required information to be supplied in response to a regulatory information notice (RIN) developed in conjunction with each EDB.

The issues paper was accompanied by an information guidelines reporting template, a template for back–casting capex and opex and examples of regulatory assurance reports. The requirements for back–casting cover the previous and current regulatory periods. There is again generally a predominance of financial data over physical data.

The paper proposes expenditure statements covering expenditure on capex, opex, major items and contributions. Capex is to have segregation by being on system or non–system assets with the former segregated by:

- driving cause (extension, load management, renewal/replacement, service improvement);
- asset class (lines and cables, substations and transformers, buildings, etc);
- voltage level (subtransmission, high voltage and low voltage);
- underground or overhead; and
- feeder type (CBD, urban, rural short or rural long).

Opex is separated as being maintenance (with a broadly similar segregation matrix) and operating. Opex is also segregated into labour, materials, contractors and other. Capital contributions, prepayments and financial guarantees are to be listed in dollar values.

The regulatory asset base (RAB) is required with some network characteristics and requires reconciliation of assets by category according to valuation, additions, disposals and depreciation as well as listing by categories of useful life remaining.

Some network characteristics are required with line length (underground or overhead, and subtransmission, high voltage and low voltage) segregated by feeder type as well as the number of metered supply points according to customer type and supply voltage. These are

generally similar to the SCONRRR templates but other SCONRRR data items on transformers, energy delivered and system demand are not included.

At the time of preparing this report the AER's exact timeframe and process for finalising the RIO was yet to be decided.

3.2   Gas distribution reporting

This sector has also only recently come under AER regulation having undergone, in most cases, two or three jurisdictional review cycles. The following considers reporting requirements and data availability responses from Victoria as an example although it should be noted that Victoria appeared to have better data collection than other jurisdictions. It should also be noted that the AER also has the power to issue a RIO under the Gas Law.

The Victorian ESC requires reporting against its 'Gas Industry Guideline No. 17: Regulatory Accounting Information Requirements' and associated templates. The latest version is Issue No. 2 (ESC 2008a) which is a revision of a similar guideline of July 2005. Changes in this latest version apply to the calendar year ending 31 December 2008 and the Commission notes (ESC 2008a, p.3) 'that the *National Gas (Victoria) Law 2008* … provides for this guideline to transition to the AER'. The revision seeks to improve the quality and relevance of information partly relating to issues identified during the recent gas access arrangement review (GAAR).

The guideline provides 'considerable discretion to the distributors, particularly regarding the allocation of shared costs, capitalisation policies, provisions and related party transactions' allowing each gas distribution business (GDB) 'to adopt the policies considered appropriate and consistent with efficient and effective business practice'.

The guideline requires mainly financial information including income, balance sheet, profits, cash flows and asset values. The accounts submitted are not public. Data in the ESC gas performance reports (ESC 2008c) and utility submissions to the GAAR are public.

Total RAB values are available publicly since 1998 as part of GAAR decisions and published financial models but no segregation of the RAB by category has been provided to the ESC. Reconciliation of the RAB for inflation, depreciation and additions is available from 1998 to 2007 but only the total value of RAB is reported publicly.

Capex in total is available publicly from 1998 to 2007 but segregation is only contained in the regulatory accounts and only from 2004. Asset life data (total and residual) are collected in the regulatory accounts for fixed assets. Capital contributions are available from 1998 to 2007 but only in the regulatory accounts.

The subtotal for operating expenses is available publicly in the GAAR since 2004. Segregations are available since 2004 in the regulatory accounts and hence are not public.

Gas delivery details are publicly available from 1998 to 2007 and include total energy per annum, distribution revenue and number of customers (but not overall maximum hourly quantity) and energy and revenue for the customer class segregations. Maximum hourly quantities and revenue (but not energy or customer numbers) are available for the capacity based tariffs.

Pipeline length (segregated for the various overall pressure classes and by material) has been collected since 2004 and is presented is in the comparative performance reports. The number of service connections (but not their length) is available since 1998. The numbers of city gate stations and pressure regulators are not collected and nor is the split of meter/regulator installations according to capacity.

3.3   Electricity transmission reporting

Electricity transmission has been progressively regulated centrally since 2000, firstly by the ACCC and more recently by the AER. The AER response to the questionnaire thus indicated no data availability (from that source) before 2000, with data only becoming progressively available from that date. Where data are available the response noted that 'unless [data are] … already disclosed in regulatory proposals' the data holder 'will require TNSP permission to disclose [it]'.

It is apparent, however, that data consistency both between utilities and over time is likely to be poor with reporting tailored to the circumstances of each business.

Asset values are taken as the jurisdictional value without adjustments but it was noted that asset classes used by businesses vary and sometimes assets have been included or excluded between regulatory periods (and presumably across transmission businesses).

Capex and asset lives are available progressively from 2000 but, again, asset classes vary. Opex data are similarly available and regarded as 'robust' although it was noted there were changes in reporting with new AER templates introduced in 2007. Cost allocation methodologies were approved for each business by the AER only in 2008.

There are no physical data – line length, transformer and line capacity, system demand or capacity and line losses – and some businesses do not report energy throughput.

The AER (2007) paper 'Information guidelines – Electricity transmission network service providers' includes requirements based on the AER's existing information requirements guidelines with amendments and additions made to take account of the requirements of chapter 6A of the NER. Extensive templates accompany these Information Requirements Guidelines (IRGs) covering financial and service performance and each business's service performance template will be customised to reflect its service target performance incentive scheme.

3.4   Gas transmission reporting

The AER noted that data available (from that source) are only for the limited number of pipelines that are or have been *covered* pipelines and in some cases the information is out of date.

Financial data are forecasts as service providers are not obliged to submit actual data to the AER. Some historical data may have been provided in support of an access agreement proposal but this is not continuous or uniform. Publicly available information is on the AER website in access agreements, service providers' information, consultants' reports and decision documents.

4 ASSESSMENT OF CURRENTLY AVAILABLE DATA

As discussed in section 3 and reported in detail in appendix B, Economic Insights has undertaken a detailed examination of data availability, quality, extent and comparability across all Australian jurisdictions for the electricity and gas distribution and transmission industries. Data sources examined include regulatory reporting requirements, templates and (where possible) responses, jurisdictional regulators' responses to Economic Insights' questionnaire, proposed data collection by the AER for future reviews and template data requests for current reviews. Economic Insights also conducted detailed discussions with key interested parties, including the AER and the ESC, and considered submissions on the AEMC Issues Paper for the TFP Review and on the AER's proposed regulatory reporting requirements for electricity distribution.

Significant amounts of data have been collected for the four industries but not specifically for the purpose of productivity measurement. To assess whether the data that has been collected for other regulatory purposes would be fit for purpose for productivity–based regulatory decisions, we have to address the following questions:

- What is the coverage of currently collected data across the output and input prices and quantities required for robust productivity analysis as identified in section 2 and appendix A?

- Have available data been supplied subject to clear and precise definitions?

- Have available data been supplied consistently through time for each business and consistently across jurisdictions?

- Are available data in the public domain or accessible by interested parties?

- Do both regulators and regulated businesses feel the data are robust and consistent and do all relevant parties have 'ownership' of the data as being an accurate and consistent record of actual outputs produced and inputs used?

It is important to recognise that the threshold for acceptance of available data as being fit for purpose for productivity–based regulation needs to be set relatively high. Regulatory pricing and revenue decisions for energy networks have significant consequences for regulated businesses and affect the supply of essential infrastructure to the community. Decisions therefore need to be made using data that are as robust and consistent as possible. Data that have been supplied subject to varying requirements and definitions may be suitable for use in productivity analysis that provides background for or 'informs' pricing and revenue decisions. But productivity analysis using such data is unlikely to be fit for the purpose of basing the entire pricing and revenue decision on.

In the remainder of this section we assess data currently available for each of the four industries against the considerations outlined in the questions above. Electricity distribution is discussed in most detail because it has the most detailed history of regulation and the data available are more extensive than for the other three industries.

4.1 Electricity distribution data

Coverage

All jurisdictions have required relatively detailed regulatory accounts for EDBs. However, the format of these regulatory accounts is almost exclusively concerned with financial details. Regulators noted that efforts to date have, by necessity, almost exclusively been directed at obtaining the financial data required for building blocks regulation and there has been little time to assemble data on physical characteristics and outputs. The need to fill this gap was noted along with the need to link financial and system physical data to provide regulators with a more complete picture of EDB operations. The physical quantity data that is currently not, in most instances, included in the regulatory accounts is a central requirement for productivity analysis.

As well as (financial) regulatory reporting, several jurisdictions require 'performance reporting'. This reporting generally has regard to service quality, such as frequency and duration of system interruptions, promptness in response to telephone inquiries and achievement of promised connection or site contact arrangements. Some become very detailed, for example, in identifying performance by zone substation and even distribution feeder. However, most do not include detail on either key output or key input quantities.

Some electricity distribution reporting has adopted the Steering Committee on National Regulatory Reporting Requirements (SCONRRR) formats, which, if implemented fully, do seek some system information of use for TFP. For instance, the distribution quality of service reporting template seeks business descriptors covering supply points, energy delivered, line length, transformer details and is potentially quite relevant for TFP studies. The SCONRRR distribution regulatory accounts reporting template requires revenue from network charges and other sources, asset values and capex by classes for system assets and various non system assets as well as segregation by purpose. Depreciation and life and age of asset classes are sought and operating costs are separated from network maintenance and other costs with related party transactions to be disclosed.

However, the SCONRRR format has generally only been part of the jurisdictional reporting to date and the data provided has been of varying quantity and quality. For example, the ESC presents data for the Victorian EDBs from 2001. Early years, prior to 2004 generally show only aggregated data for revenue, assets, capex, asset life and opex while varying levels of segregation are apparent from 2004 on.

Another problem with data coverage relates to the progressive transfer of network regulation responsibilities from jurisdictional regulators to the AER. This has effectively created a hiatus in data collection efforts. In most cases the sector has only relatively recently come under AER regulation, having undergone two or three jurisdictional review cycles within the various state regimes. The AER is currently considering its first distribution utility regulatory decisions, and preparing for the next reviews.

Data from previous reviews will become available to the AER but it will be difficult for the AER to acquire and understand the 'corporate history' behind the previous regimes and resulting characteristics of and inconsistencies in the data. In many cases the relevant staff that were involved in earlier jurisdictional decisions have already left the jurisdictional

regulators. Understandably, the focus of jurisdictional regulators has also moved to their other areas of responsibility. The difficulty the AEMC and Economic Insights have had in getting timely responses and, in some cases, any response from jurisdictional regulators on the data availability questionnaire is likely to be reflective of the much greater difficulties that would be experienced in compiling a retrospective database.

The AER has issued draft requirements for Regulatory Information Orders (RIOs) for regular utility reporting and the NSW and ACT utilities have made responses to specific Regulatory Information Notices (RINs) as part of the AER review process. The draft requirements are largely financial and include much detailed segregation of financial items, variously by asset class, voltage level and capex driver. They do include some of the SCONRRR data items although information on transformers and voltage steps, energy delivery and system capacity components (as required for a full TFP specification) are not included. The RIOs could be extended with relatively little effort to include the additional variables required for TFP analysis.

The experience of the AER in the NSW and ACT review is also instructive. A significant part of the RIN for the EDBs was a relatively ambitious data 'back–casting'. Much of the RIN information was required year by year to cover three regulatory periods – in the NSW case the previous regulatory period 1999–2000 to 2003–04, the current regulatory period 2004–05 to 2008–09 (actuals and current estimates) as well as the next regulatory period 2009–10 to 2013–14.

However, the AER indicated that only partial data were in fact provided to them in response to the RIN. Capex and opex were provided for varying parts of the requested periods (generally from the early 2000 years onwards only) and much of the demand and customer detail was not available for all years and all sub–categories as the data at the required level did not go back this far. The AER suggested more confidence could be placed in the most recent five years of data due to more maturity in the regulatory regimes and stability in classifications, as well as requirements for auditing of regulatory accounts.

Submissions on the AEMC (2008) TFP Review Issues Paper also generally stated that current data coverage was inadequate to support robust TFP analysis. The AER (2009, p.6) noted:

> 'the amount and quality of data available for distribution networks is variable across jurisdictions. The AER understands that the Essential Services Commission of Victoria (ESC) is the only Australian utility regulator that has collected TFP data in a structured and systematic manner'.

EnergyAustralia (2009, p.4) noted:

> 'currently a national dataset (that is robust and consistent) required for the application of TFP does not exist to the extent that is required for an accurate and transparent calculation of TFP growth. … Establishing a robust and reliable dataset is a prerequisite for application of a TFP based method; hence ensuring the results are creditable and accurate. EnergyAustralia submits that for as long as such dataset is not available, any application of a TFP based method is likely to lead to disputes about the results of TFP calculations and therefore likely to undermine confidence in the regulatory framework as well as its integrity'.

The only group that claimed current data coverage was adequate to support robust TFP analysis was the proponent of the original TFP Rule Change Proposal, the Department of Primary Industries (DPI) of Victoria, and the ESC. The DPI (2009, p.5) submission to the AEMC Issues Paper noted that:

'In 2004, the Essential Services Commission of Victoria initiated a major ongoing project reviewing the use of the TFP approach to regulate electricity distribution services. There is now an appropriate time series of data that can be used. In December 2006, the Essential Services Commission of Victoria – assisted by the Pacific Economics Group – completed a report which indicated that a "sufficient time series" of data would exist within three years of the report's publication'.

DPI (2009, p.8) went on to note that it:

'considers that there is a critical mass of robust and consistent data currently available in at least one jurisdiction, as collected by the Essential Services Commission of Victoria in association with Pacific Economic Group. Additional data from other jurisdictions will be available following the implementation of the TFP approach which should be appropriately incorporated into the dataset'.

As noted in section 2, the TFP model specification used by the ESC and PEG relies entirely on financial data for inputs and derives input quantities indirectly by deflating dollar values by price indexes. It also does not explicitly include a system capacity output measure. This does reduce its data requirements and aligns them more closely with the (financial) data required in current regulatory processes. However, as the AER (2009, p.6) noted in its submission 'regarding the specification of outputs and inputs for TFP calculations, often the specification will be designed to fit with the dataset available'. The AER observed 'this can result in a workable TFP estimate, (but) the methodology may lose some accuracy and robustness'.

The observations of the respected regulatory analyst Paul Joskow (2006, p.80) are also noteworthy here:

'Incentive regulation in practice requires a good accounting system for capital and operating costs, cost reporting protocols, data collection and reporting requirements for dimensions of performance other than costs'.

The approach adopted in this report is that available data needs to cover a range of likely TFP specifications to, among other things, allow sensitivity analyses to be undertaken. This is a vital part of developing stakeholder confidence in the productivity–based regulation methodology.

It should also be noted that the ESC's Victorian database has been the subject of some debate with the ESC having 'cleansed' the database relative to information supplied by the EDBs. In its submission to the AEMC Issues Paper EnergyAustralia (2009, p.7) made the following observation:

'this issue [data cleansing] had arisen in Victoria where the ESC and its consultant had made adjustments to the audited actual information which has

made it impossible for the business to replicate and understand the results. EnergyAustralia submits that such adjustments to audited data are inappropriate. Allowing the AER to adjust audited data undermines confidence in the determination process and the regulatory framework. It also brings into question the validity and integrity of the assurance and reporting processes used by individual businesses'.

The ESC and PEG (2006) experience with attempting to undertake a national EDB TFP study is also instructive. Despite four jurisdictional regulators agreeing to participate in the project, the ESC and PEG could not obtain all of the (limited) data they sought from regulatory accounts. Instead, the ESC and PEG had to rely on more limited public domain data and use what was considered a 'second best' methodology. However, the ESC and PEG (2006, p.xi) made the following statement:

'Even though a limited time series is available for some data, the fact remains that the necessary data are beginning to be collected. Thus, in a few years time, a sufficient time series on these data should be available to rely increasingly on TFP methodologies to regulate distribution network prices'.

But the ESC and PEG went on to say:

'The Commission strongly urges policy makers and other regulators to move toward the earliest establishment of a consistent set of data necessary for implementing TFP–based approaches to regulation. This work would inform and provide input into the AEMC's anticipated review'.

But despite this plea, little progress has effectively been made in the ensuing three years due to the transition from jurisdictional to AER coverage and associated disruption.

The difficulties in coverage and quality of available data are not confined to Australia. For instance, PEG (2008c, p.1) recently noted in the case of Ontario in Canada:

'Benchmarking of the operating performance of utilities is facilitated by the extensive data that they report to regulators. Accurate performance appraisals are nonetheless challenging. For example, there are important differences between companies in the services provided, the prices of inputs used in service provision, and in other business conditions that influence their costs. The sample of quality, standardized data available for benchmarking is sometimes small and data on key variables needed for benchmarking are sometimes unavailable'.

Also in a Canadian context, Cronin and Mukluk (2004, p.4) noted that while 'economists have long had straightforward measures of efficiency: the primary road block to their implementation is the availability of properly specified and collected data'.

In summary, the coverage of currently available data is patchy across the various jurisdictions. Regulatory reporting to date has focused almost exclusively on financial data. Non–financial data reporting is tilted heavily towards reliability performance. Regulators have identified the need to make reporting of physical system characteristics and output quantities and the integration of this data with financial data a future priority. It is precisely this dimension which is important for productivity analysis. Recent attempts to backcast data

have tended to meet with mixed success with important variables often only being available with any degree of confidence for a few years.

Definitions

The principles and policies behind regulatory reporting are, in some cases, mandated but in other cases are those proposed by the utility. Regulators responded that they believed there were definitions for most of the variables identified in appendix 4.1. Some of these were provided in relevant regulatory accounts guidelines and some were specified by the Rules. However, for many variables it was noted that relevant definitions were as provided or interpreted by the EDB itself. For example, the ESC noted that segregation into peak and off–peak deliveries time periods are 'defined by the DNSPs'. Similarly, most of the Victorian revenue and output disaggregations are said to be 'defined by distributors'. IPART also noted a change by EnergyAustralia to its peak, shoulder and off–peak time spans.

The ESC also noted that 'DNSPs often define [separation of operating and maintenance costs] according to their internal reporting requirements'.

There are also definitional differences across jurisdictions for service quality reporting (eg actual versus normalised interruptions, excluded events and telephone response definitions).

Zone substation capacity was also not well defined, especially where multiple levels of transformation are involved. The ESC noted it was 'defined by the DNSP'. Different interpretations can have an important bearing on the reported number. For instance, consider a delivery capacity of 100 MVA. If transformation is from 132 kV direct to 11 kV (as, for example, in some parts of EnergyAustralia and for ActewAGL), then this would require 100 MVA of zone capacity. But if transformation was 132 kV to 66 kV or 33 kV and then from this intermediate voltage to 11 kV, then this would require 100 MVA of capacity in both steps and this might be counted as 200 MVA. Similarly, unless there are clear definitions, some EDBs might report capacity based on its nameplate rating while others might only report effective capacity on, say, an N–1 basis.

Discussions with the ESC also indicated that the choice of regulatory asset lives and, hence, the regulatory depreciation rate was effectively at the EDB's discretion. This was because it only affected the timing of receipts in a building blocks framework rather than the net present value of overall returns. However, if a constant price depreciated asset value approach to measuring the quantity of capital was used and varying regulatory depreciation rates were used then this could have a significant (and artificial) effect on measured productivity growth.

The AER noted a possible definitional difficulty TFP analysis where the new Rules allow reclassification of a service as being standard control, alternate control or negotiated so that continuity of even the extent of service provided may be less certain in fact than in appearance.

In some cases, the reporting principles and associated definitions can be changed year by year or at regulatory review times. While this may be able to be accommodated within building blocks based regulation, unless there are clear and well specified definitions for all necessary variables that are stable over time and are the same across all EDBs then results from productivity analysis run the risk of reflecting definitional changes and vagaries rather

than actual productivity change. This means that the classification of services to be included in productivity reporting also needs to stay constant over time, regardless of variations in what is classed as standard control, alternate control or negotiated services across regulatory periods.

Consistency

The scope for definitional differences both over time and across EDBs identified above indicate that data consistency is likely to be a significant concern. The progressive revision of regulatory reporting requirements indicates that regulators have also felt the need to change or clarify the basis on which data are provided as reporting problems and inconsistencies have been identified.

Discussions with the ESC highlighted a number of concerns the ESC held regarding data consistency over time including the impact of outsourcing, third party transactions, auditing materiality thresholds, accounting practices and identifying the impact of corrections of errors and EDB reporting policy changes. Use of accounting principles commonly used in other sectors (eg accruals and provisions and the expensing of write–offs) and the definition of materiality in auditing have at times been regarded as not appropriate for these industries by the regulator. The use of 'associated parties' for EDB activities has also clouded cost reporting.

In some cases, data submitted by EDBs have not been accepted by the regulator or have been negotiated or manipulated before acceptance. Asset lives and, hence, depreciation rates have varied. Cost segregation for operating and maintenance and for allocations have varied over time and between utilities.

With regard to the practice of regulators 'cleansing' data, the AER (2009, p.6) noted in its submission of the AEMC TFP Review Issues Paper:

> 'Consistent with generally accepted data collection and analysis practices, any 'clean up' of data should encompass standardised, widely accepted quantitative methods of data cleansing for the purpose of more rigorous analysis. This does not include manipulation or transformation of data in response to unexpected or seemingly unreasonable results'.

Concerns over data consistency are not confined to current NEM jurisdictions. The Northern Territory Utilities Commission said it was 'not satisfied that the revenue allocated to Networks in the new system was correct' and that 'PWC have changed its [overhead cost] allocation methodology numerous times'.

Western Power (2008, p.31), in a submission to the ERA, noted that 'when making comparisons between Western Power and other electricity network businesses, care must be taken to establish like for like comparisons'. It noted that 'Western Power transmission services extend to local load centres (via sub–transmission lines and zone substations). Elsewhere, this sub–transmission layer ... is managed by distributors'. It also noted that 'businesses treat public lighting and metering in a variety of ways'.

Concerns were expressed with respect to data accuracy and consistency by many of the submissions to the AEMC's Issues Paper. For example, the ACT Independent Competition

and Regulatory Commission's (ICRC's) Senior Commissioner noted concerns with early data before jurisdictional refinement and with inconsistencies between jurisdictions:

'should the data contained in earlier decisions be relied upon to calculate TFP measures, it could potentially lead to significant debate regarding the accuracy and reliability of the underlying data. In addition, many of the supporting documents and worksheets associated with the preparation of the earlier decisions no longer exist, adding to the potential for debate. …

'With respect to inconsistencies between jurisdictions, each jurisdiction has tailored its approach to regulation to suit its individual circumstances. As such, it is natural that there will be differences in definitions used between jurisdictions and therefore difficulties in comparing data across jurisdictions. On this point I note the difficulties experienced in attempting to create a nationally consistent performance reporting framework'.

The ESC (2009, p.74) also commented:

'Procedures also need to be put in place to ensure that these data are accurate and defined comparably across companies. We recommend that a process be put in place to improve data quality and consistency'.

In its comments on the AER reporting requirements paper, ETSA Utilities noted (2009, p.9) 'the cost allocation basis was altered significantly … from the period 2000–2005 to 2005–2010 (and) our ability to extract and provide data prior to 2005 is thus very limited'.

In its comments on the AER reporting requirements paper EnergyAustralia (2009, p.12) noted:

'EnergyAustralia notes that it is important that the definitions used for CBD, Urban and Rural, are the same as those used by the DWE [NSW Department of Water and Energy]. It is not possible to ascertain whether this is the case as the definitions provided are incorrect. …. these differences do have significant impact in other reporting measures (such as reliability under the AER's STPIS) that EnergyAustralia is required to report to both DWE and the AER. … the differences in definitions will cause confusion and uncertainty as a result of having two sets of 'correct' data reported'.

Again, the words of Paul Joskow (2006, p.) are relevant:

'Moreover, the sound implementation of incentive regulation mechanisms depends in part on information gathering, auditing, and accounting institutions that are commonly associated with traditional cost of service or rate of return regulation. … The failure to understand the role of this regulatory infrastructure, especially as it relates to data collection, accounting rules, reporting and auditing standards can significantly undermine the effectiveness of incentive regulation in practice'.

Public domain

Much of the detail of current regulatory reporting data is not publicly available. Regulators, in some instances, publish aggregated data but detailed data are treated as commercial–in–

confidence and not released. Most regulators indicated in their questionnaire responses that data that was not publicly available was in many cases not likely to be sensitive and could be releasable with EDB approval. However, the experience of ESC and PEG (2006) indicates that such approval cannot be automatically assumed.

Data relating to key quantity variables are often not reported, as indicated above, and so are only held by the EDB in its own records. Experience with previous benchmarking studies has shown that such data (and consistent cost data) are not always readily recoverable by businesses. Often accounting and information systems have changed and are not compatible with predecessor systems so that these data are effectively lost.

Transparency is a key requirement for a successful productivity–based regulation regime so that all stakeholders can test the available data and models to assure themselves of the veracity of the inputs to the regulatory decision, to allow sensitivity analyses to be performed and to allow stakeholders to undertake their own productivity calculations through time. The currently available Australian data falls far short of this requirement.

Robustness

Both regulators and EDBs expressed concerns regarding the robustness of currently available EDB data for TFP purposes. For example, the ACT ICRC's Senior Commissioner noted:

> 'The transfer of the regulation of distribution networks to the AER offers perhaps the best opportunity to develop a database required to investigate further the opportunities for a TFP based approach to regulation. Over time, the AER, will develop an internally consistent data set covering all distribution businesses in the National Electricity Market for example, thereby allowing appropriate comparisons over time and between businesses.'

The Energy Networks Association (ENA 2009, p.1) noted 'one of the issues ENA members are concerned about is that the data that is currently available for input into a TFP model is not robust and therefore inhibits accurate analysis'.

Energex (2009, p.6) noted

> 'much of the data that would be required to calculate an industry–wide TFP is not currently maintained and/or reported by DNSPs. It is also important to note that data that is currently maintained and reported may be subject to definitions and methods of calculation which vary between jurisdictions or may only be available at an aggregate level … Data integrity is paramount to the successful adoption of a TFP based methodology and therefore there is little or no acceptable 'trade–off' between data precision and data availability'.

The ETSA Utilities/CitiPower/Powercor (2009, p.7) submission on the AEMC Issues Paper noted:

> 'it is not currently clear that all Australian DNSPs, who might be included in the industry on which the X–factor is calculated currently have comparable data that is robust, consistent and reliable. Before TFP can be feasibly introduced a consistent, robust and credible database will need to be established'.

Only the DPI and ESC supported the use of currently available data for TFP analysis to be

used in productivity–based regulation pricing and revenue decisions. And this support was mainly limited to Victorian data. Nearly all the other stakeholders lacked confidence in the robustness of currently available EDB data for TFP purposes.

4.2   Gas distribution data

Coverage

Gas distribution information is more sparse and less uniform than for electricity distribution. Responses to Economic Insights' questionnaire on data availability were received from Victoria, South Australia, the ACT and Tasmania but no responses were received from NSW, Queensland or the AER.

Like electricity distribution, most states have regulatory accounts which concentrate on financial variables and performance reports which concentrate on service quality issues. Delivered volumes were generally available but sometimes only in aggregate and sometimes only for customers on volume tariffs. Maximum daily quantities were sometimes available for customers on demand or capacity tariffs. Physical data on pipeline lengths has been collected in most instances over recent years only and is broken down by pressure category and material of construction.

Cost information available is generally less detailed and complete than in the case of electricity distribution. For instance, the ESC noted that allocation of overheads to gas distribution opex was 'unavailable' and only aggregate RAB is reported although capex by category has been collected since 2004.

An important source of information in gas distribution is the Access Arrangement Information (AAI) filings GDBs lodge as part of the periodic review of access arrangements. However, the AAIs mainly contain forecast information for the forthcoming regulatory period. While some historic information is reported in the AAIs, it tends to be patchy.

It should be noted that Lawrence (2007a) undertook what to date has been the most detailed TFP study of energy networks in Australia for the Victorian GDBs. However, this study used confidential data compiled by the Victorian GDBs on their own operations rather than using generally available information.

Definitions

Regulators generally indicated that there were clear definitions of the variables listed in appendix A3 although these were either according to regulatory reporting guidelines, as specified in particular access arrangement reviews or using a 'standard approach'. In some cases, particularly for physical input data, data supplied were 'as defined by the GDB'.

Consistency

The ESC again described data accuracy on many relevant items as being 'subject to Regulatory Accounts' though one item noted that 'where DB data [are] inconsistent with regulatory accounts, reconciliations [are] required'. Other items, mainly physical, are noted as being 'based on GDB data – assumed robust, used in comparative reports'.

In most cases, the ESC was not aware of differences with other jurisdictions or changes over time, except for a note relating to segregation of operating and maintenance expenses where no changes are noted since 2004, though 'pre 2004 the cost categories may have been different.'

In a number of cases regulators indicated they were not aware of whether there had been changes in the definitions used over time or whether the definitions used in their jurisdiction were the same as or different to those used in other jurisdictions.

The ACT ICRC, however, noted significant difficulties it had had in trying to compare opex across jurisdictions and over time in a consistent manner:

> 'For example, the Commission's 2004 review of ActewAGL's gas distribution business spent significant time attempting to reconcile differences in the categorisation of non–capital cost information between regulatory periods. …

> 'In addition, the 2004 review demonstrates how the approach to regulation has increased in sophistication and detail over time to capture additional cost information. The Commission's 2004 decision included 10 non–capital cost subcategories compared to six in the 2001 decision. While the increase in detail improves the accuracy of the review, it creates difficulties in creating reliable data time series'.

Public domain

Some of the data available are contained in regulatory accounts which are not public. Some data are in the public domain in performance reports or as part of gas access arrangement reviews.

Robustness

In most cases regulators noted that data were thought to be robust as they were 'subject to audited regulatory accounts'. However, in a number of cases variables were 'as agreed with the GDB' or 'based on GDB data – assumed robust [and] used in comparative reports'. Regulators outside Victoria generally offered no view on the robustness of their GDB input data.

Discussions with the Economic Regulatory Authority (ERA) of Western Australia indicated that data which was consistence for a decade and comparable across businesses was 'just not available'. Collecting data for TFP to a formal data specification with good auditing of the data was thought to be better than 'trying to use data beyond its original intention'.

4.3   Electricity transmission data

Coverage

In its response to the Economic Insights questionnaire on data availability the AER noted that data became available only progressively from 2000 as the various state–wide transmission network service providers (TNSPs) became regulated by the ACCC and then the AER. Tasmania was the only state to provide a response to Economic Insights on electricity

transmission. There is no indication in any of the responses of any data being available, or previously available, before centralised regulation.

In many cases segregated data are not available. The AER noted that historically it has not collected information on network statistics such as line length and maximum demand.

Transmission use of service (TUOS) revenue is progressively available from 2000, but the AER noted that some TNSPs report a total figure only while some break it up to some degree. Similarly, throughput data became available from 2000 with some reporting segregations but some TNSPs do not report throughput at all.

The AER noted that separated amounts for operating and maintenance expenditures and the shared allocation of overheads were available progressively since 2000 but 'unless … already disclosed in regulatory proposal [the data holder] will require TNSP permission to disclose'.

RAB, capital expenditure, asset lives and remaining lives have become available progressively from 2000 but asset classes used by TNSPs vary.

Definitions

The AER indicated that definitions for most output items were clear although they have varied over time, including for throughput. The definitions of excluded events have also tended to change between regulatory periods.

The AER also noted that opex definitions were clear but TNSPs had some flexibility in reporting disaggregated components. Some changes were introduced with new reporting templates in 2007. It was noted that capital items are clearly defined but assets can sometimes be either included or excluded over time.

Consistency

There are inherent difficulties in data comparability across TNSPs given differences in jurisdictions' utility structures, transmission/distribution boundaries and physical arrangements.

While performance measures and some input and output measures have been developed for reporting on electricity transmission in some jurisdictions, these are generally not uniform so that comparisons between operators are difficult. Cost allocation methodologies (CAMs) for shared overhead costs have only recently been codified by the AER and appear not to be uniform between utilities.

As noted above, the AER indicated that in some cases definitions have varied over time so, while robust, the definitions 'need checking'. This applies to a wide range of variables from throughput to outage performance (where the treatment of excluded events has varied) to assets (where the inclusion/exclusion of assets has varied over time and, presumably, across TNSPs). While such changes can be accommodated within building blocks regulation, which tends to look at each regulatory period and each business separately, they would make compilation of consistent TFP estimates problematic.

Public domain

Some of the data available are contained in performance reports and regulatory proposals and determinations but these are generally at a more aggregated level. Much of the data required

for TFP analysis, including key output and input quantities, are currently not collected.

Robustness

As noted above, while the AER considers that many of the available data items are individually robust, the fact that definitions and coverage for many items have changed both between regulatory periods and across TNSPs will make their use in robust TFP analysis problematic.

4.4   Gas transmission data

Coverage

Many gas transmission pipelines are not covered within the current regulatory regime so that historical reporting is at best patchy and the establishment of comparable and reliable data has not been a priority. For regulated gas transmission pipelines, the AER indicated that most data are forecasts contained in AAIs. Providers are not generally required to submit historical data although certain network characteristics do have to be disclosed in the AAIs. Some historical data has been included in the AAIs but it is not uniform or continuous.

Definitions

No response was provided by the AER on whether clear definitions exist for variables.

Consistency

Since the AAIs contain mainly forecast information for the next regulatory period and are often tailored to the circumstances of each regulated pipeline, data consistency is likely to be poor.

The AER noted that a RAB reconciliation had only been undertaken for the Victorian system. This was the only instance where the access arrangement had been reviewed and the capital base rolled forward. For the other covered pipelines the initial capital base had been set but the capital base had not reviewed.

Public domain

The AER indicated that most of the available data is in the public domain in the form of the AAIs and relevant decisions.

Robustness

There are least data available for the gas transmission industry. Although some relevant items for TFP analysis are required to be disclosed in AAIs, most of the data available appears to be forecasts for the next regulatory period with varying detail provided in each case. This makes the robustness of the relevant data questionable.

4.5   Conclusions

There are currently more regulatory data relevant for TFP analysis available for the electricity distribution industry than for the other three industries being examined in the AEMC Review. Gas distribution has the next most relevant regulatory data available,

followed by electricity transmission with gas transmission having the least relevant data currently available. However, even for electricity distribution, the regulatory data currently available are not fit for the purpose of robust TFP analysis of the standard required to base regulatory pricing and revenue determinations on.

The extent, quality, uniformity and continuity of currently available historical regulatory data are very variable both between jurisdictions and over time. Regulatory data have to date concentrated almost exclusively on financial variables with limited physical data being collected on system characteristics and output variables. Regulators have identified the absence of physical quantity data in their regulatory requirements as an important gap that has resulted from the need to obtain the financial data necessary to support building blocks regulation. Supplementing financial data with relevant physical quantity data and understanding the linkages between the two has been recognised as a high priority to improve regulators' understanding of network operations and to help reduce information asymmetries. It is precisely this type of information that is relevant for TFP analysis.

Even for financial data, there are significant gaps and changes in coverage over time and across jurisdictions. While some variables are subject to relatively uniform (if not well specified and tight) definitions, many have been less clearly and uniformly defined and many have been left to the regulated business to define. This compromises comparability across businesses, across jurisdictions and over time.

Regulatory data consistency is also very variable. Even the coverage of key cost variables such as opex has varied over time as regulators have progressively tightened definitions and collection requirements in response to identified gaps and actions by the regulated businesses. In some cases regulators have unilaterally revised and altered data with a corresponding loss of ownership of the data and ensuing results by other stakeholders. And the coverage and treatment of a key opex component – the allocation of corporate overheads – has contained little clarity in the past.

Data requirements have in general evolved first and foremost to reflect jurisdictional characteristics and priorities with the objective of national uniformity being recognised but not receiving the highest priority. The transfer of network regulation to the AER presents an opportunity to achieve greater uniformity going forward and but also makes it quite difficult to assemble consistent and robust historical databases. Jurisdictional regulators now have, understandably, less focus on network data issues. In many cases staff who formerly worked on network regulation have moved on and there has been a corresponding loss of the 'corporate memory' necessary to understand whether past data are consistent and comparable across jurisdictions. The difficulty in obtaining timely responses (and, in some cases, any response) about data availability in the current exercise is likely to be indicative of the much greater difficulty that would be encountered in attempting to compile a robust historical database. The difficulty the AER has had in attempting to backcast data in its initial distribution reviews confirms this.

Much of the regulatory data currently collected is not in the public domain or else is only presented in aggregated format publicly. This impairs the transparency of any TFP exercise that was to draw heavily on current regulatory accounts that could not be made public. Transparency and the availability of all relevant data in the public domain are important

requirements for a successful TFP–based regulatory regime. This allows stakeholders to test the veracity of the data and to undertake their own sensitivity analyses and updates of relevant TFP analysis.

Experience with the New Zealand thresholds regime indicated that having all data in the public domain was an important part of obtaining accurate data as it allowed businesses to identify errors in past data they may have provided themselves – or that other businesses may have provided – and to identify differences in interpretation that had led to inconsistent data having been supplied. This contrasts with US experience where consultants have sometimes developed and used their own 'proprietary' databases which have contained many changes to reported data but which are not released publicly. This removes an important dimension of checking and accountability and leads to stakeholders having little ownership of the process.

Both regulators and regulated businesses have expressed the view that currently available regulatory data are not sufficiently robust to support TFP analysis of the standard to base regulatory pricing and revenue determinations on. Our assessment of the available regulatory data supports this view. The coverage of currently available data is not adequate to support the range of currently used TFP specifications and likely future feasible refinements both over time and across jurisdictions. Definitions of the data required to be supplied have not been clearly set out in sufficient (if any) detail. The basis of reporting has varied over time in each jurisdiction with progressive refinement and across jurisdictions depending on jurisdictional priorities. And much of the available data is not in the public domain which impairs transparency and the ability to have multiple parties checking the veracity of the data.

The data gaps and inconsistencies currently existing would also limit attempts to normalise data for operating environment differences across businesses with sufficient robustness.

In submissions to the AEMC Review the Victorian DPI and ESC were the only ones who expressed the (somewhat guarded) view that currently available data were sufficiently robust to support TFP analysis suitable to base regulatory determinations on. This was thought to be the case in at least one jurisdiction and it was suggested that data from other jurisdictions could be progressively 'rolled in'. However, this view was predicated on the TFP specification used in the research sponsored by the ESC to date which relies on financial variables as the sole basis for determining input quantities. Our review of the available data has indicated that even key financial variables have been subject to progressive refinement and changes in coverage over time and differences across jurisdictions which compromise their use for TFP purposes. And, as the AER noted in its submission, it is unwise to adopt and 'lock in' a TFP specification on the basis of current data availability as this is likely to be at the expense of accuracy and robustness.

While currently available regulatory data are not sufficiently robust to support TFP analyses of the rigour required to be the principal determinant of revenue or price determinations, it is important to recognise that this is not to say they were not fit for the purpose they were originally collected for. Rather, currently available data were collected for use in building blocks analysis which is more forward looking in nature and so having fully consistent historical data is less critical for this type of regulation than it is for TFP–based regulation.

It is also important to note that network TFP analyses can and have been done using currently available regulatory data (although other studies have used data especially supplied by

network businesses). Economic Insights is of the view that an important part of developing a robust TFP database for Australian energy network businesses is the use of currently available data in TFP studies. That is, it is only by actually using available data for TFP analysis that the full extent of inconsistencies and problems in that data are identified and can then be rectified. While this study has identified obvious gaps and inconsistencies in currently available data, it is only by carrying out TFP studies that less obvious inconsistencies and gaps are fully identified and understood. There is, hence, an important element of 'learning by doing' in using available data for TFP analysis. This points to the desirability of both the AER and network businesses undertaking TFP analysis using available data. This will promote understanding of the methodology while identifying data deficiencies which will allow better specification of data requirements going forward.

The results of these preliminary TFP analyses could be used to inform regulatory determinations and be one aspect of benchmarking information the AER is able to draw on within the building blocks regime.

The concurrent priority is for industry consultation to be undertaken aimed at developing a the specification of relevant variables and their associated rigorous definition to be used in compiling a productivity database which is fit for purpose of robust TFP analysis of the standard required to support regulatory determinations. This is explored further in section 5.

Our assessment echoes the finding of the Expert Panel report to the MCE (2006, p.103) that 'the development of robust TFP estimates depends crucially on the availability of long term, reliable information on outturn costs of supply as well as a range of physical input and output parameters, ideally for a large number of firms operating in the relevant industry. … By contrast [to the United States situation], the quality and robustness of regulatory accounting information in the Australian energy sector is poor, and varies from one jurisdiction to another'.

5 ADDRESSING GAPS IN THE EXISTING ARRANGEMENTS

5.1 Current reporting impediments

The assessment of currently available regulatory data presented in section 4 has identified a large number of reporting impediments which mar the completeness, quality and consistency of currently available data. The key impediments include:

- current regulatory reporting is generally concerned with financial data whereas physical data on both outputs and inputs are of key importance for productivity measurement;

- current performance reporting usually concentrates on failures of some sort – interruption frequency and duration, response to telephone calls – rather than on delivery or capacity to deliver;

- definitions are often not specific enough, vary across jurisdictions or are left to the regulated business's discretion and exclusions or inclusions often change from one regulatory period to another;

- regulatory reporting requirements are not uniform between jurisdictions though migration to the AER may result in greater uniformity;

- there is now a low priority allocated to past data by state regulators who no longer have responsibility for network regulation as evidenced by the slow responses and non–responses to our questionnaire;

- regulatory reporting is often a matter of dispute between the utility and the regulator, with regulators on occasion making 'adjustments' (sometimes without explanation) so that the regulated business has little 'ownership' of the resulting data;

- regulatory reporting (as finally accepted by the regulators) may thus not be subject to independent audit;

- regulatory reporting is generally not available publicly or is available only in aggregated terms;

- the SCONRRR reporting for electricity distribution has been adopted by some jurisdictions but the data provided are often sparse and sometimes discrepancies arise when reporting officers change or business ownership changes; and

- current reporting generally does not allow consideration of differences in activities between utilities (eg differences in transmission/distribution boundaries and system structure).

In their submissions to the AEMC TFP Review some energy network businesses expressed the view that any extra reporting requirements for TFP purposes would be seen as an unreasonable burden on those utilities not themselves subject to a TFP regulatory regime. For example, Energex (2009, p.10) stated it would 'strongly oppose the imposition of a requirement for service providers to populate a national database of TFP related data, regardless of whether they are subject to TFP based regulation'. The AER also indicated in

discussions that under the current Rules it can only collect data which will be used for a demonstrable purpose.

5.2   Forming a robust database for future productivity analysis

The main finding of this report is that currently available regulatory data for the four industries – electricity and gas distribution and transmission – are not sufficiently robust to support TFP analysis of the rigour required to be the primary determinant of regulatory pricing and revenue decisions.

There is a strong case for developing a well specified and robust national TFP database for at least the electricity and gas distribution industries. Such a database would allow the potential application of an alternative method of regulation in the future and also assist with addressing the information asymmetry regulators face in applying building blocks regulation. In the case of electricity distribution it could be formed at relatively low cost by modest extensions to the AER's draft regulatory information order. A similar process could be developed for gas distribution.

The importance of the 'option value' associated with facilitating the conditions required to allow TFP–based regulation was well summarised by the ESC (2009, p.73) in its submission on the AEMC TFP Review Issues Paper as follows:

> 'It is also important to recognise that the Commission [AEMC] is effectively making a once–and–for all decision about whether to add an option to the existing regulatory framework. Although the level of current company interest in the option should be considered when making this decision, the Commission should not lose sight of the enormous opportunity cost associated with foreclosing the TFP–based option indefinitely. This decision would lock in existing regulatory arrangements and eliminate the chance for service providers to pursue what the ESC believes is a low-cost and effective regulatory alternative. Especially because establishing and administering a TFP–based regime is unlikely to be costly, the ESC believes that barring some companies to pursue this approach would be a significant lost opportunity'.

As well as allowing businesses the option of an alternative and potentially lower cost form of regulation, creation of a national TFP database would also greatly improve the information available to regulators for use in building blocks regulation. Regulators identified the current shortage of data collected on quantities and system physical characteristics as a major gap in their understanding of regulated network business operations and their ability to cross check the quality and consistency of financial data reported to them. The tendency to change reporting requirements and definitions from one regulatory period to another has also undermined regulators' ability to effectively monitor changes in the regulated business over time. The respected US regulatory analyst Paul Joskow (2006 p.26) has made the following observation with respect to incentive regulation:

> 'Although it has been of limited concern to contemporary economists, any well functioning regulatory system needs to adopt good cost accounting rules, reporting requirements for costs, output, prices, and other dimensions of firm

performance, and enforce auditing and monitoring protocols to ensure that the regulated firm applies the auditing rules and adheres to its reporting obligations. Much of the development of U.S. regulation during the first half of the 20th century focused on the development of these foundation components required for any good regulatory system that involves cost contingent regulatory mechanisms'.

This need applies just as much to building blocks regulation as it does to TFP–based regulation.

The benefits from establishing a robust national TFP database are, therefore, significant both in terms of option value and in terms of improving the information available to base building blocks regulatory decisions on. As noted by regulators, the current focus on financial data needs to be supplemented by data on key quantity variables. This will enable regulators to better understand network businesses' operations, to better assess the quality of financial data supplied in a fuller context and to have a more stable information base that is less affected by changes in regulatory coverage and associated gaming. This will help address information asymmetries currently besetting regulators. It will also provide other stakeholders with a more complete information base with which to assess network businesses' performance.

While some network businesses have complained of the 'burden' that might be placed on them from extending reporting requirements to cover data necessary for TFP, the true cost of doing so is likely to be relatively small. The AER's draft RIO could be extended to include more quantity information on both outputs and inputs and to ensure cost data consistent with TFP requirements were collected. The extra information required should not be onerous for network businesses to supply – it is basic information that any well run network business should readily have at hand.

The alternative approach would be to collect TFP data requirements in a separate instrument but this would seem to add little value and introduce scope for reporting inconsistencies compared to having all the necessary data collected in a (modestly) expanded RIO instrument. One advantage of a separate collection instrument though is that it might facilitate the relevant data being made available in the public domain – something that is an important requirement for a successful TFP–based approach.

While some businesses expressed reservations, there is support for the establishment of a robust TFP data collection mechanism from both regulators and businesses. For instance, the Senior Commissioner of the ACT ICRC observed in his response to the Economic Insights questionnaire:

> 'The transfer of the regulation of distribution networks to the AER offers perhaps the best opportunity to develop a database required to investigate further the opportunities for a TFP based approach to regulation. Over time, the AER, will develop an internally consistent data set covering all distribution businesses in the National Electricity Market for example, thereby allowing appropriate comparisons over time and between businesses.'

In its submission on the AEMC Issues Paper, SP AusNet (2009, p.8) noted 'it is up to the Regulator to make an assessment as to the quality and consistency of information available

for benchmarking purposes. A longer term data set for the sample period would be preferable.' It further observed that 'the timing for introducing TFP depends on …[inter alia] … the quality of benchmarking data and information [and] how quickly the AER can establish appropriate information collection processes'.

As noted in section 4, the steps involved in forming a robust national TFP database are to commence consultation with network businesses and other stakeholders on the data variables required for TFP analysis and their detailed definition. The range of variables collected should be sufficient to cover the currently used TFP specifications and likely future extensions. It is important that definitions and collection methods remain unchanged for an extended period to allow formation of a robust database of sufficient length so it is necessary to devote sufficient time to this at the outset. An important part of this process is using currently available data to undertake TFP analyses as a means of further identifying gaps and inconsistencies for TFP purposes in currently collected data.

The need to maintain consistency in definitions and collection methods is paramount. But the difficulty of doing this should not be underestimated in an environment which is itself changing – some network businesses remain government owned while others are privately owned and some may change ownership over time. It is essential to have tight reporting rules in the case of ownership changes and amalgamations to preserve data continuity. This was one shortcoming in New Zealand's Information Disclosure Data regime where entities were only required to report data for operations that been under their control as at the end of the reporting year. Where an amalgamation had taken place half way through the year, the data for the entity that was taken over did not have to be reported anywhere for the first half of the year. This oversight in the reporting requirements meant that the data for the taken over entity had to be estimated for the first half of the year when the productivity analysis the thresholds regime was based on was undertaken. It is, thus, important to 'future proof' the reporting requirements as much as possible at the outset.

The importance of having clear and detailed definitions and ensuring they are complied with is illustrated by the following considerations that need to be addressed:

- How is pole replacement treated financially[3]? What about replacement just of the cross–arm?

- Where are control wires for streetlighting counted?

- How are poles with several circuits (of the same or different voltage) treated?

- Does the rated capacity of a transformer relate to its rating with natural cooling, with forced cooling, or to the emergency cyclic rating?

- Does the rating of a substation reflect its 'firm' (N–1) capacity, or the summation of its transformers?

- How is the 'capacity' of a transmission line reported?

- How is the increase in a gas pipeline's capacity with compressor stations treated?

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[3] In its response to the AEMC Issues Paper, EnergyAustralia (2009, p.9) noted 'EnergyAustralia recently had a change in capitalisation policy with respect to pole replacement'.

- 'Customers' can be of very different characteristics, demand and consumptions. How is the 'mix' of customers handled in the counting?

- How are individual tenants in a shopping mall (who may be 'sub–metered' by the head customer) counted within customer numbers? How are individual units in an apartment counted within customer numbers?

- How are corporate overheads allocated?

- Do utilities operating in multiple services (electricity, gas, possibly transmission, distribution and retailing and possibly with shared call centres) report – on a basis of 'stand alone' costs, actual allocated costs or fully distributed costs?

- Is metering included as a regulated activity? Has it changed over time? How far down the metering – accounting process is the cost relevant?

- How are activities carried out by 'associated entities' reported? Are they at genuine 'arm's length' pricing? How can this be determined?

- How should capital contributions (in cash or in kind) be treated so far as RAB and physical asset extent are concerned – they require opex and might be included in physical system–based productivity reporting but may not be in the current RAB?

- Are the same range of services being reported on over time, regardless of what might happen to be classified as standard control, alternate control or negotiated services across regulatory periods?

It needs to be recognised that establishment of a robust TFP database will take some time. After appropriate definitions and collection mechanisms have been developed, it will obviously take a number of years before there is a sufficiently long time series available to make TFP–based regulatory determinations on. If the process is commenced as soon as possible, it may be possible to start making TFP–based regulatory determinations in the next round of reviews or, more likely, the round after that. In the meantime, greater use of currently available data will develop stakeholders' familiarity with the method. It may be possible to use these results to inform building blocks decisions and to run 'paper trials' on what the impact of using TFP–based regulation instead of building blocks regulation would be likely to have been until such times as a sufficiently robust TFP database is in place.

As noted above, the establishment of robust TFP database has important benefits for building block regulation as well as providing the option for TFP–based regulation. Regulators need the authority to collect this data if incentive regulation, including building blocks regulation, is to be successful in the long term. Joskow (2006, p.83) again makes the point:

> 'Collection of data on all relevant and significant measures of firm performance and the use of these data for benchmarking purposes and for developing performance targets is an important component of good incentive regulation in practice. Regulators need the authority to require firms to collect performance data, to audit performance data and to analyze these data. Absent these authorities and resources incentive regulation mechanisms will not achieve their promise in practice'.

APPENDIX A: DATA REQUIREMENTS FOR TFP ANALYSIS

In this appendix we present complete lists of the variables required to support TFP analysis in each of the four sectors – electricity distribution, electricity transmission, gas distribution and gas transmission. These variables cover both of the energy network TFP specifications that have been used recently in Australia plus likely extensions. These lists formed the basis of our questionnaires to relevant regulators and other information gathering on data consistency and quality.

A1 Electricity distribution

OUTPUTS

DUOS – $m
  DUOS from Fixed Customer Charges – $m
  DUOS from On–Peak Energy Deliveries – $m
  DUOS from Off–Peak Energy Deliveries – $m
  DUOS from Contracted Peak Demand – $m
  DUOS from Measured Peak Demand – $m
  DUOS from Domestic Customers – $m
  DUOS from Commercial Customers – $m
  DUOS from Small Industrial Customers – $m
  DUOS from Large Industrial Customers – $m
  DUOS from Other Customers – $m
Revenue/penalties from incentive schemes (eg S factor) – $m
Total GWh delivered
  On–Peak Deliveries – GWh
  Off–Peak Deliveries – GWh
  Domestic Customer Deliveries – GWh
  Commercial Customer Deliveries – GWh
  Small Industrial Customer Deliveries – GWh
  Large Industrial Customer Deliveries – GWh
  Other Customer Deliveries – GWh
Non–coincident Peak Demand – MW
Coincident Peak Demand – MW
Total Distribution Customer Numbers
  Domestic Customer Numbers
  Commercial Customer Numbers
  Small Industrial Customer Numbers
  Large Industrial Customer Numbers
  Other Customer Numbers
Reliability
  Distribution–related SAIDI
  Distribution–related SAIFI
Line losses – %

INPUTS

Total Distribution O&M Expenditure (opex) (excluding depreciation and all capital costs) – $m
Shared allocation of opex to distribution activities (eg head office) included in above – $m
Opex by category
The costs of operating and maintaining the network (excluding all capital costs and capital construction costs) by the following categories:

    Network operating costs
    Network maintenance costs:
            Inspection
            Maintenance and repair
            Vegetation management
            Emergency response
            Other network maintenance
    Other operating costs (specify items > 5% total opex)
Total opex
Corporate overhead costs should be allocated to the relevant categories.
Additionally, the following item is required:
        An estimate of the opex costs that would be associated with end–user contributed
        assets that are operated and maintained by directly connected end–users (eg
        transformers) if the operation and maintenance were provided by the DNSP (please
        describe basis of estimation).
Direct employees
Number of full–time equivalent employees in operating and maintenance activities
(including shared overhead allocation). Employee time spent on capital construction
projects is to be excluded.
Direct labour cost – $m
Labour cost (including on–costs) of employees in operating and maintenance activities
(including shared overhead allocation). Cost of time spent on capital construction projects
is to be excluded.
O/H network circuit km
        Low voltage distribution
        HV 11 kV
        HV 22 kV
        HV 33 kV (if used as distribution voltage)
        SWER
        S/T 44/33 kV (if used as subtransmission)
        S/T 66 kV
        S/T 132 kV
        (Other voltages)
Total overhead circuit km
U/G network circuit km
        Low voltage distribution
        HV 11 kV
        HV 22 kV
        HV 33 kV (if used as distribution voltage)
        S/T 66 kV

S/T 132 kV

(Other voltages)

Total underground circuit km

Transformer Total Installed Capacity – MVA

Zone substation transformer capacity

Zone substation capacity where there are two transformation steps (eg 132 kV to 66 kV then 66 kV to 11 kV)

Zone substation capacity where there is a single transformation step (eg 132 kV to 22 kV)

Distribution transformer capacity owned by utility

Distribution transformer capacity owned by HVCs

Regulatory Asset Base Values – $m

Overhead distribution assets (wires and poles)

Underground distribution assets (cables)

Distribution substations including transformers

Sub–transmission assets (wires and poles)

Sub–transmission substations including transformers

Total DORC – $m

RAB Reconciliation – $m

Opening value

Inflation addition

Regulatory depreciation

Physical additions (recognised in RAB)

Retirements

Revaluation adjustments

Resulting summation for asset value

Smoothed asset value wrt revaluations

Basis for initial RAB, eg DORC, adjusted DORC, historic cost, etc

Have DORC valuations been undertaken? If so, for which years?

Replacement Cost or Optimised Replacement Cost Asset Values – $m

Overhead distribution assets (wires and poles)

Underground distribution assets (cables)

Distribution substations including transformers

Sub–transmission assets (wires and poles)

Sub–transmission substations including transformers

Total RC or ORC Value – $m

Actual Capital Expenditure – $m

Overhead distribution assets (wires and poles)

Underground distribution assets (cables)

Distribution substations including transformers

Sub–transmission assets (wires and poles)

Sub–transmission substations including transformers

Total Capital Expenditure – $m

Asset Lives – estimated total and residual in years

Overhead lines

Underground cables

Transformers

Other assets

Value of Capital Contributions or Contributed Assets – $m

Price Index for Labour Inputs
Price Index for O&M Expenditure
Price Index for Network Assets

A2   Electricity transmission

OUTPUTS

TUOS – $m
     TUOS from Other connected transmission networks
     TUOS from Distribution networks
     TUOS from Directly connected end–users
     Total TUOS
Revenue/penalties from incentive schemes (eg S factor) – $m
Throughput – GWh
     To Other connected transmission networks – GWh
     To Distribution networks – GWh
     To Directly connected end–users (please specify voltage) – GWh
     Total energy delivered – GWh
Maximum demand – MW
Line length by voltage level – kms
Network circuit kilometres (route length multiplied by number of circuits per tower at year
end) for the following voltage classes:
     500 kV
     330 kV
     275 kV
     220 kV
     132 kV
     Other (please specify)
     Total circuit kilometres
Data for each voltage is to be given separately for overhead and underground circuits.
Transmission circuit availability – hours
Total number of hours for the following (force majeure events to be excluded):
     Circuit hours actually available
     Maximum possible number of circuit hours
Number of loss of supply events by time
The total and planned numbers of loss of supply events by the following outage lengths:
     less than 0.2 minutes (including momentary unavailability pending a reclosure which
     is successful)
     greater than 0.2 minutes
     greater than 1 minute.
Excluded events to include circuit interruptions caused by third party systems such as
intertrip signals from another party, generator outage or by customer installations, and force
majeure events.
Average outage duration – mins
Aggregate minutes of duration of all and planned outages divided by the number of

respective outage events. Excluded events to include circuit interruptions caused by third party systems such as intertrip signals from another party, generator outage or by customer installations and force majeure events.

Line losses – %

INPUTS

Total Transmission O&M Expenditure (opex) (excluding depreciation and all capital costs) – $m

Shared allocation of opex to transmission activities (eg head office) included in above – $m

Opex by category – $m

The costs of operating and maintaining the network (excluding all capital costs and capital construction costs) by the following categories:

> Network operating costs
> Network maintenance costs:
>> Inspection
>> Maintenance and repair
>> Vegetation management
>> Emergency response
>> Other network maintenance
>> Other operating costs (specify items > 5% total opex)
> Total opex

Corporate overhead costs should be allocated to the relevant categories.

Additionally, the following item is required:

> An estimate of the opex costs that would be associated with end–user contributed assets that are operated and maintained by directly connected end–users (eg transformers) if the operation and maintenance were provided by the TNSP (please describe basis of estimation).

Direct employees

Number of full–time equivalent employees in operating and maintenance activities (including shared overhead allocation). Employee time spent on capital construction projects is to be excluded.

Direct labour cost – $m

Labour cost (including on–costs) of employees in operating and maintenance activities (including shared overhead allocation). Cost of time spent on capital construction projects is to be excluded.

Installed transformer capacity – MVA

> Transmission substations (eg 500 kV to 275 kV)
> Terminal points
> Transformer capacity for directly connected end–users owned by the TNSP
> Transformer capacity for directly connected end–users owned by the end–user
> Other (please specify)

Optimised replacement cost by nature of asset – $m

Optimised replacement cost (or replacement cost if ORC is unavailable) in current prices for:

> Overhead lines
> Underground cables
> Transformers owned by the TNSP

Transformers owned by directly connected end–users
Other assets including:
Communications equipment
Land and buildings
Other items not elsewhere included
Total
Regulatory Asset Base Values – $m
Overhead lines
Underground cables
Transformers owned by the TNSP
Transformers owned by directly connected end–users
Other assets including:
Communications equipment
Land and buildings
Other items not elsewhere included
Total
RAB Reconciliation – $m
Opening value
Inflation addition
Regulatory depreciation
Physical additions (recognised in RAB)
Retirements
Revaluation adjustments
Resulting summation for asset value
Smoothed asset value wrt revaluations
Basis for initial RAB, eg DORC, adjusted DORC, historic cost, etc
Have DORC valuations been undertaken? If so, for which years?
Actual capital expenditure by nature of asset – $m
Overhead lines
Underground cables
Transformers owned by the TNSP
Transformers owned by directly connected end–users
Other assets including:
Communications equipment
Land and buildings
Other items not elsewhere included
Total
Asset total lifetime by nature of asset – years
Overhead lines
Underground cables
Transformers
Other capital
Estimated residual life by nature of asset – years
Overhead lines
Underground cables
Transformers
Other capital
Value of Capital Contributions or Contributed Assets – $m

Price Index for Labour Inputs
Price Index for O&M Expenditure
Price Index for Network Assets

A3   Gas distribution

OUTPUTS

Gas delivered
  Total
      Energy – TJ per annum
      Maximum hour – TJ / hr
      Distribution Revenue – $M
      Number of Customers – no.
  Domestic Volume Based Tariffs
      Energy – TJ per annum
      Maximum hour – TJ / hr
      Distribution Revenue – $M
      Number of Customers – no.
  Non–domestic Volume Based Tariffs
      Energy – TJ per annum
      Maximum hour – TJ / hr
      Distribution Revenue – $M
      Number of Customers – no.
  Capacity Based Tariffs
      Energy – TJ per annum
      Maximum hour – TJ / hr
      Distribution Revenue – $M
      Number of Customers – no.
Revenue/penalties from incentive schemes (eg S factor) – $m
System Performance
      SAIDI
      SAIFI
      Number of interruptions affecting 5 customers or fewer
      Number of interruptions affecting more than 5 customers
Unaccounted for Gas – %

INPUTS

Opex
Total distribution opex (excluding depreciation and all capital costs) – $m
Shared allocation of opex to distribution activities (eg head office) included in above – $m
Operating expenses – $m
      Network Operations
      Customer Connections
      Meter Reading Services
      Billing and Revenue Collection

      Advertising and Marketing

      Regulatory Costs

      Change in Provisions

      Other Operating Costs (excl those below)

Subtotal of above – $m

Maintenance expenses – $m

      City Gate Stations

      Transmission mains

      Distribution mains

      Services

      Cathodic protection

      Supply Regulators

      Meters

      SCADA and remote control

      Other

Subtotal of above – $m

Direct employees

Number of full–time equivalent employees in operating and maintenance activities (including shared overhead allocation). Employee time spent on capital construction projects is to be excluded.

Direct labour cost – $m

Labour cost (including on–costs) of employees in operating and maintenance activities (including shared overhead allocation). Cost of time spent on capital construction projects is to be excluded.

SYSTEM PHYSICAL DATA

Distribution System Quantities and Capacity

  Transmission mains – over 1050 kPa g

      Weighted average of max sustainable pressure

      Weighted average of pipe diameter – mm

      Pipeline Length – km

  High Pressure Distribution mains – up to 1050 kPa g

      Weighted average of max sustainable pressure

      Weighted average of pipe diameter – mm

      Pipeline Length – km

  Medium Pressure Distribution mains – 20 to 210 kPa g

      Weighted average of max sustainable pressure

      Weighted average of pipe diameter – mm

      Pipeline Length – km

  Low pressure distribution mains – to 7 kPa g

      Weighted average of max sustainable pressure

      Weighted average of pipe diameter – mm

      Pipeline Length – km

  Pipeline length by material – km

      Polyethylene

      PVC

      Protected Steel

      Unprotected Steel

      Cast iron

       Other
  Service connections (from mains to customer)
       Number
       Length – km
  City Gate Stations – number
  Field regulators – number
  District Regulators – number
  Meter Regulator Installations
       Meters over 10 cubic metres/hour
       Meters up to 10 cubic metres/hour
ASSET VALUES
Regulatory Asset Base Values – $m
       City Gate Stations
       Transmission mains
       High pressure distribution
       Medium pressure distribution
       Low pressure distribution
       Cathodic protection
       Services
       Supply Regulators / Valve Stations
       Meters
       SCADA and other remote control
       Other – IT
       Other – non IT
       Total – $m
RAB Reconciliation – $m
       Opening value
       Inflation addition
       Regulatory depreciation
       Physical additions (recognised in RAB)
       Retirements
       Revaluation adjustments
       Resulting summation for asset value
Smoothed asset value wrt revaluations
Basis for initial RAB, eg DORC, adjusted DORC, historic cost, etc
Have DORC valuations been undertaken? If so, for which years?
Replacement Cost or Optimised Replacement Cost Asset Values – $m
       City Gate Stations
       Transmission mains
       High pressure distribution
       Medium pressure distribution
       Low pressure distribution
       Cathodic protection
       Services
       Supply Regulators / Valve Stations
       Meters
       SCADA and other remote control
       Other – IT

Other – non IT
Total – $m
Actual Capital Expenditure – $m
City Gate Stations
Transmission mains
High pressure distribution
Medium pressure distribution
Low pressure distribution
Cathodic protection
Services
Supply Regulators / Valve Stations
Meters
SCADA and other remote control
Other – IT
Other – non IT
Total – $m
Asset Lives – estimated total and residual in years
City Gate Stations
Transmission mains
High pressure distribution
Medium pressure distribution
Low pressure distribution
Cathodic protection
Services
Supply Regulators / Valve Stations
Meters
SCADA and other remote control
Other – IT
Other – non IT
Value of Capital Contributions or Contributed Assets – $m

Price Index for Labour Inputs
Price Index for O&M Expenditure
Price Index for Network Assets

A4   Gas transmission

OUTPUTS

Revenue – $m
From capacity charges
From throughput charges
From other charges
Total
Revenue/penalties from incentive schemes (eg S factor) – $m
Number of gas input locations
Listing of inputs
Number of off–take locations

          Listing of off–takes

Gas actual throughput – TJ
       Annual total delivery
       Maximum Daily Quantity
       Maximum Hourly Quantity
       Delivered to connected distribution systems
       Delivered to other connected transmission systems
       Delivered to directly connected end–users
       Delivered to other

Gas maximum throughput capacity – TJ
       Annual total delivery
       Maximum Daily Quantity
       Maximum Hourly Quantity

Reliability

Gas transmission reliability indicators are not well developed.

Unaccounted for Gas – %

INPUTS

Opex

Total Transmission opex (excluding depreciation and all capital costs) – $m

Shared allocation of opex to transmission activities (eg head office) included in above – $m

Operating expenses – $m

Maintenance expenses – $m
       Compressor Stations
       City Gate Stations
       Transmission mains
       Other

Direct employees

Number of full–time equivalent employees in operating and maintenance activities (including shared overhead allocation). Employee time spent on capital construction projects is to be excluded.

Direct labour cost – $m

Labour cost (including on–costs) of employees in operating and maintenance activities (including shared overhead allocation). Cost of time spent on capital construction projects is to be excluded.

SYSTEM PHYSICAL DATA

Transmission System Quantities and Capacity
   Transmission mains – over 1050 kPa g
       Weighted average of max sustainable pressure
       Weighted average of pipe diameter – mm
       Pipeline Length – km
   Other mains – less than 1050 kPa g
       Weighted average of max sustainable pressure
       Weighted average of pipe diameter – mm
       Pipeline Length – km
   Compressor Stations – number
   City Gate Stations – number

ASSET VALUES
Regulatory Asset Base Values – $m
       Transmission mains
       Other mains
       Compressor stations
       City Gate Stations
       SCADA and other remote control
       Other – IT
       Other – non IT
       Total – $m
RAB Reconciliation – $m
       Opening value
       Inflation addition
       Regulatory depreciation
       Physical additions (recognised in RAB)
       Retirements
       Revaluation adjustments
       Resulting summation for asset value
Smoothed asset value wrt revaluations
Basis for initial RAB, eg DORC, adjusted DORC, historic cost, etc
Have DORC valuations been undertaken? If so, for which years?
Replacement Cost or Optimised Replacement Cost Asset Values – $m
       Transmission mains
       Other mains
       Compressor stations
       City Gate Stations
       SCADA and other remote control
       Other – IT
       Other – non IT
       Total – $m
Actual Capital Expenditure – $m
       Transmission mains
       Other mains
       Compressor stations
       City Gate Stations
       SCADA and other remote control
       Other – IT
       Other – non IT
       Total – $m
Asset Lives – estimated total and residual in years
       Transmission mains
       Other mains
       Compressor stations
       City Gate Stations
       SCADA and other remote control
       Other – IT
       Other – non IT
Value of Capital Contributions or Contributed Assets – $m

Price Index for Labour Inputs   58
Price Index for O&M Expenditure
Price Index for Network Assets

APPENDIX B: CURRENT DATA AVAILABILITY

To ensure it was fully informed on data availability, Economic Insights prepared questionnaires covering the four sectors – electricity distribution, electricity transmission, gas distribution and gas transmission – for jurisdictional regulators and the AER seeking their input on currently available data. These questionnaires were sent out by the AEMC on 6 January 2009 with responses requested by 6 February 2009. Only two completed responses were received by the requested date. Most of the remaining responses were received over the following two months, although not all were complete. One regulator said it did not have the resources to provide a written response but participated in a phone hook–up as a substitute and one regulator has yet to provide a response.

The questionnaires sought the regulators' input and views on the following questions for the variables listed in appendix A which are those required by a range of likely TFP specifications:

- what data are currently available for each of the identified items for each of the years since 1995

- whether the data are currently in the public domain, not currently in the public domain but could be made publicly available or not currently in the public domain and commercially sensitive

- whether detailed definitions of the data have been given to businesses supplying the information and, if so, whether these have changed over time

- whether the regulator is aware of changes in the way each data item may have been reported over time

- whether the regulator is aware of differences in the way each variable is reported in its jurisdiction compared to other Australian jurisdictions, and

- the regulator's views on the robustness of each data item available in its jurisdiction.

The following sections summarise the data availability and quality information obtained for each jurisdiction including regulatory reporting guidelines, the regulator's responses to our questionnaires and other sources of information.

It is important to recognise at the outset that data based on currently available regulatory reporting requirements have not been purposely specified or collected for productivity analysis. For instance, regulatory reporting guidelines deal almost exclusively with financial matters required for building block regulation with little or no mention on any physical system data. Thus, while they examine the moneys received and spent, and the financial characteristics of assets used, created and depreciated, there is no quantification of *what* assets are built, maintained or operated to deliver the network service. Similarly, much of the available data is of variable quality, consistency and continuity. While changes in the consistency and continuity of data can be accommodated within building block regulation, they represent a significant problem for robust productivity analysis. Jurisdictional regulators noted that their efforts to date had almost exclusively been directed at obtaining the financial data required for building blocks regulation and they had had little time to assemble data on

physical characteristics and outputs. However, they noted the need to fill this gap and to then link financial and system physical data. It is precisely these linkages and data which are important for robust productivity analysis.

B1   Victoria

Electricity distribution – Regulatory reporting guidelines

The Essential Services Commission (ESC) requires reporting against ESC Guideline No 3: Electricity Industry – Regulatory Accounting Information Requirements This reporting almost exclusively relates to financial disclosures. There have been regular revisions as the ESC has sought to obtain further data which has become necessary as the structure of the EDBs' operations has changed (to ensure reporting of 'substance' rather than 'form' of a transaction) or because of changes to, for example, Financial Reporting Standards.

Some of the amendments reflect responses to problems that have emerged from pricing reviews. The level of detail required to progressively more fully define disclosure and reporting is itself instructive and indicative of previous deficiencies. Changes in Issue 6 (of 14 December 2006) include those 'arising during the EDPR 2006–2010':

* requiring disclosures with respect to related party transactions to show 'the actual cost incurred by the related party in providing services to the distributor to be included in the Regulatory Accounting Statements rather than the amount which was paid by the distributor to the related party for services or assets. The actual costs incurred will be reported net of any profit margin or management fee.'

* requiring 'comparative data' for a previous year 'where a Licensee has made changes to its accounting policies or allocation basis the comparative figures (for the previous year) must incorporate the effect of the changed policy or basis, as if it had applied in the previous Regulatory Accounting Period.'

* differently reporting metering services to account for the separate unbundled price control of standard metering services. It notes possible further changes deriving from the State Government's decision to roll out remotely read interval meters

* requiring additional schedules by taxation category

* requiring segregation of operating expenditure, maintenance expenditure and capital expenditure into labour and non–labour costs which will clarify the assumption in the 2006–2010 Review that 'labour costs represented 62.3 per cent of total operating and maintenance expenditure'

* requiring disclosure of the distributor's definition of employees used in determining the numbers disclosed in the statements

* requiring extensions to allow balancing and reconciliation between the Income Statement, the Balance Sheet, and the Cash Flow Statement. Previous formats apparently did not include items which would allow this.

The ESC publishes annual Electricity Distribution Businesses Comparative Performance Reports which consider 'supply reliability and quality, customer service and profitability of

the monopoly energy distribution businesses.' Information on electricity distributed is included for each distributor, but only at the aggregate level. Average customer numbers are segregated as residential or business.

With respect to financial information in this series, the ESC notes that 'financial information reported by the distributors (under the guidelines above) has been used before the verification process is completed.' Thus 'it should not be assumed that inclusion of the financial information … indicates the Commission's acceptance of this information for regulatory analysis purposes.'

Data are also available in the various documents associated with the EDPR (Electricity Distribution Pricing Review).

Electricity distribution – ESC response to questionnaire

In its response to Economic Insights' questionnaire, the ESC indicated that data available is generally 'robust' or 'reliable' – often being from 'Audited Regulatory Accounts' or has been 'used for tariff setting'. In some cases, particularly for output quantities, the ESC noted that the variables have been 'defined by DNSP'. The ESC is generally 'unaware' of reporting differences in other jurisdictions and generally notes no reporting change over time though, for example, total opex is 'consistent since 2001' but pre–2001 'may have been defined differently by DNSPs'.

As far as detailed data items are concerned:

- segregated DUOS revenue by charge type and by customer type is available from 2001 in the public domain. Segregation into on–peak and off–peak deliveries have been available since 1995 or 1996 but are not publicly available. The time periods are 'defined by DNSPs'. Customer numbers and consumption by various classes are available since 2001. Coincident demand (but not non–coincident demand) is available since 2006. Line losses are available since 1998 but definition changed in 2002 from backward looking DLF to be a forecast value for advice to NEMMCO. SAIDI and SAIFI are available since 2001.

- distribution O&M (opex) are publicly available only as totals as the 'regulatory accounts (breakdown) is not published.' Separated operating costs and maintenance costs are available since 1998 but 'DNSPs often define according to their internal reporting requirements'. Further split of maintenance into task types was 'not well known'.

- incentive scheme data 'used to compute the S factors not public' and exists only from 2001. The S factor rates are in the 2006–10 EDPR.

- there was no response regarding the allocation of corporate overheads and 'no data' on opex associated with end–user contributed assets and 'little reporting by DNSPs' of specific labour costs.

- total circuit length for underground and overhead (separately) has been available since 2006 with some segregated data by voltage while zone substation capacity is available since 2006 although it is 'defined by DNSP'. No response was provided regarding multiple steps of transformation or distribution transformer capacity.

- asset items are available since 1996 with RAB being rolled forward from a Victorian Government valuation at vesting in 1995. Data are not publicly available being 'at

discretion of Vic Govt to release'. Replacement Cost or Optimised Replacement cost data segregated by asset types are 'not kept by ESC' but 'could be obtained from DNSPs if required'. Total asset lives are defined in the guidelines and residual life is 'defined by DNSP'.

- annual capital expenditure is available from 1996 to 2007 in aggregate. Detailed segregation is available although under headings 'defined in regulatory accounting guidelines' which differ from those nominated in the questionnaire. The ESC noted 'only totals are publicly available – breakdowns are in regulatory accounts.' The value of capital contributions or contributed assets is available since 1998 but are 'not publicly available – in regulatory accounts.'

- price indices for labour and O&M were 'calculated in EDPR 2006–10' being 'derived from DNSP data' and the price index for network assets was 'developed by PEG in TFP research.'

As many items were related to the regulatory accounts, Economic Insights held discussions with the ESC which highlighted some of the matters which had attracted its attention over the years and which had, to varying extents, been subject to difference of opinion between the EDBs and the ESC. Proforma regulatory accounts were discussed and the extent of some responses examined.

The ESC noted that Victoria had the most rigorous data reporting regime and, hence, (especially in recent years) the most reliable data of any of the jurisdictions. It was also noted that Victoria has the longest and broadest history of a regulator dealing with wholly privatised utilities.

Some of the matters raised by the ESC in discussions relating to data availability and integrity included the following:

- Outsourcing of activities to related entities has caused difficulty, both in obtaining data (eg labour content and overheads allocations) and in gaining certainty that the amounts paid by the regulated entity do represent efficient costs. The claim that the subsidiaries do not have the data in the format sought and that its preparation would be onerous has made it difficult for the ESC to access required information as times.

- Deficiencies in auditing (eg what is regarded as 'material' for audit examination) have, especially in early years, cast doubts on data quality. More recent data (say for the last five years) would be regarded more highly.

- Some practices, which may have backing in conventional accounting practice may nonetheless offer opportunities for gaming of data presented to the regulator. Examples given included:

  - timing of expenditure through provisions or accruals in a regime operating on a quasi–cash basis;

  - alteration of asset lives and remaining lives with resulting effects on depreciation amounts;

  - expensing of equipment written off;

- acknowledgement of 'intangible assets'; and

- treatment versus reality of self insurance – and alteration of policies in this regard.

- On some occasions, EDBs had amended incorrect data 'at the last minute' making regulatory examination difficult. In other cases it had been observed that relativities between certain constituents and a totalled item showed an unexpected exact replication year on year. On other occasions, when policies have changed, it would be necessary to seek data on old and new bases for a comparative year to understand the impact of the changes made.

- It was suggested that to obtain a fuller picture of activities, sources other than the regulatory accounts (eg determinations, performance reports and tariff submissions) would need to be used although these may not have the official status of the audited accounts.

- The format of the regulatory accounts was almost exclusively concerned with financial details. Data for the income statement (and hence profit), balance sheet (and hence equity), cash flow (from operating, investing and financing activities) and changes in equity derive 'distribution business' results by 'adjustments' to the 'audited statutory amounts'. There is a note on each such sheet that 'balancing is required at the distribution business level.'

- It was noted that efforts to date had almost exclusively, by necessity, been directed at obtaining the financial data required for building blocks regulation and there had been little time to assemble data on physical characteristics and outputs. However, the need to fill this gap was noted along with the need to link financial and system physical data.

- The regulatory accounts proformas contain some financial segregation according to asset types (eg capex, depreciation, WDV, maintenance etc have line items for subtransmission, CBD, urban, rural, metering, public lighting, SCADA etc) but without physical data.

- Distribution revenue is required by tariff categories with the amount or electricity and revenue to be shown. Prescribed metering revenue is to be similarly segregated with the number of meters/NMIs/lights to be shown.

Gas distribution – Regulatory reporting guidelines

The ESC (2008a) requires reporting against its Gas Industry Guideline No.17: Regulatory Accounting Information Requirements: Issue No. 2, being a revision of a similar guideline of July 2005. Changes apply to the calendar year ending 31 December 2008 and the ESC (2008a, p.3) notes that 'the *National Gas (Victoria) Law 2008* … provides for this guideline to transition to the AER'.

This has been developed 'on the basis of a number of guiding principles [which] provide considerable discretion to the distributors, particularly regarding the allocation of shared costs, capitalisation policies, provisions and related party transactions. This approach allows each distributor to adopt the policies considered appropriate and consistent with efficient and effective business practice … [and] … is considered preferable to a more prescriptive reporting regime' (ESC 2008a, p.1).

But the ESC goes on to note 'however, the Guideline does incorporate a number of specific requirements that promote the presentation and development of information in a manner that allows the information provided by each distributor to be accurately reviewed and compared both within and across businesses over time'.

As a development from an earlier guideline and having identified a number of issues during the recent Gas Access Arrangement Review, the revision seeks to improve the quality and relevance of information. It requires, for example, disclosure of cost allocation policies, reporting of substance rather than legal form, derivation of these accounts from the base accounts of the licensee, independent auditing and a Directors' responsibility statement.

Changes in the latest version related to:

- changes to regulatory accounting principles and policies in recognition of changes to Australian Accounting Standards towards international harmonisation and specific ESC permission being required for asset revaluation or adjustments for impairment;

- changes to capital addition cost categories and definitions and to the need for reporting additions also by taxation category;

- amendments to ancillary reference services definitions;

- addition of a labour / non-labour cost matrix for operating and maintenance costs and a requirement to define 'employees'; and

- clarification of the definition of 'related party' and 'related party' transaction disclosure and a requirement for account to be 'internally consistent'.

The reporting guidelines include mainly financial data. They include templates for provision of income statement, balance sheet, retained profit, cash flow, assets at cost and written down values and additions by various asset categories and in tax categories, and depreciation by asset categories. Maintenance and operating costs are required by various activities and including provisions and changes to provisions are to be disclosed. Details of non–causal allocations are required.

Revenue and number of customers are required for Tariffs V and D. UAG is to be disclosed as are costs and revenues from ancillary reference services. Related party and third party transactions – payments made and received and associated details – are to be disclosed where greater than $1 million in aggregate. The effect of any change in accounting principles or policies is to be disclosed and previously stated items re–expressed to reflect the effect of the changes.

The ESC (2008c) publishes annual Gas Distribution Businesses Comparative Performance Reports which include financial information collected under the guidelines mentioned above, as well as data on reliability of supply, network integrity and customer service.

The reporting also includes energy distribution volumes (for Tariff V customers) and energy and MHQ (for Tariff D customers). Operating expenditure and capital expenditure (for several years) are also included. There is some information on customer numbers (domestic and non-domestic), on network mains length and length segregation data and graphs according to pipe material and pressure.

Gas distribution – ESC response to questionnaire

The ESC again describes data accuracy on many relevant items as being 'subject to Regulatory Accounts' though one item notes that 'where DB data inconsistent with regulatory accounts, reconciliations [are] required'. Other items, mainly physical, are noted as being 'based on GDB data – assumed robust, used in comparative reports'. Thus, some of the data is in the regulatory accounts (which are not public), while other is public in the ESC gas performance reports or a part of the Gas Access Arrangement Review (GAAR).

In most cases, the ESC is not aware of differences with other jurisdictions or changes over time, except for a note relating to segregation of operating and maintenance expenses where no changes are noted since 2004, though 'pre 2004 the cost categories may have been different.'

As far as detailed data items are concerned:

- Gas delivery details are publicly available from 1998 to 2007 and include total energy terajoules per annum, distribution revenue and number of customers (but not overall maximum throughput per hour) and energy and revenue for the customer class segregations. Maximum throughput per hour and revenue are available for capacity based tariffs (but no indication was given that corresponding energy or customer numbers were available).

- The subtotal for operating expenses is available publicly in the GAAR since 2004, while the similar subtotal for maintenance is noted as being 'not in the public domain but not really sensitive.' Segregations as listed are available since 2004 in the regulatory accounts, and hence are not public. Prior to 2004, category segregation was by 'different categories'. The number of employees and labour cost are 'not collected' and are noted as being 'less relevant now, due to the prevalence of contracting out arrangements.'

- Pipeline length (segregated for the various overall pressure classes and by material) has been collected since 2004 and is in the Comparative Performance Reports. Pipe diameter and averaged sustainable pressure is 'not collected'. The number of service connections (but not their length) is available since 1998. The number of city gate stations, pressure regulators and the split of meter/regulator installations according to capacity are not collected.

- Total RAB values are available publicly since 1998 'as part of GAAR decision and published financial models' but no segregation of RAB by category has been provided to the ESC. 'Capital expenditure by [class] has been provided since 2004 in the [unpublished] Audited Regulatory Accounts'. Reconciliation of RAB for inflation, depreciation, additions, etc are available from 1998 to 2007 but 'only total value of RAB (is) reported publicly'. The initial RAB was the DORC valuation in 1998 and was 'accepted as robust, [being] used as starting point for RAB calculation in 2003'. No further DORC valuations have been undertaken.

- There appear to be no segregated values for replacement cost or ORC but there is a note that 'engineering firms conducted this in 1998, so data [is] available, though not readily to hand.' It is listed as not public. Since 2004 the total is available with a note regarding availability that 'replacements/upgrades [are] provided by GDBs in their proposed Access

Arrangements for 2003 and 2008' and a note for robustness that 'additions [are] reported in audited regulatory accounts.'

- Capex in total is available publicly from 1998 to 2007 but segregation is only contained in the regulatory accounts and only from 2004. Total and residual asset lives are collected in the regulatory accounts for fixed assets. Capital contributions are available from 1998 to 2007, but only in the regulatory accounts.

- With regard to price indices for labour and O&M, the ESC noted that 'PEG used the same index for gas Opex that was used for electricity'. It notes that the indexes were 'derived from GDB data and econometric studies' and that the definitions are 'contentious'.

B2   New South Wales

Electricity distribution – Regulatory reporting guidelines

In New South Wales, the Independent Regulatory and Pricing Tribunal (IPART 1997) sets out requirements for public Regulatory Accounting Statements and provides a proforma for their submission.

Financial items include revenue from network charges (segregated partly by tariff class and voltage), asset values, capital expenditure, depreciation and asset lives segregated into various classes as well as operating costs (as a single line) but with maintenance and other costs with some segregation. There is no physical data in these reports.

As well as this regulatory reporting, the NSW Department of Water and Energy (DWE 2009a) has issued performance reporting requirements as follows:

- Transmission network service provider annual report outline – NSW Electricity Network Performance Report – March 2009. This requires some network operator statistics (for the beginning and end of current year), customer numbers, aggregate system maximum demand MW, energy received, system loss factor, length of HV OH and UG (separately), number of substations, number of employees and contractors.

- Distribution network service provider annual report outline – NSW Electricity Network Performance Report – March 2009. This also requires system information, with more data items than for transmission, by inclusion of regions, residential energy distributed, zone and distribution substation numbers, mains length for HV and LV and OH and UG (separately) and streetlighting. It includes a summary of Design Planning criteria showing varied security standards for varying load types and seeks reporting against these criteria.

Reports are available for the 2007–08 year and suggest some possible data and definitional uncertainties which have been clarified in the responses by footnote:

- Country Energy (2008b, p.5) shows a decrease for the year in length for its subtransmission system as well as for HV OH and UG, LV OH and UG and the number of poles noting 'differences in length due to data correction made during the year. Country Energy is still in the process of validating these data.' It notes, by way of clarification of definition that 'line length does not include LV services.'

- EnergyAustralia (2008b, p.4) notes that its number of 'transmission substations' is quoted 'including subtransmission switching stations (SWS)'. It notes that 'the number of streetlights includes all streetlights owned by EnergyAustralia as well as those owned by customers but maintained by EnergyAustralia, and streetlights owned and maintained by customers.' It also notes audit of its reporting 'against the Ministerially imposed Licence Conditions on Reliability' which it notes 'were introduced in 2005, amended in 2006, and revised again effective 1 December 2007'. It sets out the criteria and their interpretation.

- Integral Energy (2008b, p.6) notes that 'energy distributed … excludes inter–distributor transfers' and that 'streetlight numbers exclude unmetered supplies and nightwatch / private lighting.' It notes that employee and contractor numbers include 'business units Network Asset Operation and Network Development and Control. (They) do not include business units Retail and Customer Services, Human Resources and Regulatory and Corporate Affairs.'

Electricity distribution – IPART response to questionnaire and review documents

IPART indicated that the robustness of data available was generally 'reasonable' or 'reasonably robust' although no view was offered on many output variables. It generally responded 'don't know' or 'not aware' of reporting differences in other jurisdictions and generally noted no reporting change over time. It did note a change by EnergyAustralia to its peak – shoulder – off peak time span definitions and changes to the shared allocation factors. Many asset–related input variables were listed as not being available.

As far as detailed data items are concerned:

- Segregated DUOS revenue by charge type and by customer type is available from 2004–05. Segregation of energy by peak and off–peak, and for domestic customers (only) is available from 1999–00. Customer numbers (split as Domestic and Other only) are available from 2004–05 but all are noted as 'Not public, but releasable with DNSPs' agreement'. Non–coincident and coincident peak are available since 2004–05, and are public in the DNSPs' Network Performance reports.

- Opex and category segregation are available from 2000 and are 'not public, but releasable with DNSPs' agreement'. Full time employee numbers in O&M are available from 2004 in the public DNSP Network Performance Report but direct labour cost is not available.

- Physical data for OH and UG line lengths and transformer capacity are not available.

- The basis for asset valuations is initial DORC valuation made in 1999 with roll–forward from this. Segregated capital expenditure is available from 1999–2000 but is 'Not public – releasable with DNSPs' agreement.' Value of capital contributions is listed as 'Yes in 1999'. The RAB by asset classes is available from the 2004 IPART determination and subsequent roll–forward.

- No price index data for labour, opex or network assets are available.

IPART Reviews of Distribution Pricing included data on each of the distribution businesses, both historical and forecast, including demand, energy, customer numbers, asset values, opex and capex.

In a previous study by Economic Insights staff, use was made of publicly available physical and financial data on NSW EDBs from IPART's Report 'NSW Electricity Distribution Pricing 2004–05–2008–09' and associated engineering consultants' reports to construct TFP estimates for the period 2000–2003. The tables and appendices provided much useful data although considerable care was needed in its assembly and matching. The TFP estimates constructed were considered of reasonable approximate quality given the limited data available but would not have been sufficiently robust to use in a regulatory determination. However, the availability of these data sources was a one–off event associated with the IPART EDPR and it is not clear if future determinations will contain compatible, or even similar, historical and projection data from NSW, particularly seeing that they will be undertaken by a different regulator.

B3   Queensland

Electricity distribution – Regulatory reporting guidelines

The Queensland Competition Authority (QCA 2005b) provides regulatory reporting guidelines for electricity distribution. The QCA notes that 'he focus of these Guidelines is on financial information requirements' and that 'the Guidelines detail the financial information that a Distribution Network Service Provider (DNSP) must report to the Authority on an annual basis. These reports are not publicly released.'

The 2005 version of the reporting guidelines aimed at 'ensuring the reporting of more consistent and comparable financial information over time' with an inference of previous deficiencies in this regard. The QCA goes on to state 'the Authority will approve a DNSP's Regulatory Reporting Principles and Policies as part of each Price Determination' so as to 'ensure on–going comparability in financial information between DNSPs.'

The QCA notes that 'The DNSP is not defined by legal entity structures but by the activities undertaken to fulfil the obligations set out in the Distribution Licence by the Licensee and/or a Related Party of the Licensee, that is, to supply electricity using its supply network within a defined distribution area'. Thus, 'transactions with Entities that are a Related Party of the DNSP are considered part of the DNSP's accounts.'

Separately, service quality performance is 'required to be submitted in accordance with the Authority's Electricity Distribution: Service Quality Reporting Guidelines' (QCA 2005c). Quarterly and annual data are published. The August 2005 version notes some changes in interruption data reporting from previously to better align with the Steering Committee on National Regulatory Reporting Requirements (SCONRRR) formats. The annual reporting includes some system physical data according to the SCONRRR format on system length, energy delivered, transformer capacity, asset utilisation (at Zone substation level) and coincident demand.

Electricity and gas distribution and transmission – QCA response to questionnaire

An initial email response from the QCA noted that 'QCA has no role in the regulation of electricity transmission or gas transmission … (and) has passed gas distribution to the AER.' Thus, it advised that 'publicly available data ... is available from the Authority's web site' and notes it 'relates primarily to the 2001 and 2006 … reviews. … The Authority holds no

data prior to the 2001 review.' It noted that the Authority had received regulatory accounting statements from gas distributors from 2001 through to 2007 and noted further that in electricity distribution 'the story is much the same.'

Electricity distribution – Regulatory accounts

The following comments relate to the type and extent of data reported:

- The Regulatory Statements are principally financial and primarily cover the single reporting year. There are some comparative tables with 5 year data where relevant amounts are segregated as being DUOS, non–DUOS regulated services and excluded services. Non–DUOS regulated services include recoverable works, recoverable infrastructure projects and builders' temporary supplies and income includes capital contributions in cash and kind.

- DUOS revenue (for the current year) is segregated according to customer types (eg individually connected customers, connection asset customers, standard asset customers and franchise customers) and further segregated into a matrix according to annual energy delivery bands (less than 100 MWh pa, 100 to 4,000 MWh pa, 4,000 to 40,000 MWh pa and over 40,000 MWh pa). Customer numbers and energy are similarly segregated. The TUOS allocation and expense items are stated, as is the over or under recovery amount.

- The asset value schedule of plant, property and equipment with opening value, additions and final value, together with accumulated depreciation is listed in aggregate and individually for various asset classes (eg separately for OH and UG subtransmission lines, OH and UG distribution lines and cables, distribution equipment, substation bays, establishment, distribution switchgear and zone transformers, distribution transformers, distribution mains and meters). Annual depreciation and expected and residual asset lives are listed. A separate schedule lists major assets into classes by network type (CBD, urban, etc), possibly by allocation rather than segregation within the underlying asset registers.

- Maintenance costs and operating costs are separately listed, segregated as common costs allocated, indirect expenses directly attributable to the DNSP, and direct costs. There is also segregation of the total according to task types.

- Capex for the DNSP is segregated by asset type (as above), and separated according to expenditure drivers (eg replacement, demand initiated, reliability improvement, etc) and, in another schedule, according to network type.

- A calculation for updated RAB (forecast and actual) is disclosed with reasons required for differences.

Similarly to other jurisdictions, there is no indication of physical quantities (peak demand, line length, transformer capacity, etc).

Electricity distribution – QCA consultant's comments

McLennan Magasanik Associates (MMA 2004), a consultant to QCA, sought to prepare an independent set of growth forecasts for distribution network services in Queensland during the QCA's 2005 electricity distribution review. MMA (2004, p.4) noted that 'it quickly became apparent that the DNSPs could not provide coherent data sets in many of the areas of

interest. … As well, the historical data provided by [one of the DBs] was inconsistent.' While the consultant's projection and methodology were subject to comment and criticism, this comment seems to remain valid, especially where predecessor organisations have been merged or redefined.

Similarly, comment by MMA in preparing an updated set of growth forecasts for Queensland's gas distribution network services for the QCA's 2006 Gas Access Arrangement Review (MMA 2006, p.ii) noted that 'during [MMA] re–analysis of the data it became clear that the data previously provided by Allgas was incomplete, meaning that the decline in load factors [used in MMA's initial analysis] was exaggerated.'

B4   Tasmania

Electricity distribution – Regulatory reporting guidelines

The Office of the Tasmanian Economic Regulator (OTTER) has issued Version 1.0 of its Electricity Supply Industry Performance and Information Reporting Guideline with effect from 1 July 2007 (OTTER 2007). It replaced earlier documents – the Customer Service Plan Guideline and the Distribution Service Plan Guideline – issued in October 2000.

This guideline requires reporting in this format to the jurisdictional regulator as well as to AER until the next regulatory review. It includes general reporting requirements as well as specific information from the various sectors – generators, TNSP, DNSP and retailers – and separately for King and Flinders Islands.

The guideline notes that the sectors and entities will be assessed against relevant:

- past performance;

- industry standards;

- standards and targets established by a licensee in a customer charter;

- targets established under a price determination;

- standards established by the Reliability and Network Planning Panel;

- standards prescribed by the Code, regulation or National Electricity Rules;

- standards, targets and indicators included in the licensee's management and compliance plans;

- performance targets and indicators established by the regulator in consultation with licensees;

- reports provided by the Energy Ombudsman; and

- performance of other electricity entities (including national and international entities).

The Tasmanian Code requires development by licensees of management and compliance plans which themselves contain performance measures (targets and indicators) against which performance in delivering key goals and objectives can be measured

The Transmission Network Service Providers Section specifically includes:

- general reporting as set out generally in the guidelines

- comparative information

    - asset statistics – route and circuit length as well as number of firm and non–firm connections sites both segregated by voltage

    - system peak demand for the year and date of occurrence

    - percentage of 'unserved energy' for the year

    - system minutes off supply for the year

- performance indicators (actual result against the licensee's management and compliance plans targets) concerning

    - loss of supply events, transmission line availability, transformer availability, capacitor bank availability

    - progress against milestones in the Asset and Vegetation Management Plan for augmentation and renewal projects, O&M strategy and programming for future major capital works

    - progress and performance with the Emergency Management and Compliance Plans and against Transmission Planning Criteria.

- performance against target for distribution system and direct connection sites (separately for firm and non–firm sites) considering availability, security (for firm sites, ie occasions and durations when supply became non–firm), and supply availability, including energy not served – MW minutes and as a percentage of served energy.

The DNSP sections specifically include:

- general reporting as set out in the guidelines

- specifically the information required by SCONRRR Attachment 1 – the Distribution Quality of Service template.

    - reporting in the SCONRRR format occurred in Tasmania for several years, but, for example the 2006–2007 report from Aurora Networks, shows good detail for SAIDI, SAIFI, CAIDI and MAIFI by feeder category but much of the rest of the response shows N/A for other than aggregated items. In the Business Descriptors part there is no information on metered supply points or energy delivered. The line length and transformer data are included as is peak demand. Earlier reports show similar data coverage and gaps.

- comparative information

    - asset statistics (compared to the previous year) – customer number (residential and business), overhead and underground lengths separately and, for high and low voltage, number of poles, distribution substations and feeders

    - supply area category details for distribution and other feeders – area covered, number of feeders, connected kVA, number of customers and route length

- zone substation detail (for each substation) – number of feeders, connected kVA, installed and firm capacity MVA and maximum demand

- aggregated consumption at distribution points of supply, aggregated feeder demand and demand (in MWh) for customers directly connected to the distribution network

- network Losses

- specific performance indicators against target

  - most data is to be prepared on a monthly and quarterly basis, and submitted quarterly while some is only relevant annually

  - against the Distribution Asset Management plan:

  - summary and annual reporting of capital works and by asset class against targets in the asset management plan

  - reporting against the Distribution Services Plan for supply reliability including interruption number, duration planned and unplanned, including also MAIFI and major event days, feeder performance and contributions to SAIDI and SAIFI by various types of events (birds, weather, vegetation)

  - quality of supply (annually) regarding over–voltages from various causes

  - customer service (quarterly and aggregated annually) including unplanned interruptions, new connections, reconnections, complaints, streetlighting faults and repair times, planned interruptions

  - Reliability Improvement strategy (annually) with respect to projects and their status

  - Customer Charter Guarantees (annually), indicating for each item the number of claims or of people eligible for compensation.

Electricity distribution – OTTER response to questionnaire

Data, where available, were generally claimed to be 'robust' but it was noted that much of the segmentation data is not available or is available by different segregation. Data are variously available from 1996–97, 1998, 1999, 2000, 2002–03, 2003 and 2008. Definitions are regarded as generally clear and unchanged but 'changes to tariffs have been implemented over time'. No knowledge of other jurisdictions was frequently noted but some items were marked as 'unsure'. An incentive scheme operated from 2004 to 2007 but was 'scrapped from 2008.'

As far as detailed data items are concerned:

- DUOS revenue is shown as available only from 2008, and segregated only by tariff. Energy delivery is not reported by time of day and is available only by tariff since 2008. Non–coincident demand is not known, while peak demand 'should be available from 2000' and noted as 'unknown if in public demand – releasable.' Customer numbers are known for 'installations only, by tariff only' but 'changes to tariffs have been implemented over time'.

- SAIDI and SAIFI are known publicly for FYs 1996–2007 as are line losses

- Distribution O&M is available from 2000 with SCONRRR segregation from 2002–03 on the regulator's website. Direct labour and employee numbers are not available.

- System mains length, separately for OH and UG is known from 1996–97 with the total length being public although public availability of segregation by voltage availability is 'unknown'. Segregation by voltage goes up to 33 kV only – probably the highest distribution voltage relevant in Tasmania. Zone substation transformer capacity is known from 1996–97 but distribution transformer capacity is unknown. It is 'unknown if (any data is) in public domain'.

- RAB is available (probably from 1999 when a roll–forward approach from a 1998 DORC valuation has been used) but 'different classifications (are) used' for the segregation. Roll forward values are available in the price determination reports. RC and ORC are not known overall or by segregation.

- Actual Capex is known since 1999, but with different segregation for SCONRRR or for investigations. The total appears to be available publicly but 'na' was entered for the segregations. Asset lives are known since 2003–04 and are available in SCONRRR reports but segregations do not match those asked for. It is not clear if residual lives are available. Contributions are known since 1999, apparently public in various reports.

- For price indices, OTTER notes it 'assumed real labour index used in 2007 determination' while for O&M expenditure it 'assumed materials index (was) used in year 1 of the 2007 determination, otherwise used CPI'. For a network assets index the response was 'no.'

Electricity transmission – OTTER response to questionnaire

Many of the responses on transmission were given in the context of the transferral of regulatory coverage from an OTTER determination in 1999 to an ACCC determination in 2003. Thus, many of the items contain the entry 'refer to AER'.

It was noted in many responses that the 'boundary between distribution and transmission differs in Tasmania compared to mainland.' It notes further that prior to 2004–05 TUOS was calculated 'for two blocks of load –'general or retail loads' and 'major industrial loads''.

As far as detailed data items are concerned, the OTTER response noted:

- GWh delivered 'should be available from 2000' with the total shown in Tasmanian ESI reports but regarding the segregation between distribution and direct connected customers, the response was 'don't think this is publicly available'. Maximum demand and line length by voltage and OH or UG 'should be available from 2000' in the ESI performance reports.

- Line losses (for the transmission system only) should be available from 2000 in Transend's annual planning report.

- Total transmission O&M 'should be available' through performance reports and price determination reports. It notes use of 'standard accounting approaches up to 2003' but

says 'refer to ACCC/AER' since then. The allocation of shared items is unknown, and it notes 'discuss with AER' for segregation of opex costs.

- Transformer continuous rating 'should be available from 2000' in the annual planning report but capacity for direct end users is 'not collected'.

- Optimised Replacement Costs (and possibly DORC) is 'available as at 1 July 1998 and 1 July 2003' but the response on segregation was 'not sure about the level of detail'. Similar comments applied to the RAB itself. Reconciliation of the RAB suggests 'refer to AER.' Some actual capex is 'available' but the notes were 'not sure about the level of detail – see performance reports' and 'refer also to AER'. Asset lives and remaining lives data, the value of capital contributions and price indices are 'unknown' but 'refer to AER.'

Gas transmission – OTTER response to questionnaire

The Longford to Hobart pipeline is not regulated so there was only very sparse information in this response.

B5   Western Australia

Electricity distribution – Regulatory reporting guidelines

The Economic Regulation Authority (ERA) is responsible for administering the electricity licensing scheme under the Electricity Industry Act 2004 which saw the disaggregation of the formerly vertically integrated Western Power into four new statutory corporations from 1 January 2005 as follows:

- Western Power which operates transmission and distribution networks in the South West Interconnected System (SWIS) which includes the south western coastal area and Kalgoorlie;

- Synergy which retails electricity with in the SWIS;

- Horizon Power which operates a vertically integrated electricity business that operates in areas of the State outside the SWIS; and

- Verve which operates the former Western Power generation facilities.

ERA manuals for reporting include:

- Electricity Compliance Reporting Manual including corrigenda (ERA 2008a). This followed a draft of 26 Jul 2006, and earlier versions of 24 Jan 2007 and 25 May 2007. The differences have not been examined but the rapidity of re–issue is noteworthy.

- Electricity Distribution Licence Performance Reporting Handbook (ERA 2008c) which 'replaces the definitions related to the performance reporting obligations for electricity distribution licensees in the Electricity Compliance Reporting Manual – Data Input Guide for Retail and Distribution Licensees, published by the Authority in May 2007'. Its definitions refer to the Performance Report (spreadsheet proforma) mentioned below.

    - It is noted that in the Handbook for Electricity Distributors that the Authority requires the holders of gas trading licences to report against the performance

indicators identified in section 17.1 of the Electricity Compliance Reporting Manual (Reporting Manual).

- Electricity Distribution Licence Performance Report (proforma spreadsheet) and the Handbook notes that 'it is mandatory for licensees to provide their annual performance reports ... by completing the Performance Report' which comprises 7 worksheets, including the following reporting categories relevant to data for TFP:

  - Customer Connections;

  - Network and Asset Information (Annexure 2 of the spreadsheet is in the SCONRRR format for the energy delivered, line length and transformer data series).

Gas distribution – Regulatory reporting guidelines

ERA manuals for gas reporting include the Gas Compliance Reporting Manual (ERA 2008b). ERA (2008b p.8) notes:

> 'There are no equivalent national performance reporting indicators for gas distribution of the kind that exist for electricity distribution … in the 2002 SCONRRR Report …. Instead, the practice in other jurisdictions has been to develop jurisdiction–specific performance reporting arrangements, although there are similarities between the arrangements that have been developed.

> 'While there is not a uniform reporting standard or template that is applied across the jurisdictions, there is significant commonality in the performance information that is reported. In particular, it is generally the case that the interstate regulators require performance information to be reported on network operations, network performance and consumer protection matters. Some regulators also require businesses to report performance information about safety issues and on financial matters, depending on whether the regulator has responsibility for these matters.'

Electricity and gas transmission and distribution – response to questionnaire

No formal written response to the questionnaire was received. Instead an extended telephone interview was held with officers concerned with licensing and performance reporting who were mainly experienced in the gas area.

The following comments are based on this discussion and from examination of various documents mentioned in the discussion and elsewhere.

- There have been various licensing and access arrangements so that a comparable data sequence is not readily available from any single source. The gas distribution network sale in 2000 included information in the public offer document and, prior to that, the 'old style' licensing had required response against performance criteria. However, a 2006 review resulted in 'new style' gas licensing, with a new Gas Compliance Reporting Manual (mentioned above). Information from 2007–08 will be against this requirement and would represent a 'start point' for consistent data. Some information would be available in the Gas Access Arrangements applications but this would be mostly projected data rather than actual historical results.

- Electricity data would be available for many years from relevant annual reports but, before the 2006 split, would be for the vertically integrated Western Power rather than for the now four separated businesses.

- More recent electricity distribution data is collected in the SCONRRR format, with good information on reliability and interruptions but is generally incomplete as far as system details are concerned. Data in the 2008 Revised Access Arrangement Information set is a mixture of recent actual expenditures and forecasts for the next period.

- In summary, the officers agreed that data which was consistence for a decade and comparable across businesses was 'just not available'. Collecting data for TFP to a formal data specification, with good auditing of the data would be better than 'trying to use data beyond its original intention'.

B6   Northern Territory

Electricity distribution – UC response to questionnaire

For the Northern Territory regulated networks (Darwin–Katherine, Tennant Creek and Alice Springs), data available was generally stated by the Utilities Commission (UC) as 'relatively robust' but some items for DUOS revenue for certain years are questioned. The robustness of opex data was described as 'uncertain, as this data is not externally audited' while that for corporate allocations was described as 'not robust for comparative purposes, given the different allocation methodologies that PWC has used over the years'. The response generally notes clear definitions, no change in reporting and is not aware of differences in other jurisdictions. Exceptions are in the areas of network revenue allocation (DUOS) for two periods and the noted changes over time to the allocation of overhead costs.

Data are generally available from 2000–01 and some (generally at an aggregate level) are in the public domain and much of what is not 'could be made public'.

As far as detailed data items are concerned:

- DUOS revenue and energy delivered are in the public domain from 2000–01 onwards, but only at the total level. Prior to that time, network charges were not separated but 'the breakdown information could be made public.' Coincident peak demand is available from 200–01, but is not in the public domain. Non–coincident demand is not available. Customer numbers (overall) are public from 1998–99 – segregation into domestic and commercial is available from 2002–03 and could be made public. Line losses are not reported but could be derived.

- Total O&M is available publicly from 2000–01, but significant changes to allocation of common costs have been made 'numerous times' and 'the robustness of this data is uncertain'. Total opex is available from 2000–01 but is not segregated.

- Total network circuit length is public from 2000–01 to 2007–08, but 'is not broken down into OH and UG or by voltage level. This information could be made public'. Transformer data is similarly not in the public domain but could be made public.

- Referring to the asset base the response notes that 'in 2005, the UC revalued PWC's assets in place at 1 July 2002 (ie the initial RAB) at an amount that at least ensured cash flows sufficient to meet certain debt and equity return benchmarks'. Thus, reference to valuation or replacement cost data is shown as N/A.

- RAB data is available from 2006–07. It is not in the public domain, but it 'could be made public'. Annual Capex is available from 2002–03 but is not public and 'capital contributions data has not been consistently reported separately.'

- There are no price indexes for labour, O&M or network assets.

B7   South Australia

The Essential Services Commission of South Australia (ESCOSA) has published an Annual Performance Report: South Australian Energy Networks (APR) which covers ETSA Utilities (regulated electricity distribution), Envestra Ltd (regulated gas distribution) and ElectraNet Pty Ltd (regulated electricity transmission). Its questionnaire response, especially for gas, makes reference to this publication. The latest ESCOSA (2008) covering 2007–08 is the latest release and includes some data tables for previous years.

Electricity distribution – ESCOSA response to questionnaire

In its response, ESCOSA claimed definitions to be clear and it is not aware of any changes. It offered no comment about other jurisdictions or data robustness.

The response makes reference in several places to data which are available in the completed ETSA SCONRRR data templates which are available on the ESCOSA website. For example, the Financial report to 30 June 2007 includes detail of network charges, asset values, capital expenditure and operating costs according to the SCONRRR segregation. The Service report includes line lengths as well as transformer information according to the SCONRRR segregation. Reports in this format are available from 2002–03.

As far as detailed data item responses are concerned:

- DUOS revenue is available from 2001–02 onwards but is not public. Customer numbers by various segregations are available from 2005–06, but not publicly. A note adds that the Commission's Annual Performance Report (APR) provides a breakdown of distribution sales volume into various tariff categories. Examination of the APR for 2007–08 showed a graph of GWh by nine tariff categories which could be scaled for approximate values. The response indicated that energy segregations are available from 2005–06, but are not publicly. Demand was shown as N/A.

- Line length data and transformer number and capacity (in the SCONRRR segregations) are publicly available from 2003–04 onwards while line losses from 2001–02 are not public.

- Distribution O&M by category is publicly available from 2002–03. Labour hours booked are available from 2005–06, while direct labour cost is available from 2002–03 to 2004–05. Neither is public.

- DORC valuation at June 1998 is rolled forward. The valuation and roll forward are 'Not public and releasable', presumably meaning 'not public but releasable', in contrast to the 'not public and sensitive' response option. Capex from 2002–03 is public in the SCONRRR format. Asset lives and residual lives are 'not public but releasable.' Capital contributions are public from 2005–06.

- Price index forecasts are made but no track is kept of year to year actuals. They are not public.

In its response to the AER data Issues paper, ETSA Utilities (2008, p.9) notes that 'due to cost allocation and system changes in late 2005, our ability to back–cast data in the 2000–2005 regulatory period is very limited'.

Gas distribution – ESCOSA response to questionnaire

In its response ESCOSA claims definitions are clear and it is not aware of any changes. There is note of 'some changes in the way customers were allocated between pricing zones'. It offers no comment about other jurisdictions or data robustness.

As far as detailed data item responses are concerned:

- Delivered gas quantities and customer numbers (total and segregated) are available from 1997–98, being public from 2003–04 or (except for capacity based tariffs) 'not public but releasable'. Overall distribution revenue is available from 2001–02 and public from 2003–04 while the volume based customer revenue includes domestic and commercial haulage reference services. Maximum hourly data is not available, but 'SA has MDQ data' though possibly only for capacity based customers. Capacity based customer data are 'not public'.

- O&M overall is available from 2001–02 and public from 2003–04. Non–capital costs are segregated differently, are available from 2003–04 and are not public but releasable. In particular, O&M is 'not broken down into individual categories'. Direct employee numbers and labour cost are 'N/A'.

- Pipeline physical data is available from 2005–06 but is not public. It is segregated by material and pressure categories. Service connections are known from 2005–06 but again not public.

- The asset base is a DORC valuation of June 1998 with no further revaluations. The segregated asset base value is 'not public, but available from 1998' while the RAB reconciliation is public since 1998–99. A possibly conflicting entry shows that the '1998 DORC (is) broken down by mains, inlets, meters, regulators, odorising plant, telemetry' and is 'Public'. Annual Capital Expenditure is available from '1998–99 onwards, but broken down into different categories'. It is 'not public'. Asset lives are similarly available in different categories and are public.

- Capital contributions are available from 2001–02 and are 'not public, but releasable.'

- ESCOSA's pricing model has 'forecasts of the cost indices and does not keep track of year–to–year' changes. They are not public.

B8   Australian Capital Territory

Electricity distribution – ICRC response to questionnaire

Data available was described by the Independent Competition and Regulatory Commission (ICRC) as 'robust' but only for the relatively sparse data sets available. Of these items, definitions are said to be clear but the response is 'not aware' of changes to definitions or differences between jurisdictions.

As far as detailed data items are concerned:

• DUOS revenues and segregation by time and customer class are available from 1995[4] but the answer is 'no' to the public domain column. Energy delivery, by peak and off–peak, and by customer class are available from 1995 and the answer is 'yes' to the public domain question. Peak demand, coincident and non–coincident are 'yes' from 1995, as are customer numbers by type and size.

• Distribution O&M is 'yes' from 1995 but with 'not same categorisation' entered for segregated data availability and no entry shown for the public domain question. No data are available for corporate overhead allocation, opex on contributed assets, employee numbers or direct labour on O&M.

• System details (OH and UG lines and transformer capacity) have availability entered as 'ActewAGL'. It is assumed this means data are not held by the regulator and would have to be specifically sought from the utility.

• Total DORC is shown as 'no' for availability but for the DORC valuation question it notes no valuation by ICRC but 'ODRC as at June 1997 [was] provided by ACTEW'. RAB values 'have been aggregated – information published in Commission's regulatory reviews', but the split items are noted as 'not the same categories'. RAB reconciliation is for 1995 and is public. ODRC was used with adjustment in 2004 for 'assets which had been omitted in the original ODRC study'.

• The actual capital expenditure is noted as 'not by the same categories' but there was no response to the public availability question. Asset lives and residual life carry the same responses. Contributions are available from 1995.

• No price index data for labour, O&M or network assets are available.

Gas distribution – ICRC response to questionnaire

Gas distribution regulatory data available were described by the ICRC as 'robust' but only for the relatively sparse data set available. Of these items, definitions are said to be clear but the response is "not aware" of changes to definitions or differences between jurisdictions.

As far as detailed data items are concerned:

• Revenues and segregation by tariff class are available publicly from 1995, though for maximum hour quantities the response is 'need to talk to ActewAGL'. There are no incentive schemes and data on system performance (eg SAIDI) are 'not available'. UAG

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[4] The common entry is '1995' in the column asking 'Are data available? If so, for which years from 1995 onwards?' This is assumed to mean all years from 1995 onwards.

is disclosed publicly. Operating cost information is 'reported in the Commission's regulatory reviews' but data are 'not separated in this [questionnaire's] way'.

- Pipeline length in various pressure categories is available from 1995 but for detailed pressure and diameter information the reference is to 'ActewAGL'.

- Asset values have been aggregated and so are not available in the requested segregation. The RAB is an optimised deprival value based on the maximum of net realisable value (disposal value) and the net present value (economic value). The reply noted that 'each jurisdiction has used its own approach [and] ICRC closely follows IPART'. Replacement cost or ORC value and items were 'not available'.

- All capital cost information is noted as being reported in the Commission's regulatory reviews but is not available using the requested categories. The value of capital contributions is available publicly from 1995.

- There are no price index values.

Electricity and gas distribution – Covering letter comments

The covering letter from the Senior Commissioner of the ICRC made some pertinent observations regarding data quality for TFP purposes. Mr Baxter offered the following observations:

'In considering the applicability of a TFP based approach, the Commission has identified two concerns with respect to data availability and accuracy.

'The first relates to the availability and accuracy of data relating to electricity and gas distribution networks in the ACT. The most obvious source of data is the Commission's regulatory decisions which date back to the mid 1990s. These decisions contain high level capital cost, non–capital cost, regulated asset base and network information.

'The approach to regulation has evolved and become more sophisticated over time. This has resulted in additional detail and investigation of specific cost items and a refined regulatory methodology. As such, in the calculation of any TFP based measures, the data contained in recent decisions would be considered more appropriate and detailed than that from earlier determinations. For example, although the Commission has regulated electricity distribution charges since the mid 1990's, it has only been since 1999 that there had been an approved regulated asset base.

'Furthermore, should the data contained in earlier decisions be relied upon to calculate TFP measures, it could potentially lead to significant debate regarding the accuracy and reliability of the underlying data. In addition, many of the supporting documents and worksheets associated with the preparation of the earlier decisions no longer exist, adding to the potential for debate.

'It is considered that the data contained in the decisions covering the two most recent regulatory periods is likely to be the most appropriate for use in any TFP calculations. These decisions cover the period from 2001 to present.

'The Commission's second concern relates to potential data inconsistencies within jurisdictions over time as well as between jurisdictions.

'For example, the Commission's 2004 review of ActewAGL's gas distribution business spent significant time attempting to reconcile differences in the categorisation of non–capital cost information between regulatory periods. …

'In addition, the 2004 review demonstrates how the approach to regulation has increased in sophistication and detail over time to capture additional cost information. The Commission's 2004 decision included 10 non–capital cost subcategories compared to six in the 2001 decision. While the increase in detail improves the accuracy of the review, it creates difficulties in creating reliable data time series.

'With respect to inconsistencies between jurisdictions, each jurisdiction has tailored its approach to regulation to suit its individual circumstances. As such, it is natural that there will be differences in definitions used between jurisdictions and therefore difficulties in comparing data across jurisdictions. On this point I note the difficulties experienced in attempting to create a nationally consistent performance reporting framework.

'The transfer of the regulation of distribution networks to the AER offers perhaps the best opportunity to develop a database required to investigate further the opportunities for a TFP based approach to regulation. Over time, the AER, will develop an internally consistent data set covering all distribution businesses in the National Electricity Market for example, thereby allowing appropriate comparisons over time and between businesses.'

B9   Utility Regulators Forum – SCONRRR report

The Utility Regulators Forum (URF 2002, p.1) recognised that:

'With the different jurisdictional legal frameworks, information requirements vary. In general, each jurisdiction has continued to collect information in the same form than before the creation of the NEM. This meant that businesses operating in multiple jurisdictions had to collect their data in jurisdiction–specific forms. Many businesses only have the capability to collect data in the pre–NEM form. Such differing requirements have prevented cross–jurisdictional businesses from achieving economies from a single data base collection system, and also made it difficult to compare performance across jurisdictions.'

The Steering Committee on National Regulatory Reporting Requirements (SCONRRR) was established to develop a core set of performance reporting requirements for the electricity industry that was nationally consistent and in 2002 published its discussion paper (URF 2002), with three attachments:

- Attachment 1: the distribution quality of service (QoS) reporting template requires SAIDI, SAIFI, CAIDI and (optionally) MAIFI segregated according to feeder category and by events planned or otherwise. It seeks technical QoS complaints overall and by

percentage by category and likely cause. Customer service includes provision of services, streetlight repairs, call centre performance and analysis of complaints by type. A page of business descriptors looks at supply points, energy delivered, line length, transformer details and is potentially quite relevant for TFP studies.

- Attachment 2: the distribution regulatory accounts reporting template requires revenue from network charges and other sources, asset values and capex by classes for system assets and various non system assets as well as segregation by purpose. Depreciation and life and age of asset classes are sought and operating costs are separated from network maintenance and other costs. Related party transactions are to be disclosed.

- Attachment 3: retailing quality of service reporting template.

This SCONRRR format has been adopted in several jurisdictions, generally as only part of the reporting, and the data provided seems to have been of varying quantity and quality.

For example, ESC presents data in Attachment 1 and 2 formats for the Victorian EDBs from 2001. Early years, prior to 2004 generally show only aggregated data for revenue, assets, capex, asset life and opex while varying levels of segregation are apparent from 2004 on[5].

ESCOSA presents reports in these formats, but the data are incomplete. For example, while the 2006–07 financial reporting appears complete, the service standards data is more sparse, including a note that 'distribution of customers by SCONRRR definitions is not available until [ETSA's] outage management system is fully operational with accurate … linkages.' The business descriptors data is provided from 2002–03.

B10   Australian Energy Regulator

Electricity transmission – AER reporting requirements

The Australian Energy Regulator (AER 2007) has issued 'Information Guidelines – Electricity transmission network service providers'. The guidelines are 'based on the AER's existing information requirements guidelines, with amendments and additions made to take account of the requirements of chapter 6A of the NER'.

The AER notes that 'through the service standards guidelines and service standards measures outlined in individual TNSP's revenue cap decisions, TNSPs are encouraged to meet unique service performance targets. TNSPs are required to report this performance on an annual basis.' The AER has issued service standards compliance reporting requirements and templates.

TNSPs are required to submit certified annual financial statements to the AER in accordance with the AER's Information Requirements Guidelines (IRG). The IRG contain information templates which provide the source data for this report. Annual regulatory reports have been published from 2002–03 to 2006–07. They focus on 'the revenue and expenditure performance of the networks'. Information is presented on the TNSPs' profitability and

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[5] It should be noted that four of the five responses indicated on the ESC website as being for 2007 actually contain data for 2006 instead.

investment outcomes, comparing actual expenditure with those forecast in the original revenue cap decisions.

A discussion paper (AER 2008) on 'priorities and objectives of electricity TNSP performance reporting' was issued in December 2008 and comments closed on 20 January 2009. A summary of 'contents of previous TNSP performance reports' in included in the discussion paper as appendix A. The Final Decision paper (AER 2009) was released in March 2009.

Electricity transmission – AER response to questionnaire

The AER noted that data became available only 'progressively from 2000 as various TNSPs became regulated by ACCC/AER'. There is no indication in any of the responses of any data being available, or previously available, before centralised regulation.

Many of the item responses showed that segregated data were not available and hence for many items the questions on definitions, changes, differences between jurisdictions and data robustness contained 'n.a.' as the response.

As far as detailed data items are concerned:

- TUOS revenue is progressively available from 2000, but 'some report a total figure, some break it up to some degree'. TNSP revenue 'is reported (publicly) in the annual TNSP performance report' and is defined in the NER. Incentive schemes are progressively available (from 2003) and are reported. However, 'the performance indicators vary between TNSPs'. Again, GWh became available from 2000 with some reporting segregations but 'some do not report GWh at all'. It was noted that 'definitions have varied over time' so, while robust, the definitions 'need checking'.

- There is no circuit length data available. Line losses are not available.

- Transmission O&M has become progressively available since 2000 and, although there were 'some changes (in reporting) with new AER templates introduced in 2007', the data is classed as 'Robust'. Cost allocation methodologies approved by AER in 2008 specify how shared costs (such as corporate overheads) are to be allocated. The response notes that separated amounts for operating from maintenance, and the shared allocation are available progressively since 2000 but 'unless … already disclosed in regulatory proposal (the data holder) will require TNSP permission to disclose'.

- There is no data on direct employees, direct labour costs, transformer capacity or optimised or other replacement cost.

- The RAB is the 'jurisdictional value, but no greater than deprival value.' There have been no DORC valuations or revaluation adjustments. The RAB data are 'available progressively from 2000' but 'asset classes used by TNSPs may vary'. An 'indicative RAB [is] reported in the ERA's annual TNSP performance report' while 'RAB for revenue setting purposes [is] calculated using AER's roll forward model and post tax revenue model (PTRM)'. The definitions are clear and have not changed over time but 'sometimes assets have been included / excluded from the RAB.'

- Capital expenditure, asset lives and remaining lives have become available progressively from 2000 but 'asset classes used by TNSPs vary'.

- There are no data on capital contributions and none for price index values.

Gas Transmission – AER response to questionnaire

With respect to gas transmission pipelines, the AER notes in its response to the data availability questionnaire:

- Where information is available, it is for the limited number of pipelines that are or have been covered pipelines. In some cases the information is out–of–date.

- Financial data are forecasts. Service providers are not obliged to periodically submit actual data to the AER. In some cases some actual historical data may have been provided by service providers to support an access arrangement proposal (for example, in the access arrangement information, or a submission, or a consultant's report) but it is not continuous. In some cases the service providers would have submitted additional information (for example, at a disaggregated level) to the AER/ACCC on a confidential basis.

- Information that is publicly available is located on the AER's website for each pipeline. It is included in access arrangement information, the service providers' submissions, the AER/ACCC's decision documents and consultants' reports.

Electricity distribution – AER RIN information sought for NSW/ACT review

The AER did not provide a data availability questionnaire response on electricity distribution but Economic Insights discussed the AER's recent NSW/ACT and current electricity distribution review experience with AER staff.

The AER made available a pro–forma of one of the regulatory information notice (RIN) templates and accompanying notice paper for data sought for the recent review of NSW and the ACT DNSPs[6]. It covered (back cast) data for the previous regulatory period and the current period, as well as projections for the next period under review. Being only a pro–forma, the following comments relate to the data sought rather than data actually obtained.

It is not clear if other reviews or the templates for other DNSPs in the NSW/ACT review sought similar information as the content seems to have been the result of negotiation between the DNSP and the AER.

The AER was very conscious of the need for legislative backing for what could be included in regulatory information orders (RIOs) and RINs, so extension of their data collection for TFP purposes (rather than for assessment of provider's regulatory proposals developed under a building block methodology) may not be easily achieved.

At an overview level, the templates cover financial and operational arrangements, together with some 'demand side' throughput items (customer numbers, energy, demand, etc) but do not include items such as line length by voltage, transformer capacity, asset values by category necessary for TFP calculations.

As much of the data would be effectively 'back cast', its consistency of collation and definition may reduce its immediate usefulness for any TFP analysis. Occasional 'correction

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[6] It is noted that AER use the more generic term RNSP – regulated network service provider – rather than the previously common TNSP and DNSP. This report has generally used the earlier distinguishing terminology.

of an error' noted in various data responses elsewhere may not be fully incorporated into all years' data. It may, however, offer an opportunity to commence collection of some of the data required for future TFP analysis.

The following comments relate to the content of the RIN itself rather than to the accompanying data templates (which will be discussed below):

- The RIN recognises that differing 'service performance and reliability obligations' may be 'imposed upon the RNSP' and seeks details of the impact of these.

- Information is sought on capital contributions 'in order to ensure that a RNSP's expenditures and revenues do not include these amounts'. This exclusion of capital contributions as revenue appears to differ from treatment of capital contribution as part of regulated revenue in some previous jurisdictional reviews.

- Regarding recent historic expenditure levels the AER 'requires a level of assurance about this historic information. A level of independent assurance is therefore required.' Later the audit assurance required is expanded upon. This should enhance data integrity and continuity, if not comparability, at least for the recent periods.

- Recognising its proposed use of the post tax revenue model (PTRM), the AER notes that 'for businesses previously regulated under a pre–tax framework, a value of assets for tax purposes will need to be established'.

- The AER sought an overview of staffing numbers but noted it was 'seeking information on labour hire numbers not labour provided under service contracts'. This basis of reporting may affect input quantity measures of 'labour' in some TFP specifications.

- The RIN required 'key internal plans, policies, procedures or strategies … (which) … may include … accounting policies and methodologies (including capitalisation policy, depreciation policy and an approved cost allocation methodology)'. The inference is that treatment of, for example, capitalisation of pole replacement or works in progress and the asset lives to be used for depreciation are not certain to be uniformly defined and/or applied across the industry as would be required for robust TFP analysis.

The proforma spreadsheets include multiple pages for the different types of data required by the various paragraphs in the Notice:

- Much of the information is required year by year to cover three regulatory periods – in the NSW case the 'previous regulatory period 1999–2000 to 2003–04', the 'current regulatory period 2004–05 to 2008–09 (actuals and current estimates)' as well as the 'next regulatory period 2009–10 to 2013–14'. Previous and current data are to be in nominal dollars, while future periods are to be in real dollars (of end financial 2008–09).

- Such information covers capex with segregation by asset types (for example (distribution) substations, subtransmission lines and cables (not separated into OH and UG), distribution lines and cables (separated by HV or LV but not OH or UG) and distribution transformers and segregation by expenditure purpose (renewal, growth, etc) and segregation by composition (labour, materials, contractors and other).

- Operating and maintenance costs also cover the 15 years segregated into various activities (eg inspection, pole replacement, vegetation, etc) and by composition (as for capex).

- One table requires enumeration of 'services' for the current regulatory period, with the number of customers and revenue earned from the service as well as current prices and indicative prices for the next regulatory period. Services are split between standard control, alternative control and negotiated.

- A demand forecast of some several hundred rows requires data for two years earlier than the previous regulatory period (ie 1997–98 and 1998–99). Data includes customer numbers and electricity consumption by voltage level (including LV split for residential and non–residential and with controlled load separated). Maximum coincident demand is to be detailed at network level in MW and MVA for summer and winter – historical and forecast with 10 per cent and 50 per cent PoE. (There is a note 'please indicate if actual maximum demand includes weather and/or diversity correction' so that definitional consistency for TFP may be an issue.)

- Summer and winter maximum demands are required separately for enumerated BSPs where supply is taken from the TNSP. Data is required for MW, MVAr, MVA and PF and (possibly for the end of the next regulatory period) 'total capacity', 'secure capacity' in MVA and year of 'investment required' (presumably by the TNSP). Rows are provided for (overall) undiversified and diversified MW, MVAr, MVA and PF, as well as for MVA growth.

- A further segregation requires similar summer and winter detail for each subtransmission substation (or S/T voltage customer) supplied from each BSP above. This is required separately for each intermediate subtransmission voltage (eg subtransmission substation/132 kV/66 kV customer as a set) and for each zone substation and 66/33 kV customer.

- Further tables represent a review of energy and demand forecasts from the RNSP in pricing reports, in advice to the TNSP and in previous reset submissions and notes a requirement to 'indicate if actual maximum demand includes weather and/or diversity correction'.

Without disclosing any data, the AER indicated that only partial data were in fact provided to them in response to the RIN. Capex and opex were provided for varying parts of the requested periods (generally from the early 2000 years onwards only) and much of the demand and customer detail was 'not available for all years and all sub–categories as the data at the required level did not go back this far'.

The AER suggested more confidence could be placed in the most recent five years of data due to more maturity in the regulatory regimes and stability in classifications, as well as requirements for auditing of regulatory accounts.

A possible difficulty mentioned for TFP analysis was that the new NER allows reclassification of, for example, a service being standard control, alternate control or negotiated so that continuity of even the extent of service provided may be less certain in fact than in appearance. (The varying inclusion and exclusion of streetlighting and metering has been noted in previous regimes and has required 'adjustment' in some previous TFP studies.)

Electricity distribution – AER proposed reporting requirements

In preparation for its electricity DNSP review program, the AER has initiated discussions on reporting requirements. It has released an issues paper Electricity DNSPs Annual Information Reporting Requirements (AER 2008) and received subsequent submissions from all the east coast DNSPs. These proposals and submissions in response will be examined in more detail with respect to their relevance to TFP studies but the predominance of financial over physical detail is seen as a major deficiency for TFP purposes.

The principle aim of the issues paper was 'to receive feedback from stakeholders regarding thee templates'. The paper notes the AER intention to publish a regulatory information order (RIO) setting out a nationally consistent framework for annual information reporting by DNSPs. It will contain reporting templates to report relevant information, including annual expenditure information according to the proposed templates mentioned below. The RIO, together with the regulatory information instruments (RIIs) being developed will specify for DNSPs the information requirements of the AER.

The extensive set of worksheets in the issues paper's appendix A (information guidelines reporting template) is almost entirely financially based with some performance details. Each item is to have supporting working papers as relevant. Detailed definitions (with a source acknowledgment) are given for each set for relevant items:

- Expenditure statements covering expenditure on capex, opex, major items and contributions. Capex is to have segregation by being for system or non–system assets, the former segregated by cause driver (extension, load management, renewal/replacement, service improvement), by asset class (lines and cables, substations and transformers, buildings etc), by voltage level (S/T, HV and LV), by being UG or OH and by feeder type (CBD, urban, rural short or rural long). Opex is separated into maintenance (with a similar segregation matrix) and operating (under various headings). Opex segregation is also into labour, materials, contractors and other. Major programs or projects (with a value over the life of the program or project greater than 2% of the final year AAR) are to be listed. Capital contributions, prepayments and financial guarantees are to be listed in dollar values.

- Financial Statements including income statement, balance sheet and cash flow statement for standard control distribution services.

- Disaggregation statements covering income, balance sheet, cash flow statement and asset disaggregation statements according to items being standard control services, alternative control services, negotiated services or unregulated services.

- Cost allocation allowing for causal and non–causal allocation and requiring the allocator, its value and the allocated cost, disaggregated according to the services (as mentioned above).

- Regulatory Asset base with some network characteristics – this requires reconciliation of assets by category (S/T, HV, LV and Other) according to valuation, additions, disposals and depreciation as well as listing by categories of useful life remaining.

- The network characteristics sheet picks up the line length (by being OH or UG, and being S/T, HV or LV) segregated by feeder type as well as the number of metered supply points according to customer type and supply voltage. These are generally similar to the SCONRRR data but other SCONRRR data covering transformers, energy delivered, and system demand are not included.

- Service performance includes interruption, complaint and customer service data with much segregation and including worst feeder listing. Major event days and other exclusions are to be listed.

- Pass–through services for network support – positive and negative with amounts to be disclosed.

- Relationships with other entities are to be listed and described and the top ten expenditures are to be detailed.

- Regulatory adjustments to show adjustment journals for each regulatory adjustment made to the income statement and balance sheet.

Appendix B of the issues paper includes back–casting capex and opex templates. Back–casting (and forecasting) information seems more related to regulatory proposals, being largely 'information that it is not appropriate or cost efficient to collect annually'.

Appendix C of the issues paper includes examples of regulatory assurance reports.

At the time of preparing this report the AER's exact timeframe and process for finalising the RIO was yet to be decided.

Electricity distribution – Responses to the AER's proposed reporting requirements

The NSW and ACT distribution businesses make the point that data has been supplied to the AER under RINs as part of their recent regulatory proposals and that these RINs were developed with consultation with the EDBs involved but the EDBs claim that 'lessons' from this consultative process are not reflected in the current proposals for RIOs.

The following extracts from EDB responses are relevant:

- ActewAGL Distribution

  - ActewAGL (2008, p.2) claimed that the AER's 'broad justifications for collecting the proposed information annually … are relatively vague and do not make a compelling case regarding the benefits of collecting the information … in an ex–ante regulatory regime (where) DNSPs provide detailed information at the time of regulatory reset in accordance with the RIN …'

  - It was also concerned about 'potential overlap with other obligations relating to compliance – for example, obligations to demonstrate compliance in the annual pricing proposal'.

- Aurora Distribution

  - Aurora (2008, p.1) noted that translation of past data into this format is 'problematical'. It highlighted that a cost allocation methodology (CAM) must be used but cautions that 'the categories within this CAM (to be proposed to and

approved by the AER) may be different to any CAM used by the DNSP in current or past pricing periods…. (This) may well render … comparison of expenditure … of limited value'.

- It noted that, under transitional rules, its reporting requirements will be those applicable under the Tasmanian rules as at the time of the 2007 determination until the next regulatory review (to be effective from end June 2012). It noted that 'the duplication of reporting is also an issue'.

- Commenting on network planning requirements, Aurora noted its unusual arrangement of supply 'Aurora's distribution network is connected to the transmission system at 40 Transend connections sites ... where the voltage is reduced from 110 kV to 44 kV, 33 kV, 22 kV and 11 kV. The distribution connection points and the asset boundaries … are on the load side of the 'Transend owned' feeder circuit breaker equipment. Aurora has a sub–transmission network in the greater Hobart area, (with)… 8 zone substations (33/11 kV).'

- CitiPower and Powercor

  - CitiPower and Powercor (2008, p.1) noted that the 'AER's proposed capital, operating and maintenance templates include more detail than the current Victorian reporting requirements. This is despite the Essential Services Commission of Victoria (ESCV) and its consultants appearing not to have used most of the information that is reported'.

  - They were concerned (2008, p.2) that reporting required a 'level of detail which would require a significant level of cost allocation of the businesses' source information. Cost allocations result in approximations only and different businesses are likely to use different cost drivers to allocate costs. This will limit the usefulness of cost comparisons at these detailed levels'.

- Country Energy

  - Country Energy (2008a, p.2) noted that the 'proposed templates in their current form do not reflect current internal or jurisdictional reporting requirements, and do not adequately reflect the extensive consultation process that took place between the AER and NSW/ACT DNSPs'.

  - The response summary (2008a, p.4) noted that 'Country Energy is aware that the issues paper is an initial step in the consultation process, and that substantial work remains before a complete regulatory information order can be finalised'

- Energex

  - 'Energex's current reporting capability and operational processes have been developed to support its existing internal and jurisdictional regulatory reporting requirements … aligned closely with the (SCONRRR) templates. The reporting proposed … is more detailed … and Energex would be required to invest ... resources, time and effort (if the framework was implemented)' (Energex 2009, p.1–2)

- Energy Networks Association (ENA)

  - ENA (2009, p.1) noted that the 'proposed Regulatory Information Order (RIO) and accompanying templates do not clearly reflect the functions and obligations that the information is meant to address' and suggests discussion and a working group.

- EnergyAustralia

  - Energy Australia offered a 'high level' response to the Issues paper saying it does not sufficiently address how the proposed order is necessary for the AER to carry out its functions and powers under the Rules.

  - It noted differences in reporting definitions and requirements between the draft RIO, its reporting requirements to the NSW Government (Department of Water and Energy) and also compared with the requirements of the RIN relevant to the recent regulatory proposal and review.

- Ergon Energy

  - Ergon Energy (2009, p.3) noted that 'the draft templates request a level of detail that significantly exceeds that requested by its current economic regulator, the Queensland Competition Authority.' Investing in system and process changes would enable Compliance with the RIO detail but 'the business will not obtain any additional benefits.'

  - Ergon (2009, p.8) recognised 'the rationale for the information requirements is to assess efficiency by establishing a relationship between certain inputs and outputs' but notes that 'while this produces a measure of efficiency there are significant difficulties associated with relying on such a measure'. In particular:

    - There are significant measurement difficulties associated with both the outputs and inputs as a consequence of most network distributors producing multiple outputs, and all using multiple inputs;

    - Often the output measure is highly aggregated. For example, a typical output measure is the total number of kWh. In Ergon Energy's environment the use of kWh as an output measure is inappropriate as the network configuration and development is primarily demand driven not energy driven. The asset type and configuration is not driven by kWh and is significantly constrained by the historical investment in assets. Voltage level is a simple example of a characteristic that is not driven by the most efficient method of delivering energy to a customer but significantly driven by historical development; and

    - An 'apparent' increase in efficiency could be explained by the increase in the use of another input, but this does not form part of the measure. For example, output may go up because a utility gains a large customer instead of becoming more efficient.

- ETSA Utilities

  - ETSA (2008, p.2) noted its current reporting templates 'were developed having regard to the information required by the jurisdictional regulator … and ETSA Utilities' needs for managing the ... business. The AER templates … would substantially extend and modify the information required .... (and) would cost millions of dollars to implement.'

- Integral Energy

  - Integral (2008a, p.1) noted that 'the information agreed between the AER and the NSW/ACT businesses in … the 2009–14 Regulatory Information Notice templates appears not to have been reflected in the proposed RIO templates.' It notes that 'The development of the RIN templates … forms a sound basis for information collection to apply nationally.'

- Jemena Electricity Networks (JEN)

  - Jemena (JEN 2008, p.3) believed that 'the Requirements, as contemplated in the issues paper, will require the businesses to provide too much detail.' and 'does not believe that this level of detail is necessary to assess future regulatory proposals.'

  - JEN believes that 'at that level of detail, the information would also cease to be meaningful, as it would require costs allocations to categories far removed from underlying cost drivers.'

- Southern Sydney Regional Organisation of Councils

  - This response believes that 'robust reporting on public lighting (should) be part of this framework.'

- United Energy Distribution (UED)

  - UED (2008, p.2) 'has no major objection with [the] broad intention to use that information to assist in the assessment of future regulatory proposals' but that the issues paper 'has a number of significant problems. [It] seeks a large volume of information that in many cases is not relevant to the regulatory price setting process, yet will require a complex and often artificial or arbitrary derivation process.'

  - 'The level of detail and categorisation proposed appears to be inconsistent with the regulatory pricing process as well as being inconsistent with how the businesses are managed, the fundamental cost drivers [of the] business and/or how data is collected.'

  - With respect to details of network characteristics, UED (2008, p.8) notes that 'apart from the difficulty providing the characteristics across the various headings, there is generally little [annual] movement in the actual numbers that requires reporting at this level of detail.'

  - With respect to 'backcasting' UED believes that 'forcing historical data onto templates will become an exercise in allocation rather than representing the actual cost driver.'

B11   Comments from responses to the AEMC Issues Paper

A number of submissions on the AEMC's Issues Paper made comments specifically relevant to data availability.

AER

- Considering data requirements, the AER (2009, p.6) noted that 'data available for Australian transmission networks is more limited that that available for distribution networks, while the amount and quality of data available for distribution networks is variable across jurisdictions. The AER understands that the Essential Services Commission of Victoria (ESCV) is the only Australian utility regulator that has collected TFP data in a structured and systematic manner.' It 'considers that the sample period should cover at least two regulatory periods, … have regard to the nature of the business cycle, … and whether the period corresponds to a steady state … in network investment.'

- The AER noted 'regarding the specification of outputs and inputs for TFP calculations, often the specification will be designed to fit with the dataset available'. The AER (2009, p.6) observed 'this can result in a workable TFP estimate, (but) the methodology may lose some accuracy and robustness'. Further, the AER (2009, p.7) noted that 'any 'clean–up' of data … does not include manipulation or transformation of data in response to unexpected or seemingly unreasonable results.'

- Recognising that 'the scope for productivity growth may differ across … businesses.' AER noted that benchmarking for relative efficiency performance 'would inevitably require more comprehensive data than the basic input and output data used for measuring TFP.'

DPI Victoria

- DPI (2009, p.4) stated that 'the TFP approach entails a shift from firm–specific forecast information …. to *known and measurable* historical industry data.' It observed that 'reliance on data collected from many industry participants, robustly verified and standardised, and averaged across the industry, reduces the asymmetry of information that arises when an individual distribution business proposes price outcomes to the regulator.'

- DPI (2009, p.8) considered that 'there is a critical mass of robust and consistent data currently available in at least one jurisdiction, as collected by the Essential Services Commission of Victoria in association with Pacific Economic Group. Additional data from other jurisdictions will be available following the implementation of the TFP approach which should be appropriately incorporated into the dataset'.

- DPI (2009, p.16) also considered that 'mechanical issues such as collection of TFP datasets should be within AER's remit, and an appropriate use of its powers under the existing NER and NGR to collect regulatory information. If confidential data is aggregated, DPI supports its inclusion in the dataset.

ENA

- ENA (2009, p.1) noted that 'one of the issues that ENA members are concerned about is that the data that is currently available for input to a TFP model is not robust and

therefore inhibits accurate analysis.'

Energex

- Energex (2009, p.6) indicated that implementation of an effective TFP framework will be undermined by:

  - 'An absence of data – much of the data that would be required to calculate an industry–wide TFP is not currently maintained and/or reported by DNSPs. It is also important to note that data that is currently maintained and reported may be subject to definitions and methods of calculation which vary between jurisdictions or may only be available at an aggregate level;

  - 'An inability to obtain data of the required quality, and thereby the required consistency and accuracy …

  - 'The lack of data across an appropriate time–series – there will be limited available information to analyse 'long–run' TFP growth for service providers'.

- Energex (2009, p.11) went on to note 'Data integrity is paramount to the successful adoption of a TFP based methodology and therefore there would little or no acceptable 'trade–off' between data precision and data availability.'

EnergyAustralia

- EnergyAustralia (2009, p.6) stated that 'EnergyAustralia submits that currently a national dataset (that is robust and consistent) required for the application of TFP does not exist to the extent that is required for an accurate and transparent calculation of TFP growth.'

- Considering the issue of data cleansing, EnergyAustralia (2009, p.7) noted that 'this issue had arisen in Victoria where the ESC and its consultant had made adjustments to the audited actual information which has made it impossible for the business to replicate and understand the results. EnergyAustralia submits that such adjustments to audited data are inappropriate. Allowing the AER to adjust audited data undermines confidence in the determination process and the regulatory framework. It also brings into question the validity and integrity of the assurance and reporting processes used by individual businesses.'

- EnergyAustralia considered that 'supplementation (of Australian data with data from overseas) is inappropriate. The inherent differences between each of the different Australian businesses have already made it difficult to identify an appropriate industry for the purpose of applying TFP. This problem should not be further exacerbated by including overseas data which is unlikely to be comparable due to differences in accounting policies, tax laws, reporting requirements, corporate structures, design standards, exchange rates, and labour rates.'

- EnergyAustralia considered that 'it would not be appropriate for the regulator to use confidential information (provided previously to a regulator) for other purposes than that originally intended by the provision of the confidential information.'

Energy Users Association of Australia – EUAA

- EUAA (2009) expressed the opinion that 'the act of gathering and presenting information on productivity and efficiency would be valuable. This would be of most value if it were centrally used to help determine future price paths for regulated network business but even if it is not (initially) formally used in setting regulated prices, it could still be useful.'

Envestra

- Envestra (2009, p.9) noted that 'those jurisdictions that have implemented TFP have, unlike Australia, had access to robust, consistent and relevant time series data on which to calculate TFP. This type of data does not exist [in Australia] ... Envestra would be concerned if attempts were made to collect the relevant information on a retrospective basis given the different data collection processes of distributors'.

Ergon Energy

- Ergon (2009, p.3) noted in principle that it 'considers that the use of TFP for a DNSP is only feasible if the input and output measures are truly reflective of the provider's inputs and outputs.' Specifically it expressed concern at the use of energy as an output and noted 'it is not appropriate for a TFP factor to be significantly influenced by energy usage changes with no capital or operational cost changes (and by definition no productivity change) by the provider … [such as when] a major mine or mineral processing facility can change their energy usage from 1 shift to 3 shift operation with no change to the network infrastructure or operational costs from the DNSP'.

ESC Victoria

- In its submission the ESC (2009, p.73–4) made the following observations:

  'the ESC believes the dataset required to estimate TFP is minimal. All the data needed to calculate the output quantity index (billing determinants and associated revenues, net of any revenues associated with service quality or supplemental regulatory mechanisms) will be provided through utilities' annual tariff submissions. Data on operating expenditures and changes in the RAB also needs to be provided. We believe data on these variables may be sufficiently accurate to be included at the present time in TFP calculations. All companies for which this is determined to be the case should be immediately added to TFP computations. The data quality for all other companies should be evaluated on a case by case basis.

  'Procedures also need to be put in place to ensure that these data are accurate and defined comparably across companies. We recommend that a process be put in place to improve data quality and consistency. However, we believe this process can run parallel to what is needed to compute industry TFP trends, and TFP measurement should not wait until this process is finalised, especially since there is a significant probability that costs can never be defined completely comparably across companies. It should also be recognised that the quality of company–

specific data is even more important in building block regulation, yet building block reviews will not be delayed until data imperfections have been eliminated.'

- The ESC noted that the TFP analysis for distribution businesses in other Australian States and Territories developed in 2006 by PEG and the ESC represented 'very preliminary TFP trend estimates'.

ETSA, CitiPower and Powercor

- ETSA, CitiPower and Powercor (2009, p.3) noted that 'it is not currently clear that all Australian DNSPs ... currently have comparable data that is robust, consistent and reliable'… and … 'have the required data collection systems in place to support the calculation of the X factor.' It noted that 'before TFP can be feasibly introduced a consistent, robust and reliable database will need to be established'.

- Its proposed design parameters include the requirement 'to use audited historic data only' but that the design should 'require data used … to be normalised in order to account for differences between DNSPs …. (to) ensure any differences are adequately taken into account in order to allow 'like–for–like' comparison'.

Grid Australia (comprising TNSPs Powerlink, TransGrid, ElectraNet, Transend and SP AusNet)

- In considering output measures Grid Australia (2009, p.5) noted that 'the output of a transmission business has at least three major elements – how much is being transported, how far it is being transported, and the reliability of the transport service.' It felt that 'the task of specifying inputs for electricity transmission is also likely to be controversial because of the differences across the sector in terms of asset base values and average asset ages'.

Integral

- In considering the matter of industry comparability in the light of differing mandated standards and, hence, grouping Integral (2009, p.12) noted that 'the differences in customer and community preferences between network supply areas pose a first order barrier to networks being sufficiently comparable between jurisdictions to facilitate TFP benchmarking, as the output measures themselves for network security and service reliability are not consistent'.

Jemena

- Jemena (2009, p.4) noted with regard to PEG's (2006) work on National Electricity Distribution Trends that 'PEG did not have access to consistent data for all four jurisdictions so had to adopt what it describes as second best approach for Tasmania, NSW and SA.'

- Commenting further on the PEG reports Jemena (2009 p.5) observe that PEG had 'also calculated an updated TFP trend for the five Victorian electricity distribution businesses as new data is added for each of the years 2003 to 2006' but it noted that 'even in that case, where there is extensive detailed and consistent data, there are significant uncertainties.'

- Jemena also noted that the 'work done by PEG to estimate TFP values for Victoria, South Australia, NSW and Tasmania suggests that either there are significant differences in TFP performance between jurisdictions or that data quality and model definition have a significant effect on the resultant TFP value.'

SP AusNet

- SP AusNet (2009, p.2) noted that 'transitional measures and data–collection will be necessary to transition businesses towards a new regulatory approach'. Later, it considered that 'the selection of an appropriate data set or peer group is an important issue. The outcomes from TFP rely upon relevant and accurate data used in an appropriately designed model'. It noted that while 'a fair amount of data and information would be available from businesses and Regulators from the last decade of regulatory reviews … it is up to the Regulator to make an assessment as to the quality and consistency of information available for benchmarking purposes. A longer term data set for the sample period would be preferable.' It further observed that 'the timing for introducing TFP depends on …[inter alia] … the quality of benchmarking data and information [and] how quickly the AER can establish appropriate information collection processes …' (SP AusNet 2009, p.12).

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