**Australian Energy Market Commission**

# Issues in relation to the Availability and Use of Asset, Expenditure and Related Information for Australian Electricity and Gas Distribution Businesses

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*This report contains 124 pages*

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# 1 Executive Summary

The Australian Energy Market Commission (AEMC) is currently assessing a proposed Rule Change submitted by the Victorian Government, which seeks to allow the Australian Energy Regulator (AER) to use Total Factor Productivity analysis (TFP) as an economic regulation methodology to be applied to electricity distribution businesses. In order to inform its assessment, the AEMC is undertaking a review of the use of TFP for electricity and natural gas distribution businesses and released a Framework and Issues Paper on 12 December 2008, which was followed by a public forum in February 2009.

The AEMC has engaged Network Advisory Services to investigate what publicly available expenditure and asset information exists for Australian electricity and gas distribution businesses. In particular, the AEMC is seeking to understand the degree of stability of capital and operating expenditure over time and whether there is a "wall of wire" looming for the Australian electricity and gas distribution sectors by virtue of a need to replace large quantities of ageing assets that are nearing the ends of their useful lives.

By agreement with the AEMC, this Report has been prepared on the basis of desktop research of existing publicly available information. Network Advisory Services found that there are various factors that affect the availability, quality and comparability of historic expenditure information for Australian distribution businesses. These factors limit the conclusions that have been drawn in this Report in relation to the stability of capital and operating expenditure over time and the possibility of an impending "wall of wire".

### *Actual Capital Expenditure: 1950 to the mid 1990s*

Network Advisory Services has not been able to find an existing publicly available data set of capital expenditure information for the electricity and gas distribution sectors across Australia that could be used either to:

- Provide long term data that could be used as the basis for TFP analysis, if such a long term data set was considered necessary or valuable for such a purpose; and

- Understand, in specific terms, the profile of investment in Australian electricity and gas distribution infrastructure.

While distribution-specific capital expenditure data is available in annual reports for some businesses, such as the State Electricity Commission of Victoria, it is not feasible to prepare a comprehensive data set of capital expenditure information:

- For the electricity distribution sector because of the lack of organisational continuity, especially in NSW and Queensland, before the mid to late 1990s and the fact that not all of the formerly vertically integrated electricity monopolies separately reported distribution expenditure information before the mid 1990s.

Even where information is publicly available it is not always clear on what basis "distribution" data that is available has been prepared; and

- For the gas distribution sector given that several distribution systems were privately owned by companies that no longer exist or no longer have an interest in distribution assets and none of the entities that owned gas distribution systems before 1997 still own them today.

***Actual Capital and Operating Expenditure: Mid 1990s to the present day***

Network Advisory Services found that capital and operating expenditure information is publicly available for the electricity distribution sector for: NSW and Victoria from 1995-96; South Australia and Tasmania from 1999-00; Queensland and the Northern Territory from 2001-02; and Western Australia and the ACT from 2002-03.

Attachment A of this Report provides a detailed breakdown of the specific nature, and source, of the publicly available electricity expenditure information by jurisdiction, for each distribution business, by year.

Network Advisory Services found that capital and operating expenditure information is publicly available for the gas distribution sector for: AGL in NSW from 1996-97 and for other NSW distribution businesses from 1999-00; Victorian distribution businesses from 1998; Envestra in South Australia from 1998-99; ActewAGL in the ACT from 1999-00; AlintaGas in Western Australian in 2000; and Queensland distribution businesses from 2000-01, although operating expenditure information is available for Allgas from 1999-00.

Attachment B of this Report provides a detailed breakdown of the specific nature, and source, of the publicly available gas expenditure information by jurisdiction, for each distribution business, by year.

However, there are a variety of factors that affect the quality and comparability of the available expenditure data, both between distribution businesses, and over time for individual businesses. These factors include that distribution businesses' expenditure, whether it be forecasts or actual amounts incurred, reflect different:

- Categorisations of distribution services – this reflects the fact that not all distribution services are regulated and that not all regulated services are regulated under a building block approach;

- Distinctions between distribution and transmission assets – this reflects the flexibility in the definitions in the National Electricity Rules as well as various jurisdiction specific arrangements;

- Allocations of shared costs between services – this reflects the flexibility given in the regulatory regime to distribution businesses to develop their own cost allocation methods;

- Approaches to capitalising and expensing expenditure – this reflects the flexibility given in the regulatory regime to distribution businesses to develop their own capitalisation policies;

- Types and scope of works being undertaken by distribution businesses and third parties – this reflects differences in contestability arrangements between jurisdictions;

- Treatments, and financial recognitions, of capital contributions – these contributions are included in capital expenditure in some jurisdictions but not others;

- Legislative and regulatory obligations – this reflects the needs for distribution systems to be designed to deliver specific service performance outcomes, which differ between jurisdictions;

- Operating environments – this reflects such matters as the geographic, topographic and climatic circumstances of distribution businesses, as well as their customer bases and historic development;

- Categorisations of expenditure – this reflects the differences between the categories that distribution businesses use internally to report expenditure information as well as differences between the categories that they have been required to report to their regulator; and

- Values of reported information – this reflects the difficulty in some cases in verifying whether expenditure has been reported in real or nominal terms and the need to convert expenditure before 1966 from Australian pounds to dollars.

Taken together, these factors limit the ability to develop a meaningful data set of comparable historical expenditure and to draw conclusions about the profile of historic expenditure for individual electricity and gas distribution businesses or between electricity and gas distribution businesses.

### *Forecast Capital Expenditure: The present day to 2029*

Network Advisory Services has not been able to obtain current capital expenditure forecast information for electricity and gas distribution businesses between the present day and 2029:

- Electricity distribution businesses planning reports and regulatory proposals do not typically include long term capital expenditure forecasts. The NSW and Victorian distribution businesses did provide forecast information to their jurisdictional regulators for their respective 2004-05 to 2008-09 and 2006-10 regulatory control periods. However, this information is now outdated and is not supported by detailed publicly available explanations; and

- The gas distribution businesses' Access Arrangement Information documents, and the related decisions of their regulators, do not include long term capital expenditure forecasts.

### *Age Profile of Distribution Assets*

The AEMC asked Network Advisory Services to investigate what information is publicly available about the age profile of electricity and gas distribution assets.

Many, but not all, electricity distribution businesses' recent regulatory submissions and proposals to their regulators include information about the age profile of their network assets. Generally, these distribution businesses claim that:

- The majority of their assets were built between the 1950s or 1960s and the early 1980s;
- They now have ageing asset bases, which have the potential to affect adversely the service, and safety, performance of their distribution systems; and
- Significant asset replacement expenditure is required in order to address their ageing asset bases, which in many cases involves large increases from what they have been spending in recent years.

Most of the publicly available ageing asset information provided by the distribution businesses is qualitative in nature and describes the historical development, and current state, of the distribution networks. Some businesses have also provided quantitative and graphical details of their assets' age profiles, which highlights particular types of ageing assets.

There is relatively little publicly available information in gas distribution businesses' Access Arrangement Information documents, or elsewhere, about the age profile of their assets. Available asset age information is generally limited to what is necessary to justify regulatory depreciation forecasts, as part of the building block requirement.

Despite this, some gas distribution businesses' Access Arrangement Information documents provide qualitative information which indicates, as for electricity, that:

- They now have ageing asset bases, which have the potential to affect adversely the service, and safety, performance of their distribution systems; and
- Significant asset replacement expenditure is required in order to address their ageing asset bases, which in many cases involves large increases from what they have been spending in recent years.

In the case of both electricity and gas distribution businesses, it would be necessary to review asset registers in order to verify, and further understand the details of, their claims about their ageing asset bases. Network Advisory Services has not sought, or had access to, this information in preparing this Report.

### *Conclusions*

Network Advisory Services has not been able to draw firm conclusions about the degree of stability of capital and operating expenditure over time, or of the extent to which past expenditure provides a reasonable indication of forecast expenditures. This is because of a lack of publicly available expenditure data, particularly before the mid 1990s, and because of a variety of factors that limit the quality and comparability of the expenditure data that is available. This is true both for the electricity and gas sectors.

There is considerable qualitative, but less quantitative, information provided by electricity distribution businesses supporting a view that they have ageing asset bases. This is being reflected into requests by a number of electricity distribution businesses for the AER to approve significantly increased asset replacement expenditure programs in the coming years. Less publicly available information is available about ageing assets in the gas distribution sector than the electricity distribution sector. Network Advisory Services has therefore not been able to draw firm conclusions about the nature, extent and timing of a "wall of wire" that the distribution businesses may be facing because the publicly available information is not sufficiently complete.

### *Options Available to the AER*

This report highlights a range of factors that limit the ability to understand, and draw conclusions about distribution businesses' historic and forecast expenditure and asset age profiles. However, these are not necessarily factors that need affect the AER if it was responsible for applying a TFP approach to the future regulation of electricity and gas distribution businesses. This is because they could request, through Regulatory Information Notices or Regulatory Information Orders, distribution businesses to:

- Provide existing information that we understand does exist, but is not currently publicly available; and

- Prepare information in a specific format that may not currently exist, but which would be necessary in order to compare information between distribution businesses, or for a specific distribution business over time.

However, it is noted that just because the AER is able to ask for particular information doesn't necessarily mean that the distribution businesses will be able to provide it. In relation to historic information in particular, this will depend on how effectively the distribution businesses are able to backcast existing information into the format that has been requested by the AER.

# 2 Introduction

## 2.1 Background

The Victorian Government submitted a proposed Rule Change to the Australian Energy Market Commission (AEMC) on 23 June 2008. The Rule Change sought to allow the Australian Energy Regulator (AER) to use Total Factor Productivity analysis (TFP) as an economic regulation methodology to be applied to electricity distribution businesses. TFP would therefore be an alternative to the current building block approach, which is provided for under Chapter 6 of the National Electricity Rules.

The AEMC is undertaking a review of the use of TFP for electricity and natural gas distribution businesses and released a Framework and Issues Paper on 12 December 2008, which was followed by a public forum in February 2009.

Some stakeholders raised various concerns with the AEMC about the proposed Rule Change, including that TFP is premised on there being a "steady state" and that this is a theoretical concept that may not actually exist in an environment where both corporation and customer initiated capital works are rarely forecast with accuracy. Other stakeholders questioned whether an industry TFP rate is suitable given the nature and extent of differences between distribution businesses within the same industry.

On this basis, some stakeholders questioned whether TFP could adequately deal with a distribution businesses' changing specific characteristics throughout a regulatory control period (for electricity), or Access Arrangement period (for gas), in a way that could be accommodated in expenditure forecasts under a building block approach. This could include lumpy system capital expenditure, unforseen growth in new connections, or growth in the volumes of some services.

Some distribution businesses also foreshadowed being faced with a "wall of wire" in their forward expenditure budgets, which relates to the need to replace, in the medium term, a very large number of assets at the end of their useful lives. These businesses questioned how TFP could accommodate a resultant "bow-wave" of required capital expenditure and, in turn, whether TFP would give a distribution business a "reasonable opportunity to recover at least the efficient costs" the service provider incurs, as is required by section 7A(2) of the National Electricity Law and section 24(2) of the National Gas Law.

## 2.2 Purpose and Scope of this Report

The AEMC has engaged Network Advisory Services to investigate what information is publicly available for Australian electricity and gas distribution businesses about:

- Capital expenditure between 1950 and 2029;
- The profile of, and key trends in, annual capital and operating expenditures since 1998; and
- The age profile of distribution assets.

To the extent that relevant information is publicly available, the AEMC is seeking to understand for the electricity and gas distribution businesses:

- The degree of stability of capital and operating expenditure over time;
- The certainty of forecast expenditure and the extent to which past expenditure provides a reasonable indication of forecast expenditures;
- The impact of jurisdictional, or business-specific, characteristics on actual and forecast expenditure; and
- Whether or not there is a "wall of wire" looming for the Australian electricity and gas distribution sectors by virtue of a need to replace large quantities of ageing assets that are nearing the ends of their useful lives.

It is noted that, in relation to gas, this report only focuses on regulated natural gas distribution systems.

## 2.3 Structure of this Report

The remainder of this report is structured as follows:

- Chapter 3 overviews the nature of the structural and organisational changes that have been made to the Australian electricity and gas distribution sectors since around 1950;
- Chapter 4 examines available public information about the asset age profiles of Australian electricity and gas distribution businesses;
- Chapter 5 examines available public information about the historic capital and operating expenditure of Australian electricity and gas distribution businesses;
- Chapter 6 examines factors affecting the quality and comparability of historic capital and operation expenditure of Australian electricity and gas distribution businesses;
- Chapter 7 provides a high level discussion of the key drivers of expenditure by electricity and gas distribution businesses and of the interactions between their capital and operating expenditure; and
- Chapter 8 examines other options that may be available to the AER for sourcing expenditure and asset age profile information other than relying on publicly available information sources.

## 2.4 Approach to Preparing this Report

By agreement with the AEMC, this report has been prepared on the basis of desktop research of existing publicly available information.

Importantly, Network Advisory Services did not seek, or have access to:

- Any information directly from electricity and gas distribution businesses, other than through their public websites;

- Any information from jurisdictional regulators or the AER, other than through their public websites, with the exception of the Essential Services Commission of Victoria (ESCV). The ESCV made available certain data that supported various publicly available reports that it has issued in recent years in relation to its assessment of the suitability of the application of TFP to the electricity and gas distribution sectors; and
- Any regulatory accounts of electricity and gas distribution businesses, as these are typically not in the public domain but rather are provided by distribution businesses for confidential use by their regulators.

Network Advisory Services sought publicly available information from the following organisations for this report:

- Australian Bureau of Statistics;
- Energy (formerly Electricity) Supply Association of Australia;
- Energy Networks Association;
- National Competition Council; and
- Productivity Commission.

Network Advisory Services also obtained various publicly available information from the internet, in particular from websites of:

- Jurisdiction regulators and the AER, particularly information in:
    - Past submissions and Access Arrangements submitted by distribution businesses;
    - Engineering consultants' expert reviews of capital and operating expenditure, and regulatory asset bases, for distribution businesses;
    - Past regulatory decisions of jurisdictional regulators and the AER; and
    - Performance reports prepared by jurisdictional regulators, including under the Standing Committee on National Regulatory Reporting Requirements (SCONRRR).
- Distribution businesses' websites, particularly information in:
    - Annual reports;
    - Submissions to jurisdictional regulators, the AER and other bodies; and
    - Planning reports.

Network Advisory Services found that there are various factors that affect the availability, quality and comparability of historic expenditure information for Australian distribution businesses. These factors, which are discussed in detail in Chapter 6, limit the conclusions that have been drawn in this Report in relation to the stability of

capital and operating expenditure over time and whether or not there is a "wall of wire" looming for the Australian electricity and gas distribution sectors.

## 2.5 Expenditure Information Required for TFP Analysis

In June 2009, the AEMC publicly released a report prepared by Economic Insights entitled "Assessment of Data Currently Available to Support TFP–based Network Regulation"[1]. Economic Insights' report includes "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."[2]

Appendix A of Economic Insights' report identified a range of capital and operating expenditure data (as well as extensive other data) that would be needed to support TFP analysis for electricity and gas distribution businesses. Their report concluded that:

- "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"[3];
- "for financial data, there are significant gaps and changes in coverage over time and across jurisdictions.....This compromises comparability across businesses, across jurisdictions and over time"[4];
- "Regulatory data consistency is also very variable."[5] The report goes on to state that "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"[6];
- "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"[7]; and
- "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."[8]

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[1] Available at: http://www.aemc.gov.au/News/Whats-New/Consultant-reports-for-Review-into-the-Use-of-Total-Factor-Productivity-for-the-Determination-of-Prices-and-Revenues.html

[2] Economic Insights, "Assessment of Data Currently Available to Support TFP–based Network Regulation", June 2009, page iii

[3] Ibid, page v

[4] Ibid, page v

[5] Ibid, page v

[6] Ibid, page v

[7] Ibid, vi

[8] Ibid, page vii

## 2.6 Disclaimer

This Report has been prepared for the AEMC to meet the Terms of Reference and has been developed based on publicly available materials and discussions with the AEMC. The conclusions drawn in this Report may not be valid if there is any change in the facts, circumstances or assumptions that have been made available to Network Advisory Services. Accordingly, while we believe that the statements made in this Report are accurate, no warranty of accuracy or reliability is given.

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# 3 Australian Electricity and Gas Distribution Businesses

This report examines historic information in relation to the Australian electricity and gas distribution businesses. It is therefore important to understand who these distribution businesses are today and how they have evolved in structure and scope over the second half of the 20th century. During this period, the Australian electricity and gas distribution sector underwent significant structural reform. This included horizontal and vertical aggregations and disaggregations as well as numerous changes in business names and ownership arrangements.

This Chapter overviews the nature of the structural and organisational changes that have been made to the Australian electricity and gas distribution sectors since around 1950. These changes provide important insights into the nature of the expenditure and asset information that is now publicly available for these sectors.

## 3.1 Electricity Distribution Businesses

### 3.1.1 NSW – Electricity

In 1945, 188 bodies were responsible for electricity distribution in NSW. By 1959, amalgamations reduced this to 69 bodies and by 1980 this was further reduced to 26 bodies.[9]

On 1 March 1996, the NSW electricity distribution sector was further restructured with the establishment of six corporatised distribution businesses from the then 25 existing distribution businesses:

- MetNorth, later renamed EnergyAustralia, was formed from Sydney Electricity and Orion Energy;
- Integral Energy was formed from Prospect Electricity and Illawarra Electricity;
- NorthPower Energy was formed from Namoi Valley Electricity, New England Electricity, NorthPower, Northern Rivers Electricity, North-West Electricity, P-CCC Electricity, Tenterfield Shire Council Electricity Division;
- Advance Energy was formed from Central West Electricity, Ophir Electricity, Southern Mitchell Electricity, Ulan Electricity and Western Power;
- Energy South was formed from Monaro Electricity, Murray River Electricity, Murrumbidgee Electricity, Northern Riverina Electricity, Southern Riverina Electricity, Southern Tablelands Electricity, South-West Slopes Electricity, Tumut River Electricity; and

[9] Australian Academy of Technological Sciences and Engineering, "Technology In Australia 1788 – 1988", 2000, http://www.austehc.unimelb.edu.au/tia/message.html, page 806

- Far West Energy was formed from Broken Hill Electricity.[10]

Later in 1996, Far West Energy was renamed Australian Inland Energy and Energy South was renamed Great Southern Energy.

On 1 July 2001, Country Energy was formed following the merger of Advance Energy, Great Southern Energy and NorthPower.

On 1 July 2005, Country Energy merged with Australian Inland Energy.

There are therefore now three NSW electricity distribution businesses – Energy Australia, Integral Energy and Country Energy. These are all wholly owned by the NSW Government. Each of these distribution businesses currently has a related retail business.

EnergyAustralia is also an electricity transmission network service provider and Country Energy also owns a gas distribution network.

### 3.1.2 Victoria – Electricity

Prior to 1993, the Victorian electricity industry was dominated by the vertically integrated State Electricity Commission of Victoria, which had been formed in 1918, with 11 metropolitan councils also being responsible for electricity distribution in accordance with Municipal Electricity Undertakings.

In 1993, the SECV was corporatised and restructured into three businesses, with Electricity Services Victoria being established with responsibility for providing distribution services.

In October 1994, Electricity Services Victoria and the 11 Municipal Electricity Undertakings were restructured with the establishment of five distribution businesses – United Energy Limited (United Energy), Solaris Power Limited (Solaris), CitiPower Limited (CitiPower), Energy Limited (Eastern Energy) and Powercor Australia Limited (Powercor).

The five distribution businesses were privatised in 1995. Eastern Energy is now known as SP AusNet and Solaris is now known as Jemena Electricity Networks (Jemena).

There are therefore now five electricity distribution businesses in Victoria:

- United Energy, which is jointly owned by Singapore Power and the DUET Group;

- Jemena, which is owned by Singapore Power;

[10] IPART, Electricity Prices - 1996, March 1996, http://www.archive.ipart.nsw.gov.au/

- CitiPower, which is jointly owned by Cheung Kong Infrastructure Ltd (CKI), Hong Kong Electric Holdings Ltd (HEH) and Spark Infrastructure (Spark);
- SP AusNet, which is owned by SP AusNet, with Singapore Power being the majority shareholder; and
- Powercor, which is jointly owned by CKI, HEH and Spark.[11]

None of the Victorian electricity distribution businesses has a related retail business, although each of the distribution businesses have at least one related business, which owns an Australian electricity transmission network or a gas network.

### 3.1.3 Queensland – Electricity

Prior to 1993, there were seven electricity distribution businesses in Queensland:

- Capricornia Electricity Board;
- Far North Queensland Electricity Board;
- Mackay Electricity Board;
- North Queensland Electricity Board;
- South-East Queensland Electricity Board;
- South-West Queensland Electricity Board;
- Wide Bay-Burnett Electricity Board.

Each of these Boards was corporatised in 1993.

In 1999, the Queensland electricity distribution sector was restructured with:

- Ergon Energy Corporation Limited being established following the merger of Capricornia Electricity Corporation, Far North Queensland Electricity Corporation, Mackay Electricity Corporation, North Queensland Electricity Corporation, South-East Queensland Electricity Corporation, South-West Queensland Electricity Corporation and Wide Bay-Burnett Electricity Corporation; and
- South-East Queensland Electricity Corporation becoming known as Energex Limited.

[11] Australian Energy Regulator, State of the energy market 2008, November 2008, page 145

Ergon Energy and Energex remain the two Queensland distribution businesses. These are both wholly owned by the Queensland Government. Ergon Energy has a related retail business. It also owns some high voltage assets, which might otherwise be categorised as transmission assets, although it is not itself a transmission network service provider.[12]

### 3.1.4 Western Australia – Electricity

The State Electricity Commission of Western Australia was formed in 1945. In 1975, it was merged into the newly created State Energy Commission of Western Australia, which was a vertically integrated utility responsible for both electricity and gas.

In 1995, the State Energy Commission of Western Australia was restructured and Western Power was established with responsibility for electricity, including electricity distribution, and AlintaGas was established with responsibility for gas, including gas distribution.

On 1 April 2006, Western Power was disaggregated. Western Power retained responsibility for distribution and transmission services in the south west of the State and Horizon Power was made responsible for generating, procuring, distributing and retailing electricity outside of the south west of the state.

There are therefore two electricity distribution businesses in Western Australia – Western Power and Horizon Power. These are both wholly owned by the Western Australian Government.

### 3.1.5 South Australia – Electricity

Prior to 1998, the South Australian electricity industry was vertically integrated in the Electricity Trust of South Australia (ETSA), which had been formed in 1946.

In July 1995, ETSA was corporatised.

ETSA was disaggregated in 1998 and ETSA Utilities become responsible for providing electricity distribution services.

In late 1999, ETSA Utilities was privatised.

ETSA Utilities remains the sole electricity distribution business in South Australia. It is jointly owned by CKI, HEH and Spark. ETSA Utilities does not have a related retail business.

[12] This is by virtue of clause 9.32.1(b) of the National Electricity Rules, which provides a permanent derogation in relation to the definition of a "transmission network" in Queensland, so that it only relates to a transmission network service provider.

### 3.1.6 Tasmania – Electricity

Prior to 1996, the Tasmanian electricity industry was vertically integrated in the Hydro-Electric Commission, which had been formed in 1930.

The Hydro-Electric Commission was corporatised in 1995 to become the Hydro-Electric Corporation.

In 1997, the Hydro-Electric Corporation was disaggregated and Aurora Energy was established with responsibility for providing electricity distribution services. It remains the sole electricity distribution business in Tasmania. It is wholly owned by the Tasmanian Government and has a related retail business.

### 3.1.7 Australian Capital Territory – Electricity

The ACT Electricity Authority (ACTEA), a Commonwealth Government agency, became responsible for electricity distribution in the Australian Capital Territory (ACT) in 1963.

In 1988, ACT Electricity and Water (ACTEW), an ACT Government agency, was established with responsibility for providing electricity, water and sewerage services.

ACTEW was corporatised in 1995 and became ACTEW Corporation Limited (ACTEW Corporation).

In 2000, a joint-venture was formed between ACTEW Corporation and AGL to form ActewAGL. ACTEW Corporation remains an ACT Government agency however, in 2006, AGL's former interests in ActewAGL transferred to Alinta Limited and are now owned by Singapore Power, through its subsidiary Jemena. ActewAGL has a related retail business, which is jointly owned by ACTEW Corporation and AGL Energy.

ActewAGL remains the sole electricity distribution business in the ACT. It also provides water, sewerage and gas network services in the ACT.

### 3.1.8 Northern Territory – Electricity

The Northern Territory Electricity Commission was created in 1978 when the Territory became self-governing.

In 1987, the Power and Water Authority (PAWA) was created when the Northern Territory Electricity Commission merged with the Northern Territory Water Authority.

The Power and Water Authority was corporatised in 2002, becoming the Power and Water Corporation.

Power and Water Corporation, now known as Power Water, is a vertically integrated utility that is responsible for electricity generation, system operations, network

services and retailing. It is the sole electricity distribution business in the Northern Territory. It also provides water and sewerage services in the Northern Territory.

### 3.1.9 Conclusions

The dominant trends in the Australian electricity distribution sector, particularly since the early 1990s, have been:

- The horizontal aggregation of bodies responsible for distribution in jurisdictions where many bodies had previously existed – this is particularly evident in NSW, Victoria and Queensland, albeit that each of these states currently have multiple distribution businesses;

- The vertical separation, to varying extents, of distribution responsibilities from generation, transmission, system operation and retailing in most (but not all) jurisdictions:

    - In Victoria (other than SP AusNet), Queensland (Energex) and South Australia there are stand alone electricity distribution businesses;

    - In Victoria (SP AusNet), NSW (EnergyAustralia) and Western Australia (Western Power) there are distribution businesses that also provide transmission services;

    - In NSW, Queensland (Ergon Energy only), Western Australia (Horizon Power), Tasmania, the ACT and the Northern Territory distribution businesses have a related retail business. Power Water and Horizon Power are vertically integrated generation, networks and retail electricity business; and

    - In NSW (Country Energy), Victoria (United Energy, Jemena and SP AusNet), the ACT and the Northern Territory all have distribution businesses that either own, or who have related parties that own, gas, water or sewerage networks.

- In some jurisdictions there have been several stages to industry restructurings, with interim bodies being established before the current industry structure has been reached – this is particularly evident in NSW and Victoria; and

- Victoria, South Australia and the ACT privatised their distribution sectors, whereas NSW, Queensland, Western Australia, Tasmania and the Northern Territory have all corporatized their distribution businesses and kept them in public ownership.

The results of the industry restructuring have been that in:

- NSW, Victoria (if the 11 Municipal Electricity Undertakings are considered in addition to the State Electricity Commission of Victoria) and Queensland there

have been many bodies responsible for providing distribution services over the past 60 years. These bodies have had many different legal forms and names; and

- South Australia, Tasmania, the ACT and the Northern Territory there have always only been one distribution business in each jurisdiction, but their legal form and name have changed several times over the past 60 years. Western Australia has historically only had one business that has been responsible for distribution services, but since 2006 it has had two such bodies.

## 3.2 Gas Distribution Businesses

### 3.2.1 NSW – Gas

Prior to 2006, the Australian Gas Light Company (AGL) was the main natural gas distribution businesses in NSW. In 2006, AGL's distribution assets were merged with those of Alinta Limited. In 2007, Alinta Limited was split up with Alinta LGA established to manage assets in the eastern states of Australia. It was renamed Jemena in August 2008. The licensee of the NSW gas distribution network is Jemena Gas Networks (NSW) Ltd, which is owned by Singapore Power. Jemena Gas Networks (NSW) Ltd does not have a related retail business.

The Albury Gas Company Limited was a wholly owned subsidiary of the Gas and Fuel Corporation of Victoria. Following the restructuring of the Victorian gas industry in 1997, the Albury Gas Company Limited became part of the Stratus network, which is now owned by Envestra. Envestra does not have a related retail business.

The Central Ranges Pipeline Pty Ltd is owned by APA Group – the gas distribution network having been newly built in 2006. APA Group does not have a related retail business, although it owns a number of gas distribution and transmission networks.

Great Southern Energy Gas Networks Pty Limited was established in 1997 as a subsidiary of Great Southern Energy to distribute gas in Wagga Wagga and surrounding areas.[13] On 1 July 2001, Country Energy was formed following the merger of Advance Energy, Great Southern Energy and NorthPower. Great Southern Energy Gas Networks Pty Limited was renamed Country Energy Gas Pty Ltd and is a subsidiary of Country Energy, which is wholly owned by the NSW Government. Country Energy has a related retail business.

### 3.2.2 Victoria – Gas

The Gas and Fuel Corporation of Victoria (GFCV) was established in 1951, replacing the former Metropolitan Gas Company. The Victorian Pipelines Commission was established in 1967 to construct, maintain and operate a natural gas pipeline in

[13] Country Energy, Annual Report 2001–02, page 58

Victoria. Its functions were transferred to the GFCV in 1971.[14] The Albury Gas Company Limited was a wholly owned subsidiary of the GFCV.

In 1994, the distribution functions of the GFCV and the Albury Gas Company Limited were transferred to a newly established Victorian Government owned gas distribution business, Gascor.

Gascor was disaggregated in 1997 with the creation of three gas distribution businesses – Westar, Stratus and Multinet. These three gas distribution businesses were privatised in 1998:

- Westar is now known as SP AusNet, whose majority shareholder is Singapore Power;
- Stratus is now known as Victorian Gas Distribution Pty Ltd and is owned by Envestra; and
- Multinet is now known as the Multinet Partnership, and is now jointly owned by the DUET Group and Babcock and Brown Infrastructure.

None of the Victorian gas distribution businesses has a related retail business, although all of their owners have various other interests in gas distribution and transmission assets elsewhere in Australia.

### 3.2.3 Queensland – Gas

Prior to 2006, Allgas Energy was a Queensland Government owned gas distribution business that operated in parts of Queensland. Allgas Energy was sold by the Queensland Government in November 2006 to APA Gas Networks. The network is now known as APT Allgas and is owned by the APA Group. APA Group does not have a related retail business, although it has interests in a number of gas distribution and transmission networks elsewhere in Australia.

Prior to 1997, the Gas Corporation of Queensland distributed gas in parts of Queensland and was owned by Boral. In 1997, the Gas Corporation of Queensland was merged with the South Australian Gas Company and Centre Gas Pty Ltd to form Envestra. Envestra does not have a related retail business although it does own gas distribution networks in South Australia, Victoria and the Northern Territory.

It is noted that there are two other small distribution networks in Queensland that are not covered pipelines for the purposes of the National Gas Rules. These are owned by the APA Group and the Dalby Town Council respectively.

[14] Australian Academy of Technological Sciences and Engineering, op cit, 2000, page 771

### 3.2.4 Western Australia – Gas

From 1975, the State Energy Commission of Western Australia was responsible for gas (and electricity) distribution.

In 1995, the State Energy Commission of Western Australia was restructured and AlintaGas became responsible for gas, including gas distribution and Western Power became responsible for electricity, including electricity distribution.

AlintaGas was privatised in 2000. The network is now known as WA Gas Networks and is jointly owned by the DUET Group and Babcock and Brown Infrastructure. This followed the split up of Alinta Limited in 2007.

### 3.2.5 South Australia – Gas

Prior to 1997, the South Australian Gas Company (SAGASCO) was the sole gas distribution business in South Australia and was owned by Boral.

In 1997, SAGASCO was merged with the Gas Corporation of Queensland and Centre Gas Pty Ltd to form Envestra. It is the sole gas distribution business in South Australia.

Envestra does not have a related retail business although it does own gas distribution networks in Queensland, Victoria and the Northern Territory.

### 3.2.6 Tasmania – Gas

Tas Gas Networks Pty Ltd commenced the design and construction of the new Tasmanian natural gas network in 2003. It is the sole gas distribution business in Tasmania and is owned by Babcock and Brown Infrastructure.

Tas Gas Networks Pty Ltd has a related retail business.

Importantly, Tas Gas Networks Pty Ltd's gas network is not a covered pipeline for the purposes of the National Gas Rules.

### 3.2.7 ACT – Gas

Prior to 2000, AGL owned the gas distribution network in the ACT.

In 2000, a joint-venture was formed between ACTEW Corporation and AGL to form ActewAGL. The licensee of the ACT gas network is ActewAGL Distribution.

ACTEW remains an ACT Government agency however, in 2006 AGL's former interests in ActewAGL transferred to Alinta Limited and are now owned by Singapore Power, through its subsidiary Jemena. ActewAGL has a related retail business, which is jointly owned by ACTEW Corporation and AGL Energy.

ActewAGL is the sole gas distribution business in the ACT. It also provides water, sewerage and electricity network services in the ACT.

### 3.2.8 Northern Territory – Gas

Prior to 1997, Centre Gas Pty Ltd distributed gas in Alice Springs in the Northern Territory and was owned by Boral. In 1997, the Centre Gas Pty Ltd was merged with Gas Corporation of Queensland and SAGASCO to form Envestra. Envestra does not have a related retail business although it does own gas distribution networks in South Australia, Victoria and the Queensland.

NT Gas Distribution, which is part of NT Gas is the other natural gas distribution business in the Northern Territory. The majority shareholder of NT Gas is the Australian Pipeline Trust (which is part of the APA Group). NT Gas also owns gas transmission assets in the Northern Territory.

Importantly, neither of the gas networks in the Northern Territory is a covered pipeline for the purposes of the National Gas Rules.

### 3.2.9 Conclusions

The dominant characteristics of Australian gas distribution businesses that are regulated under the National Gas Rules are that:

- Almost all gas distribution networks in Australia are now privately owned – the only publicly owned assets are:
    - Country Energy Gas Pty Ltd's network in NSW, which is owned by the NSW Government; and
    - ACTEW's joint interest with Singapore Power in ActewAGL's ACT network.
- There are several entities with interests in multiple gas distribution networks:
    - Singapore Power has interests in the NSW Gas Networks, the ACT network and the Victorian Westar network;
    - Envestra owns networks in Victoria, Queensland, South Australia and the Northern Territory;
    - Babcock and Brown Infrastructure and the DUET Group have interests in the Victorian Multinet network and WA Gas Networks and Babcock and Brown Infrastructure owns the Tasmanian network; and
    - APA Group have interests in the Allgas network in Queensland and NT Gas in the Northern Territory - APA Group also has interests in Envestra.

- There are several entities with interest in gas distribution and gas transmission - Singapore Power, Babcock and Brown Infrastructure, the DUET Group and APA Group.

# 4 Asset Age Profile Information

The AEMC has asked Network Advisory Services to investigate what publicly available information exists in relation to the asset age profiles of Australian electricity and gas distribution businesses.

The AEMC is seeking this information in order to understand whether distribution businesses' asset bases are ageing in such a way that there may be a need for them to replace, in the medium term, a very large number of assets because they are approaching, or at, the end of their useful lives. This may require the distribution businesses to significantly increase their asset replacement capital expenditure over time.

In surveying the available information, Network Advisory Services did not seek, or have access to, any information directly from distribution businesses, jurisdictional regulators or the AER, other than through their public websites. In particular, Network Advisory Services did not have access to distribution businesses' asset registers, which typically contain detailed information on the age of individual assets in the distribution system.

The information we obtained from public websites was principally contained in past Regulatory Proposals, submissions and Access Arrangements submitted by distribution businesses to their regulators. However, we also examined:

- Engineering consultants' expert reports prepared either for distribution businesses or regulators;
- Past regulatory decisions of jurisdictional regulators and the AER; and
- Planning reports prepared by distribution businesses.

Importantly, we did not attempt to catalogue all of the publicly available age asset profile information for each distribution business. Rather, we sought to identify the most recent details, or discussion, of the age profile of asset information from publicly available sources.

## 4.1 Electricity

Electricity distribution networks comprise a variety of assets, including: sub-stations and transformers, conductors and connectors, poles and cross arms, circuit breakers, auto reclosers, switchgear, fuses, isolators, surge arresters and meters.

Table 1 details indicative standard asset lives of key types of electricity assets. This information has been sourced from Appendix C of the NSW Treasury's July 2001

document entitled "Valuation of Electricity Network Assets – A Policy Guideline for NSW DNSPs (Draft)"[15].

**Table 1 – Electricity Standard Asset Lives**

| Asset Type | Standard Asset Life (Years) |
|---|---|
| 132kV overhead lines (double circuit steel lattice tower) | 60 |
| 66kV overhead lines | |
| Wet | 45 |
| Dry | 55 |
| Distribution 11kV and 22kV overhead lines | |
| Wet | 45 |
| Dry | 55 |
| 11kV and 22kV underground lines | 60 |
| Distribution low voltage overhead lines | |
| Wet | 45 |
| Dry | 55 |
| Distribution LV underground cables | 60 |
| Zone substations | 40 |
| Distribution substations (excluding transformers) | 40 |
| Distribution transformers | |
| Pole mounted – wet | 35 |
| Pole mounted – wet | 45 |
| Kiosk and Pad mounted | 45 |
| Distribution equipment | 35 |

This remainder of this section details publicly available information in relation to the asset age profiles of Australian electricity distribution businesses.

### 4.1.1 EnergyAustralia (NSW)

In its June 2008 Regulatory Proposal to the AER, EnergyAustralia noted that:

> *A large proportion of the network was built between 1965 and 1980 and its age is therefore approaching or above 40 years old.*[16]

[15] Sourced from Appendix 1 of Meritec's report for IPART, entitled "Review of Capital and Operating Expenditure of the NSW Electricity Distribution Network Service Providers – Final Report', September 2003. Data is for illustrative purposes only.

[16] EnergyAustralia, Regulatory Proposal, June 2008, page 6

It went on to say that:

> *On 30 June 2007, 11 percent (on a value basis) of our network assets are older than their designed technical lives.*[17]

EnergyAustralia included a series of publicly available Replacement Plans with its Regulatory Proposal, which provided age profiles for different categories of distribution assets. These documents provided detailed information to support its view that it has an ageing asset profile and that, in response, it needs to significantly increase its asset replacement expenditure over the 2008-09 to 2012-13 regulatory control period.[18]

Wilson Cook, the engineering consultants engaged by the AER to assess EnergyAustralia's capital expenditure proposal, noted in their public report to the AER that EnergyAustralia had a "notable quantity of very old assets installed before 1960 and a heavy weighting of assets installed in the period 1960 to 1985"[19]. This lead Wilson Cook to conclude that "EnergyAustralia's network assets are quite aged across a wide front with several major asset categories having average ages in excess of two-thirds of their standard life, suggesting that high levels of replacement capex should be anticipated"[20].

EnergyAustralia's asset replacement expenditure on its distribution system in 2006-07 was $266 million, which was 34 per cent of its total capital expenditure of $770 million. The AER's Distribution Determination approved capital expenditure building blocks for 2009-10 to 2013-14 based on average asset replacement expenditure of approximately $583.5 million, which is 44 per cent of EnergyAustralia's average capital expenditure building block of $1,327 million.[21] Indeed, EnergyAustralia's asset replacement expenditure allowance increases, as a percentage of its total capital expenditure building block, from approximately 36 per cent in 2009-10 to 54 per cent in 2013-14.

### 4.1.2 Integral Energy (NSW)

Integral Energy's Network Management Plan for the period 2009 to 2014 states that:

> *Many elements of Integral Energy's network were constructed during the infrastructure boom in the 1960s through to the 1980s and are now reaching the end of their useful lives. An ageing asset base will eventually display declining performance and increased operating expenditure requirements, particularly as individual assets reach the end of their operating life. As a result, Integral Energy needs to replace large numbers*

[17] Ibid, page 6

[18] Refer to Attachments 4.8.1 to 4.8.6 of EnergyAustralia's Regulatory Proposal.

[19] Wilson Cook, "ACT & NSW DNSP Expenditure Review - Vol 2", October 2008, page 4

[20] Ibid, page 4

[21] AER, "New South Wales Distribution Determination 2009–10 to 2013–14", page xxix, and Wilson Cook, "ACT & NSW DNSP Expenditure Review - Vol 2", October 2008, page 11

> *of assets in an economically efficient manner to ensure that age-related equipment failures do not adversely impact on network reliability and safety. Therefore, a key assumption underpinning the network strategy is that the age and condition of assets will impact on asset renewal and replacement requirements.*[22]

In its June 2008 Regulatory Proposal to the AER, Integral Energy explained that it prepares an annual Strategic Asset Renewal Plan, which forecasts its required renewal and replacement capital expenditure. The Regulatory Proposal indicates that the Plan includes asset age and condition data. However, this was provided to the AER as a confidential attachment to Integral Energy's Regulatory Proposal and is therefore not publicly available.[23]

Wilson Cook, the engineering consultants engaged by the AER to assess Integral Energy's capital expenditure proposal, noted in their public report to the AER that "Integral Energy's zone substations, power transformers protection relays and transmission circuits are ageing, suggesting that high levels of replacement capex in these areas should be anticipated. The weighted average age of the network is predicted to keep increasing, albeit at a lower rate over the next period"[24].

Integral Energy's asset replacement expenditure on its distribution system in 2006-07 was $143 million, which was 36 per cent of its total capital expenditure of $394 million. The AER's Distribution Determination approved capital expenditure building blocks for 2009-10 to 2013-14 based on average asset replacement expenditure of $156.2 million, which is 29 per cent of Integral Energy's average capital expenditure building block of $544.3 million.[25]

### 4.1.3 Country Energy (NSW)

Country Energy's June 2008 Regulatory Proposal makes a number of references to its "ageing asset profiles" and the risks that they present to its future service delivery.

The Regulatory Proposal states that:

> *The general picture of Country Energy's asset base shows a varied age profile. The network was initially developed in the 1940s and a major period of investment can be traced back to the 1950s and 1960s, as a result of policies to invest in the creation and development of infrastructure in rural areas. It is clear that a large proportion of the assets installed over this period continues to remain in service, and represents a large proportion of the network and has aged.*

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[22] Integral Energy, Network Management Plan 2009 – 2014, page 17

[23] Integral Energy, Regulatory Proposal – Appendix K: "PB Review of Assumptions underpinning capital and operating expenditure forecasts", Appendix C, page 52

[24] Wilson Cook, "ACT & NSW DNSP Expenditure Review - Vol 3", October 2008, page 9

[25] AER, "New South Wales Distribution Determination 2009–10 to 2013–14", page xxix, and Wilson Cook, "ACT & NSW DNSP Expenditure Review - Vol 3", October 2008, page 9

> *The weighted average age across all asset classes is around 27 years. Around 33 per cent of Country Energy's existing asset base (by replacement cost) was installed during the 1950s and 1960s, and around 18 per cent (by replacement cost) was installed over 45 years ago. It is expected that on average 1 per cent of all assets will reach the end of their nominal engineering lives each year over the next regulatory control period.*
>
> *Country Energy has entered a period in which the requirement for asset renewal expenditure will need to increase.*[26]

Country Energy did not provide a detailed breakdown of the age profile of its asset base by asset type in the public documents that supported its Regulatory Proposal.

However, Wilson Cook, the engineering consultants engaged by the AER to assess Integral Energy's capital expenditure proposal, provided an indicative asset age profile in their public report to the AER. Wilson Cook noted that "that significant growth in the network took place in the 1950s and 1960s and that a reasonably uniform rate of investment has been maintained since. The weighted average age of the assets is around 27 years but an estimated 18% of the network by replacement value is 45 years of age or older and thus near the end of its life. This supports Country Energy's view that it should be accelerating its rate of asset replacement."[27]

Country Energy's asset replacement expenditure on its distribution system in 2006-07 was $101 million, which was 21 per cent of its total capital expenditure of $469 million. The AER's Distribution Determination approved capital expenditure building blocks for 2009-10 to 2013-14 based on average asset replacement expenditure of $159.1 million, which is 21 per cent of Country Energy's average capital expenditure building block of $765.2 million.[28]

### 4.1.4 Powercor (Victoria)

In its October 2004 submission to the ESCV entitled "2006 Electricity Distribution Price Review", Powercor stated that it faces:

> *the aging of the asset base, with a significant proportion of Powercor Australia's assets reaching the end of their engineering lives within the next regulatory period. The aging of our assets increase the expenditure required on our renewals and replacement programs.*[29]

Powercor went on to state that:

> *A key measure of the age profile of the asset base is the Weighted Average Remaining Life (WARL). This is a measure of how far Powercor Australia's*

[26] Country Energy, Regulatory Proposal 2009-2014, page 110

[27] Wilson Cook, "ACT & NSW DNSP Expenditure Review - Vol 4", October 2008, page 4

[28] AER, "New South Wales Distribution Determination 2009–10 to 2013–14", page xxix, and Wilson Cook, "ACT & NSW DNSP Expenditure Review - Vol 3", October 2008, page 9

[29] Powercor Australia, 2006 Electricity Distribution Price Review, October 2004, page 58

> *assets are, on average, through their engineering lives. Put another way, it measures the extent of the useful life left in the assets. In considering an asset's engineering life, Powercor Australia benchmarks its asset management processes based on best engineering practice and its experience of when it is more efficient to replace an asset than to maintain it. The WARL of the Powercor Australia network is predicted to decline from 56 per cent in 2004 to 51 per cent by 2010, despite the proposed level of capital expenditure.*[30]

Appendix C to Powercor's 2004 submission to the ESCV was a report prepared by SKM entitled "Impact of ageing assets on operating expenses". This report provides a detailed breakdown of the age profile for each distribution asset class.[31]

Powercor provided a completed template at the request of the ESCV with its submission that detailed the weighted average remaining life of its assets.[32]

Powercor is due to submit its Regulatory Proposal to the AER for the 2011 to 2015 regulatory control period in November 2009. The AER will assess Powercor's asset replacement expenditure in setting the capital expenditure building block as part of its Distribution Determination.

### 4.1.5 CitiPower (Victoria)

In its October 2004 submission to the ESCV entitled "2006 Electricity Distribution Price Review", CitiPower stated that:

> *CitiPower's network has a significant number of aging assets which are approaching the end of their engineering lives. Investment in the renewal and replacement of assets that have reached the end of their engineering lives ensures the aging profile of the assets remains within the bounds of good engineering practice, and are cost-effective to maintain while delivering appropriate levels of safety, reliability and quality of service for our customers. Without investing in renewals and replacements, the network and the service it delivers will very quickly begin to deteriorate.*[33]

CitiPower went on to state that:

> *just under half of CitiPower's existing asset base (by replacement cost) was installed in the period from the late 1950s to the mid 1970s. As a result, over 12 per cent of CitiPower's assets will have reached the end of their*

[30] Ibid, page 66

[31] Powercor, "Appendix C - 2006 Electricity Distribution Price Review", page 6

[32] Refer Templates 15(a)-(g) available at
http://www.esc.vic.gov.au/public/Energy/Consultations/Electricity+Distribution+Price+Review+2006-10/Powercor+Australia.htm

[33] CitiPower, 2006 Electricity Distribution Price Review, October 2004, page 59

> *engineering asset lives by the end of the regulatory period, of which the majority will require replacing.*[34]

CitiPower added that:

> *The WARL of the CitiPower network is predicted to be 48 per cent in 2005.*

Appendix C to CitiPower's 2004 submission was a report prepared by SKM entitled "Impact of ageing assets on operating expenses". This report provides a detailed breakdown of the age profile for each distribution asset class.[35]

CitiPower also provided a completed template at the request of the ESCV with its submission that detailed the weighted average remaining life of its assets.[36]

In November 2009, CitiPower is due to submit its Regulatory Proposal to the AER for the 2011 to 2015 regulatory control period in November 2009. The AER will assess CitiPower's asset replacement expenditure in setting the capital expenditure building block as part of its Distribution Determination.

### 4.1.6 United Energy (Victoria)

In its 2004 submission to the ESCV entitled "2006 Electricity Distribution Price-Service Offering", United Energy stated that:

> *UED is entering a period in which the requirement for asset replacement expenditure will substantially increase. This increase in replacement expenditure requirements reflects the age profile of the asset population, the large proportion of the assets installed beginning in the early 1960s, and the fact than many of the assets installed at that time are approaching the end of their expected lives. The increase in expenditure is therefore required to ensure that the network age and condition is not permitted to deteriorate to the extent that there is an increased risk of component failures, and a subsequent risk to network reliability over the medium term.*[37]

United Energy provided a completed template at the request of the ESCV with its submission that detailed the weighted average remaining life of its assets.[38]

United Energy is due to submit its Regulatory Proposal to the AER for the 2011 to 2015 regulatory control period in November 2009. The AER will assess United

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[34] Ibid, page 60

[35] CitiPower, "Appendix C - 2006 Electricity Distribution Price Review", page 6

[36] Refer Templates 15(a)-(g) available at

http://www.esc.vic.gov.au/public/Energy/Consultations/Electricity+Distribution+Price+Review+2006-10/United+Energy.htm

[37] United Energy, Electricity Distribution Price-Service Offering, 2004, page 95

[38] Refer Templates 15(a)-(g) available at

http://www.esc.vic.gov.au/public/Energy/Consultations/Electricity+Distribution+Price+Review+2006-10/CitiPower+Pty+Ltd.htm

Energy's asset replacement expenditure in setting the capital expenditure building block as part of its Distribution Determination.

### 4.1.7 SP AusNet (Victoria)

In its 2004 submission to the ESCV entitled "TXU Networks Electricity Distribution Price Review 2006 - Price-Service Proposals for the Period 2006-2010", SP AusNet (then called TXU Networks) stated that:

> *As the age of the entire network increases, the condition of the assets is expected to deteriorate. The age profile of each asset class can be used to determine a Weighted Average Remaining Life ('WARL'), which provides an indication of how old the network is. The lower the WARL, the older the network. The WARL is forecast to remain relatively constant at approximately 67% over the 2006-2010 regulatory period.*

SP AusNet provided a completed template at the request of the ESCV with its submission that detailed the weighted average remaining life of its assets.[39]

SP AusNet is due to submit its Regulatory Proposal to the AER for the 2011 to 2015 regulatory control period in November 2009. The AER will assess SP AusNet's asset replacement expenditure in setting the capital expenditure building block as part of its Distribution Determination

### 4.1.8 Jemena (Victoria)

In its 2004 submission to the ESCV entitled "2006 Electricity Distribution Price Review", Jemena (then known as AGL Electricity Limited) stated that:

> *Asset replacement involves the replacement of assets that have reached the end of their useful life. AGLE engaged PB Associates to model the capital requirements for asset replacement.*
>
> *The model used by PB Associates provided a detailed assessment of the future capital requirements. A description of the PB Associates Asset Replacement model is given in Appendix J.*
>
> *The PB Associates model of non-load related capital expenditure forecasts that, due to the aging of assets, there is a requirement for increased capital expenditure during the 2006 to 2010 period and beyond. The model predicts that average expenditure over the next 20 years will be $19 million per year.*[40]

Appendix J to Jemena's submission stated that:

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[39] Refer Templates 15(a)-(g) available at http://www.esc.vic.gov.au/NR/rdonlyres/717D921F-EEE7-46A4-BEB5-7AA7CDC4A902/0/040630TXU_NetworkData.pdf

[40] AGLE, "2006 Electricity Distribution Price Review", page 46

> *The age profile is applied from the known age of the assets. For some asset classes, such as zone substation transformers, the exact age is known; for others, such as switches on poles, an estimate of the age is made. Estimates of asset age are made where historical records are not available or incomplete. In these cases the estimate is based on the available information and local knowledge.*[41]

Jemena's submission also provided a discussion of the nature of the ageing asset profile for various asset classes, which were supported by charts showing the age profile.[42]

Jemena provided a completed template at the request of the ESCV with its submission that detailed the weighted average remaining life of its assets.[43]

Jemena is due to submit its Regulatory Proposal to the AER for the 2011 to 2015 regulatory control period in November 2009. The AER will assess Jemena's asset replacement expenditure in setting the capital expenditure building block as part of its Distribution Determination

### 4.1.9 Ergon Energy (Queensland)

Ergon Energy's Network Management Plan for 2008 to 2013 provides a graphical representation of the age profile of its distribution assets. The Plan also states that the:

> *large volume of assets installed in the 1950s and 1960s is the major driver of increasing refurbishment and replacement expenditure*.[44]

This position is supported by two independent reports prepared in 2004 about the age profile of Ergon Energy's distribution asset base, which provided a basis for the QCA significantly increasing Ergon Energy's capital expenditure building block for the 2005-06 to 2009-10 regulatory control period:

- The QCA engaged engineering consultants Burns Roe Worley (BRW) to undertake an assessment of Ergon Energy's capital and operating expenditure forecasts. BRW's report, entitled "Report to the Queensland Competition Authority Capital and Operating Expenditure Study for Distribution Network Service Providers in Queensland – Ergon Energy", details the age profiles of Ergon Energy's distribution assets;[45] and

[41] ALGE, "Appendix J - Description of the PB Associates Asset Replacement Model"

[42] AGLE, "2006 Electricity Distribution Price Review", pages 48-52

[43] Refer Templates 15(a)-(g) available at

http://www.esc.vic.gov.au/public/Energy/Consultations/Electricity+Distribution+Price+Review+2006-10/AGL+Electricity.htm

[44] Ergon Energy, Network Management Plan - 2008 to 2013, page 23

[45] BRW, "Report to the Queensland Competition Authority Capital and Operating Expenditure Study for Distribution Network Service Providers in Queensland – Ergon Energy", pages 39 to 52

- An Independent Panel commissioned by the Queensland Government prepared a report entitled "Electricity Distribution and Service Delivery for the 21st Century". This report presented a detailed assessment of Ergon Energy's asset age profiles, as at 2003-04.[46]

Ergon Energy submitted its Regulatory Proposal to the AER for the 2010-11 to 2014-15 regulatory control period on 1 July 2009. Attached to this Regulatory Proposal are Asset Equipment Plans, which provide asset age information for Ergon Energy's 26 asset equipment types.

Ergon Energy's Regulatory Proposal proposes an average $131 million per annum increase in asset replacement capital expenditure between 2007-08 and 2010-11 and 2014-15.[47] Its average asset replacement expenditure is 20 per cent of its total capital expenditure for 2010-11 and 2014-15.

The AER will assess Ergon Energy's asset replacement expenditure in setting the capital expenditure building block as part of its Distribution Determination.

### 4.1.10 Energex (Queensland)

Two independent reports were prepared in 2004 about the age profile of Energex's distribution asset base, which provided a basis for the QCA significantly increasing Ergon Energy's capital expenditure building block for the 2005-06 to 2009-10 regulatory control period:

- The QCA engaged engineering consultants Burns Roe Worley (BRW) to undertake an assessment of Energex's capital and operating expenditure forecasts. BRW's report, entitled "Report to the Queensland Competition Authority Capital and Operating Expenditure Study for Distribution Network Service Providers in Queensland – Energex", details the age profiles of Energex's distribution assets;[48] and
- An Independent Panel commissioned by the Queensland Government prepared a report entitled "Electricity Distribution and Service Delivery for the 21st Century". This report presented a detailed assessment of Ergon Energy's asset age profiles, as at 2003-04.[49]

Energex submitted its Regulatory Proposal to the AER for the 2010-11 to 2014-15 regulatory control period on 1 July 2009. This Regulatory Proposal stated that:

> *ENERGEX has a significant number of assets that were installed in the 1960s and are approaching the end of their forecast life. In addition, large quantities of assets installed in the 1980s are moving into the latter part of*

[46] Independent Panel, "Electricity Distribution and Service Delivery for the 21st Century", pages 100-103

[47] Ergon Energy, "Regulatory Proposal to the Australian Energy Regulator – Distribution Services for the period 1 July 2010 to 30 June 2015", page 216

[48] BRW, "Report to the Queensland Competition Authority Capital and Operating Expenditure Study for Distribution Network Service Providers in Queensland – Energex", pages 39 to 49

[49] Independent Panel, "Electricity Distribution and Service Delivery for the 21st Century", pages 100-103

> *their forecast life and, depending on service conditions such as the need for high loading during periods of peak demand, require refurbishment or replacement.*
>
> *In accordance with its Asset Renewal Strategy, ENERGEX undertakes detailed analysis of the network assets using the CBRM methodology. The results of the analysis lead to the development of a comprehensive program to replace higher risk assets prior to anticipated failure.*[50]

ENERGEX proposed in its Regulatory Proposal to the AER an average $164 million per annum increase in asset replacement and renewal capital expenditure between 2007-08 and 2010-11 and 2014-15.[51] Its average asset replacement expenditure is 18 per cent of its total capital expenditure for 2010-11 and 2014-15.

The AER will assess Energex's asset replacement expenditure in setting the capital expenditure building block as part of its Distribution Determination.

### 4.1.11 Western Power

Western Power's proposed Access Arrangement revisions for its south west network include capital expenditure forecasts for 2009-10 to 2011-12 in an attachment entitled "Capital and operating expenditure 2009/10 to 2011/12". This attachment states that "a wave of asset replacement is required"[52] in relation to its transmission assets, however comparatively little information is provided about the age profile of its distribution assets.

It is therefore not clear that an ageing asset profile is currently a key driver of distribution asset replacement expenditure for Western Power's distribution system.

### 4.1.12 ETSA Utilities (South Australia)

In its submission to ESCOSA entitled "Expenditure Submission 2005/06 – 2009/10", ETSA Utilities stated that:

> *The South Australian distribution network, in common with most other Australian states, was constructed substantially in the 1950s and 1960s and thus significant components of the network are now nearing the end of the lifetimes for which they were originally designed to remain in service.*[53]

The submission went on to state that:

> *A significant proportion of the asset base is greater than 40 years old and a sizeable number of assets are more than 50 years old. If left unaddressed,*

[50] Energex, "Regulatory Proposal for the period July 2010 – June 2015", July 2009, page 203

[51] ENERGEX, "Regulatory Proposal for the period July 2010 – June 2015", page 216

[52] Western Power, "Capital and Operating Expenditure 2009/10 to 2011/12", September 2008, page 82

[53] ETSA Utilities, "Expenditure Submission 2005/06 – 2009/10", page 80

> *this increasing age profile will result in escalating plant failure rates and subsequent increased maintenance costs, lower reliability and higher risks. There is evidence that for some categories of network assets, this is already beginning to occur.*
>
> *Furthermore, if steps are not taken to begin addressing the problem now, the bow wave of replacement expenditure will continue to build until crisis action must be taken to bring the situation back under control. Under the EPO[54] expenditure allowances, only critical, short-term performance related replacement work could be undertaken, leaving the long-term problem unaddressed.*
>
> *Detailed Asset Management Plans have been developed for all of ETSA Utilities' asset categories. These consider historical asset performance as well as operational issues such as specialised skills, knowledge and equipment required to maintain the assets and the cost and availability of spares holdings. The risk of failure of specific items of equipment is also considered. On the basis of this analysis, optimal replacement profiles for each asset category have been developed.*
>
> *These plans have been independently reviewed using top-down models to derive asset replacement requirements. These models have confirmed that ETSA Utilities' replacement plans are prudent in starting to address the growing issue of aged asset replacement. The modelling also demonstrated that a significantly higher level of expenditure will be required in the future to fully address the problem, in the region of $150m per annum.[55]*

ESCOSA engaged PB Associates to review ETSA Utilties' proposed capital expenditure. Its report to ESCOSA supported ETSA Utilities' view of an ageing asset base and stated that:

> *The network age profile indicates large portions of the ETSA Utilities network were installed between 1955 and 1970 and should be due for replacement during the next 20 year period.[56]*

ETSA Utilities submitted its Regulatory Proposal to the AER for the 2010-11 to 2014-15 regulatory control period on 1 July 2009. The Regulatory Proposal stated that:

> *In common with much of Australia's electricity infrastructure, a significant proportion of ETSA Utilities' asset base is nearing the end of its prudent engineering life.*

[54] Electricity Pricing Order

[55] Ibid, page 80

[56] PB Associates, "South Australian Electricity Distribution Price Review: Prepared for Essential Services Commission of South Australia", September 2004, page 87

> *As assets approach their end of life, the risk of unplanned equipment failure and consequent reliability impacts increase unacceptably. ETSA Utilities cannot therefore maintain historic levels of asset replacement expenditure, generally based on a 'replace on failure' asset management strategy, without increasing risk to unacceptable levels.*
>
> *This issue, which was foreshadowed in ETSA Utilities' expenditure proposals to ESCoSA in relation to the current regulatory control period, has resulted in a major review of ETSA Utilities' asset management plans, and the 2008 decision by ETSA Utilities Board to adopt an asset management policy and underlying strategies that reflect increased condition monitoring and consequent increased condition-based asset replacement.*
>
> *ETSA Utilities engaged SKM to review its revised asset management policy, which SKM found 'to be reasonable and consistent with good industry practice.*
>
> *These new plans and strategies require that ETSA Utilities' Asset Replacement expenditure increase from a 2008/09 value of $32.4 million per annum to an average of $93.4 million per annum over the next regulatory control period.*[57]

The Regulatory Proposal went on to state that:

> *ETSA Utilities' proposed program is consistent with the trend in expenditure in the current period, and will still see ETSA Utilities' average asset age increase over the period from 36 to 39 years. It will also see the proportion of assets with ages in excess of their technical lives increase to more than 20%.*
>
> *This being the case, although the condition monitoring strategy will enable prudent deferral in the short-term, asset replacement expenditure must continue to significantly increase over the next 15—20 years as replacement deferral techniques are exhausted.*[58]

ETSA Utilities engaged SKM to assess the impact of the ageing asset base. SKM determined that the ageing assets will add 2 per cent per annum to Ergon Energy's operating expenditure over the period 2010 to 2015.[59]

ETSA Utilities proposed in its Regulatory Proposal to the AER to increase its asset replacement expenditure from $32.4 million in 2008-09 to an average of $93.4 million

[57] ETSA Utilities, "Regulatory Proposal 2010-15", page 119
[58] Ibid, page 120
[59] Ibid, page 158

per between 2010-11 and 2014-15.[60]. Its average asset replacement expenditure is 20 per cent of its total capital expenditure for 2010-11 and 2014-15.

The AER will assess ETSA Utilities' expenditure building blocks as part of its Distribution Determination.

### 4.1.13 Aurora Energy (Tasmania)

In its January 2007 submission to OTTER entitled "Submission to the Investigation of Prices for Electricity Distribution Services on Mainland Tasmania", Aurora Energy provided a graphical representation of its ageing distribution asset base. It stated, in reference to this graphical representation, that:

> *Aurora currently commits around $15 million per annum to the non-demand replacement of assets. This submission proposes to increase that expenditure to around $30 million per annum. Whilst appropriate for the next regulatory period, Figure 13 shows that even the proposed level is not sustainable in the medium term. Continuing with $30 million of replacement expenditure in the subsequent regulatory period would lead to continued ageing and increased risk.*[61]

OTTER engaged Wilson Cook to review Aurora Energy's proposed capital expenditure. Its report to OTTER stated that:

> *We are satisfied that Aurora has established a good information base on the age and condition of its assets and that this has allowed it to identify and prioritise the assets that should be replaced. We are also satisfied that the new replacement programmes are based on sound assessments and decision-making and are based in turn on the information available.*
>
> *Although the level of expenditure is much higher than historical levels of expenditure under this category, we consider that the historical levels are not sustainable if the network is to continue to meet acceptable service and safety targets.*
>
> *Overall, therefore, we consider that the level of replacement expenditure is well targeted and may be considered efficient.*[62]

Aurora Energy will submit its Regulatory Proposal to the AER for the regulatory control period commencing on 1 July 2012 in May 2011. The AER will assess Aurora Energy's asset replacement expenditure in setting the capital expenditure building block as part of its Distribution Determination.

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[60] ETSA Utilities, "Regulatory Proposal 2010-15", page 119

[61] Aurora Energy, "Submission to the Investigation of Prices for Electricity Distribution Services on Mainland Tasmania", page 52

[62] Wilson Cook, "Review of Aurora Energy's Capital and Operating Expenditure - Final Report", page 22

### 4.1.14 ActewAGL (ACT)

In its June 2008 Regulatory Proposal to the AER, ActewAGL noted that:

> *the majority of ActewAGL Distribution's electricity network assets were installed over the period from 1965 onwards, with the largest proportion installed during the period 1985–95. While a small amount of targeted refurbishment took place over time, the portfolio of assets continued to accumulate and progressively age. As the portfolio of assets progressively reach the end of their service life, it will become necessary to allocate an increasingly larger amount of capital expenditure for asset refurbishment and replacement purposes.*[63]

However, ActewAGL went on to state that:

> *Even if the AER approves ActewAGL Distribution's expenditure proposals, the ActewAGL Distribution system will still continue to age (to 27.53 years) by the end of the 2009–14 regulatory period. This will continue to be within the range of normal system ages experienced by other utilities.*
>
> *The main conclusion to be drawn from this analysis is that ActewAGL Distribution will need to continue to monitor system ageing and performance over the 2009–14 regulatory period, and will need to increase future refurbishment/replacement capital expenditure to maintain optimum system cost and performance.*[64]

ActewAGL provided a detailed breakdown of the age profile of its asset base by asset type in its Regulatory Proposal.[65]

### 4.1.15 PowerWater (Northern Territory)

In its January 2009 Revised Regulatory Proposal to the Utilities Commission, PowerWater noted that:

> *Much of Power and Water's network is now over 30 years old, as it was rebuilt following Cyclone Tracy in 1974. Due to the increasing age of its network, Power and Water is required to invest increasingly to maintain network reliability and security of supply and to prudently address the risks associated with ageing infrastructure located in tropical and arid environments. Power and Water is continuing to develop new asset management procedures and systems to assist it in cost effectively meeting these needs.*[66]

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[63] ActewAGL, "ActewAGL Distribution Determination - Regulatory Proposal to the Australian Energy Regulator", June 2008, page 113

[64] Ibid, page 116

[65] Ibid, page 114

[66] PowerWater, "2009 Networks Regulatory Reset Revised Regulatory Proposal - 1 July 2009 to 30 June 2014", page 27

PowerWater did not provide a detailed breakdown of the age profile of its asset base by asset type in its Revised Regulatory Proposal.

### 4.1.16 Conclusions

The key conclusions that can be drawn from the above discussion are that many, but not all, of the electricity distribution businesses claim that:

- The majority of their assets were built between the 1950s or 1960s and the early 1980s;
- They now have ageing asset bases, which have the potential to affect adversely the service, and safety, performance of their distribution systems; and
- Significant asset replacement expenditure is required in order to address their ageing asset bases, which in many cases involves large increases from what they have been spending in recent years.

By way of example:

- EnergyAustralia's asset replacement expenditure on its distribution system in 2006-07 was $266 million whereas the AER's Distribution Determination approved capital expenditure building blocks for 2009-10 to 2013-14 is based on average asset replacement expenditure of $583.5 million;[67]
- Integral Energy's asset replacement expenditure in 2006-07 was $143 million whereas the AER's Distribution Determination approved capital expenditure building blocks for 2009-10 to 2013-14 is based on average asset replacement expenditure of $156.2 million;[68]
- Country Energy's asset replacement expenditure in 2006-07 was $101 million whereas the AER's Distribution Determination approved capital expenditure building blocks for 2009-10 to 2013-14 is based on average asset replacement expenditure of $159.1 million;[69]
- ETSA Utilities proposes in its July 2009 Regulatory Proposal to the AER to increase its asset replacement expenditure from $32.4 million in 2008-09 to an average of $93.4 million per between 2010-11 and 2014-15;[70]
- ENERGEX proposes in its July 2009 Regulatory Proposal to the AER an average $164 million per annum increase in asset replacement and renewal capital expenditure between 2007-08 and 2010-11 and 2014-15;[71]

[67] AER, "New South Wales Distribution Determination 2009–10 to 2013–14", page xxix, and Wilson Cook, "ACT & NSW DNSP Expenditure Review - Vol 2", October 2008, page 11

[68] AER, "New South Wales Distribution Determination 2009–10 to 2013–14", page xxix, and Wilson Cook, "ACT & NSW DNSP Expenditure Review - Vol 3", October 2008, page 9

[69] AER, "New South Wales Distribution Determination 2009–10 to 2013–14", page xxviii, and Wilson Cook, "ACT & NSW DNSP Expenditure Review - Vol 4", October 2008, page 9

[70] ETSA Utilities, "Regulatory Proposal 2010-15", page 119

[71] ENERGEX, "Regulatory Proposal for the period July 2010 – June 2015", page 216

- Ergon Energy proposes in its July 2009 Regulatory Proposal to the AER an average $131 million per annum increase in asset replacement capital expenditure between 2007-08 and 2010-11 and 2014-15.[72]

The current building block approach has provided a clear basis for the:

- Distribution businesses to present arguments to their regulators for increased asset replacement expenditure to address their ageing asset bases; and
- Regulators to consider, and make decisions in relation to, the distribution businesses' arguments, typically with the benefit of advice from expert engineering consultants.

## 4.2 Gas

Gas distribution networks comprise a variety of assets, including: mains and inlets; valves, pressure regulating stations; meters, telemetery; and IT systems.

Table 2 details the standard asset lives of key types of gas assets. This information has been sourced from a various Access Arrangement Information documents that have been provided by gas distribution businesses to their jurisdictional regulators.

**Table 2 – Gas Standard Asset Lives**

| Asset Type | Standard Asset Life (Years) |
|---|---|
| Mains and inlets | 50 + |
| Meters | 20 – 30 |
| Telemetry | 5 – 10 |
| IT systems | 5 |
| Other distribution equipment, such as valves and pressure regulating stations | 40-50 |
| Other assets | 10 |

This remainder of this section examines the publicly available information, principally in gas distribution businesses' Access Arrangement Information documents, about the age profile of their networks. Details of the age profile of assets typically arises in the context of distribution businesses' justifications of asset replacement expenditure, which is usually targeted at managing levels of unaccounted for gas (UAFG).

### 4.2.1 Jemena's NSW network

Jemena's "Access Arrangement Information for NSW Network" for the 2005-06 to 2009-10 Access Arrangement period does not discuss the age profile of its assets

[72] Ergon Energy, "Regulatory Proposal to the Australian Energy Regulator – Distribution Services for the period 1 July 2010 to 30 June 2015", page 216

however it does discuss the need for asset replacement and renewals expenditure, including for the purposes of managing UAFG levels.

Jemena is due to submit its Access Arrangement revision proposals to the AER on or before 26 August 2009.

### 4.2.2 Country Energy's NSW network

Country Energy's January 2006 "Access Arrangement Information for the Wagga Wagga Natural Gas Distribution Network" for the 1 January 2006 to 30 June 2010 Access Arrangement period stated that:

> *The majority of Country Energy Gas' galvanised steel network was constructed between 1950 and 1980. Field data and engineering forecasts suggest that a median life of 50 years for these pipelines is likely, and probability analysis suggests that a growing proportion of the network will require replacement over the period to 2017. Country Energy Gas proposes to replace 2.5% of the network each year over the forthcoming regulatory period.*
>
> *Country Energy Gas operates some 44 kilometres of cast iron main. The last of the cast iron mains were laid in the early 1990s and a proportion of the system has already been rehabilitated. A section of cast iron will be replaced primarily where leak survey information indicates it is prudent to replace a section of main compared to repairing individual leaks, or where insufficient capacity on the main is available.*[73]

This is used as the basis for explaining Country Energy's proposed asset replacement expenditure. Country Energy's Access Arrangement Information does not provide a detailed breakdown of the age profile of its asset base by asset type however it does provide economic asset lives and remaining lives for the purposes of calculating regulatory depreciation.

On 1 July 2009, Country Energy submitted its "Access Arrangement Information for the Wagga Wagga Natural Gas Distribution Network" for the 1 July 2010 to 30 June 2015. The Access Arrangement Information stated that:

> *The major component of the asset and refurbishment capital expenditure relates to a long term pressure upgrade program. This program commenced in 2006/07 to address supply pressure problems and gas leaks caused by ageing assets in Wagga Wagga which have new growth areas connected to them.*[74]

[73] Country Energy, "Access Arrangement Information for the Wagga Wagga Natural Gas Distribution Network" (1 July 2006 to 30 June 2010), page 13

[74] Country Energy, Access Arrangement Information for the Wagga Wagga Natural Gas Distribution Network (1 July 2010 to 30 June 2015), page 24

Country Energy is proposing to increase its asset replacement and refurbishment expenditure from $1.266 million in 2007-08 to an average of $1.8 million in the next access arrangement period.

### 4.2.3 SP AusNet's Westar Victorian network

SP AusNet's Access Arrangement Information for the January 2008 to 31 December 2012 is not publicly available. Network Advisory Services has not been able to source recently publicly available information about the age profile of SP AusNet's Westar gas distribution network.

### 4.2.4 Envestra's Stratus Victorian network

Envestra's "Amended Access Arrangement Information for Envestra's Victorian Distribution System" for the 1 January 2008 to 31 December 2012 Access Arrangement period stated that:

> *Envestra's Distribution System has a high percentage of low pressure mains, comprised mostly of aged cast iron pipes. It is well recognised that such ageing infrastructure is the major contributor to gas leakage and interruptions to supply from the ingress of water. For this reason network owners around Australia (and overseas) have programs in place (or have completed programs) to replace old gas mains as soon as practicable. However, replacement comes at considerable cost so network owners have had to balance several factors when determining the rate of mains replacement. Such factors include:*
>
> - *safety;*
> - *reliability of supply - water ingress causes customer outages. Also, old low pressure mains may not cope with the gas supply demands, especially at peak times;*
> - *capacity of main – continually repairing low pressure mains may be inefficient if low pressure provides insufficient capacity for increasing loads in the area, particularly high instantaneous loads;*
> - *cost (cost of repairing leaks versus replacing mains)*
> - *impact of gas that is lost through leakage; and*
> - *competing demands for capital.*[75]

This is used as the basis for explaining Envestra's proposed asset replacement expenditure program. Envestra's Access Arrangement Information does not provide a detailed breakdown of the age profile of its asset base by asset type.

[75] Envestra, "Amended Access Arrangement Information for Envestra's Victorian Distribution System", page 23

### 4.2.5 Envestra's Albury network

Envestra's "Access Arrangement Information for Envestra's Albury Distribution Network" for the 1 January 2008 to 31 December 2012 Access Arrangement period does not discuss the age profile of its assets however it does discuss the need for asset replacement and renewals expenditure.

### 4.2.6 Multinet's Victorian network

Multinet's Access Arrangement Information for the January 2008 to 31 December 2012 is not publicly available. Network Advisory Services has not been able to source recently publicly available information about the age profile of Multinet's gas distribution network.

### 4.2.7 Allgas's Queensland network

Allgas's "Access Arrangement Information for the Queensland Network" for the 1 July 2006 to 30 June 2010 Access Arrangement period does not discuss the age profile of its assets however it does discuss the need for asset replacement and renewals expenditure, including for the purposes of managing UAFG levels.

### 4.2.8 Envestra's Queensland network

Envestra's "Access Arrangement Information for Envestra's Queensland Network" for the 1 July 2006 to 30 June 2010 Access Arrangement period stated that:

> *The Network has one of the highest percentages of cast iron and unprotected steel mains in comparison to other networks in Australia. This category provides for the replacement of gas mains and inlet services on a planned basis. In the absence of mains replacement, the annual volume of UAFG will trend upwards as a result of deterioration in the condition of cast iron and unprotected steel mains.*
>
> *A certain critical length of cast iron and unprotected steel must be replaced annually in order to offset the effect of this deterioration. If this critical length is not replaced the annual volume of UAFG will rise. If a greater length is replaced, the annual volume of UAFG will fall. It is difficult to assess this critical length because it depends upon many factors including the total length and overall condition of cast iron and unprotected steel mains within the Network. Further, UAFG volume cannot be measured directly, but is assessed in arrears, and is also affected by other factors.*
>
> *As discussed in section 2.1, Envestra is planning to replace 70km of mains per year through block replacement. The prudency of the proposed level of replacement is also underpinned by economic analysis. Before Envestra undertakes a mains replacement programme, it assesses a number of factors pertinent to the ability of the gas mains to continue to provide adequate service. Such factors include leak history and the age, condition*

*and material type of the main concerned. Economic analysis is then used to compare the cost of replacing mains with the forecast cost of*

*(a) continuing to repair leaks as they arise;*

*(b) gas lost from leakage; and*

*(c) ancillary tasks, such as attending to water ingress problems.*

*Where economic analysis indicates it is more prudent to replace a main, it is prioritised and scheduled for replacement, taking into account manpower/contractor resources and network planning considerations. All of the mains replacement forecast for the Second Access Arrangement Period either passes Envestra's economic test for replacement or is required to be replaced for operational reasons.*[76]

This is used as the basis for explaining Envestra's proposed asset replacement expenditure. Envestra's Access Arrangement Information does not provide a detailed breakdown of the age profile of its asset base by asset type however it does provide economic asset lives and remaining lives for the purposes of calculating regulatory depreciation.

### 4.2.9 AlintaGas's Western Australian network

AlintaGas "Access Arrangement Information for the Mid-West and South-West Gas Distribution Systems" for the 2005 to 2010 Access Arrangement period does not discuss the age profile of its assets, however it does discuss the need for asset replacement and renewals expenditure.

### 4.2.10 Envestra's South Australian network

Envestra's "Access Arrangement for the South Australian Gas Distribution Network: Explanatory Information" for the 1 July 2006 to 30 June 2011 Access Arrangement period includes a forecast for asset replacement for the "increased replacement of aging cast iron and unprotected steel mains"[77]. This document states that:

*The level of UAFG in the Network is impacted mostly by leakage arising from aging cast iron and unprotected steel mains. With the higher rate of mains replacement over the Second Access Arrangement Period, the level of UAFG is expected to decrease, with an expected level of about 1545 TJ by the end of the period. The forecast level has been calculated according to an average rate of gas leakage per km of cast iron and unprotected steel main. This rate is applied to determine the reduction in UAFG volume for each year of the Access Arrangement Period. Based on the proposed*

[76] Envestra "Access Arrangement Information for Envestra's Queensland Network", page 30

[77] Envestra's "Access Arrangement for the South Australian Gas Distribution Network: Explanatory Information", page 15

> *mains replacement of 100 km/year, this results in an annual reduction in UAFG volume of 15 TJ.*
>
> *Given that the higher rate of mains replacement will not commence until 2006/2007, the full reduction in UAFG volume will not be realised until 2007/2008. Due to the expiry of the previous contract for supply of gas for UAFG, and the market now containing a number of participants that could potentially supply that gas, Envestra has tendered for the supply of gas for UAFG for the Access Arrangement Period. This has ensured an efficient cost in relation to this key component of Non-Capital Cost*.[78]

This is used as the basis for explaining Envestra's proposed asset replacement expenditure. Envestra's Access Arrangement Information does not provide a detailed breakdown of the age profile of its asset base by asset type however it does provide economic asset lives and remaining lives for the purposes of calculating regulatory depreciation.

### 4.2.11 ActewAGL Distribution's ACT network

ActewAGL Distribution's "Access Arrangement Information for ActewAGL Gas Distribution System in ACT and Greater Queanbeyan" for the 1 July 2005 to 30 June 2010 Access Arrangement period includes provision for the "renewal and replacement of aging network assets"[79]. However, ActewAGL Distribution's Access Arrangement Information does not provide a detailed breakdown of the age profile of its asset base by asset type, although it does provide economic asset lives for the purposes of calculating regulatory depreciation.

ActewAGL Distribution's submitted its "Access arrangement information for the ACT, Queanbeyan and Palerang gas distribution network" for the 1 July 2010 to 30 June 2015 Access Arrangement period in June 2009. This includes provision for the renewal expenditure but does not provide a detailed breakdown of the age profile of its asset base by asset type.[80]

### 4.2.12 Conclusions

The key conclusions that can be drawn from the above discussion are that:

- There is a correlation between the age of distribution assets – particularly older cast iron assets – and the level of UAFG, which is particularly significant for systems that converted from towns gas to natural gas in the late 20th century, such as in Queensland. UAFG levels are a key driver of asset replacement capital expenditure;

[78] Ibid, pages 21-22

[79] Jemena, "Access Arrangement Information for ActewAGL Gas Distribution System in ACT and Greater Queanbeyan", page 7

[80] Jemena, "ActewAGL Distribution Access Arrangement Information for the ACT, Queanbeyan and Palerang Gas Distribution Network", refer chapter 6

- There is relatively little publicly available information in distribution businesses' Access Arrangement Information documents, or elsewhere, about the age profile of individual distribution assets; and
- Asset age information in Access Arrangement Information documents is generally limited to that necessary to justify regulatory depreciation forecasts, as part of the building block requirement.

Despite this, some gas distribution businesses claim that:

- They now have ageing asset bases, which have the potential to affect adversely the service, and safety, performance of their distribution systems; and
- Significant asset replacement expenditure is required in order to address their ageing asset bases, which in many cases involves large increases from what they have been spending in recent years.

The current building block approach has provided a clear basis for the:

- Distribution businesses to present arguments to their regulators for increased asset replacement expenditure to address their ageing asset bases, particularly in the context UAFG levels, albeit that the businesses have typically provided little publicly available information in support of their forecasts; and
- Regulators to consider, and make decisions in relation to, the distribution businesses' arguments, typically with the benefit of advice from expert engineering consultants.

# 5 Available Expenditure Information

The AEMC has asked Network Advisory Services to investigate what publicly available information exists in relation to the long term expenditure profile of electricity and gas distribution businesses since approximately 1950 to approximately 2029.

This Chapter examines the public availability of expenditure information for Australian electricity and gas distribution businesses by jurisdiction in the following three timeframes:

- Actual Capital Expenditure: 1950 to the mid 1990s;
- Actual Capital and Operating Expenditure: Mid 1990s to the present day; and
- Forecast Capital Expenditure: The present day to 2029.

## 5.1 Actual Capital Expenditure: 1950 to the mid 1990s

Network Advisory Services investigated the public availability of capital expenditure information for electricity and gas distribution businesses between 1950 and the mid 1990s.

These investigations were made through:

- The Australian Bureau of Statistics;
- The Productivity Commission;
- The Energy (formerly Electricity) Supply Association of Australia;
- The Energy Networks Association; and
- Electricity and gas businesses' annual reports.

### 5.1.1 Australian Bureau of Statistics

The Australian Bureau of Statistics' data series ABS 8208.0 provides information on capital expenditure for the electricity and gas industries. However, capital expenditure for the:

- Electricity industry is presented in aggregate form by State. It therefore does not provide details of annual capital expenditure for the electricity distribution sector as a whole or for individual electricity distribution businesses; and
- Gas industry is presented as national, rather than State, figures. It therefore does not provide details of annual capital expenditure for the gas distribution sector as a whole or for individual gas distribution businesses.

On this basis, the data limitations associated with the ABS 8208.0 series mean that it is not an appropriate source of information concerning capital expenditure estimates in the electricity distribution sector for Australian States and Territories.

### 5.1.2 Productivity Commission

Network Advisory Services contacted the Productivity Commission to ascertain if it held historic capital expenditure information for Australian electricity and gas distribution businesses.

It referred to its publication entitled "Performance of Government Trading Enterprises, 1991–92 to 1996–97"[81]. The purpose of this research report was to analyse the outcomes of the reforms of Government Trading Enterprises during the period 1991–92 to 1996–97 for key stakeholders – consumers, shareholder governments, employees and the community generally.

The research report contains extensive discussion of the nature of the industry reforms of the 1990s but does not detail historic capital expenditure information for the electricity and gas distribution sectors.

### 5.1.3 Energy (formerly Electricity) Supply Association of Australia

Network Advisory Services contacted the Energy (formerly Electricity) Supply Association of Australia (ESAA) to ascertain if it held historic capital expenditure information for Australian electricity and gas distribution businesses.

The ESAA advised that it does not hold this information, although its publication "Electricity Gas Australia" provides extensive information about capacity and performance data for the Australian energy industry.

### 5.1.4 Energy Networks Association

Network Advisory Services contacted the Energy Networks Association (ENA) to ascertain if it held publicly available historic capital expenditure information for Australian electricity and gas distribution businesses.

The ENA advised that it does not publish this information.

### 5.1.5 Annual Reports

As discussed in Chapter 3 of this Report, there were significant structural reforms made at various times in the second half of the 20th Century to the Australian electricity and gas businesses.

[81] Productivity Commission 1998, Performance of Government Trading Enterprises, 1991–92 to 1996–97, Research Report, AusInfo, Canberra, October. Available at: http://www.pc.gov.au/__data/assets/pdf_file/0007/8647/perf9697.pdf

## ***Electricity***

The results of the electricity industry restructuring have been that in:

- NSW, Victoria (if the 11 Municipal Electricity Undertakings are considered in addition to the State Electricity Commission of Victoria) and Queensland there have been many bodies responsible for providing distribution services over the past 60 years. These bodies have had many different legal forms and names; and

- South Australia, Tasmania, the ACT and the NT there have always only been one distribution business in each jurisdiction, but their legal form and name have changed several times over the past 60 years. Western Australia has historically only had one business responsible for distribution services, but since 2006 it has had two bodies.

Network Advisory Services obtained copies of a sample of electricity distribution businesses' annual reports to determine the nature of the historic distribution specific capital expenditure information that is publicly available. We found that:

- The State Electricity Commission of Victoria's annual reports include a breakdown of annual distribution capital expenditure;

- The Tasmanian Hydro Electric Commission's annual reports include a breakdown of annual distribution capital expenditure; and

- The Electricity Trust of South Australia's annual reports did not include a breakdown of annual distribution capital expenditure.

We did not seek to obtain annual reports in any other jurisdictions. This would have been a particularly complex exercise in NSW and Queensland given that, as discussed in Chapter 3:

- NSW had 188 bodies responsible for electricity distribution in 1945, which reduced to 69 by 1959, 26 by 1980 and six by 1996; and

- Queensland had seven bodies responsible for electricity distribution prior to 1993.

We agreed with the AEMC that, based on our initial investigations, it would not be feasible in this engagement to construct a meaningful national trend in capital expenditure for the electricity distribution sector from annual reports. This is despite:

- There being distribution capital expenditure information available in some jurisdictions; and

- The possibility of distribution capital expenditure information being available in some other jurisdictions. However, it would be extremely difficult to accurately

assemble meaningful data given the large number of bodies that have historically been responsible for providing distribution services.

***Gas***

The results of the gas industry restructurings since the mid 1990s have been that none of the entities that owned gas distribution assets prior to 1997 still own them today.

Network Advisory Services obtained copies of the Gas and Fuel Corporation of Victoria's annual reports and established that it did report its annual distribution specific capital expenditure.

However, following discussions with the AEMC, we agreed that it would not be feasible in this engagement to construct a meaningful national trend in capital expenditure for the gas distribution sector from annual reports. This is particularly the case because several distribution system were privately owned by companies that no longer exist or no longer have an interest in distribution assets. These include the Australian Gas Light Company and Boral. This is despite:

- There being distribution capital expenditure information available in some jurisdictions; and
- The possibility of distribution capital expenditure information being available in some other jurisdictions. However, it would be extremely difficult to accurately assemble meaningful data given the changes in the bodies that have been responsible for providing gas distribution services.

### 5.1.6 Conclusion

We have not been able to find, in the course of our research for this engagement, an existing data set of capital expenditure information for the electricity and gas distribution sectors across Australia that could be used either to:

- Provide long term data that could be used as the basis for TFP analysis, if such a long term data set was considered necessary or valuable for such a purpose; and
- Understand, in specific terms, the profile of investment in Australian electricity and gas distribution infrastructure.

While distribution-specific capital expenditure data are available in annual reports for some businesses, it is not feasible to prepare a comprehensive data set of capital expenditure information:

- For the electricity distribution sector because of the large number of bodies that have been responsible for providing distribution services, especially in NSW and Queensland, and that other jurisdictions, such as South Australia, have not

historically publicly reported distribution specific capital expenditure information; and

- For the gas distribution sector given that several distribution systems were privately owned by companies that no longer exist or no longer have an interest in distribution assets and none of the entities that owned gas distribution systems before 1997 still own them today.

## 5.2 Actual Capital and Operating Expenditure: Mid 1990s to the present day

Network Advisory Services has investigated the public availability of capital and operating expenditure information for electricity and gas distribution businesses between the mid 1990s and the present day.

### 5.2.1 Importance of introducing Independent Economic Regulators

A significant development that occurred during the course of the 1990s as part of the implementation of national competition policy, the restructuring of the Australian electricity and gas industries and the establishment of a National Electricity Market (eventually, after the admission of Tasmania, covering all jurisdictions other than Western Australia and the Northern Territory) was the introduction of the national independent economic regulation of distribution services.

This development had its genesis in 1993 in the "Report by the Independent Committee of Inquiry into a National Competition Policy for Australia", which became known as the Hilmer Report. The Hilmer Report recommended that:

> *Governments should work together to address government monopoly pricing issues, particularly in the context of introducing competition in markets or improving the efficiency of sectors of national economic significance. State and Territory Governments should consider establishing expert and independent bodies along the lines of the NSW Government Pricing Tribunal.*[82]

At its August 1994 meeting, the Council of Australian Governments (COAG) gave effect to the Hilmer Report's recommendation by agreeing to:

> *the establishment in each jurisdiction of a system to carry out surveillance of prices charged by utilities and other corporations with high levels of monopoly power and a regime to provide access to essential facilities such as electricity grids, gas pipelines, airports, rail networks, postal delivery services, communication channels and seaports.*[83]

[82] Report by the Independent Committee of Inquiry into a National Competition Policy for Australia, 1993, page 289

[83] COAG Communiqué, August 1994

As a result, all Australian states and territories established independent regulators that became responsible for the economic regulation of relevant electricity and gas distribution businesses:

- The NSW Independent Pricing and Regulatory Tribunal (IPART) had been established 1992;
- The Victorian Office of the Regulator General (ORG), later to become the Essential Services Commission of Victoria (ESCV), was established in 1994;
- The Queensland Competition Authority (QCA) was established in 1997;
- The Western Australian Office of the Independent Gas Pipelines Access Regulator (OFFGAR) was established in 1998. In 2004, it became part of the new Western Australian Economic Regulation Authority (ERA), with responsibility for the economic regulation of electricity and gas distribution services (amongst other things);
- The South Australian Independent Industry Regulator (SAIIR) was established in 1999, which later became the Essential Services Commission of South Australia (ESCOSA);
- The Tasmanian Government Prices Oversight Commission (GPOC) was established in 1995 and the Tasmanian Electricity Regulator (OTTER) was established in 1998 and is now part of the Tasmanian Economic Regulator;
- The ACT Independent Competition and Regulatory Commission (ICRC) was established in 1997; and
- The Northern Territory Utilities Commission (UC) was established in 2000.

***Electricity***

On 16 September 1998, the Australian Competition and Consumer Commission (ACCC) accepted the National Electricity Code as an access code under the Trade Practices Act 1974.

The National Electricity Code established IPART, the ORG (later the ESCV), the QCA, the SAIIR (later ESCOSA) and the ICRC as jurisdictional regulators, with responsibility for the economic regulation of electricity distribution services in their respective jurisdictions.

Part D of Chapter 6 of the National Electricity Code included a procedure for determining a distribution business's Aggregate Annual Revenue Requirement (AARR) for each regulatory year of a regulatory control period. Although each of the jurisdictional regulators needed to consider jurisdictional-specific regulatory requirements in addition to Chapter 6 of the Rules in making their price determinations, they all applied a "building block approach" as the basis for setting an

AARR. Two key building blocks in this approach relate to capital and operating expenditure.

The way in which the jurisdictional regulators typically applied the building block approach for capital and operating expenditure was to:

- Invite the distribution business to submit its forecasts of capital and operating expenditure for the regulatory control period. These forecasts typically made reference to the business's historic expenditure;

- Engage an engineering consultant to undertake an expert review of the distribution business's expenditure forecasts. This review typically had regard for the business's historic expenditure; and

- Make a draft, then final, determination, which would incorporate approved capital and operating expenditure building blocks into the calculation of the AARRs. This final determination typically had regard for the business's historic and forecast expenditure, including the outcomes of the engineering consultant's expert review.

As a result of this process, a clearer public picture began to emerge of individual electricity distribution businesses' actual and forecast capital and operating expenditure:

- IPART issued its first decision under the National Electricity Code for the NSW distribution businesses in December 1999, entitled "Regulation of New South Wales Electricity Distribution Networks - Determination and Rules under the National Electricity Code";

- The ICRC issued its first decision under the National Electricity Code for ACTEW in May 1999, entitled "Price Direction - ACTEW'S Electricity, Water & Sewerage Charges for 1999/2000 to 2003/2004";

- The ORG issued its first decision under the National Electricity Code for the Victorian distribution businesses in September 2000, entitled "Electricity Distribution Price Determination 2001-05"; and

- The QCA issued its first decision under the National Electricity Code for the Queensland distribution businesses in May 2001, entitled "Regulation of Electricity Distribution, Final Determination".

On 1 July 2005, the National Electricity Rules replaced the National Electricity Code and the Australian Energy Regulator (AER) became responsible for the economic regulation of distribution services in the National Electricity Market.

Part C of Chapter 6 of the National Electricity Rules retains the building block approach as the basis for the AER setting a distribution business's annual revenue requirement (ARR) for Standard Control Services for each regulatory year of a regulatory control period. Under Chapter 6, an electricity distribution business must

submit to the AER (amongst other things) in its regulatory proposal various information in relation to its historic and forecast capital and operating expenditure.

To date, the AER has only issued Distribution Determinations under the National Electricity Rules for the NSW and ACT distribution businesses. In the future, all distribution businesses in the National Electricity Market will be regulated by the AER under Chapter 6 of the National Electricity Rules.

Tasmania did not enter the National Electricity Market until 2004. Prior to this, it operated under the Tasmanian Electricity Code, which was introduced in July 1998 and which, while broadly modelled on the National Electricity Code, contained various Tasmanian-specific chapters and provisions. OTTER issued its first decision for Aurora Energy's distribution services under the Tasmanian Electricity Code in December 1999, entitled "Investigation into Electricity Supply Industry Pricing Policies". Aurora Energy's distribution services in its next regulatory control period, commencing on 1 July 2012, will be regulated by the AER under the National Electricity Rules.

Western Australia is not part of the National Electricity Market. Western Australian distribution businesses are regulated under the *Electricity Networks Access Code 2004*. Unlike either the National Electricity Code or the National Electricity Rules, the Western Australian *Electricity Networks Access Code 2004* requires an electricity distribution business to submit an Access Arrangement to the ERA for approval. Western Power's South West Interconnected Network (SWIN) within the South West Interconnected System (SWIS) is currently the only covered network under the Code. The ERA first approved an Access Arrangement for Western Power with effect from 1 July 2007.

The Northern Territory is also not part of the National Electricity Market. Power Water's distribution system is regulated under Part 3 of the Northern Territory's *Electricity Networks (Third Party Access) Code*. The Utilities Commission issued its first decision for Power Water in March 2000, entitled "Revenue Determinations - April to June 2000", which was followed by a further decision in June 2000, entitled "Revenue Determinations, 2000-01 to 2002-03". However, the Utility Commission's most recent decision for Power Water, which took effect from 1 July 2009, had regard for the National Electricity Rules.

In parallel with making determinations in relation to the economic regulation of distribution services, jurisdictional regulators have introduced requirements for distribution businesses to submit financial performance information to them within approved regulatory control periods.

In March 2002, the Utility Regulators' Forum issued a discussion paper entitled "National regulatory reporting for electricity distribution and retailing businesses". This discussion paper was prepared with the participation of jurisdictional and national electricity regulators and relevant departments from NSW, Victoria, ACT, Queensland, Tasmania and South Australia. It set out a consistent basis for reporting of financial performance information for electricity distribution businesses, including in relation to capitalisation policies, capital expenditure and operating expenditure.

Jurisdictional regulators have required electricity distribution businesses to prepare regulatory accounts and to provide other performance information, including in relation to actual capital and operating expenditure incurred during the regulatory control period. Typically, electricity distribution businesses' regulatory accounts have not been made publicly available, although jurisdictional regulators have published performance reports, which in some cases include summarised or aggregated expenditure information:

- IPART requires reporting against its document entitled "Regulatory Information Requirements for Electricity Distributors in New South Wales". IPART issued its first "Price and Service Report - NSW Electricity Distribution Businesses 1999/2000" in July 2001. These reports include expenditure information;

- The ESCV requires reporting against its document entitled "Guideline No 3: Electricity Industry – Regulatory Accounting Information Requirements". The ESCV (then the ORG) issued its first "Electricity Distribution Businesses Comparative Performance for the Calendar Year 1997" in July 1998. These reports include expenditure information;

- The QCA requires reporting against its document entitled "Electricity Distribution: Regulatory Reporting Guidelines". The QCA issued its first "Electricity Distribution Businesses Financial Performance for the Financial Year 2001-02" in August 2003. These reports include expenditure information;

- The ERA requires reporting against its document entitled "Electricity Compliance Reporting Manual" using its "Electricity Distribution Licence Performance Reporting Handbook". The ERA issued its first "Electricity Industry Network Quality and Reliability Performance Report 2005/06" in April 2007. These reports do not include expenditure information;

- ESCOSA requires reporting against its document entitled "Electricity Industry Guideline No. 1: Electricity Regulatory Information Requirements – Distribution". ESCOSA (the the SAIIR) issued its first "Performance of Regulated Electricity Businesses 1999/2000" in November 2000. These reports include expenditure information;

- The OTTER requires reporting against its document entitled "Electricity Supply Industry Performance and Information Reporting Guideline". The OTTER issued its first "Electricity Supply Industry Performance Report - 2000-2001" in December 2001. These reports include expenditure information;

- The ICRC requires licensees to submit annual compliance reporting returns, including based on SCONRRR. The ICRC issued its first "Compliance and performance report for 2001–02: Licensed electricity, gas, and water and sewerage utilities" in January 2004. These reports include expenditure information; and

- The Utilities Commission's "Northern Territory Electricity Ring Fencing Code" requires Power Water to prepare annual regulatory accounts. The Utilities

Commission began publishing Power Water's regulatory accounts from 2000-01. These accounts include expenditure information.

## ***Gas***

On 30 July 1998, the *Gas Pipelines Access (South Australia) Act 1997* commenced and gave effect to the *National Third Party Access Code for Natural Gas Pipeline Systems (National Gas Code)*, which regulates the provision of third party access to gas distribution systems.

The *Gas Pipelines Access (South Australia) Act 1997*, and equivalent Acts in other jurisdictions, established IPART, the ORG (later the ESCV), the QCA, the Western Australian Independent Gas Pipelines Access Regulator (later the ERA), the South Australian Independent Pricing and Access Regulator (later ESCOSA), the OTTER, the ICRC and the ACCC for the Northern Territory as local regulators. These local regulators had responsibility for the economic regulation of electricity distribution services in their respective jurisdictions, in accordance with the National Gas Code.

The National Gas Code required distribution businesses to submit an Access Arrangement, and an Access Arrangement Information, for each Access Arrangement period. A key requirement of these documents was a need to include, and to justify, one or more reference tariffs for the services that the distribution business intended to provide.

Distribution businesses would include details, and justifications, of their forecast capital and operating expenditure in their Access Arrangement Information documents in support of their proposed reference tariffs - these forecasts would typically make reference to the business's historic expenditure. The relevant local regulator would then typically:

- Engage an engineering consultant to undertake an expert review of the distribution business's expenditure forecasts. This review typically had regard for the business's historic expenditure; and

- Make a draft, then final, decision in relation to the acceptance of the Access Arrangement, which would include consideration of the distribution business's historic and forecast expenditure, including the outcomes of the engineering consultant's expert review.

As a result of this process, a clearer public picture began to emerge of individual gas distribution businesses' actual and forecast capital and operating expenditure:

- IPART issued its first decision under the National Gas Code for Great Southern Networks' Wagga Wagga natural gas system in March 1999, entitled "Access Arrangement Great Southern Energy Gas Networks Limited". In July 1997, IPART had issued its final determination on the access undertaking of AGL Gas Networks Limited, although this was made under the previous NSW Access Code;

- OFFGAR issued its first decision under the National Gas Code for AlintaGas in June 2000, entitled "Final Decision: Access Arrangement Mid-West and South-West Gas Distribution Systems";

- The ICRC issued its first decision under the National Gas Code for ActewAGL in November 2000, entitled "Access Arrangement for ActewAGL Natural Gas System in ACT, Queanbeyan and Yarrowlumla";

- The QCA issued its first decision under the National Gas Code for the Queensland gas distribution businesses in October 2001, entitled "Proposed Access Arrangements for Gas Distribution Networks: Allgas Energy Limited and Envestra Limited";

- SAIPAR issued its first decision under the National Gas Code for Envestra in December 2001, entitled "Access Arrangement for Envestra Limited's South Australian Natural Gas Distribution System";

- The ORG issued its first decision under the National Gas Code for the Victorian gas distribution businesses in October 2002, entitled "Review of Gas Access Arrangements: Final Decision". In October 1998, the ORG had issued its "Final Decision on Access Arrangements for Victorian Gas Distribution Assets" under the Victorian Third Party Access Code for Natural Gas Pipelines.

On 1 July 2008, the National Gas Rules were introduced for all jurisdictions, other than Western Australia, and the Australian Energy Regulator (AER) became responsible for the economic regulation of distribution services, replacing the National Gas Code. Western Australia is intending to adopt a modified version of this National Gas Law.

Part 9 of the National Gas Rules specifies the basis for regulating prices and revenues of gas distribution businesses, including requiring that the total revenue for each regulatory year of the Access Arrangement period be determined using the building block approach. Under Part 9, a gas distribution business must submit to the AER in its Access Arrangement (amongst other things) various information in relation to its historic and forecast capital and operating expenditure.

To date, the AER has not approved an Access Arrangement for a gas distribution business under the new National Gas Rules. The NSW and ACT gas distribution businesses will be the first to have their Access Arrangements assessed by the AER under the National Gas Rules.

Local regulators have required gas distribution businesses to submit to them regulatory accounts during the course of Access Arrangement periods. However, there has not been the same extent of public performance reporting of the gas distribution sector as there has been of the electricity distribution sector:

- The ESCV requires reporting against its document entitled "Gas Industry Guideline No. 17: Regulatory Accounting Information Requirements". The ESCV (then the ORG) issued its first "Gas Industry Comparative Performance

Report 1999" in October 2000. These reports initially did not, but later began to, include expenditure information;

- ESCOSA requires reporting against its document entitled "Gas G1 - Gas Regulatory Information Requirements - Distribution System". ESCOSA issued its first "2004/05 Annual Performance Report Performance of South Australian Energy Distributors" covering Envestra's gas distribution business in November 2005. These reports initially did not, but later began to, include expenditure information;

- IPART introduced a "Natural Gas Reticulator Reporting Manual" in 2003, which requires reporting on operating statistics. However, these reports do not contain information on capital or operating expenditure;

- The ERA requires reporting against its document entitled "Gas Compliance Reporting Manual" using its "Gas Distribution Licence Performance Reporting Handbook". The ERA issued its first "2006/07 Annual Performance Report Gas Distribution and Trading Licences" in October 2007. However, these reports do not contain information on capital or operating expenditure;

- The ICRC requires licensees to submit annual compliance reporting returns. The ICRC issued its first "Licensed electricity, gas and water and sewerage utilities - Compliance and performance report for 2002–03", which requires reporting on various financial and operating statistics. However, these reports do not contain information on capital or operating expenditure; and

- There are no published performance reports for the Queensland, Tasmanian or Northern Territory gas distribution businesses. There has therefore been no public reporting by the local regulators on capital or operating expenditure for businesses in these jurisdictions.

### 5.2.2 Nature and Sources of Expenditure Information

Since the introduction of new economic regulatory arrangements for the Australian electricity and gas distribution sectors, including independent economic regulators, in the 1990s, there have emerged four broad categories of capital and operating expenditure information that are now publicly available at various levels in different jurisdictions:

- Forecast expenditure information that is provided by distribution businesses to their regulators in their Regulatory Proposals, Access Arrangements or related documents;

- Expenditure building blocks that are approved by regulators as part of Distribution Determinations or Access Arrangement approvals. In developing these building blocks, a regulator typically engages an engineering consultant to undertake an expert review of the distribution business's expenditure forecasts;

- Budget forecasts that are developed by distribution businesses for the purposes of capital and operating expenditure planning and delivery – these forecasts may be (and invariably are) quite different to:
    - What the distribution business has submitted to its regulator in a regulatory proposal or Access Arrangement. This is because circumstances can change within a regulatory control, or Access Arrangement, period and a distribution business needs to adjust its expenditure requirements accordingly; or
    - What the regulator has reflected in its building block approval, as there is typically no particular requirement for a distribution business to spend in accordance with the building block amounts that are used by the regulator for its economic regulatory requirements. Distribution businesses are free to spend more or less as they see fit, subject to meeting their regulated service requirements.
- Actual (also typically referred to as historic or outturn) expenditure that is actually incurred by a distribution business in undertaking its operations and delivering its services.

It is important, for the purposes of this report, to distinguish between these broad four categories of expenditure because it is only the last category – actual expenditure – that relates to what a distribution business has actually spent.

The key public sources of actual capital and operating expenditure are now:

- Regulatory submissions, especially where regulators explicitly ask, or regulatory instruments require, this to be provided – typically some parts of these regulatory submissions are public whereas other parts are not;
- Engineering consultants' expert reports, as they typically review forecast expenditure in the context of historic expenditure – typically some parts of these documents are public whereas other parts are not;
- Regulators' Distribution Determinations, or Access Arrangement approvals, as they have regard for historic expenditure in making their decisions – while these are public documents they do not necessarily reproduce all of the information that has been available to the regulator in making its decision;
- Regulatory accounts submitted to the regulator by the distribution business – these are typically not public documents;
- Performance reports published by the regulator, on the basis of information submitted by the distribution business – these are typically designed specifically for the public; and
- Annual reports of the distribution business.

### 5.2.3 Previous Analysis by the Essential Services Commission of Victoria

Since at least 2004, the ESCV has been investigating the feasibility of using TFP based approaches to regulating electricity and gas distribution services.

In December 2006, the ESCV and Pacific Economics Group (PEG) released a report entitled "Total Factor Productivity and the Australian Electricity Distribution Industry – Estimating a National Trend". As part of its research and data gathering for this report, the ESCV sought the assistance of other jurisdictional regulators to collate the necessary information, including (but not limited to) capital and operating expenditure information, to enable it to undertake its desired analysis.

However, the ESCV and PEG encountered a range of difficulties in obtaining the data that they were seeking. Their 2006 report states that:

> *The data template sent to the jurisdictional regulators is set out in appendix C.*
>
> *Obtaining time series data on these parameters would allow PEG to implement the methodology that it employed in estimating the TFP trend for Victorian electricity distribution services.*
>
> *In response, the Independent Pricing and Regulatory Tribunal (IPART) (NSW), the Essential Services Commission of South Australia (ESCOSA), the Independent Competition and Regulatory Commission (ICRC) (ACT) and the Office of the Tasmanian Energy Regulator (OTTER) agreed to participate in the project.*
>
> *The Energy Regulation Authority in WA and the Northern Territory's Utilities Commission indicated that they could not participate in the project because they still had vertically integrated businesses that prevented separate identification of distribution data. The Queensland Competition Authority advised the Commission to approach the Queensland electricity distributors directly.*
>
> *Even though WA and the NT were not included in the project, it was still believed that a reasonable estimate of a 'national' trend could be developed.*
>
> *Despite the efforts of the other jurisdictional regulators and PEG's direct approach to the Queensland distributors, the Commission could not obtain all of the data that was required to implement PEG's preferred TFP methodology.*
>
> *To varying degrees, the jurisdictional regulators were reliant on their regulated businesses to either collate the data requested in the data template or approve the release of the data to the Commission or PEG. Much of the data that the Commission requested is submitted to jurisdictional regulators in their regulatory accounts on a 'commercial-in-confidence' basis.*
>
> *However, the regulated businesses were either reluctant to devote the resources necessary to extract and compile the data or would not permit the release of the data to the Commission or PEG.*

> *It is not clear to the Commission why these distributors were not prepared to participate in the review.*[84]

The 2006 report went on to state that:

> *Being unable to obtain the necessary data from the regulated businesses, the Commission and PEG relied upon publicly available sources for the data. The sources relied upon included:*
>
> - *the data reported under the Steering Committee on National Regulatory Reporting Requirements*
> - *jurisdictional regulators' performance reports*
> - *jurisdictional regulators' regulatory price determinations*
> - *other publicly available documents such as distributors' submissions to regulatory price reviews.*
>
> *While these sources provided data useful to the project, the data available was insufficient to include Queensland, Western Australia, Northern Territory and the ACT in the project. For NSW, South Australia and Tasmania, gaps in the information remained:*
>
> - *……..*
> - *Data on capital additions (including capital contributions) and regulatory depreciation expenses were not available.*
> - *Disaggregated data on the sources of distribution operating and maintenance expenditure data was generally not available.*[85]

The report also stated that:

> *IPART, ESCOSA and OTTER indicated that much of the additional data required to implement PEG's preferred methodology was available … but they could not release this data to the Commission.*[86]

Despite this, the ESCV and PEG was able to obtain data that "were the minimum that PEG considered necessary to develop a feasible and conceptually defensible methodology for estimating TFP"[87]. It therefore used this data as the basis of the analysis in its 2006 report.

The ESCV made available to Network Advisory Services certain capital and operating expenditure information that supported the analysis in its 2006 report. Network Advisory Services does not express an opinion about either:

[84] ESCV and PEG, "Total Factor Productivity and the Australian Electricity Distribution Industry – Estimating a National Trend", December 2006, pages 9-10
[85] Ibid, page 11
[86] Ibid, page 12
[87] Ibid, page 14

- The suitability of the data used by the ESCV and PEG for use in TFP analysis; or

- The conclusions drawn in the 2006 report on the basis of the available data.

However, the ESCV and PEG's experience underscores the difficulties of gathering a comprehensive national dataset of capital and operating expenditure for the electricity distribution sector. A detailed discussion of the specific factors affecting the quality and comparability of historic expenditure information is provided at Chapter 6 of this report.

Network Advisory Services notes that the ESCV and PEG have also undertaken TFP analysis of the Victorian gas distribution industry using the Victorian gas distribution businesses Regulatory Accounting Statements. Network Advisory Services understands that they have not undertaken any such analysis for the national gas distribution industry.[88]

### 5.2.4 Available Expenditure Information

Network Advisory Services has researched the public availability of capital and operating expenditure information for Australian electricity and gas distribution businesses between 1995 and the present day.

Table 1 below shows, by jurisdiction, what capital and operating expenditure information is publicly available for the electricity distribution sector between 1995-06 and 2008-09. Table 1 shows that information is available for:

- NSW and Victoria from 1995-96;

- South Australia and Tasmania from 1999-00;

- Queensland and the Northern Territory from 2001-02; and

- Western Australia and the ACT from 2002-03.

Capital and operating expenditure information is therefore only publicly available for all jurisdictions (with the exception of capital expenditure information for the Northern Territory) from 2002-03.

Attachment A of this Report provides a detailed breakdown of the specific nature, and source, of the publicly available electricity expenditure information by jurisdiction, for each distribution business, by year.

[88] Refer to PEG's November 2008 report entitled "TFP Research for Victoria's Gas Distribution Industry" at http://www.esc.vic.gov.au/public/Energy/Regulation+and+Compliance/Reports+and+Investigations/Total+Factor+Productivity+(TFP)/

Table 2 below shows, by jurisdiction, what capital and operating expenditure information is publicly available for the gas distribution sector between 1995-06 and 2008-09. Table 2 shows that information is available for:

- AGL in NSW from 1996-97 and for other NSW distribution businesses from 1999-00;
- Victorian distribution businesses from 1998;
- Envestra in South Australia from 1998-99;
- ActewAGL in the ACT from 1999-00;
- AlintaGas in Western Australian in 2000; and
- Queensland distribution businesses from 2000-01, although operating expenditure information is available for Allgas from 1999-00.

Capital and operating expenditure information is therefore only publicly available for NSW, Victoria, Queensland, South Australia, Western Australia and the ACT from 2000-01, although there are gaps for various jurisdictions from this time. Expenditure information is not publicly available for either Tasmania or the Northern Territory.

Attachment B of this Report provides a detailed breakdown of the specific nature, and source, of the publicly available gas expenditure information by jurisdiction, for each distribution business, by year.

**Table 3 – Electricity Distribution Sector - Capital and Operating Expenditure Data Availability: 1995-96 to 2008-09**

| | 1995-96 | 1996-97 | 1997-98 | 1998-99 | 1999-00 | 2000-01 | 2001-02 | 2002-03 | 2003-04 | 2004-05 | 2005-06 | 2006-07 | 2007-08 | 2008-09 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **NSW** | | | | | | | | | | | | | | |
| Capex | x | x | | x | x | x | x | x | x | x | x | x | | |
| Opex | | x | x | x | x | x | x | x | x | x | x | x | | |
| **Victoria** | | | | | | | | | | | | | | |
| Capex | x | x | x | x | x | x | x | x | x | x | x | x | | |
| Opex | | x | x | x | x | x | x | x | x | x | x | x | | |
| **Queensland** | | | | | | | | | | | | | | |
| Capex | | | | | | | x | x | x | x | x | x | x | |
| Opex | | | | | | | x | x | x | x | x | x | x | |
| **Western Australia** | | | | | | | | | | | | | | |
| Capex | | | | | | | | x | x | x | x | | | |
| Opex | | | | | | | | x | x | x | x | | | |
| **South Australia** | | | | | | | | | | | | | | |
| Capex | | | | | x | x | x | x | x | x | x | x | x | |
| Opex | | | | | x | x | x | x | x | x | x | x | x | |
| **Tasmania** | | | | | | | | | | | | | | |
| Capex | | | | | | x | x | x | x | x | x | x | x | |
| Opex | | | | | x | x | x | x | x | x | x | x | x | |
| **ACT** | | | | | | | | | | | | | | |
| Capex | | | | | | | | x | x | x | x | | | |
| Opex | | | | | | | | x | x | x | x | | | |
| **Northern Territory** | | | | | | | | | | | | | | |
| Capex | | | | | | | | | | x | x | x | x | x |
| Opex | | | | | | | x | x | x | x | x | x | x | x |

**Table 4 – Gas Distribution Sector - Capital and Operating Expenditure Data Availability: 1995-96 to 2008-09**

| | | | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1995-96 | 1996-97 | 1997-98 | 1998-99 | 1999-00 | 2000-01 | 2001-02 | 2002-03 | 2003-04 | 2004-05 | 2005-06 | 2006-07 | 2007-08 | 2008-09 |
| **NSW** | | | | | | | | | | | | | | |
| Capex | | AGL | AGL | AGL | x | x | x | x | x | x | | | | |
| Opex | | | | | AGL | x | x | x | AGL | | | | | |
| **Victoria (calendar)** | | | | | | | | | | | | | | |
| Capex | | | x | x | x | x | | | x | x | x | x | | |
| Opex | | | x | x | x | x | | | x | x | x | x | | |
| **Queensland** | | | | | | | | | | | | | | |
| Capex | | | | | | x | x | x | x | x | | | | |
| Opex | | | | | Allgas | x | x | x | x | x | | | | |
| **Western Australia (calendar)** | | | | | | | | | | | | | | |
| Capex | | | | | x | x | x | x | x | | | | | |
| Opex | | | | | x | x | x | x | x | | | | | |
| **South Australia** | | | | | | | | | | | | | | |
| Capex | | | | x | x | x | x | x | x | x | | | | |
| Opex | | | | | | | x | x | x | x | x | | | |
| **ACT** | | | | | | | | | | | | | | |
| Capex | | | | | x | x | x | x | x | | | | | |
| Opex | | | | | | x | x | x | x | | | | | |

### 5.2.5 Comparison of Actual and Approved Capital Expenditure

Attachment C of this Report provides a series of graphs that compare Australian electricity and gas distribution businesses' actual expenditure with the capital expenditure building blocks approved by their respective jurisdictional regulators. The graphs show that:

- Some distribution businesses have consistently overspent their capital expenditure building blocks;
- Other distribution businesses' actual capital expenditure has fluctuated around their capital expenditure building blocks, with some years being above and some years being below, the amounts approved by their regulators; and
- Some distribution businesses have, in most years, underspent their capital expenditure building blocks, albeit that in particular years they have overspent the approved building block amounts.

These graphs highlight that:

- The building block amounts do not mandate what distribution businesses must spend on their distribution systems each year. Rather, distribution businesses ultimately control and determine the amount of capital expenditure that they undertake, albeit that they typically have close regard for their approved capital expenditure building blocks; and
- Even if distribution businesses are minded to have close regard for their approved capital expenditure building blocks when planning their expenditure programs they often need to alter the profile of their expenditure in order to meet the changing needs of their distribution system. This reflects the fact that it is not feasible to expect that either a regulator, or a distribution business, should be able to forecast with certainty the levels of corporation and customer initiated capital expenditure that will be required in each year of a four or five year regulatory control, or access arrangement, period. Inevitably, changes will need to be made to the level and timing of expenditure to meet the distribution business's, and its customers', needs.

Furthermore, just because a distribution businesses' capital expenditure may track an approved building block amount doesn't necessarily mean that the distribution business is spending on the same projects or programs as the regulator relied upon in approving the capital expenditure building block. It is common, for example, for distribution businesses that are experiencing higher than forecast customer or demand growth to defer some of their forecast corporation initiated capital expenditure in order to deliver increased customer initiated expenditure. Equally, it may be possible for a distribution business to defer certain capital expenditure by increasing its operating expenditure program. Some of the interactions between different types of capital expenditure, and between capital and operating expenditure, are discussed in section 7.3 of this report.

## 5.3 Forecast Capital Expenditure: The present to 2029

Network Advisory Services has researched the public availability of capital expenditure forecasts for Australian electricity and gas distribution businesses between the present day and 2029.

***Electricity***

There are several circumstances in which electricity distribution businesses prepare public information about their future capital expenditure programs, in particular:

- Planning reports in accordance with regulatory requirements; and
- Regulatory submissions for the purposes of economic regulation.

All of the electricity distribution businesses (other than ActewAGL, Horizon Power and Power and Water) prepare an annual planning report in accordance with a jurisdictional regulatory instrument, which is made publicly available on their websites:

- In NSW, these are known as Network Management Plans, which have a five year horizon and detail, amongst other things, their asset investment and management strategies[89]. In addition, the NSW distribution businesses prepare an Electricity System Development Review, which forecasts constraints on their distribution systems. However, neither of these documents provides a capital expenditure forecast;
- In Victoria, these are known as Distribution System Planning Reports. These have a five year horizon and provide, amongst other things, preliminary information on addressing expected network constraints[90]. However, they do not provide a capital expenditure forecast;
- In Queensland, these are known as Network Management Plans. These plans have a five year horizon and detail, amongst other things, network limitations and proposed augmentation works scheduled to undergo the Regulatory Test/public consultation. ENERGEX's Network Management Plan[91] for 2008-09

[89] Available at http://www.energy.com.au/energy/ea.nsf/Content/Network+Home, http://www.integral.com.au/wps/wcm/connect/integralenergy/NSW/NSW+Homepage/ourNetworkNav/Network+management/, http://www.countryenergy.com.au/wps/wcm/connect/CEL/ce/aboutus/ourenergynetwork

[90] Available at http://www.powercor.com.au/Electricity_Networks/Powercor_Network/Powercor_-_Network_Planning/, http://www.powercor.com.au/Electricity_Networks/CitiPower_Network/CitiPower_-_Network_Planning/, http://www.ue.com.au/industry/ind_Trans_Conn_Planning_Report_2004.asp http://www.jemena.com.au/operations/distribution/JEN/planning.aspx, http://www.sp-ausnet.com.au/CA256FE40021EF93/Lookup/PlanningRep/$file/DSPR2009.pdf

[91] Available at http://www.energex.com.au/network/annual_network_management_plans.html

to 2012-13 provides a five year capital expenditure forecast, however Ergon Energy's[92] equivalent plan does not contain such a forecast;

- In South Australia, this is known as an Electricity System Development Plan. ETSA Utilities' 2008 Plan details expected constraints on its distribution network over the next three years[93]. It does not provide a capital expenditure forecast;

- In Western Australia, this is known as a Transmission and Distribution Annual Planning Report. Western Power's 2009 report details its major network development plans from 2009 to 2014[94]. It does not provide a capital expenditure forecast; and

- In Tasmania, this is known as a Distribution System Planning Report. Aurora Energy's 2008 Report provides details of the expected changes to its distribution network over the next five years[95]. It does not provide a capital expenditure forecast.

While these reports and plans variously discuss planning criteria and processes, future network constraints and forecast augmentation requirements over the next three to five years, they do not (with the exception of Energex) provide details of their forecast capital expenditure programs for their distribution systems.

The other types of documents that electricity distribution businesses produce, which relate to their future capital expenditure programs, are their regulatory proposals to the regulator for the next regulatory control period.

Network Advisory Services' is only aware of two jurisdictional regulators, IPART and the ESCV, publishing long term capital expenditure forecasts for electricity distribution businesses as part of a regulatory reset process:

- IPART published capital expenditure forecasts for the NSW electricity distribution businesses in April 2003 for the period 2003 to 2014 as part of the 2004 electricity network price review for the 2004-05 to 2008-09 regulatory control period[96]; and

- The ESCV published capital expenditure forecasts for the Victorian electricity distribution businesses in February 2005 for the period 2004 to 2025 as part of

[92] Available at http://www.ergon.com.au/about_us/network_management_plan.asp?yf=true&platform=PC

[93] Available at http://www.etsautilities.com.au/centric/news_information/development_plans.jsp

[94] Available at http://www.westernpower.com.au/subContent/aboutUs/publications/Annual_planning_report_.html

[95] Available at http://www.auroraenergy.com.au/pdf/powerline_network/Aurora_Network_Distribution_System_Planning_Report_20081.pdf

[96] Available at - www.archive.ipart.nsw.gov.au - /submiss/ENR_DNSP_models03/

Electricity Distribution Price Review for the 2006 to 2010 regulatory control period.[97]

However, there is very little detailed explanatory information about the forecasts beyond the immediate regulatory control periods in the distribution businesses' associated submissions to their regulators. Furthermore, the available information is now outdated.

In June 2008, the NSW and ACT distribution businesses submitted their original regulatory proposals to the AER for the 2009-10 to 2013-14 regulatory control period and submitted revised regulatory proposals in January 2009. The initial and revised Regulatory Proposals both included five year capital expenditure forecasts for Standard Control Services and Alternative Control Services (i.e. public lighting). The NSW and ACT distribution businesses submitted completed templates with their Regulatory Proposals in response to the AER's Regulatory Information Notices. These completed templates included further capital and operating expenditure information, however these completed templates are not publicly available. After considering the initial and revised Regulatory Proposals, the AER then issued its Distribution Determinations for these businesses in April 2009, which included capital expenditure building blocks.

The Queensland and South Australian distribution businesses submitted regulatory proposals to the AER in early July 2009. The AER will not issue a Distribution Determination for these businesses until April 2010. The Victorian and Tasmanian distribution businesses are due to submit their first regulatory proposals to the AER in November 2009 and May 2011, respectively.

It is important to note that neither the distribution businesses' Regulatory Proposal, nor the AER's Distribution Determination, provide a firm view of what capital expenditure the distribution business will actually spend on its distribution system in a regulatory control period:

- A regulatory proposal is simply its forecast of its required capital expenditure for the purposes of complying with the requirements of clause 6.5.7 of the Rules; and

- The capital expenditure building block included by the AER in its Distribution Determination simply represents its view of what is required in order to reasonably reflect the requirements of clause 6.5.7 of the Rules.

It is entirely a matter for an electricity distribution business to determine what it will forecast to spend, and what it will actually end up spending, during a regulatory

[97] Available at - http://www.esc.vic.gov.au/ESC/Templates/Consultations/ConsultationDetails.aspx?NRMODE=Published&NRNODEGUID=%7b4CEB3254-469F-4E9D-A692-18B17453B0A3%7d&NRORIGINALURL=%2fpublic%2fEnergy%2fConsultations%2fElectricity%2bDistribution%2bPrice%2bReview%2b2006-10%2fElectricity%2bDistribution%2bPrice%2bReview%2b2006-10%2ehtm&NRCACHEHINT=Guest

control period, albeit that a significant proportion of its capital expenditure will relate to customer initiated capital works for new and upgraded customer connections.

As a result, no clear view can be drawn from distribution businesses planning reports or Regulatory Proposals, or from a Distribution Determination issued by the AER, of the distribution businesses' capital expenditure forecasts between the present day and 2029.

***Gas***

Gas distribution businesses do not prepare public planning reports of the kind that are prepared by the electricity distribution businesses.

The Country Energy and ActewAGL Distribution submitted their first Access Arrangements under the new National Gas Rules on 1 July 2009 and Jemena is due to do so for its NSW network on 26 August 2009.

As with the equivalent documents for the electricity distribution businesses, neither the gas distribution businesses' Access Arrangements nor the AER's approval documents, provide a firm view of what capital expenditure the distribution business actually forecasts to spend on its distribution system in a regulatory control period:

- An Access Arrangement proposal is simply a forecast of its required capital expenditure for the purposes of Part 9 of the National Gas Rules; and

- The capital expenditure building block included by the AER in its Distribution Determination simply represents its view of what is required in order to reasonably reflect the requirements of Part 9 of the National Gas Rules.

It is entirely a matter for a gas distribution business to determine what it will forecast to spend, and what it will actually end up spending, during an Access Arrangement period albeit that a significant proportion of its capital expenditure will relate to customer initiated capital works for new and upgraded customer connections.

As a result, no clear view can be drawn from a distribution business's Access Arrangement, or from a related decision of the AER, of the distribution businesses capital expenditure forecasts between the present day and 2029.

# 6 Factors Affecting Quality and Comparability of Historic Expenditure Information

This Chapter examines a range of factors, which affect the quality and comparability of historic capital and operating expenditure information for Australian electricity and gas distribution businesses. These factors are important because they limit the ability to develop a meaningful data set of comparable historical expenditure and to draw conclusions about the profile of historic expenditure:

- For individual electricity and gas distribution businesses; or
- Between electricity and gas distribution businesses.

## 6.1 Continuity of Organisations

As discussed in Chapters 3 and 5 of this Report:

- In the electricity distribution sector:
    - There have been many bodies in NSW, Victoria (if the 11 Municipal Electricity Undertakings are considered in addition to the State Electricity Commission of Victoria) and Queensland that have been responsible for providing distribution services over the past 60 years. These bodies have had many different legal forms and names; and
    - In South Australia, Tasmania, the ACT and the Northern Territory, there has always only been one distribution business in each jurisdiction, but their legal forms and names have changed several times over the past 60 years. Western Australia has historically had only one business responsible for distribution services, but since 2006 it has had two such bodies.
- In the gas distribution sector, the industry restructurings since the mid 1990s have resulted in none of the entities that owned gas distribution assets prior to 1997 still owning them today.

This lack of organisational continuity makes it infeasible to prepare a comprehensive data set of capital expenditure information between 1950 and the mid 1990s, despite distribution-specific capital expenditure data being available in annual reports for some distribution businesses. This is because of:

- The sheer number of bodies that have been responsible for providing electricity distribution services in NSW, Victoria and Queensland and the organisational restructurings that occurred in the 1990s in Western Australia, South Australia and Tasmania; and
- The changes of ownership in the gas distribution that reduce the continuity and availability of historic expenditure information. Several of the gas distribution

systems were privately owned by companies that no longer exist or no longer have an interest in distribution assets. It is also noted that several of the current gas distribution systems have only been built since 1997.

While changes of industry structure and organisational ownership have continued to occur since the mid 1990s, these no longer impair the availability, or continuity, of capital and operating expenditure information for the electricity and gas distribution businesses to the present day.

## 6.2 Scope of Electricity and Gas Services

As discussed in Chapter 3, the evolution of the electricity distribution sector in Australia since about 1950 has occurred in two ways.

Firstly, in NSW and Queensland, there were many electricity businesses, which provided services that are broadly comparable to what are provided by electricity distribution businesses today. That is, they mainly (with some exceptions) provided distribution and retail services, not generation and transmission services. These were provided under what would now be considered geographic franchise arrangements. The many electricity businesses were progressively aggregated over time, culminating in the current industry structure with three distribution (and retail) businesses in NSW and two distribution businesses in Queensland (one of which retains a retail business). This means that it is not feasible for the purposes of this report to present long term historic capital expenditure information as it would require the aggregation of data for the many organisations, none of whom exist today.

Secondly, in all of the other jurisdictions, Governments established vertically integrated electricity monopolies that were responsible for jurisdiction-wide provision of electricity services, covering what is now recognised as generation, transmission, distribution and retailing services. While some of these vertically integrated businesses did separately report their "distribution" capital expenditure, the basis on which this expenditure was separated from consolidated accounts of the broader business is not clear. This means that it is not feasible to prepare long term historic capital expenditure information as:

- "Distribution" information is not available for all businesses; and
- It is not clear on what basis the "distribution" data that is available has been prepared.

The scope of gas distribution services presents different problems in gathering expenditure information to those for electricity distribution:

- Some gas distribution systems, for example in Queensland, have been used to transport both towns gas (a manufactured product) and natural gas over time. This means that, in some jurisdictions at some times, distribution expenditure would likely have included the manufacture of towns gas;

- Some gas distribution systems are no longer used at all – such as those in Hobart and Launceston (although the Launceston system is now used for the reticulation of LPG). This means that it is not possible only to look at existing distribution systems to understand what historically has been spent on gas distribution infrastructure; and

- The potential for gas distribution networks to be covered by the National Gas Rules (and previous instruments) and then uncovered means that capital expenditure, for regulatory purposes, can relate to different assets over time. Examples of gas distribution networks that have been covered, and then uncovered, include:

    - The Alice Springs Distribution Network, which was uncovered on 26 July 2000;

    - The Dalby System, which was uncovered on 28 November 2000;

    - The Roma Distribution System, which was uncovered on 10 May 2002; and

    - The Mildura System, which was uncovered on 17 September 2001.[98]

This means that the nature of gas distribution networks and services has evolved over time such that it is difficult to develop a consistent long term expenditure data set.

## 6.3 Scope of Distribution Services

Electricity and gas distribution businesses provide distribution services to their customers, who may include energy retailers, end consumers, registered contractors, other distribution businesses or transmission businesses. It is these distribution services (rather than, for example, the assets that they use to provide them) that are regulated and from which distribution businesses principally derive their revenues.

Distribution businesses provide many different services although there is generally a high degree of commonality in the distribution services that distribution businesses provide within, but not necessarily between, the electricity and gas industries.

In the electricity industry, Chapter 6 of both the previous National Electricity Code, and the current National Electricity Rules, provides a basis for the relevant regulator to classify distribution services for the purposes of determining the form of regulation that will be applied.

Under the previous National Electricity Code, the building block approach, with its requirement to forecast capital and operating expenditure, was only applied to "Prescribed Distribution Services", as opposed to "Excluded Distribution Services". Typically, the approach taken by jurisdictional regulators was to classify distribution

[98] Refer http://www.aemc.gov.au/Gas/Scheme-Register/Pipeline-list-summary.html

services, by default, as Prescribed Distribution Services unless they were otherwise assessed and categorised as Excluded Distribution Services. This resulted in there generally being:

- A high level of definition around the nature and scope of Excluded Distribution Services but relatively little definition in relation to the nature and scope of Prescribed Distribution Services; and

- In some jurisdictions, such as Victoria, South Australia and NSW, there being a large number of Excluded Distribution Services, whereas in others such as Queensland, there being at times no, and at other times some, Excluded Distribution Services.

The reasons for different categorisations of the same services between jurisdictions include that:

- Different tests were applied by jurisdictional regulators to assess whether a distribution service should be treated as an excluded distribution service;

- The markets for the same services had different characteristics, such as different levels of competition in providing the services; and

- Certain services were submitted to the jurisdictional regulator for re-assessment of their categorisation in some jurisdictions but not in other jurisdictions.

Process for the classification, and regulatory treatment, of distribution services also existed under the Tasmanian Electricity Code and apply under the Northern Territory's Electricity Networks (Third Party Access) Code and the Western Australian Electricity Networks Access Code.

The new Chapter 6 of the National Electricity Rules requires the AER to classify distribution services as:

- "Direct Control Services", and within this category as either "Standard Control Services" or "Alternative Control Services";

- "Negotiated Distribution Services" or

- Not classified, in which case it is not regulated by the AER.

The AER must apply a building block approach to regulating Standard Control Services, although it may also apply this approach to Alternative Control Services.

The new Chapter 6 requires a more prescriptive approach to the classification of all distribution services than applied under the previous National Electricity Code. This includes a requirement for the AER to set out its likely approach to this classification in a Framework and Approach paper before the distribution business submits its Regulatory Proposal.

At the time of drafting this Report, the AER had issued its first Framework and Approach papers for distribution businesses in Queensland, South Australia and Victoria – the service classifications for the NSW and ACT distribution businesses that were reflected into the AER's April 2009 Distribution Determinations were based on transitional provisions under Chapter 11 of the Rules.[99] There is significant commonality across the National Electricity Market in the nature and scope of distribution services that distribution businesses provide and the AER has indicated that it will initially generally retain the current service classifications determined by the previous jurisdictional regulator, unless there is a good reason to change it. However, there are likely to be differences, once the AER issues its Distribution Determinations, between:

- The classification of services between distribution businesses. This will in turn affect a distribution business's capital and operating expenditure forecasts, for the purposes of its building block proposal, based on whether more or less distribution services are classified as Standard Control Services. For example, in Queensland, the AER has indicated that its likely approach is to classify various Network, Connection and Metering Services as Standard Control Services. In contrast, in Victoria the AER has indicated that its likely approach is to classify only Network Services as Standard Control Services with Connection and Metering Services being classified as Alternative Control Services and Negotiated Distribution Services. This means that distribution businesses' capital and operating expenditure forecasts for these services will not be strictly comparable, because they relate to different distribution services; and

- The regulatory treatment of services for an individual distribution business over time. There are several examples in the AER's Framework and Approach papers of services that have in the past been regulated as Prescribed Distribution Services but which in the future would not be regulated as Standard Control Services. For example, in Queensland, public lighting has in the past been treated as a Prescribed Distribution Service but the AER has indicated that its likely approach is to classify this as an Alternative Control Service in the next regulatory control period. This means that the nature and scope of services covered by a distribution business's capital and operating expenditure forecasts will be different over time.

These differences need to be addressed in any attempt to benchmark, or compare, capital and operating expenditure information, including for TFP purposes.

It is possible that there will be greater alignment of the classification of services by the AER over time, although this will largely depend on evolving features of the markets in which individual services are provided in each jurisdiction.

In the gas industry, Part 9 of the new National Gas Rules requires that a gas distribution business's Access Arrangement Information must include capital and

[99] It is noted that the Northern Territory Utilities Commission also chose to apply the new Chapter 6 of the National Electricity Rules in its 2009 Distribution Determination for Power Water.

operating expenditure for its "pipeline services". This expenditure must then be attributed and allocated between "reference services" and other services.

A distribution business's capital and operating expenditure forecasts will therefore be affected by the scope of their pipeline services. This means that:

- Distribution businesses' capital and operating expenditure forecasts will not be strictly comparable between each other to the extent that they relate to different distribution services; and

- An individual distribution business's capital expenditure will not be comparable over time to the extent that the nature and scope of pipeline services that it provides changes.

Any such differences would need to be addressed in any attempt to benchmark, or compare, capital and operating expenditure information, including for TFP purposes.

## 6.4 Definition of Distribution and Transmission Assets

Chapter 10 of the National Electricity Rules defines an electricity "transmission network" as:

> *A network within any participating jurisdiction operating at nominal voltages of 220 kV and above plus:*
>
> *(a) any part of a network operating at nominal voltages between 66 kV and 220kV that operates in parallel to and provides support to the higher voltage transmission network;*
>
> *(b) any part of a network operating at nominal voltages between 66 kV and 220kV that is not referred to in paragraph (a) but is deemed by the AER to be part of the transmission network.*

Chapter 10 of the National Electricity Rules defines an electricity "distribution network" as "A network which is not a transmission network".

The practical application of these definitions in the economic regulation of electricity businesses means that some assets that would be classified as:

- Distribution assets in one context might be classified as transmission assets in another; and

- Transmission assets in one context might be classified as distribution assets in another.

It is also possible that assets can be reclassified between distribution and transmission over time. It is noted that the National Competition Council is responsible for determining the classification of gas pipelines and for considering any application to change classifications over time.

There are also jurisdictional specific arrangements that need to be considered. For example, electricity distribution businesses in Queensland can own high voltage assets, which might otherwise be categorised as transmission assets, despite not being a transmission network service provider. This is by virtue of clause 9.32.1(b) of the National Electricity Rules, which provides a permanent derogation in relation to the definition of a "transmission network" in Queensland, so that it only relates to a transmission network service provider.

In NSW, EnergyAustralia exercised its option under the National Electricity Rules for the 2008-09 to 2012-13 regulatory control period to have its transmission network subject to the same regulatory arrangements as its distribution network[100] - previously the two network were separately regulated. This means that both its distribution and transmission services were regulated under Chapter 6 of the Rules. While EnergyAustralia's Regulatory Proposal distinguished between capital and operating expenditure for distribution and transmission assets, the AER's Distribution Determination set a single annual revenue requirement for both EnergyAustralia's distribution and transmission services. Care would need to be taken in distinguishing between EnergyAustralia's distribution and transmission expenditure when comparing this with its previous expenditure or with expenditure of other distribution businesses.

In the Northern Territory, Power Water does not own any assets that would be defined as transmission assets under the National Electricity Rules, however it does own an asset which transports electricity between the two markets of Darwin and Katherine, which Power Water refers to as the Darwin Katherine Transmission Line. Power Water's reported expenditure relates to its networks as a whole.

These definitional issues present potential issues in strictly comparing expenditure between distribution businesses.

## 6.5 Cost Allocation Methodologies

The National Electricity Rules currently require electricity distribution businesses to prepare cost allocation methods for the AER's approval, which set out how they will allocate shared costs between different categories of distribution services – i.e. Standard Control Services, Alternative Control Services, Negotiated Distribution Services and non classified services. The National Gas Rules also contain requirements in relation to the allocation of costs by distribution businesses between reference and non-reference services.

Because distribution businesses can have their distribution services classified differently to one another, and because distribution businesses can have different cost allocation methods, may not be possible to compare the capital and operating expenditure between businesses for particular categories of distribution services.

[100] This option was established by virtue of the AEMC's "National Electricity Amendment (Economic Regulation of Transmission Services undertaken by Distributors) Rule 2008 No. 3

Further, the National Electricity Rules and National Gas Rules provide a basis for distribution businesses to change their service classifications, and cost allocation methods, over time. This means that it may not be possible to compare levels of expenditure for particular service categories of a particular distribution business over time.

While the allocation of shared costs is now a transparent characteristic of the regulatory regime, it is not clear how in the past businesses allocated shared costs between:

- Distribution and non-distribution parts of the business; and
- Within distribution services, to the extent that it was necessary to distinguish between these services.

Given that shared costs can comprise as much as 40 per cent of a distribution business's total costs their treatment can have a significant impact on reported expenditure levels. This can limit the comparability of expenditure within and between distribution businesses.

## 6.6 Capitalisation Policy

Distribution businesses have capitalisation policies, which set out how they recognise assets for statutory and regulatory accounting, and taxation, purposes as expenditure is incurred. These policies are prepared in accordance with accounting standards and Australian Taxation Office requirements and cover both direct and shared costs. The policies define the basis on which expenditure is:

- Capitalised and included as capital expenditure in the statutory, regulatory and taxation accounts; or
- Expensed and included as operating expenditure in the statutory, regulatory and taxation accounts.

While capitalisation policies are prepared in accordance with accounting standards and Australian Taxation Office requirements, they are specific to each distribution business. This means that expenditure which may be capitalised in an asset value by one distribution business might be expensed by another, meaning that capital and operating expenditure information may not be comparable between distribution businesses.

Capitalisation policies of distribution businesses are not in the public domain and the relationship between capitalisation policies and reported expenditure is therefore not clear.

## 6.7 Contestability of Capital Works

In some jurisdictions, the electricity distribution business is the only party that can design and construct distribution assets, whereas in other jurisdictions some connection and augmentation works can be designed and constructed by third parties because these works are contestable.

This means that where the distribution business is the only party that can construct distribution assets then, subject to its capital contribution policy, its capital expenditure could be higher than for a distribution business in a jurisdiction where the works are contestable. This is because the works undertaken by third parties would not necessarily be recognised in the distribution business's capital expenditure.

This means that it may not be possible to directly compare capital expenditure on connection and augmentation works between distribution businesses, where there are different contestability arrangements (and treatments of capitalisation contributions) between jurisdictions.

Furthermore, it may not be possible to directly compare capital expenditure of a particular distribution business over time, where there has been a change in the contestability arrangements in a jurisdiction. It is noted that, in some jurisdictions such as Queensland, it is up to the distribution business to determine what will be contestable

## 6.8 Capital Contributions Policy and Treatment

A capital contribution is the "entry price" paid by a customer to access a standard tariff. In most applications, customers are required to pay the portion of the cost of connection (including any shared network extension) that is not recoverable by the distribution business through the standard tariff. This portion of the connection asset is the uneconomic portion. The price signals that customers receive through the cost they are required to pay for connecting to the network are important in determining how efficiently the network develops. This is because the demand for new or expanded connections drives a significant part of network investment. If connection costs are hidden, cost-effective alternatives to connection may not be considered.

In most jurisdictions, electricity distribution businesses calculate their customer contributions based on the uneconomic portion of a customer's connection works. However, the treatment of the expenditure on the works, and the revenue paid through the contribution, differ between jurisdictions:

- In Queensland and Western Australia, distribution businesses include the full value of the capital contribution in their capital expenditure forecasts, and therefore their regulatory asset bases and their control mechanisms are adjusted by the present value of the contribution. This means that the up-front reduction in revenue is compensated by returns on, and of, assets over the life of the assets. It also means that capital expenditure for regulatory reporting

purposes includes costs that are not directly incurred by the distribution business, which are offset by reductions in revenue;

- In other jurisdictions, only capital expenditure incurred by the distribution business is included in capital expenditure amounts for regulatory reporting purposes.

This means that it may not be possible to directly compare capital expenditure, and the regulatory asset base, between electricity distribution businesses that treat capital contributions in these two different ways.

These differences do not apply to the gas distribution industry.

## 6.9 Externally Imposed Jurisdictional Obligations

Distribution businesses are subject to a range of jurisdictional planning and performance obligations, which must be considered in preparing their capital and operating expenditure forecasts and are therefore reflected in their actual expenditure. Examples of key obligations include:

- Design planning criteria, which are used by the distribution business to plan and develop its network. In particular, the criteria provide a basis for identifying and addressing potential constraints in the distribution system, which give rise to the need for expenditure. Distribution businesses will generally need to increase their expenditure where a Government imposes a requirement to build higher levels of redundancy into the network; and

- Average reliability performance standards for electricity distribution businesses, which define the maximum average duration and frequency of outages that a distribution network may experience. Similar requirements exist in the gas industry for unaccounted for gas. Distribution businesses will generally need to increase their expenditure where a Government imposes a requirement for fewer and shorter outages or lower levels of unaccounted for gas.

Many aspects of the non-economic regulatory framework remain largely jurisdictionally-based and there are significant differences between the legislative and regulatory obligations that apply across Australia.

This means that it may not be possible to directly compare expenditure between distribution businesses to the extent that their expenditures are consequent to externally imposed jurisdictional obligations and these obligations differ between jurisdictions.

Furthermore, it may not be possible to directly compare capital expenditure of a particular distribution business over time, where there has been a change in the legislative and regulatory obligations that apply in a jurisdiction.

## 6.10 Operating Environments

As is widely recognised, there are significant differences between distribution businesses' operating environments, including in relation to matters such as:

- The size, density and growth of their customer base;
- The size and nature of their networks, including whether they are CBD, urban, short-rural or long rural in nature; and
- The geographic characteristics and climatic conditions of their supply areas.

These, and other factors, significantly impact the cost structures of each distribution business and limit the direct comparability of corporation and customer initiated expenditure between distribution businesses.

## 6.11 Inconsistency of Expenditure Categories

Distribution businesses collect and report capital and operating expenditure on a different basis to each other and use different expenditure categories.

In the electricity industry, jurisdictional regulators require distribution businesses to report periodically on their capital and operating expenditure in defined categories, although these have historically differed between jurisdictions. This means that it has been difficult to compare historical information between jurisdictions at the expenditure category (as opposed to total expenditure) level.

In recognition of these differences, and in order to promote greater comparability of expenditure information between jurisdictions, in 2002 the Utility Regulators' Forum, through the SCONRRR, developed:

- Standardised capital and operating expenditure categories for reporting by distribution businesses to jurisdictional regulators; and
- Requirements for distribution businesses to explain their jurisdictional regulator differences between a standard set of capitalisation principles and their actual capitalisation policies.

These national arrangements were detailed in a March 2002 SCONRRR document entitled "National regulatory reporting for electricity distribution and retailing businesses".

Since 2002, several jurisdictional regulators have required electricity distribution businesses to report based on the SCONRRR principles as well as previous distribution specific categories. This has provided a basis for:

- Consistent information reporting between jurisdictions; and

- On-going comparisons against historical information within a particular jurisdiction.

No such consistent national reporting requirements have been developed for gas distribution businesses.

As a result, it is not possible readily to compare at a detailed expenditure category level (i.e. below total capital and operating expenditure) expenditure by:

- Electricity distribution businesses before 2002; and
- Gas distribution businesses over any period.

## 6.12 Values of Reported Expenditure

Distribution businesses' expenditure information can be reported either on a:

- Nominal basis, in dollars of the day, which include escalations from year to year; or
- Real basis, in dollars of a single year, which do not change from year to year.

It is not always clear from historically reported information whether a distribution business's expenditure is expressed in nominal or real terms and, if it is in real terms, what year has been used. It may therefore be necessary to make assumptions about what basis information has been reported in developing a data set of historical expenditure.

In addition, given that Australia's currency was Australian pounds until 14 February 1966, it would be necessary to convert expenditure into Australian dollars. The exchange rate when this change occurred was two Australian dollars replaced one Australian pound.

Neither of these factors prevent a data set of historical expenditure from being developed – they simply make it necessary to make transparent the basis on which information has been prepared and the assumptions that have been used.

## 6.13 Summary and Conclusions

There are several factors that affect the availability of historic expenditure information for Australian distribution businesses, and therefore the quality and comparability of this information:

- For the electricity industry, the availability of information is particularly affected by:
    - The lack or organisational continuity, especially in NSW and Queensland, before the mid to late 1990s; and

  - The formerly vertically integrated monopolies not all separately reporting distribution expenditure before the mid 1990s. Even where information is publicly available it is not always clear on what basis "distribution" data that is available has been prepared.

- For the gas industry, the availability of information is particularly affected by:
  - Several of the gas distribution systems were owned by companies that no longer exist, or have an interest in gas distribution; and
  - None of the entities that owned gas distribution systems before 1997 still own them today.

Where expenditure data is available, there are also a variety of factors that affect its quality and comparability, both between distribution businesses, and over time for individual businesses. These factors include that distribution businesses' expenditure, whether it be forecasts or actual amounts incurred, reflect different:

- Categorisations of distribution services – this reflects the fact that not all distribution services are regulated and that not all regulated services are regulated under a building block approach;
- Distinctions between distribution and transmission assets – this reflects the flexibility in the definitions in the National Electricity Rules as well as various jurisdiction specific arrangements;
- Allocations of shared costs between services – this reflects the flexibility given to distribution businesses to develop their own cost allocation methods;
- Approaches to capitalising and expensing expenditure – this reflects the flexibility given to distribution businesses to develop their own capitalisation policies;
- Types and scope of works being undertaken by distribution businesses and third parties – this reflects differences in contestability arrangements between jurisdictions;
- Treatments, and financial recognitions, of capital contributions – these contributions are included in capital expenditure in some jurisdictions but not others;
- Legislative and regulatory obligations – this reflects the needs for distribution systems to be designed to deliver specific service performance outcomes, which differ between jurisdictions;
- Operating environments – this reflects such matters as the geographic, topographic and climatic circumstances of distribution businesses, as well as their customer bases and historic development;

- Categorisations of expenditure – this reflects the differences between the categories that distribution businesses use internally to report expenditure information as well as differences between the categories that they have been required to report to their regulator; and

- Values of reported information – this reflects the difficulty in some cases to establish whether expenditure has been reported in real or nominal terms and the need to convert expenditure before 1966 from Australian pounds to dollars.

Taken together, these factors limit the ability to develop a meaningful data set of comparable historical expenditure and to draw conclusions about the profile of historic expenditure:

- For individual electricity and gas distribution businesses; or

- Between electricity and gas distribution businesses.

# 7 Expenditure Drivers and Interactions

This Chapter provides a high level discussion of the key drivers of expenditure made by electricity and gas distribution businesses and of the interactions between their capital and operating expenditure programs.

## 7.1 Key Drivers of Electricity Expenditure

SCONRRR's "National regulatory reporting for electricity distribution and retailing businesses" categorises capital and operating expenditure by purpose. This section provides a high level overview of the typical drivers of these expenditure categories for electricity distribution businesses.

Inevitably, the nature and extent of expenditure drivers will differ between individual distribution businesses. It is also common for projects or programs to have multiple drivers - for example, a project could have both demand and asset replacement imperatives. The discussion below therefore provides a generalised view of the types of factors that are important to a business's expenditure decision making.

Importantly, it should be noted that that:

- Most, but not all, distribution businesses have used the SCONRRR expenditure categories to report their historic expenditure to their jurisdictional regulators;
- The AER's Regulatory Information Notices have not used the SCONRRR expenditure categories as the basis for requiring distribution businesses to submit their historic or forecast expenditure in their Regulatory Proposals – different categories have instead been submitted for each jurisdiction; and
- The AER released an issues paper in August 2008 entitled "Electricity Distribution Network Service Providers - Annual Information Reporting Requirements". This issues paper proposed requiring distribution businesses to report against different expenditure categories than the SCONNRR categories in accordance with a future Regulatory Information Order. This is discussed further in Chapter 8 of this report.

### 7.1.1 Capital Expenditure

The SCONRRR paper provides for the following capital expenditure categories: Asset Replacement; Demand Related; Reliability and Quality Improvements; Environmental, Safety and Legal Obligations; Full Retail Contestability; and Other.

***Asset Replacement***

The SCONRRR paper states that asset replacement capital expenditure "includes all capital expenditure whose primary purpose is to maintain the existing level of supply and standard of service"[101]. The key drivers for distribution businesses of this category of expenditure typically include:

- The condition of assets, which may relate to issues such as: asset failure characteristics or rates; asset unserviceability or obsolescence; the need for bulk replacements of assets; the need to meet modern asset standards; reaching the end of an asset's life; and the premature ageing of assets, for example due to overloading; and

- Defects whereby assets that have either failed or are imminently about to fail are identified through the preventive maintenance asset inspection program and are replaced by undertaking capital investment.

***Demand Related***

The SCONRRR paper states that demand related capital expenditure "includes all capital expenditure whose primary purpose is to meet an increase in demand, or a movement of load within the network"[102]. This expenditure may be initiated either by the distribution business or by its customers.

The key drivers of corporation initiated expenditure typically include:

- Peak demand growth on the distribution network, including the location of that growth. This may itself be driven by factors such as economic and population growth, new customer connections and climatic effects, which may impact energy demand through applications such as increased use of air conditioning, and the effectiveness of demand side participation;

- The utilisation of distribution assets to meet existing demand. Heavily loaded assets may age prematurely, which may bring forward the need for asset replacement expenditure; and

- Network planning, operating and management requirements, including network design planning and security criteria for a distribution business, which may either be externally, or internally, imposed. These affect the level of redundancy that must be built into the system. An example of externally imposed requirements is the NSW Ministerially imposed design planning criteria that were introduced in 2005, and updated in 2007, under the NSW distribution businesses' licences.

[101] Utility Regulators Forum, "National regulatory reporting for electricity distribution and retailing businesses", March 2002, page 31
[102] Ibid, page 32

The key drivers for distribution businesses of customer initiated expenditure typically include:

- Distribution businesses' obligations to connect network users and to meet customers' demand; and
- The actual and forecast demand for new customer connections and the need for augmentations to existing customer connections.

Depending on the way in which customer connections are recognised, customer initiated expenditure may either relate:

- Only to assets that are built by the distribution business; or
- To assets that are built both by the distribution business and third parties.

Customer initiated expenditure could therefore include new customer connection assets, new distribution network assets and augmentations to the existing distribution network.

***Reliability and Quality Improvements***

The SCONRRR paper states that capital expenditure on reliability and quality of supply "includes all capital expenditure, the primary purpose of which is to improve network reliability"[103].

The key drivers for distribution businesses of reliability and quality of supply related expenditure typically include externally and internally imposed reliability-based service performance standards and quality of supply requirements.

Distribution businesses may need to increase their expenditure to the extent:

- They have not been achieving their required standards in the past; or
- New standards are introduced, or existing standards are made more demanding.

Examples of these types of externally imposed standards include:

- The minimum service standards under the Queensland Electricity Industry Code; and
- The NSW Ministerially imposed reliability standards and individual feeder standards under the NSW distribution businesses' licences.

[103] Ibid, page 32

***Environmental, Safety and Legal Obligations***

The SCONRRR paper states that this expenditure category includes "all capital expenditure relating to environmental, safety and legal obligations"[104].

This category of capital expenditure is driven by a wide range of externally imposed legislative and regulatory requirements that are not otherwise captured by the other expenditure categories. These obligations could relate to any aspect of the distribution businesses' operations, ranging from matters such as smart metering requirements to occupational health and safety obligations for employees, contractors and the public generally.

Distribution businesses may need to increase their expenditure to the extent:

- They have not been meeting their legal obligations in the past; or
- New obligations are introduced, or existing obligations are made more demanding.

***Full Retail Contestability***

The SCONRRR paper states that this expenditure category includes "All capital expenditure for full retail contestability."[105]

The key drivers for distribution businesses of this category of capital expenditure are their needs to have the required capability in relation to:

- NMI standing data – A distribution business needs to be able to populate and maintain National Metering Identifier and associated standing data in its own systems and in the Australian Energy Market Operator's (AEMO) Market Settlement and Transfer Solution;
- Customer transfers – A distribution business needs to be able to facilitate the transfer of customers between retailers;
- Service order management – A distribution business needs to be able to receive and process requests for defined business to business (B2B) services within prescribed timeframes and communicate the completion of these services to the requestor;
- Energy data management – A distribution business needs to be able to fulfil its roles for the collection and processing of energy data;

[104] Ibid, page 32
[105] Ibid, page 32

- Network billing – A distribution business needs to be able to issue bills to multiple retailers and provide such information to retailers as may be required to substantiate and reconcile the charges billed; and

- Consumer protection – A distribution business needs to be able to fulfil its regulatory consumer protection obligations, including in relation to information and service provision.

The need for this capability derives from a range of national and jurisdictional specific regulatory requirements.

***Other***

The SCONRRR paper states that this expenditure category includes "All other capital expenditure."[106]

Examples of the types of capital expenditure that could be included in this category include the need to invest in:

- Specific parts of the distribution network, such as communications, protection or undergrounding assets;

- Public, or street, lighting assets, which could relate to new assets, or the replacement, relocation or alteration of existing assets; and

- Non-system expenditure, which could relate to a wide range of purposes, such as plant and equipment, motor vehicles, information technology, property and buildings and office equipment and furniture.

### 7.1.2 Operating Expenditure

The SCONRRR paper provides for the following operating expenditure categories: Network Operations; Network Maintenance; Public Lighting and Other Costs.

***Network Operations***

The SCONRRR paper states that this expenditure category includes:

> *The operational costs associated with the operation of the network including, but not restricted to*
>
> - *the staffing of the control centre(s)*
> - *operational switching personnel*
> - *outage planning personnel*
> - *provision of authorised network personnel*

[106] Ibid, page 32

- *demand forecasting*
- *procurement*
- *logistics and stores*
- *information technology (IT) costs attributable to network operation*
- *insurance costs*
- *land tax costs.*[107]

The key driver of this expenditure category is the need for distribution businesses to efficiently deliver these activities in order to achieve their required customer service outcomes.

***Network Maintenance***

The SCONRRR paper provides for this category of expenditure to include inspection, maintenance and repair, vegetation management, emergency response and other costs. The typical key drivers of these sub-categories of expenditure include:

- Inspection – this relates to scheduled inspection activity, which is usually conducted at predetermined intervals, or based on prescribed criteria, which differ by asset types. Inspection program is typically designed to minimise the probability of network failures and the total life cycle costs of assets, as well as to meet required operating conditions and performance standards and to promote safety. Capital works that are identified through the inspection program are typically undertaken as part of the asset replacement program;

- Maintenance and repair – this relates to the need for corrective maintenance work, which is typically conducted in order to fix identified defects, prevent outages and to promote safety. The age and condition of the asset base is also a driver of expenditure in this category, while a trade-off exists with regard to capital replacement expenditure. This expenditure may also include permanent repairs, or replacement works, following temporary repairs which have been made to restore supply following a service outage;

- Vegetation management – this can involve inspection and scoping of vegetation in order to program required management works as well as undertaking cutting and clearing works. The SCONRRR paper explicitly excludes emergency vegetation clearance works from this category of expenditure. Distribution businesses typically have extensive external and internal requirements that dictate the nature and scope of their vegetation management program; and

- Emergency response – this relates to forced maintenance, including vegetation management, which involves undertaking unplanned work immediately after supply has been interrupted or assets have been damaged or rendered unsafe, in order to restore the distribution network to at least its minimum acceptable

[107] Ibid, page 32

and safe operating condition. Emergency response work often results from storms or other external events that impact on the integrity of the network.

Growth of the network is also a driver of expenditure in many of the above categories.

***Public Lighting***

The SCONRRR paper states that this expenditure category relates to "the operation of public lighting assets, including handling inquiries and complaints about public lighting, and dispatching crews to repair public lighting assets."[108] This therefore covers the operation, repair, replacement and maintenance of existing public lighting assets and of new public lighting assets as they are installed.

***Other Costs***

The SCONRRR paper provides for a distribution business to report on a variety of other operating and maintenance expenditure, such as for:

- Training of employees and contractors;
- Meter reading in the distribution business's role as a metering provider and metering data provider;
- Customer services that are provided to energy retailers, end consumers, registered contractors, other distribution businesses or transmission businesses;
- Advertising and marketing in relation to a distribution business's distribution services; and
- Full retail contestability, the required capability for which is described above.

The key driver of this expenditure category is the need for distribution businesses to efficiently deliver these activities in order to achieve their required customer service outcomes.

## 7.2 Key Drivers of Gas Expenditure

As noted elsewhere in this report, there are no national reporting requirements for the gas distribution sector of the kind established by SCONRRR in 2002 for the electricity distribution sector. Instead, gas distribution businesses have used a variety of categories to report their historic and forecast expenditure to their jurisdictional regulators.

Because the nature and extent of expenditure drivers differ between individual distribution businesses, and because projects or programs may have multiple drivers, the discussion below provides a generalised view of the types of factors that are

[108] Ibid, page 35

important to a gas business's expenditure decision making. This does not suggest that a gas distribution business will, or should, use these categories to internally or externally report historic and forecast expenditure to the AER in the future.

It should be noted that there are fundamental differences between the key drivers of electricity and gas expenditure, especially on account of gas being a "fuel of choice" that does not have comprehensive coverage, whereas electricity is universally regarded as an essential service. The drivers for capital expenditure in gas tend to be responsive to changes in the economics of connections in a particular area. There is often a long lead time and significant business development work required for gas expansions, in which distribution businesses can become involved in the development of new estates to ensure that gas is seen as a viable option.

### 7.2.1 Capital Expenditure

The following capital expenditure categories are discussed in this section: Replacement; Demand and Customer Initiated; and Other.

***Replacement Capital Expenditure***

This capital expenditure relates to the replacement of assets across the gas distribution system, including:

- Low pressure pipelines, mains and service pipes;
- Regulators, valves and regulator stations;
- Supervisory Control and Data Acquisition (SCADA) systems;
- Other assets, such as replacement of valves and pumps at odorising stations, cathodic protection systems, and the purchase of routine and specialised equipment; and
- Meters.

The key drivers of this expenditure typically include:

- The condition of assets, which may relate to issues such as: gas leakages; asset failure characteristics or rates; end of asset lives; premature ageing of assets; avoiding asset failures for public safety and system security reasons; and
- Defects whereby assets that have either failed or are imminently about to fail are identified through the asset inspection program and are replaced through capital investment.

Regulatory requirements are typically key considerations in determining the nature and levels of this expenditure, including in relation to:

- Safety, reliability and security of supply;
- Metering compliance; and
- Unaccounted for gas levels.

***Demand and Customer Initiated Capital Expenditure***

This primary purpose of this capital expenditure is to meet new or increased demand by customers across the distribution network. It includes:

- New customer connections – this involves connecting new residential and commercial customers other than through the payment of customer connections;
- Augmentations – this involves growth in the existing distribution network (gas mains), inlets (between the gas mains and the gas meter) and meters to service new delivery points and to improve the security of supply;
- Extensions – this involves extending the distribution network to new supply areas that were not previously serviced by the gas network; and
- Customer and government contributions – this involves the customer and government contributing to the cost of connection and augmentation work for new and upgraded supplies.

The key drivers of this expenditure are:

- Meeting peak demand growth on the distribution network from new and existing customers – the location and timing of that growth critically affects the need for investment;
- Actual and forecast demand for new and upgraded customer connections; and
- Meeting internally and externally imposed network planning, operating and management requirements, including system security, reliability of supply and safety standards.

***Other Capital Expenditure***

This capital expenditure could relate to matters such as:

- Information technology – this could involve installing, upgrading and replacing hardware, software and associated systems, including for network control, full retail competition and other non-system applications, such as, finance, human resource, asset management and billing; and
- Non-system expenditure – this could relate to assets such as buildings, land, office equipment, vehicles and field testing equipment.

This expenditure is driven by various non-system requirements, but may be related to external imperatives, such as the introduction of full retail competition or specific customer service requirements.

### 7.2.2 Operating Expenditure

The following operating expenditure categories are discussed in this section: Network Operations and Maintenance; Network Development; and Other.

***Network operations and maintenance***

This relates to the costs of operating and maintaining the gas distribution system, including:

- Network management;
- Network maintenance, including for assets such as: distribution mains; service pipes; cathodic protection; supply regulators/valving stations; meters; and SCADA and network control;
- Leak repairs;
- Meter reading and billing;
- Network planning;
- Facilities management; and
- Regulatory fees.

Key drivers of this expenditure relate to effective customer service delivery, asset and operational management, as well as meeting safety, security and other regulatory requirements.

***Network Development***

This expenditure relates to maintaining and growing gas demand across the supply area and includes the cost of:

- Market development; and ]
- Processing new gas connections.

This recognises that gas is a fuel of choice and that investment is required in order to increase penetration in the market for energy services.

***Other Costs***

This relates to administrative and general costs related to the provision of gas distribution services, including:

- Full retail competition capability;
- Accounting and finance costs;
- Human resource management and administration;
- Information Technology costs;
- Regulatory functions; and
- Insurance.

These costs include corporate overheads required to support the delivery of gas distribution services.

## 7.3 Capital and operating expenditure interactions

There are many potential interactions between electricity and gas distribution businesses' capital and operating expenditure programs. These include interactions between:

- Capital and operating expenditure programs;
- Different capital expenditure programs; and
- Different operating expenditure programs.

The following is a non-technical discussion that seeks to give generalised examples of how changing expenditure in one type of program can affect the need for expenditure on another type of program over time.

Asset inspections that are undertaken as part of preventive maintenance programs identify assets with actual, or imminent, defects that need to be replaced as part of capital asset replacement programs. More regular and extensive inspection programs typically result in more assets being identified for replacement.

Replacing defective assets with new assets will help to reduce the need for future corrective and forced maintenance, as new assets are less likely to fail in service, which in turn can improve the safety and service performance of the distribution system. Equally, less frequent inspections, or failing to replace defective assets as they are inspected and identified, may result in a future need for increased forced or corrective maintenance to address assets as they fail, with any such failures in the

meantime adversely affecting the safety and service performance of the distribution system.

Asset inspections do not necessarily result in the need for asset replacement capital expenditure. They can also identify where there is a need for specific corrective maintenance or no immediate action at all. However, not identifying the need for capital or maintenance work where it is required, and allowing assets to run to failure, can result in greater unplanned maintenance when the asset failure ultimately occurs.

Distribution businesses can therefore make tradeoffs between replacing and maintaining assets based on their approach to asset management and their risk appetite or aversion.

Demand related capital expenditure is also closely related to operating expenditure programs. For example, in the electricity industry, augmenting the capacity of the distribution network better equips it to meet increased demand. While all new assets need to be maintained, new investment may also reduce the utilisation of existing distribution assets. This may in turn lower the likelihood of these existing assets failing in service and so reduce the need for unplanned maintenance. It could also reduce the amount of asset replacement expenditure that may otherwise be required.

Customer initiated capital expenditure involves installing new assets that need to be operated and maintained in accordance with the distribution business's asset management policies and procedures. There is therefore typically a direct correlation between new or augmented customer connections and the level of system maintenance expenditure.

Reliability and quality improvement capital expenditure, for example investment in remote control and restoration capability, can reduce the occurrence of customer outages and the need to undertake unplanned maintenance activity. By the same token, reliability and quality improvements can be achieved by other means, such as:

- Growth related capital works that augment the existing distribution network; and
- Maintenance that avoids asset failures, or reduces supply interruptions if they occur.

It could be expected that there will be a positive correlation between growth in the distribution network – and therefore a distribution businesses' total system capital expenditure program – and its network operations expenditure. This is because more network operations activity will be required as the distribution network expands in order to coordinate outages, manage switching and access issues and to undertake network contingency planning.

There is typically also a close correlation between a distribution business's system capital and maintenance expenditure and its non-system capital expenditure. For example, an increase in the need for system capital and maintenance is likely to require greater expenditure on:

- Training of staff and contractors in order to equip them to deliver the required system works;
- Non-capitalised tools and equipment, as these are required in order to deliver the system works; and
- Motor vehicles and property because they are also needed in order to deliver the system works and require their own maintenance.

# 8 Other Options Available to AER for Sourcing Information

This report has identified a range of issues in relation to the availability, quality and comparability of asset, expenditure and related data for Australian electricity and gas distribution businesses for the period 1950 to 2029. The identified issues largely relate to Network Advisory Services only having access to existing publicly available information in preparing this report. In particular, we have not:

- Had access to information that we understand does exist, but which is not publicly available, such as capital and operating information in regulatory accounts and in information about asset lives in distribution businesses' asset registers; and

- Been able to ask electricity or gas distribution businesses to prepare information that currently does not exist, or at least does not exist in a specific format that would promote greater consistency between distribution businesses and enable comparability of data over time.

These issues are important because they limit the ability to develop in this report a meaningful data set of comparable historical expenditure and to draw conclusions about the profile of historic expenditure:

- For individual electricity and gas distribution businesses; or

- Between electricity and gas distribution businesses.

These issues also limit the ability to understand in detail distribution businesses' asset age profiles and to draw conclusions about the nature, extent and time of any future asset replacement programs that may be required in order to replace system assets that are approaching, or are at, the end of their useful lives.

However, these are not necessarily factors that need affect the AER, if it was responsible for applying a TFP approach to the future regulation of electricity and gas distribution businesses. This is because it could request distribution businesses to:

- Provide existing information that we understand does exist, but is not currently publicly available; and

- Prepare information in a specific format that may not currently exist, but which would be necessary in order to compare information between distribution businesses, or for a specific distribution business over time.

The AER's powers to obtain information are set out in the National Electricity and Rules and Laws and the National Gas Rules and Law.

In relation to electricity distribution businesses:

- Clauses S6.1.1(1) and (6) and clauses S6.1.2(1) and (7) of the National Electricity Rules require electricity distribution businesses to provide to the AER in their Regulatory Proposals information about their forecast capital and operating expenditure as well as their historic capital and operating expenditure for the past two regulatory control periods;

- Section 28F of the National Electricity Rules allows the AER to issue a Regulatory Information Notice to a distribution business in which it may require it to provide specific information in its Regulatory Proposal. This may include information in relation to its historic and forecast capital and operating expenditure. The AER has to date issued Regulatory Information Notices to various electricity distribution businesses ahead of them lodging their most recent Regulatory Proposals. It is noted that the distribution businesses' completed Regulatory Information Notices are not public documents; and

- Section 28C of the National Electricity Rules allows the AER to issue a general Regulatory Information Order to distribution businesses in which it may require them to:

    - Provide information to the AER that is specified in the order; or

    - Prepare, maintain or keep specified information in a manner and form specified in the order.

    In August 2008, the AER published an issues paper foreshadowing its intention to issue a Regulatory Information Order to the electricity distribution businesses. This order would require the distribution businesses to submit annual information to the AER within their respective regulatory control periods, including their actual capital and operating expenditure in relation to both direct control services and negotiated distribution services. The AER is currently considering public submissions on its issues paper.

In relation to gas distribution businesses:

- Rule 72(1) of the National Gas Rules requires a distribution businesses to include in its Access Arrangement Information capital and operating expenditure forecasts as well as historic capital and operating expenditure for the past access arrangement period;

- Section 48(1)(a) of the National Gas Rules allows the AER to issue Regulatory Information Notices to distribution businesses in which they would be required to provide specific information in their Access Arrangements. This may include information in relation to their historic and forecast capital and operating expenditure; and

- Section 48(1)(b) of the National Gas Rules allows the AER to issue a general Regulatory Information Order to distribution businesses in which it may require them to:

- Provide information to the AER specified in the order; or
- Prepare, maintain or keep specified information in a manner and form specified in the order.

This may include requiring information in relation to distribution businesses' capital and operating expenditure.

By virtue of these powers, the AER may therefore be able to obtain the information that is not otherwise in the public domain about:

- Historic, actual and forecast capital and operating expenditure of distribution businesses; and
- The age profile of a distribution business's asset base.

This may mean that the AER can address the data limitations that have been identified in this Report. However, it is noted that just because the AER is able to ask for particular information doesn't necessarily mean that the distribution businesses will be able to provide it. In relation to historic information in particular, this will depend on how effectively the distribution businesses are able to backcast existing information into the format that has been requested by the AER.

# A. Electricity - Capital and Operating Expenditure Data Availability 1995-96 to 2008-09

| Organisation | Document | Information | Comments |
|---|---|---|---|
| **New South Wales** | | | |
| Independent Pricing and Regulatory Tribunal (IPART) | Worley Parsons Report to the Independent Pricing and Regulatory Tribunal on Capital Expenditure review in NSW Electricity Distribution – Final Report October 1998. IPART archive web site http://www.archive.ipart.nsw.gov.au/ (RP10) | Capex for 1995-96 and 1996-97 | Aggregate capex in real $1998<br><br>Includes EnergyAustralia, Integral Energy, Country Energy, Advance Energy, Great Southern Energy and NorthPower. |
| | Price and Service Report NSW Electricity Distribution Businesses 1999/2000 March 2001 from http://www.archive.ipart.nsw.gov.au/ (OP10) | Opex for 1996-97 to 1998-99 | Aggregate opex in real $2000<br><br>Note that Country Energy reflects the aggregation of the former distribution business - Advance Energy, Great Southern Energy and NorthPower. |
| | | Capex 1997-98 | NOT AVAILABLE<br>(Some information is provided in the Worley International Report to the Independent Pricing and Regulatory Tribunal on Capital Expenditure Review In NSW Electricity Distribution – Final Report, October 1998 available on the IPART archive web site http://www.archive.ipart.nsw.gov.au/. However, given this report was finalised in October 1998, the capex value for 1997-98 is likely to be an estimate at best). |

| Organisation | Document | Information | Comments |
|---|---|---|---|
| | Meritec Review of Capital and Operating Expenditure of the NSW Electricity Distribution Network Service Providers – Final Report September 2003 http://www.ipart.nsw.gov.au/files/Meritec_final011003.pdf | Capex and Opex 1998-99 to 2001-02 | Nominal capex and opex by type of expenditure) |
| | IPART's Regulation of New South Wales Electricity Distribution Networks Determination and Rules Under the National Electricity Code, December 1999 http://www.archive.ipart.nsw.gov.au/ | Nil | No historic capex<br><br>Historic opex – however, in aggregate for entire sector and includes retail |
| | IPART NSW Electricity Distribution Pricing 2004/05 to 2008/09 Final Report June 2004 http://www.archive.ipart.nsw.gov.au/ | Nil | Capex 1998-99 to 2002-03 nominal, net of contributions. (EnergyAustralia includes transmission). Possible to use this data for other NSW businesses. |
| DNSP submissions to the IPART 2004 Distribution Determination | Energy Australia submission to IPART's 2004 Distribution Determination, 10 April 2003 at http://www.archive.ipart.nsw.gov.au/<br><br>Integral Energy submission to IPART's 2004 Distribution Determination, 9 April 2003 at http://www.archive.ipart.nsw.gov.au/<br><br>Country Energy submission to IPART's 2004 Distribution Determination, 10 April 2003 at http://www.archive.ipart.nsw.gov.au/ | Capex and opex for 2001-02 | Aggregate capex and opex for each business. |

| Organisation | Document | Information | Comments |
|---|---|---|---|
| | SCONRRR produced by EnergyAustralia, Integral Energy and Country Energy available on the IPART archive web site http://www.archive.ipart.nsw.gov.au/ | Capex and opex data for 2002-03 | Capex and opex for each distribution business<br><br>By asset type and type of expenditure for capex and by type of expenditure for opex<br><br>Includes public lighting and excludes customer contributions |
| | SCONRRR reporting requirements produced by each of the distribution businesses available at http://www.ipart.nsw.gov.au/search/search_results.asp?sidebarSearchTextBox=scnr. | Capex and opex data from 2003-04 to 2006-07 for Energy Australia<br><br>Opex and capex data from 2003-04 to 2005-06 for Integral Energy and Country Energy | Data by asset type and type of expenditure for capex and by type of expenditure for opex<br><br>Includes public lighting and excludes customer contributions |
| | Wilson Cook Review of Proposed Expenditure of ACT & NSW Electricity DNSPs Volumes 3 and 4 respectively – Integral Energy http://www.aer.gov.au/content/item.phtml?itemId=723840&nodeId=ba6358191ac574009d5f49c2f2301de5&fn=Wilson%20Cook%20volume%203%20Integral%20Energy%20(October%202008).pdf Country Energy http://www.aer.gov.au/content/item.phtml?itemId=723836&nodeId=c340179eb498cdedeb9b52cd200a1654&fn=Wilson%20Cook%20volume%204%20Country%20Energy%20(October%202008).pdf | Capex and opex data for Integral Energy and Country Energy for 2006-07 | Aggregate capex and opex for Integral Energy and Country Energy |

| Organisation | Document | Information | Comments |
|---|---|---|---|
| EnergyAustralia | Energy Australia Annual Reports https://www.energyaustralia.com.au/energy/ea.nsf/Content/NSW+Annual+reports | Nil | Capex and opex 1996-97 to 2007-08<br>However, includes all EnergyAustralia businesses – not just distribution. |
| **Victoria** | | | |
| Office of the Regulator General (subsequently ESC) | Office of the Regulator General – Victoria Electricity Distribution Businesses Comparative Performance for the Calendar Year 1997 July 1998 http://www.esc.vic.gov.au/NR/rdonlyres/37BD2F9E-1625-4BB9-83F7-BD2B389AB621/0/electric_elecjuly.pdf | Capex data for 1995 | Aggregate capex for each distribution business for 18 months to 31 December 1995<br><br>Note that AGL data appears to be financial year i.e. 30 June 1995<br><br>Nominal values<br><br>No opex for 1995<br><br>Regulatory Accounts were first requested of businesses for the year or 18 months to 31 December 1996. |
| Victorian Essential Services Commission (ESC) | ESC Electricity Distribution Businesses Comparative Performance Report 2001 http://www.esc.vic.gov.au/NR/rdonlyres/8B71AB20-96C7-4A84-AB0D-65D9010BDDD2/0/ElecDBCompPerfRptCalYr2001_Sept02.pdf | Capex and opex data from 1996 to 2001 | Aggregate capex and opex by distribution business.<br><br>Calendar year<br><br>Real 1 July $1999 |

| Organisation | Document | Information | Comments |
|---|---|---|---|
| | Essential Services Commission, Victoria Electricity Distribution Businesses Comparative Performance Report, 2007 http://www.esc.vic.gov.au/NR/rdonlyres/A58C8DE2-1617-45A2-AF48-AEE85DC63F8F/0/ElectricityComparativeReport200708.pdf | Capex and opex data from 2001 to 2007 | Aggregate capex and opex by distribution business.<br><br>Data in calendar year format<br><br>Real $2004<br><br>Excludes capital contributions<br><br>Opex excludes a number of services that were previously treated as Regulated by Price Cap |
| **Queensland** | | | |
| Queensland Competition Authority | QCA's Annual Financial and Service Quality Performance reports http://www.qca.org.au/electricity/service-quality/annfinserqualperf.php. | Capex and opex data for Energex and Ergon Energy for the period 2001-02 to 2007-08 | From 2003-04 to 2007-08 the data are disaggregated by type of expenditure. Data for 2001-02 and 2002-03 is in aggregate form only. |
| | Burns and Roe Worley Report to the Queensland Competition Authority Capital and Operating Expenditure Study for Distribution Network Service Providers in Queensland – Ergon Energy and Energex, December 2004 located at http://www.qca.org.au/electricity/2005-distribution-review/draft-determination.php. | Nil | Some disaggregated data for both opex and capex however, this information is in constant dollar terms and it is not possible to match the aggregate values in the BRW report to those in the QCA's annual reports (even after applying the cost escalators provided in the BRW report).<br>The disaggregated information for opex represent direct costs only i.e. excludes overheads |
| | Final Determination Regulation of Electricity Distribution April 2005 | Nil | Historical capex and opex data are not available in disaggregated form (only presented in graphical format). |

| Organisation | Document | Information | Comments |
|---|---|---|---|
| | Final Determination Regulation of Electricity Distribution May 2001<br>http://www.qca.org.au/files/ACF895.pdf | Nil | No data are available prior to 2001-02 on the QCA web site – no information is provided in the QCA's 2001 regulatory Determination or supporting documents. |
| **Western Australia** | | | |
| Western Power Corporation | Meyrick and Associates Benchmarking Western Power's Electricity Distribution Operations and Maintenance and Capital Expenditure Prepared for Western Power Corporation<br>3 February 2005<br>http://www.era.wa.gov.au/cproot/5427/2/AMENDED%20ACCESS%20ARRANGEMENT%20INFORMATION%20-%20APPENDIX%201%20-%20Meyrick%20Benchmarking.pdf | Nil | Capex and opex (per MWh, network km and customer) for 1999 to 2003<br><br>Assume these are calendar year (not clear from report) |
| | Western Power's Capital and operating expenditure program for the South West Interconnected Networks Prepared for Access Arrangement Regulatory Period 2006/07 to 2008/09 March 2007<br>http://www.era.wa.gov.au/cproot/5437/2/AMENDED%20ACCESS%20ARRANGEMENT%20INFORMATION%20-%20APPENDIX%206%20-%20Expenditures%20Report.pdf | Capex and opex for 2002-03 to 2004-05 | Aggregate capex and opex data |

| Organisation | Document | Information | Comments |
|---|---|---|---|
| | Amended Access Arrangement Information Western Power's amended proposed Access Arrangement for the Network of the South West Interconnected System Submitted by Western Power 2 April 2007 http://www.era.wa.gov.au/cproot/5447/2/AMENDED%20ACCESS%20ARRANGEMENT%20INFORMATION%20-%20MAIN%20AAI%20DOC%20-%20DMS%203583406v2.pdf | Capex and Opex for 2002/03 to 2005/06 | Capex and opex by type of expenditure (real $30 June 2006) |
| WA Department of Energy | Energy Western Australia February 2003 http://www.energy.wa.gov.au/cproot/454/1259/Energy%20Western%20Australia%202003.pdf | Nil | No financial information (2007 was the first determination by ERA) |
| **South Australia** | | | |
| Essential Services Commission of South Australia (ESCOSA) | ESCOSA Annual Performance Reports 1999-00 to 2007-08 located at http://www.escosa.sa.gov.au/site/page.cfm?u=27&c=47 | Capex and opex actual data for ETSA Utilities for the period 1999-00 to 2007-08 | Aggregate opex and capex only for each year.<br><br>The capex data in the Annual Performance Reports are net capex and total capex (capex including customer contributions). Customer contributed assets are not added to the regulatory asset base. |

| Organisation | Document | Information | Comments |
|---|---|---|---|
| ESCOSA | ETSA Utilities SCONRRR reporting produced by ETSA Utilities available at http://www.escosa.sa.gov.au/site/page.cfm?u=56. | Nil | Capex and opex actual data for the period 2002-03 to 2007-08.<br><br>Information disaggregated by asset type and type of expenditure for capex and by type of expenditure for opex<br><br>Note, aggregate expenditure does not match that provided by ESCOSA in the Annual Performance reports. The Annual Performance Reports are the preferred data source (since these are constructed by the regulator). |
| | 2000-2005 distribution price controls | Nil | The 2000-2005 distribution price controls were established under the Electricity Pricing Order (EPO), rather than an Electricity Distribution Price Determination. No historical data was provided under this process.<br><br>No information in relation to the period 1995-96 to 1998-99 is available on the ESCOSA web site. |
| **Tasmania** | | | |
| Office of the Tasmanian Electricity Regulator (OTTER) | OTTER Investigation into Electricity Supply Industry Pricing Policies – Pricing Determination December 1999 http://www.energyregulator.tas.gov.au/dominio/otter.nsf/LookupFiles/Pricing_Determiniation-Dec99.pdf/$file/Pricing_Determiniation-Dec99.pdf | Nil | No actual financial data |

| Organisation | Document | Information | Comments |
|---|---|---|---|
| | OTTER Electricity Supply Industry Performance Report 2000-2001 December 2001 http://www.energyregulator.tas.gov.au/domino/otter.nsf/LookupFiles/ElectricitySupplyIndPerfReport2000-01.pdf/$file/ElectricitySupplyIndPerfReport2000-01.pdf | Opex 1999-00 and 2000-01 | Aggregate opex data<br><br>No capex data provided |
| | OTTER's Tasmanian Energy Supply Industry Performance Report 2003-04 http://www.energyregulator.tas.gov.au/domino/otter.nsf/LookupFiles/Chapter_6v2.pd | Capex and opex data for the period 2000-01 to 2003-04 | Aggregate capex and opex data |
| | OTTER's Tasmanian Energy Supply Industry Performance Report 2007-08 December 2008 http://www.energyregulator.tas.gov.au/domino/otter.nsf/LookupFiles/08_4370%20_ESI_Performance_Report_2007_08.pdf/$file/08_4370%20_ESI_Performance_Report_2007_08.pdf | Capex and opex data for the period 2004-05 to 2007-08 | Aggregate capex and opex data |
| **ACT** | | | |
| Independent Competition and Regulatory Commission (ICRC) | Independent Competition and Regulatory Commission Licensed Electricity, Gas and Water and Sewerage Utilities Performance Report for 2005–06 December 2008 http://www.icrc.act.gov.au/__data/assets/pdf_file/0015/130632/Report_5_of_2008_Performance_Report_2005-06.pdf | Capex and opex data from 2002-03 to 2005-06 | Aggregate capex and opex data ($M Nominal) |

| Organisation | Document | Information | Comments |
|---|---|---|---|
| | ICRC Final decision Investigation into prices for electricity distribution services in the ACT March 2004 http://www.icrc.act.gov.au/__data/assets/pdf_file/0019/16750/finalrepelecdistnnetpricemar04.pdf | Nil | No historical financial data provided |
| **Northern Territory** | | | |
| Northern Territory Utilities Commission (NT Utilities Commission) | NT Utilities Commission, Final Determination Network Pricing: 2009 Regulatory Reset, March 2009 http://www.nt.gov.au/ntt/utilicom/s_docs/2009RegulatoryReset_Final%20Determination%20FINAL%20_with%20corrections_.pdf | Capex and opex data for the period 2004-05 to 2008-09 | Aggregate capex and opex data (Utilities Commission estimate for 2008-09) |
| | NT Utilities Commission Power and Water Regulatory Accounts 2001-02 to 2005-06 http://www.nt.gov.au/ntt/utilicom/publications/reports_publications.shtml | Opex from 2001-02 to 2004-05 | Opex split between operating and maintenance<br><br>No capex reported |
| | NT Utilities Commission Network Pricing: 2004 Regulatory Reset Final Determination February 2004 http://www.nt.gov.au/ntt/utilicom/s_docs/2004_reset_deter_final_0104.pdf | Nil | No historic financial data provided |
| **NSW, Victoria, South Australia and Tasmania** | | | |

| Organisation | Document | Information | Comments |
|---|---|---|---|
| Essential Services Commission | Pacific Economics Group, Total Factor Productivity and the Australian Electricity Distribution Industry, December 2006 http://www.esc.vic.gov.au/NR/rdonlyres/BF9D8756-A77A-4A04-A083-6ABDA8B3981E/0/RPTNationalTFPTrendReport20061010.pdf | Nil | Aggregate capex and opex data for NSW, Victoria, South Australia and Tasmania<br><br>Various years between 1995 and 2005<br><br>Numerous data sources (comparable to those listed above).<br><br>The report notes the difficulty in obtaining consistent data across jurisdictions. |

# B. Gas - Capital and Operating Expenditure Data Availability 1995-96 to 2008-09

| Organisation | Document | Information | Comments |
|---|---|---|---|
| **New South Wales** | | | |
| | IPART Access Arrangements.<br>IPART Revised Access Arrangement for AGL Gas Networks<br>April 2005 Final Decision - http://www.ipart.nsw.gov.au/files/Revised%20Access%20Arrangement%20for%20AGL%20Gas%20Networks%20-%20AGLGN%20-%20April%202005%20-%20Final%20Decision%20-%20PDF%20version.PDF<br><br>IPART Revised Access Arrangement for Country Energy Gas Network November 2005 Final Decision http://www.ipart.nsw.gov.au/files/Revised%20Access%20Arrangement%20for%20Country%20Energy%20Gas%20Network%20-%20Final%20Decision%20-%20November%202005.PDF | Capex data for 1999-00 to 2004-05 | Aggregate capex data only for AGL and Country Energy |
| | IPART's Final Decision Access Arrangement for AGL Gas Networks Limited Natural Gas System In NSW, July 2000 from http://www.archive.ipart.nsw.gov.au/ (No information was available for Country Energy) | Capex data for AGL for the period 1996-97 to 1998-99 | Aggregate capex data for AGL (No Country Energy data) |

| Organisation | Document | Information | Comments |
|---|---|---|---|
| | ECG review of costs performed for IPART - ECG Review of AGLGN Gas Access Arrangement for Independent Pricing and Regulatory Tribunal August 2004 http://www.archive.ipart.nsw.gov.au/ | Opex data for AGL for 1999-00 to 2003-04 | Aggregate opex data for AGL (Note that no such cost review was available for Country Energy). |
| | Country Energy's submission to the IPART 2005 Access Arrangement from archive http://www.archive.ipart.nsw.gov.au/. | Opex data for Country Energy (calendar year) 2000 to 2003 | Aggregate opex data for Country Energy (calendar year)<br><br>The data was provided in real $2003 |
| | | | There does not appear to be any ongoing published reporting requirements on the gas networks from either IPART or the AER. Hence it is unlikely that any additional information from 2004-05 onwards will be available until the next regulatory review. |
| **Victoria** | | | |

| Organisation | Document | Information | Comments |
|---|---|---|---|
| Essential Services Commission (ESC) | ESC Final Decision 2002 Access Arrangement Price Control Models for Envestra (and Albury)<br>http://www.esc.vic.gov.au/NR/rdonlyres/22048A64-F30C-47BA-A428-C3FC04327039/0/FinalDecisionPriceControlModel_Envestra.xls and<br><br>http://www.esc.vic.gov.au/NR/rdonlyres/FB11CA99-9A8C-4F57-8EBD-EF2CD5300838/0/FinalDecisionPriceControlModel_EnvestraAlbury.xls<br><br>TXU Networks<br>http://www.esc.vic.gov.au/NR/rdonlyres/AAC426C4-E7B6-42AA-AB70-191D7B84F0BD/0/FinalDecisionPriceControlModel_TXU.xls<br><br>Multinet Gas<br>http://www.esc.vic.gov.au/NR/rdonlyres/D68AA4A6-68AD-4B20-B507-46729360287B/0/FinalDecisionPriceControlModel_Multinet.xls | Capex and opex data for 1998 to 2001 | Aggregate capex and opex data for Envestra (including Albury), TXU Networks and Multinet Gas<br><br>Calendar year<br><br>Data for 2002 and 2003 was not available on the ESC web site. |
| | Essential Services Commission, Victoria Gas Comparative Performance Report, 2007<br>http://www.esc.vic.gov.au/NR/rdonlyres/0836F9AE-3470-4801-BB2A-9E6ECFE32841/0/GasComparativeReport200708.pdf | Capex and opex from 2004 to 2007 | Aggregate capex and opex data by distribution businesss.<br><br>Real $1 July 2001. |

| Organisation | Document | Information | Comments |
|---|---|---|---|
| | 2003 Comparative Performance Report | Nil | No Financial data reported |
| Office of the Regulator General (subsequently ESC) | Office of the Regulator General – Victoria Gas Industry Comparative Performance 1999 October 2000 http://www.esc.vic.gov.au/NR/rdonlyres/DC0622E2-CD55-4F8B-98A6-E3A5464A20C9/0/gasperfrepoct00.pdf | Nil | First gas performance report – no financial data |
| **Queensland** | | | |
| Queensland Competition Authority (QCA) | QCA's 2006 Access Arrangement Final Decisions - Envestra Access Arrangement http://www.qca.org.au/files/Revised%20Access%20Arrangement_Envestra_Final%20May06.pdf<br>Allgas Access Arrangement http://www.qca.org.au/files/Revised%20Access%20Arrangement_Allgas_Final%20May06.pdf | Capex data for 2001-02 to 2004-05 (05-06 a forecast) | Capex data by type of expenditure<br><br>Historic opex data was not reported<br><br>No capex data for the period prior to 2001-02 was available from the QCA web site. |
| | ECG consultants report for both Envestra and Allgas<br>- Envestra Pty Ltd Capital and Operating Expenditure Review for Queensland Competition Authority 2 May 2006 http://www.qca.org.au/files/Consultant_ECGReport_Envestra_Apr06.pdf<br>- Allgas Energy Pty Ltd Capital and Operating Expenditure Review for Queensland Competition Authority 19 April 2006 http://www.qca.org.au/files/Consultant_ECGReport_Allgas_Apr06.pdf. | Opex 2001-02 to 2004-05 | Aggregate opex data (2004-05 a forecast for Envestra) |

| Organisation | Document | Information | Comments |
|---|---|---|---|
| | QCA Final Decision Proposed Access Arrangements for Gas Distribution Networks Oct 2001 http://www.qca.org.au/files/ACFB0B0.pdf . | Opex information for Allgas for 1999-00 | Aggregate opex data for Allgas (No such information was available in relation to Envestra.)<br><br>No opex data prior to 1999-00 is available on the QCA web site. |
| | | | No capex or opex data are available from 2005-06 onwards on the QCA web site or the AER's web site. |
| **Western Australia** | | | |
| AlintaGas | Access Arrangement Information 1999, AlintaGas's Access Arrangement Information for the Mid-West and South-West Gas Distribution Systems Submitted 30 June 1999 http://www.era.wa.gov.au/cproot/3640/2/AlintaMWSWAccessInfo_v1.pdf | Nil | No historic data |
| Independent Gas Pipelines Access Regulator Western Australia | Independent Gas Pipelines Access Regulator Western Australia, Final Decision: Access Arrangement Mid-West and South-West Gas Distribution Systems submitted by AlintaGas, 30 June 2000 http://www.era.wa.gov.au/cproot/3900/2/Final_Decision_30_Jun_2000R4.pdf | Nil | No historic data |
| | AlintaGas Networks Access Arrangement Information for the Mid-West and South-West Gas Distribution Systems Amended AAI dated 29 July 2005 http://www.era.wa.gov.au/cproot/4262/2/Revised%20AAI%2029%20July%202005%20final2.pdf | Capex and opex 2000 to 2004 | Aggregate capex and opex data.<br><br>Calendar year, real $December 2004 |

| Organisation | Document | Information | Comments |
|---|---|---|---|
| Economic Regulation Authority of Western Australia (ERA) | Economic Regulation Authority 2007/08 Annual Performance Report Gas Distributors April 2009, http://www.era.wa.gov.au/cproot/7484/2/20090416%202007-08%20Annual%20Performance%20Report%20-%20Gas%20Distributors.pdf | Nil | No financial data – service quality information only |
| **South Australia** | | | |
| Essential Services Commission of South Australia (ESCOSA) | ESCOSA Annual Performance Reports 1999-00 to 2007-08 located at http://www.escosa.sa.gov.au/site/page.cfm?u=27&c=47 | Nil | The Annual Performance Reports do not contain sufficient information on past capex and opex in the gas sector. In particular, the information is not sufficiently disaggregated to determine the opex and capex amounts – the reports provide general commentary on the sector rather than specific financial data. |
| | ESCOSA Proposed Revisions to the Access Arrangement for the South Australian Gas Distribution System – Final Decision June 2006 http://www.escosa.sa.gov.au/webdata/resources/files/060630_GAAR_FinalDecnPublic.pdf | Capex for 1998-99 to 2004-05 | Aggregate capex data (excluding capital contributions) |
| | ECG consultant report for ESCOSA (March 2006) http://www.escosa.sa.gov.au/webdata/resources/files/060327-D-ECG_CapOpex_Final-Public.pdf | Nil | Disaggregated capex data for 2001-02 to 2005-06. However, the totals for this data are slightly different to those in the ESCOSA Access Arrangement. |
| | ESCOSA Access Arrangements | Nil | Historic opex costs are not reported |

| Organisation | Document | Information | Comments |
|---|---|---|---|
| | ECG Envestra Limited Capital and Operating Expenditure Review for Essential Services Commission of South Australia March 2006 http://www.escosa.sa.gov.au/webdata/resources/files/060327-D-ECG_CapOpex_Final-Public.pdf, | Nil | Opex data for the period 2001-02 to 2005-06. However, it is not clear whether these costs include unaccounted for gas. |
| Envestra | Envestra's Access information http://www.escosa.sa.gov.au/webdata/resources/files/050928-R-AccessArrangInformationSAGasNetwork.pdf | Opex for the period 2001-02 to 2005-06 | Aggregate opex (note that 2005-06 is a forecast). |
| South Australian Independent Pricing & Access Regulator (subsequently ESCOSA) | SAIRI December 2001 Access Arrangement http://www.escosa.sa.gov.au/webdata/resources/files/011201-R-SAIPARFinalDecisionEnvestraAA.pdf | Nil | Opex for 1998-99 to 2000-01. However, the opex values are forecasts provided by Envestra. |
| **ACT** | | | |
| Independent Competition and Regulatory Commission (ICRC) | Independent Competition and Regulatory Commission Draft Decision Review of Access Arrangement for ActewAGL natural gas system in ACT, Queanbeyan and Yarrowlumla July 2004 http://www.icrc.act.gov.au/__data/assets/pdf_file/0006/16728/gasaccessdraftreport19jul04.pdf | Capex data for the period 1999-00 to 2003-04 | Aggregate capex data |

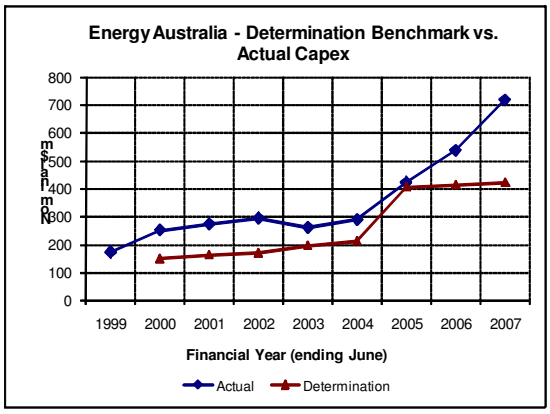
| Organisation | Document | Information | Comments |
|---|---|---|---|
| | Independent Competition and Regulatory Commission Draft Decision Review of Access Arrangement for ActewAGL natural gas system in ACT, Queanbeyan and Yarrowlumla July 2004 http://www.icrc.act.gov.au/__data/assets/pdf_file/0006/16728/gasaccessdraftreport19jul04.pdf | Opex data for the period 2000-01 to 2003-04 | Aggregate opex data<br><br>No other data readily available |

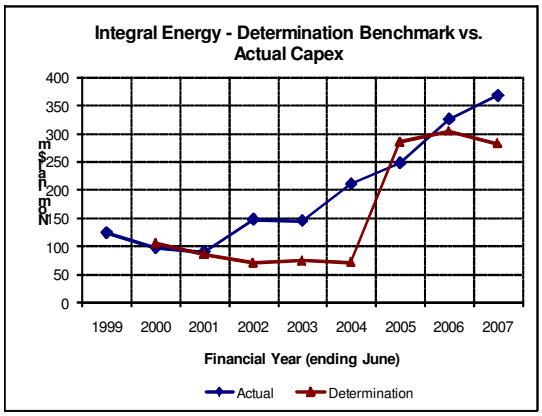
# C. Comparison of Actual and Building Block Capital Expenditure

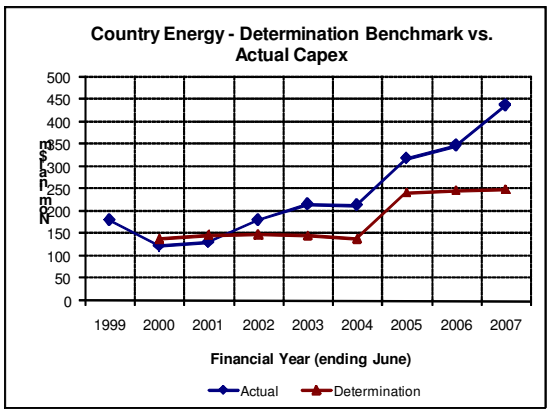
This Attachment provides graphs comparing Australian electricity and gas distribution businesses' actual expenditure with the capital expenditure building blocks approved by their respective jurisdictional regulators.

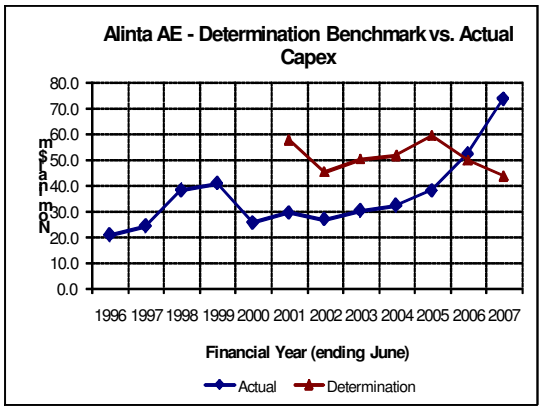
It is emphasised that in preparing these graphs certain assumptions have been made about inflation in order to present data in comparable dollar values.

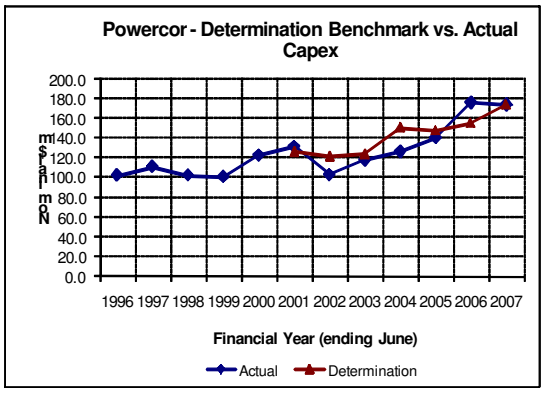
## Electricity

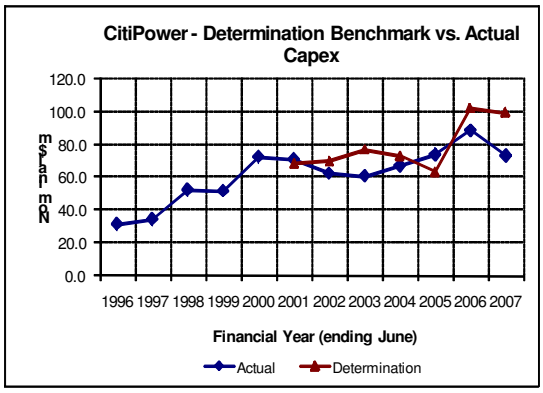


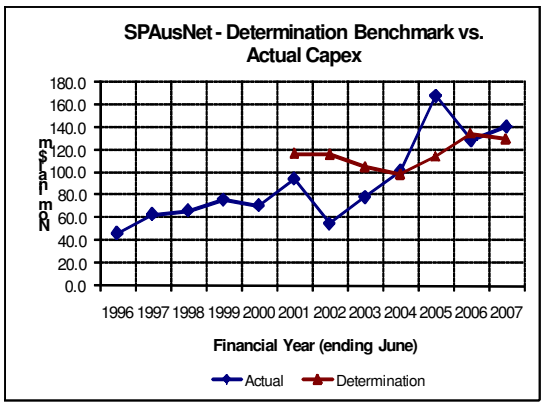



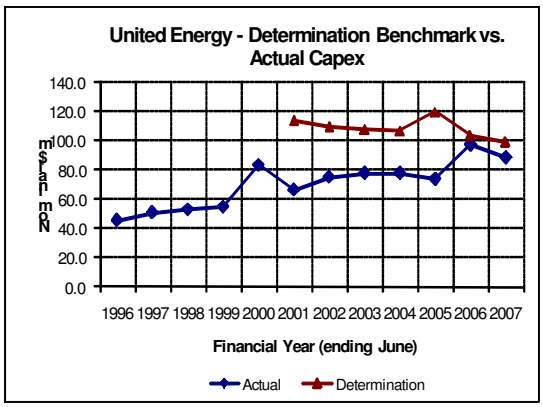



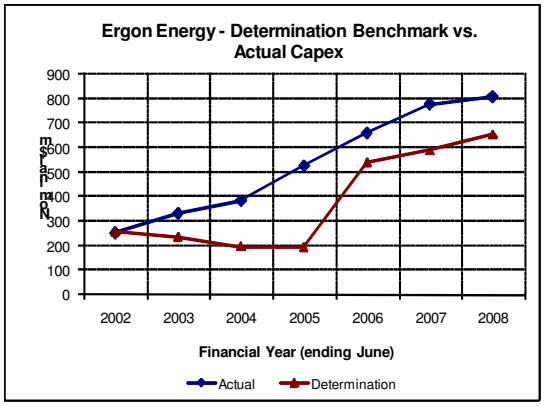



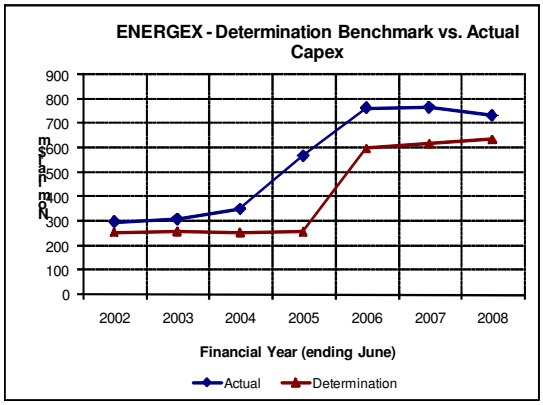

Powercor - Determination Benchmark vs. Actual Capex
$ million
200.0
180.0
160.0
140.0
120.0
100.0
80.0
60.0
40.0
20.0
0.0
1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007
Financial Year (ending June)
Actual
Determination

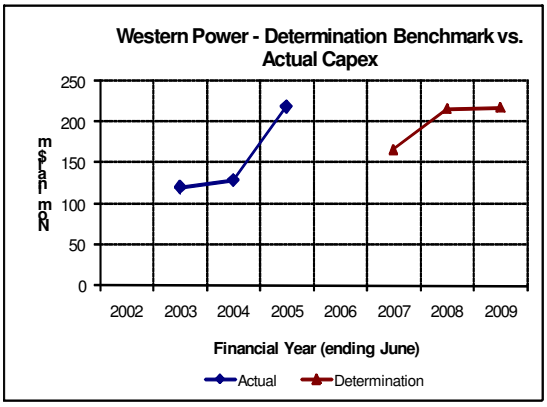

CitiPower - Determination Benchmark vs. Actual Capex
$ million
120.0
100.0
80.0
60.0
40.0
20.0
0.0
1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007
Financial Year (ending June)
Actual
Determination

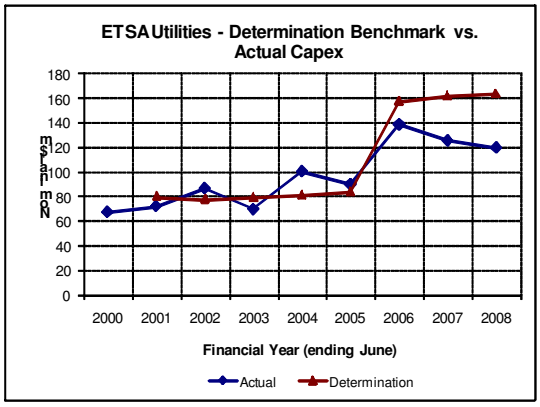

SPAusNet - Determination Benchmark vs. Actual Capex
$ million
180.0
160.0
140.0
120.0
100.0
80.0
60.0
40.0
20.0
0.0
1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007
Financial Year (ending June)
Actual
Determination

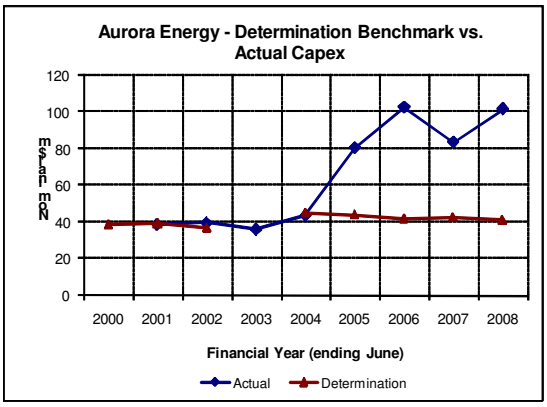

United Energy - Determination Benchmark vs. Actual Capex
$ million
140.0
120.0
100.0
80.0
60.0
40.0
20.0
0.0
1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007
Financial Year (ending June)
Actual
Determination

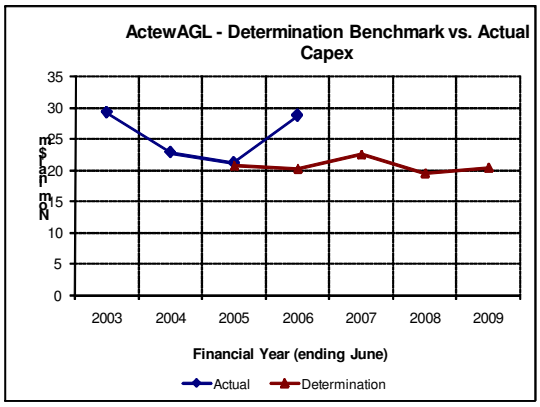

Ergon Energy - Determination Benchmark vs. Actual Capex
$ million
900
800
700
600
500
400
300
200
100
0
2002 2003 2004 2005 2006 2007 2008
Financial Year (ending June)
Actual
Determination


ENERGEX - Determination Benchmark vs. Actual Capex
$ million
900
800
700
600
500
400
300
200
100
0
2002 2003 2004 2005 2006 2007 2008
Financial Year (ending June)
Actual
Determination

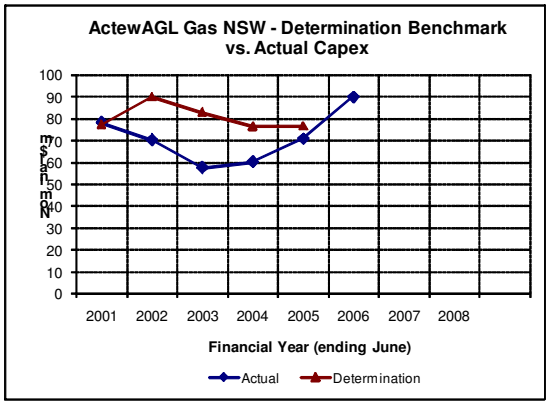

Western Power - Determination Benchmark vs. Actual Capex
250
200
150
100
50
0
2002 2003 2004 2005 2006 2007 2008 2009
Financial Year (ending June)
Actual
Determination

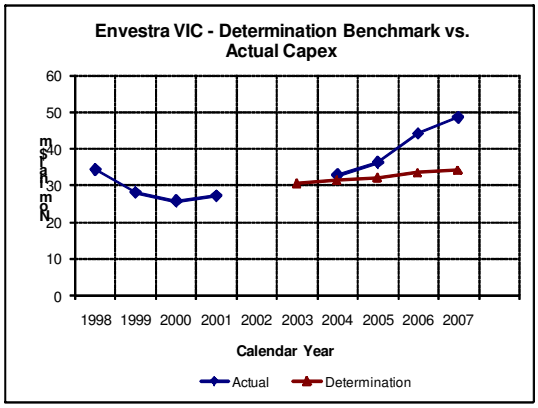

ETSA Utilities - Determination Benchmark vs. Actual Capex
180
160
140
120
100
80
60
40
20
0
2000 2001 2002 2003 2004 2005 2006 2007 2008
Financial Year (ending June)
Actual
Determination

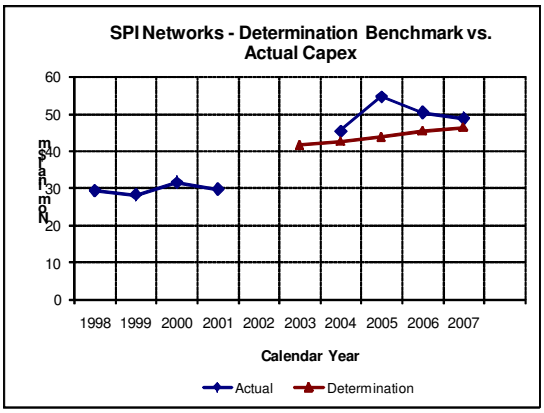

Aurora Energy - Determination Benchmark vs. Actual Capex
120
100
80
60
40
20
0
2000 2001 2002 2003 2004 2005 2006 2007 2008
Financial Year (ending June)
Actual
Determination

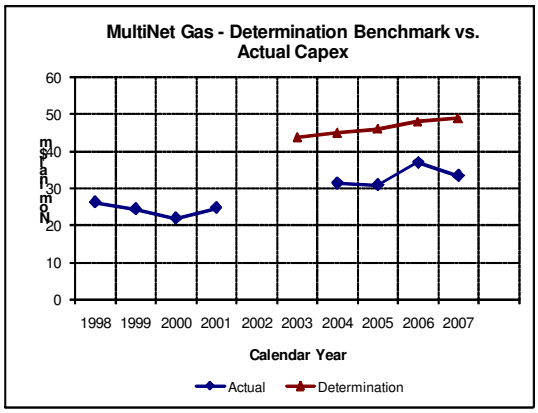

ActewAGL - Determination Benchmark vs. Actual Capex
35
30
25
20
15
10
5
0
2003 2004 2005 2006 2007 2008 2009
Financial Year (ending June)
Actual
Determination

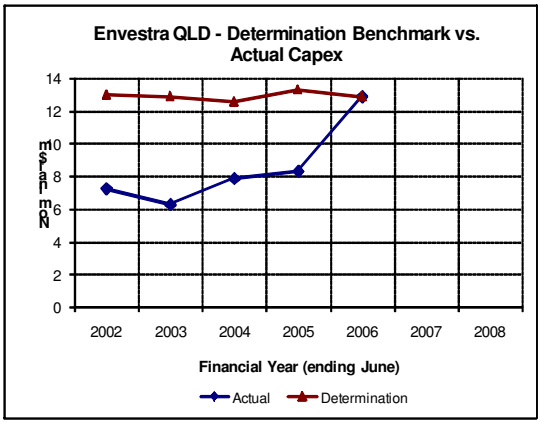
# Gas

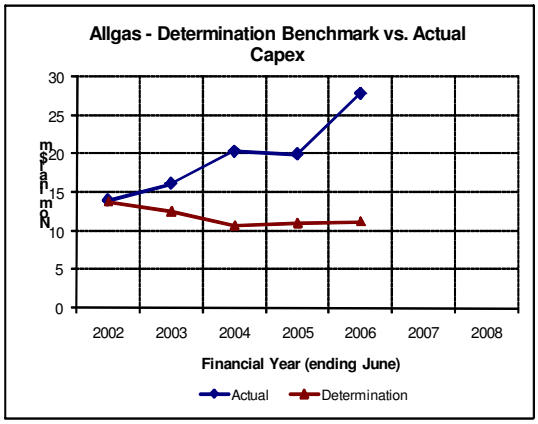

ActewAGL Gas NSW - Determination Benchmark vs. Actual Capex
100
90
80
70
60
50
40
30
20
10
0
2001 2002 2003 2004 2005 2006 2007 2008
Financial Year (ending June)
Actual
Determination

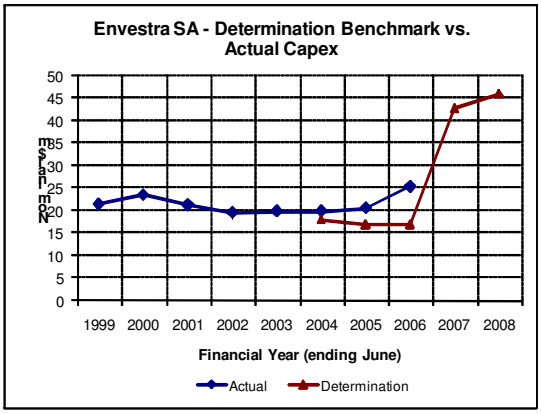

Envestra VIC - Determination Benchmark vs. Actual Capex
60
50
40
30
20
10
0
1998 1999 2000 2001 2002 2003 2004 2005 2006 2007
Calendar Year
Actual
Determination

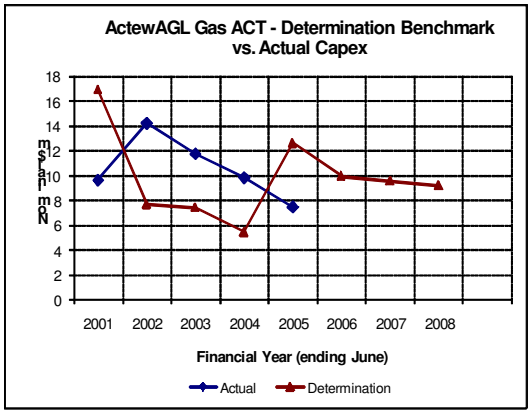

SPI Networks - Determination Benchmark vs. Actual Capex
60
50
40
30
20
10
0
1998 1999 2000 2001 2002 2003 2004 2005 2006 2007
Calendar Year
Actual
Determination


MultiNet Gas - Determination Benchmark vs. Actual Capex
60
50
40
30
20
10
0
1998 1999 2000 2001 2002 2003 2004 2005 2006 2007
Calendar Year
Actual
Determination


Envestra QLD - Determination Benchmark vs. Actual Capex
14
12
10
8
6
4
2
0
2002 2003 2004 2005 2006 2007 2008
Financial Year (ending June)
Actual
Determination


Allgas - Determination Benchmark vs. Actual Capex
30
25
20
15
10
5
0
2002 2003 2004 2005 2006 2007 2008
Financial Year (ending June)
Actual
Determination


Envestra SA - Determination Benchmark vs. Actual Capex
$ Million
50
45
40
35
30
25
20
15
10
5
0
1999 2000 2001 2002 2003 2004 2005 2006 2007 2008
Financial Year (ending June)
Actual
Determination


ActewAGL Gas ACT - Determination Benchmark vs. Actual Capex
$ Million
18
16
14
12
10
8
6
4
2
0
2001 2002 2003 2004 2005 2006 2007 2008
Financial Year (ending June)
Actual
Determination