4647.0.55.001

Australian Bureau of Statistics

Research Paper

Developing an Alternative View of Electricity and Gas Supply Activity in Australia

New Issue

Research Paper

Developing an Alternative View of Electricity and Gas Supply Activity in Australia

Kai Wallenius, Andrew Platt and Julie McKenzie

Centre of Environment and Energy Statistics

AUSTRALIAN BUREAU OF STATISTICS

EMBARGO: 11.30 AM (CANBERRA TIME) TUE 26 FEB 2008

ABS Catalogue no. 4647.0.55.001
ISBN 978 0 642 48371 3

Produced by the Australian Bureau of Statistics

INQUIRIES

The ABS welcomes comments on the research presented in this paper. For further information, please contact Kai Wallenius, Centre of Environment and Energy Statistics on Canberra (02) 6252 6019 or email <environment@abs.gov.au>.

CONTENTS

ABSTRACT 1

1. INTRODUCTION 1
   1.1 What is an alternative industry view? 2

2. BACKGROUND TO ABS STATISTICS ON THE ELECTRICITY AND GAS SUPPLY INDUSTRIES 5
   2.1 Key data items 5
   2.2 Data sources 6

3. IDENTIFYING ELECTRICITY AND GAS SUPPLY ACTIVITIES 7
   3.1 Defining the electricity and gas supply activities 7
      3.1.1 Issues with data comparability and ANZSIC industry definitions 7
      3.1.2 Perceptions of the size of the gas supply industry 10
      3.1.3 Method to address these issues 10
      3.1.4 Key findings 11
   3.2 Classifying secondary activities 13
      3.2.1 Secondary activity and stakeholder perceptions of industry size . . . 13
      3.2.2 The ANZSIC treatment of secondary activities 13
      3.2.3 Factors contributing to the issue 14
      3.2.4 Method to address these issues 14
      3.2.5 Findings 15

4. PROPOSED METHODOLOGY FOR AN ALTERNATIVE VIEW OF ELECTRICITY AND GAS SUPPLY ACTIVITY 18
   4.1 Defining the electricity and gas supply activities 18
   4.2 Methodology for an alternative view of electricity and gas supply activity 18
   4.3 Preliminary estimates and findings 19

5. CONCLUSIONS AND FURTHER WORK 21
   5.1 Conclusions 21
   5.2 Further work 21

ACKNOWLEDGEMENTS 21

REFERENCES 22

APPENDIX

A. SALES AND SERVICE INCOME 24

DEVELOPING AN ALTERNATIVE VIEW OF ELECTRICITY AND GAS SUPPLY IN AUSTRALIA

Kai Wallenius, Andrew Platt and Julie McKenzie
Centre of Environment and Energy Statistics

ABSTRACT

This research paper examines a method to enhance ABS electricity and gas supply industry statistics with separate activity data. While industry statistics allow for the comparative analysis between and across different industries at the macro-economic level, users interested in detailed activity analysis have noted some limitations with industry estimates. Specifically, these limitations relate to the industry definitions used in the *Australian and New Zealand Standard Industrial Classification* (ANZSIC), and to the classification of secondary activities of business units within the ANZSIC framework.

This paper investigates these limitations, proposes methods to address them and proposes a methodology to develop an alternative industry view of electricity and gas supply activity. For illustrative purposes some preliminary estimates of key economic and financial data for 2003–04 are presented.

1. INTRODUCTION

Energy statistics in Australia are in high demand. High quality, relevant and timely data are needed to support informed decision making. In April 2005, the Council of Australian Governments (COAG) identified a number of shortcomings in Australia's basic energy supply and use statistics in its report, *A Nationally Consistent Framework for Greenhouse and Energy Reporting* (ACG, 2005). Initiatives to improve the collection and reporting of Australia's energy and greenhouse gas statistics are the focus of current attention from the Commonwealth and State and Territory Governments. One such initiative is the October 2007 *National Greenhouse and Energy Reporting Act* (NGER Act).

Current ABS statistics on the electricity and gas supply industries are contained in the annual publication *Electricity, Gas, Water and Sewerage Operations, Australia* (ABS cat. no. 8226.0). This publication presents annual estimates of the economic and financial performance of the electricity and gas supply industries, which are the focus of this research paper, as well as estimates on the water supply, sewerage and drainage services industry.

These data are collected on an integrated economic statistics basis, where data from each industry conform to the same basic conceptual standards, including grouping the data using a common industry standard, the *Australian and New Zealand Standard Industrial Classification* (ANZSIC). These standards form a basis for creating consistent industry data that are used to compile the National Accounts, and allow users to make comparative analysis between and across different industries.

ABS energy statistics stakeholders have highlighted the importance of the *Electricity, Gas, Water and Sewerage Operations, Australia* publication and noted that it is the only official source of economic and financial data on these industries. However, users interested in detailed industry analysis have expressed some reservations with the electricity and gas supply industry statistics contained within it. It was noted that, while the statistics aligned with the integrated economic statistical system, they did not appear to align with industry specific knowledge on these industries. It was also noted that the statistics to date do not adequately capture the diverse nature of the 'energy supply' industry that has emerged since the energy market reforms of the 1990s.

This research paper identifies and analyses the industry data issues and then proposes a methodology to develop an alternative view of electricity and gas supply statistics in Australia. The preliminary investigations reveal a significant impact on statistics for gas supply activity, with substantial increases to employment and output estimates.

1.1 What is an alternative industry view?

The ABS employs a range of standards to ensure that statistics are compiled consistently and are comparable at the national and international levels. An industry classification is a way of organising data from a business unit perspective.[1] The standard industrial classification used currently by the ABS for electricity and gas statistics is the 1993 edition of the ANZSIC (ABS cat. no. 1292.0, 1993).[2]

ANZSIC provides a framework under which units carrying out similar economic activities are grouped together, and subject to certain criteria being met, each such grouping defines an industry. ANZSIC broadly aligns with the International Standard Industrial Classification of all Economic Activities (ISIC). ANZSIC has four classification levels, namely divisions (the broadest level), subdivisions, groups and classes (the finest level). Each industry class is defined in terms of a specified range of activities. Every unit is classified uniquely to one class on the basis of its predominant

1 Statistical agencies use the term 'unit' to refer to the representation of a business used for the collection of data (ABS and SNZ, 2006).

2 The ANZSIC 1993 edition was revised in 2006 to ensure the classification remained current and relevant, reflecting changes that have occurred in the structure and composition of industry since the previous edition and recognising changing user requirements for data classified to industry. The ABS is currently in the process of implementing the ANZSIC 2006 edition.

activities (ABS and SNZ, 1993 and 2006). This framework promotes comparability of industry statistics within Australia and internationally.

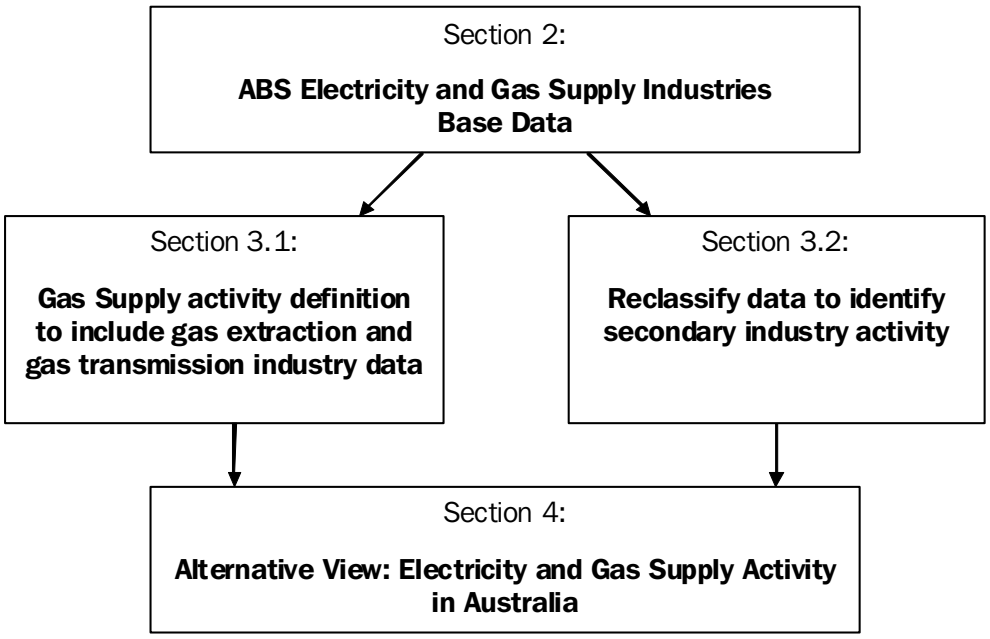
The use of a standard industrial classification is essential in preparing consistent and comparable industry statistics. However, industry estimates collated on an ANZSIC basis may be subject to analytical constraints at the finest level of classification detail. For example, some data providing businesses in the Culture and leisure industry, have been unable to provide data with sufficient detail to produce estimates based on finer levels of ANZSIC 93. This has limited the ability to identify component parts of the Culture and leisure industry on an ANZSIC 93 basis (ABS, 2001). In other cases, users wish to draw together the activities of different ANZSIC classes for industries that are not identified separately in the ANZSIC, such as the tourism industry (ABS, 2000b).

An alternative industry view aims to provide a measure of economic activity for industries that involve a combination of industry classes as defined by the ANZSIC. This involves identifying and reclassifying existing statistics. The ABS has developed some alternative industry views, particularly to address data needs in emerging industries and to support some industry based policy, but has yet to develop alternative views of the electricity or gas industry. For example, the alternative view of the 'resources industry' published in 2002, presented a broader view of the mining industry in Western Australia for the years 1995–96 to 1999–2000. In addition, the March 2007 issue of the *Western Australian Statistical Indicators* (ABS, 2002b and 2007b) provided some alternative view information for the 'resources industry' for 2001–02 to 2005–06.

An alternative activity view is also possible. The methodology developed in this research paper is an example of such an alternative view, and results in the production of estimates for separate electricity and gas supply activities.

This research paper develops an alternative view of electricity and gas supply activity in Australia, by establishing a technique for isolating electricity and gas activity from industry based data – see diagram 1.1.

1.1 Overview of the proposed methodology for an alternative view of electricity and gas supply activity



Section 2 of this paper outlines the key data items and data sources used in current ABS statistics on the electricity and gas supply industries. Section 3 analyses two specific issues with these statistics: firstly, the existing definition of the gas supply industry (Section 3.1) and secondly, the classification of secondary electricity and gas activities within other industry classes (Section 3.2). A methodology to address each issue is developed and the impact on estimates is assessed.

An alternative view of electricity and gas supply activity is then presented in Section 4. It provides a definition for the 'gas supply' industry and proposes that a methodology to develop an alternative view of electricity and gas supply activity should involve combining the methods outlined in Sections 3.1 and 3.2. For illustrative purposes, some estimates of the alternative view of electricity and gas supply activity are provided. Finally, Section 5 provides some conclusions and suggestions for further work.

Alternative view estimates are subject to the limitation that they cannot be compared on a 'like basis', with existing industry estimates. This is because of potential overlap between the groups being compared. Comparisons between industry groups are only valid when using data based on the one industry classification. Nevertheless, alternative view estimates can provide analytical insight within an industry.

2. BACKGROUND TO ABS STATISTICS ON THE ELECTRICITY AND GAS SUPPLY INDUSTRIES

This section details the key data items included in current ABS electricity and gas supply statistics, and discusses the data sources and sample scope.

2.1 Key data items

There are four key data items included in current ABS electricity and gas supply industry statistics:

- Employment (as at the end of the financial year) – this refers to the number of persons employed during the last pay period ending in June of the given year. It excludes persons paid by commission only, non-salaried directors, and self-employed persons such as consultants and contractors.
- Wages and salaries – this is the gross wages and salaries of all employees of the business. The item includes severance, termination and redundancy payments, salaries and fees of directors and executives, retainers and commissions of persons who received a retainer, bonuses, and annual and other types of leave. Provision expenses for employee entitlements are also included.
- Industry value added – this is the value of industry output less its intermediate consumption. It represents the value added by the production process undertaken by an industry.
- Sales and service income – this includes the sales of goods, whether or not produced by the business, income from services, including consulting services, repair, maintenance and service income, contract, subcontract and commission income. It excludes natural resource royalties income and interest income. The impact of the alternative activity view upon sales and service income is discussed in Appendix A.

Data on financial performance, the acquisition and disposal of assets, and selected performance measures are also available.

2.1 Key data – Electricity and gas supply industries, 2003–04

	Employment at end of June no.	*Wages and salaries (a) $m*	*Industry value added $m*
Electricity supply industry	36 791	2 654.9	12 861.9
Gas supply industry	1 906	81.4	985.9

(a) Excludes the drawings of working proprietors.

Source: *Electricity, Gas, Water and Sewerage Operations, Australia, 2005–06* (ABS cat. no. 8226.0).

Table 2.1 shows key statistics for both the electricity supply industry and the gas supply industry for 2003–04. Industry value added for the electricity supply industry was almost twelve times the industry value added of the gas supply industry in 2003–04, while employment was almost seventeen times the size of employment in the gas supply industry.

2.2 Data sources

The ABS annual Economic Activity Survey is the main source of ABS industry data. This survey directly collects information about the operation and financial performance of businesses in the public trading and private employing sectors of the Australian economy. Data from each industry in this survey conform to the same basic conceptual standards, allowing comparative analysis between different industries. Data from this survey are used as an annual benchmark of economic activity in the compilation of the National Accounts, and provide economic indicator statistics which facilitate the ongoing monitoring of the economy in regard to the business cycle (ABS, 2007a).

The majority of ABS data on the electricity and gas supply industries are sourced from the utilities industries collection. This collection is conducted as a component of the Economic Activity Survey and includes all businesses classified to the electricity and gas supply industries with an annual turnover above certain cut-offs.[3] The remainder of the data are sourced from the Australian Taxation Office (ATO) business income tax data for those businesses below the cut-off. In 2003–04, the utilities industries collection included about 400 businesses, which accounted for 99.5% and 99.6% of sales and service income for the electricity and gas supply industries respectively (ABS, 2005).

3 In 2003–04, the turnover cut-off used for electricity and gas supply businesses was $1,005,000.

3. IDENTIFYING ELECTRICITY AND GAS SUPPLY ACTIVITIES

Investigations into ABS electricity and gas supply industry statistics have identified two issues that limit the usefulness of these statistics for detailed industry analysis.

Specifically, these relate to:

- data comparability and alignment in scope of the ANZSIC electricity and gas supply industries; and
- the classification of secondary activities of business units within the ANZSIC framework.

This section examines the above issues, develops a methodology to address each, and assesses the methodological impact on some key data items.

3.1 Defining the electricity and gas supply activities

3.1.1 Issues with data comparability and ANZSIC industry definitions

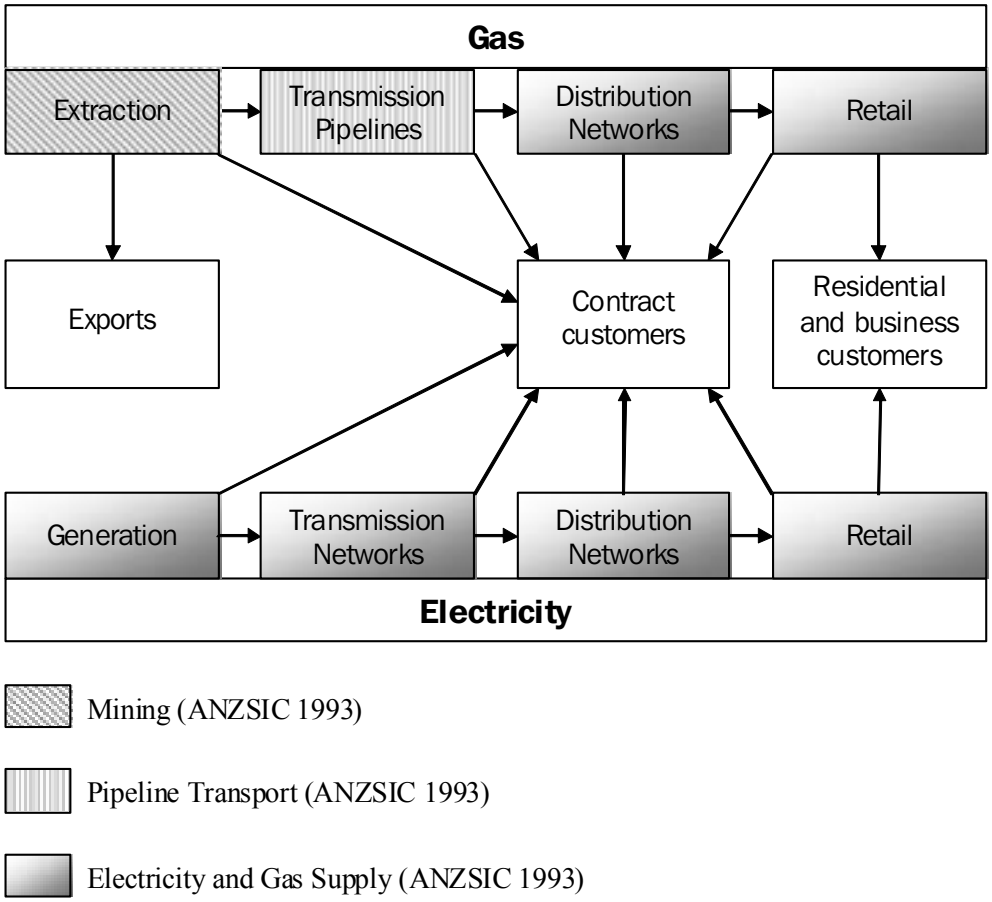
ABS statistics use *DIVISION D ELECTRICITY, GAS AND WATER SUPPLY* of the 1993 edition of ANZSIC to define the electricity and gas supply industries as follows:

- Electricity supply (ANZSIC 1993 Class 3610) is the generation, transmission or distribution of electricity. It excludes the construction, repair or maintenance of electricity transmission towers or lines, power station buildings or water storage dams;
- Gas supply (ANZSIC 1993 Class 3620) is the distribution of natural gas, liquefied petroleum gas or manufactured town gas through a system of mains. It excludes the extraction of gas, the operation of pipelines for the transportation of gas, and the construction, repair or maintenance of gas mains.

Note that there are differences in the treatment of industry activities between the ANZSIC definition of the electricity supply industry and the ANZSIC definition of the gas supply industry. Because of these differences, the economic and financial estimates for the electricity supply industry are not directly comparable with estimates for the gas supply industry.

The ANZSIC Class 3610 (the electricity supply industry) includes production (generation) and transmission activities, whereas ANZSIC Class 3620 (gas supply) excludes the production (extraction) and transmission activities – see diagram 3.1 and table 3.2.

3.1 ANZSIC coverage of electricity and gas supply industry activities



3.2 Summary of the ANZSIC 1993 classification of electricity and gas supply industries

Activity	*ANZSIC Division*	*ANZSIC Class*
	Electricity supply	
Generation	D – Electricity, Gas and Water Supply	3610 – Electricity Supply
Transmission	D – Electricity, Gas and Water Supply	3610 – Electricity Supply
Distribution	D – Electricity, Gas and Water Supply	3610 – Electricity Supply
Wholesaling / Retailing	D – Electricity, Gas and Water Supply	3610 – Electricity Supply
	Gas supply	
Extraction	B – Mining	1200 – Oil and Gas Extraction
Transmission	I – Transport and Storage	6501 – Pipeline Transport
Distribution	D – Electricity, Gas and Water Supply	3620 – Gas Supply
Wholesaling / Retailing	D – Electricity, Gas and Water Supply	3620 – Gas Supply

Businesses mainly engaged in the extraction of gas and the high-pressure transmission of gas are classified to the ANZSIC Mining [4] and Transport [5] industries respectively, and not to the gas supply industry. The purpose of this treatment is to ensure consistency with the ANZSIC classificatory framework, which groups business units carrying out similar productive activities, together within an industry boundary.

This treatment is sound for energy statistics users who need to focus on domestic and international industry comparisons. However, some energy statistics users need to focus exclusively on productive activity associated with specific energy products, which may be produced and value added across a number of ANZSIC industries. The focus of this research paper is to assist these users by developing a methodology to derive estimates of productive activity associated with electricity supply and gas supply irrespective of the industry associated with the productive activity.

3.3 Summary of the ANZSIC 2006 classification of electricity and gas supply industries

Activity	*ANZSIC Division*	*ANZSIC Class*
	Electricity supply	
Generation	D – Electricity, Gas, Water and Waste Services	2611 – Fossil Fuel Electricity Generation
		2612 – Hydro-Electricity Generation
		2619 – Other Electricity Generation
Transmission	D – Electricity, Gas, Water and Waste Services	2620 – Electricity Transmission
Distribution	D – Electricity, Gas, Water and Waste Services	2630 – Electricity Distribution
Wholesaling / Retailing	D – Electricity, Gas, Water and Waste Services	2640 – On Selling Electricity and Electricity Market Operation
	Gas supply	
Extraction	B – Mining	0700 – Oil and Gas Extraction
Transmission	I – Transport, Postal and Warehousing	5021 – Pipeline Transport
Distribution	D – Electricity, Gas, Water and Waste Services	2700 – Gas Supply
Wholesaling / Retailing	D – Electricity, Gas, Water and Waste Services	2700 – Gas Supply

4 The extraction of gas is treated differently to electricity generation in the ANZSIC because the extraction of gas to the earth's surface is similar to mining activities, where the term 'mining' is used in the broad sense to include the extraction of minerals occurring naturally as solids, liquids or gases. In contrast, electricity generation bears little in common with mining or manufacturing activities and is therefore grouped with similar electricity supply activities in the ANZSIC.

5 Gas transmission is treated differently to electricity transmission in the ANZSIC because the pipeline transportation of gas involves the physical conveyance of a good from one point to another. The transport industry includes units mainly engaged in the physical transportation of goods by road, rail, water, air or pipeline. The transmission of high voltage electricity differs from the physical transportation of goods as it cannot be transported by road, rail or other modes of transportation.

The 1993 edition of the ANZSIC has been recently reviewed. ANZSIC 2006 provides more detailed data on electricity supply activities. While this will improve the presentation of ABS economic and financial statistics for the electricity supply industry, it will not change the presentation of gas supply industry data.[6] The definition and industry activity scope of the gas supply industry remains unchanged, with gas extraction and transmission activities classified to the Mining and Transport divisions respectively.

3.1.2 Perceptions of the size of the gas supply industry

The issues associated with data generated in accordance with the ANZSIC definitions of the electricity and gas supply industries have arisen largely because of the industry reforms of the 1990's. Up until then the electricity and gas supply industries were dominated by a small number of government-owned utilities or private monopolies, operating in separate, extensively regulated State markets. Both electricity utilities and gas utilities were vertically integrated, meaning they performed most or all of the activities in the electricity or gas supply industries. Based on their predominant activities, these utilities were classified in ABS statistics to either the electricity or gas supply industry. Any extraction or transmission activities undertaken by gas utilities were included implicitly in ABS gas supply statistics, despite not being in the ANZSIC gas supply industry definition, because these activities were considered to be secondary to gas distribution activities.

The 1991 COAG energy market reforms sought to increase competition and efficiency in the electricity and gas supply industries. A key component of these reforms was industry restructuring, which saw many of these utilities commercialised and disaggregated into separate smaller businesses that tended to specialise in one or more of the supply chain activities. As a result, the ANZSIC classified businesses specialising in gas extraction or transmission activities to the mining and transport industries respectively, removing these activities from ABS gas supply industry statistics. This impact has become more significant in recent years as the reform process has progressed.

3.1.3 Method to address these issues

It is possible to construct an 'alternative view' of gas supply activity that includes gas extraction activities and gas transmission activities. This involves incorporating data from units that are classified to ANZSIC 1993 Class 1200 – Oil and Gas Extraction, and ANZSIC 1993 Class 6501 – Pipeline Transport, with the data for units already classified to the ANZSIC 1993 Class 3620 – Gas Supply.

---

6 ABS industry data for the 2005–06 financial year will be compiled using the revised ANZSIC 2006 edition.

The main advantages of presenting data based on a broader activity definition are that it:

- provides a more focused assessment of gas supply activity;
- allows for enhanced comparability between estimates for gas and electricity supply activity.

As with the current ABS electricity and gas supply industry statistics, the ABS Economic Activity Survey is also the vehicle used to collect data from businesses classified to oil and gas extraction and pipeline transport. The use of standardised concepts across the Economic Activity Survey means that data from these businesses is consistent with the data for the gas supply industry.

It is important to note that the survey data for oil and gas extraction were not designed to produce estimates that relate solely to gas supply activities and that this ANZSIC class includes data for the extraction of goods other than gas. Adjustments are therefore needed to remove the oil component from oil and gas extraction. In other words, data from only a part of the ANZSIC class is added. In this case, we refer to adding 'activity data'.

Similarly, pipeline transport includes the transport of other goods such as oil and water. However, research on the businesses classified to this ANZSIC 1993 class showed that gas transmission activities accounted for at least 98% of income data, so for the purposes of this research paper, all pipeline transport data are assumed to relate to gas transmission activities. Since data for the entire ANZSIC class is added, this is known as adding 'industry data'.

Industry Value Added (IVA) is used to demonstrate the impact of bringing gas extraction and pipeline transport into an alternative view of gas activity. IVA is preferred over sales and service income as a measure of industry activity because IVA excludes the value of goods and services that are used up in the production process. Therefore IVA is a more precise measure of an industry's productive activity. The impact upon sales and service income is presented in Appendix A.

3.1.4 Key findings

Table 3.4 shows the key data items for the electricity and gas supply industries[7], as well as preliminary estimates of an alternative view of the gas supply industry. All statistics are presented at the national level and relate to the 2003–04 financial year.

7 These statistics were published in *Electricity, Gas, Water and Sewerage Operations, Australia, 2003–04*, using ANZSIC industry definitions and where each business is allocated to a single industry, irrespective of any diversity of activities undertaken, based on the activity that provides the main source of value added.

3.4 Key data – Electricity industry gas supply activities, including gas extraction and transmission activities, 2003–04 (preliminary estimates)

	Employment at end of June no.	*Wages and salaries (a) $m*	*Industry value added $m*
Electricity supply industry (b)	36 791	2 654.9	12 861.9
Gas supply industry (c)	1 906	81.4	985.9
plus Gas extraction and gas transmission (d)(e)	3 120	321.3	5 263.4
equals Gas supply industry (alternative view) (f)	5 026	402.7	6 249.3

(a) Excludes the drawings of working proprietors.
(b) Data for ANZSIC 1993 Class 3610, which includes electricity generation, transmission & distribution activities.
(c) Data for ANZSIC 1993 Class 3620, which includes gas distribution activities only.
(d) Data derived from ANZSIC 1993 Classes 1200 and 6501.
(e) Gas extraction includes exports of $2 830m (ABS 2004b).
(f) Data derived from ANZSIC 1993 Classes 1200, 3620 and 6501, and includes gas extraction, transmission and distribution activities.

With the inclusion of gas extraction activity and transmission industry data, there is a significant increase in the key data items relating to gas supply activity, relative to the gas supply industry. Employment increases by 3,120 persons (164%), wages and salaries increase by $0.3 billion (395%), and industry value added increases by $5.3 billion (534%).[8]

These statistics allow for a more comprehensive comparison with electricity supply industry statistics. Prior to the inclusion of gas extraction and transmission data, the gas supply industry was relativity small compared to the electricity supply industry. Employment in the electricity supply industry is just under seven and a half times the size of employment associated with gas supply activity, compared with nineteen times for the gas industry data in table 2.1. Industry value added in the electricity supply industry is just over two times the industry value added associated with gas supply activity, compared with thirteen times for the gas industry data in table 2.1.

8 Note that gas extraction data includes exports of Liquid Natural Gas (LNG). Although exports are within scope of the Electricity, Gas, Water and Sewage collection (ABS cat. no. 8226.0), the gas distribution activity is only domestic in nature.

3.2 Classifying secondary activities

3.2.1 Secondary activity and stakeholder perceptions of industry size

ANZSIC-based industry statistics classify each business to a single industry according to its predominant activity, irrespective of any diversity of activities undertaken (ABS, 2005). The predominant activity of a business is defined as the activity which contributes the most value added. This principle of classification ensures that all businesses are classified uniquely and consistently to one industry along with other businesses that carry out similar economic activities (ABS and SNZ, 1993).

To illustrate, if a business derives most of its value added from electricity generation activities, it would have its total operations classified to the electricity supply industry, even if the same business undertook significant secondary activities (such as gas supply, water supply, and/or coal mining). This particular situation occurs in some of the less populous states, where water and sewerage data for their major water suppliers are classified as part of the electricity supply industry (ABS, 2005).

In some cases it may be feasible for businesses to report additional information, such as a breakdown of sales by product type. This information can be used by the ABS to separately identify business activity that is non-homogenous to the primary ANZSIC industry. However, reporting information in this manner would result in considerably higher provider burden to the community and cost to the ABS. Further, not all businesses are able to provide information in this way. Therefore businesses generally report for all combined operating activities and secondary activity within an ANZSIC class may be unavoidably included.

3.2.2 The ANZSIC treatment of secondary activities

Users of ABS energy statistics have claimed that by classifying the data of an entire business based on the major value added activity, the impact of the post-1990's growth of significant secondary activities within the energy supply industry has been understated. Accordingly, there is a perception that ABS electricity and gas supply statistics portray a view of these industries which does not fully reflect the significant structural changes that have taken place in the industry.

3.2.3 Factors contributing to the issue

Prior to the energy market regulation reforms of the 1990's, utilities were predominantly organised according to electricity supply or gas supply activities and there was little diversification into significant secondary activities.

The industry restructuring and energy market deregulation of the 1990's allowed new businesses to enter the energy supply market to compete for customers. Increased competition led to increased horizontal integration in the electricity and gas supply industries with existing and new businesses diversifying their range of activities. Electricity suppliers increasingly entered the gas supply market to undertake significant secondary gas supply activities. Similarly, gas suppliers have also been undertaking significant secondary electricity supply activities (ABS, 1999).

3.2.4 Method to address these issues

Where a business makes a significant economic contribution to different ANZSIC industries, the ABS may ask the business to report separately for each ANZSIC industry, or split the reported data of the business between the industries involved (ABS, 2005).[9]

For the electricity and gas supply industries, the importance of secondary activity may be identified by splitting the reported data of businesses that supply both electricity and gas between the respective industries. This results in estimates that align more closely to an activity basis, rather than a predominant industry basis.

The main advantages of this type of approach include:

- data for businesses engaged in the supply of both electricity and gas can be separated by activity and reclassified accordingly;
- more specific data on electricity supply activities are provided; and
- more specific data on gas supply activities are provided.

It is important to note that only secondary activities relating to electricity or gas supply have been reclassified for the purposes of this research paper. Other significant secondary activities, such as water supply, that are undertaken by businesses classified to electricity supply or gas supply remain included in the industry statistics, as these activities cannot be identified in the data. Similarly, it is not possible to identify electricity or gas supply activities undertaken by businesses classified to industries other than electricity supply or gas supply (for example, a manufacturing establishment generating electricity to provide power for its manufacturing activities) and therefore, these secondary activities are not considered in this research paper.

9 Only one unit in the electricity and gas supply industry has its reported activity reallocated between industries.

The electricity and gas supply industry data are sourced from the Economic Activity Survey. Businesses provide information on the sales of electricity and the sales of gas products.[10] This breakdown between electricity and gas sales forms the methodological basis for separating the key data items for businesses which are identified as both electricity and gas suppliers, into the respective industries.[11] The underlying assumption of this method is that the ratio of income attributable to gas and electricity sales, is representative of other employment and output ratios for the same business.

In using this method to reallocate secondary activity, we are implicitly assuming that the activities are relatively similar in nature. For example, the production inputs and processes associated with gas distribution activity are not dissimilar to the production inputs and processes for undertaking electricity distribution activity. Conversely, the production inputs and processes associated with electricity generation activity, are quite different to gas distribution activity.

Analysis of the data was undertaken to identify where business activities are of a different nature, thus where this assumption of similar production functions is less valid. The data were analysed to identify where reallocated secondary activity occurred in different types of energy businesses. Investigation results showed that the majority of units which had their activity reallocated (representing 83% of the reallocated data) were found to have similar activities, such as distribution activity. The remaining 17% of reallocated activity were associated with some different types of businesses, however these companies only contribute approximately 3% of the total IVA.

3.2.5 Findings

Table 3.5 presents preliminary estimates of the key data items for the electricity and gas supply industries on an activity basis.[12] It shows the data from table 2.1, separated into the three categories: electricity supply businesses (A), gas supply businesses (B), and businesses involved in both electricity and gas supply (C). It then shows the effect of separating out the activities of the businesses that supply both electricity and gas (C) and reallocating these activities to either electricity supply (D) or gas supply (E).

10 All other data items are reported on consolidated basis, for example, employment is reported as a single number for the total number of persons working for the business and is not split by activity.

11 A small number of transmission and distribution companies were not able to be reallocated and reclassified due to insufficient data. They have remained assigned to the industry according to their predominant activity.

12 These data are based on the statistics published in Electricity, Gas, Water and Sewerage Operations, Australia, 2003–04, using ANZSIC industry definitions, where gas supply excludes gas extraction and transmission.

3.5 Key data – Electricity and gas supply industries, by activity, 2003–04 (preliminary estimates)

	Employment at end of June no.	*Wages and salaries (a) $m*	*Industry value added $m*
Before reclassification by activity			
A. Electricity supply (b)	27 684	2 040.3	10 705.0
B. Gas supply (b)(c)	1 516	78.9	978.4
C. Electricity and gas supply (c)(d)	9 497	617.1	2 164.3
Total	38 697	2 736.3	13 847.7
After reclassification by activity			
D. Electricity supply	36 587	2 633.4	12 579.5
E. Gas supply (c)	2 110	102.9	1 268.2
Total	38 697	2 736.3	13 847.7

(a) Excludes the drawings of working proprietors.
(b) Excludes businesses that are engaged in both electricity and gas supply activities.
(c) Gas supply data excludes gas extraction and transmission activities.
(d) Includes only those business that are engaged in both electricity and gas supply.

The data for businesses engaged in the supply of both electricity and gas provides an important measure of industry diversification. Table 3.5 shows these diversified businesses represent a significant portion of the combined electricity and gas supply industries, accounting for 25% of employment, 23% of wages and salaries, and 16% of industry value added for the combined electricity and gas supply industries.

Reclassifying the data of businesses engaged in both electricity and gas supply provides a comprehensive view of the separate electricity and gas supply activities. For example, comparing the data in table 3.5 with the ABS industry data in table 2.1, shows that:

- There is a net transfer from electricity supply to gas supply of $21.5 million in wages and salaries.
- There is a net transfer from electricity supply to gas supply of $282 million of industry value added.
- There is a net transfer from electricity supply employment to gas supply employment of 205 persons.

These movements are relatively small for electricity supply, representing less than 2.5% reduction for industry value added and less than 1% reduction for wages and salaries and employment. However, the impact on gas supply is more considerable, where wages and salaries increase by 26%, industry value added increases by 29%, while employment increases by 11%.

In relative terms, more wages and salaries (26%) have moved into the gas supply industry than employees (11%). This is an interesting result. This implies that the average wage of the reallocated employment is high. However, the average wage of businesses that only undertake electricity activity, is higher than the average wage of businesses that only undertake gas activity. Anecdotal evidence suggests that specialist contractors are often used for the maintenance and operation of many gas infrastructure projects. In contrast, the majority of electricity supply industry units employ their own staff to undertake maintenance and operation of their assets. Thus we may anticipate that less employment is reallocated to the gas supply industry, on the basis of the activity methodology, compared with other key variables. However, the nature of the average wage associated with this reallocated employment is not known and requires further investigation.

In summary, this analysis shows that the reclassification of data by secondary activity can provide useful insights into electricity and gas supply activity. The identification of businesses supplying both electricity and gas provides an important measure of diversification. Also the reclassification of the secondary activity data of these diversified businesses enables a comparable delineation between total electricity and total gas supply activities.

4. PROPOSED METHODOLOGY FOR AN ALTERNATIVE VIEW OF ELECTRICITY AND GAS SUPPLY ACTIVITY

This section develops a methodology for an alternative view of electricity and gas supply activity, based on a combined approach of broadening the definition of the gas supply industry and reclassifying industry data to account for secondary activities. It develops a definition for 'gas and electricity supply activities', proposes a methodology for deriving this alternative activity view, and presents some preliminary estimates for key data items to illustrate the differences between statistics to date and the alternative view for electricity and gas supply activity.

4.1 Defining the electricity and gas supply activities

Electricity and gas supply activities, as defined in this alternative view, comprise of the following activities:

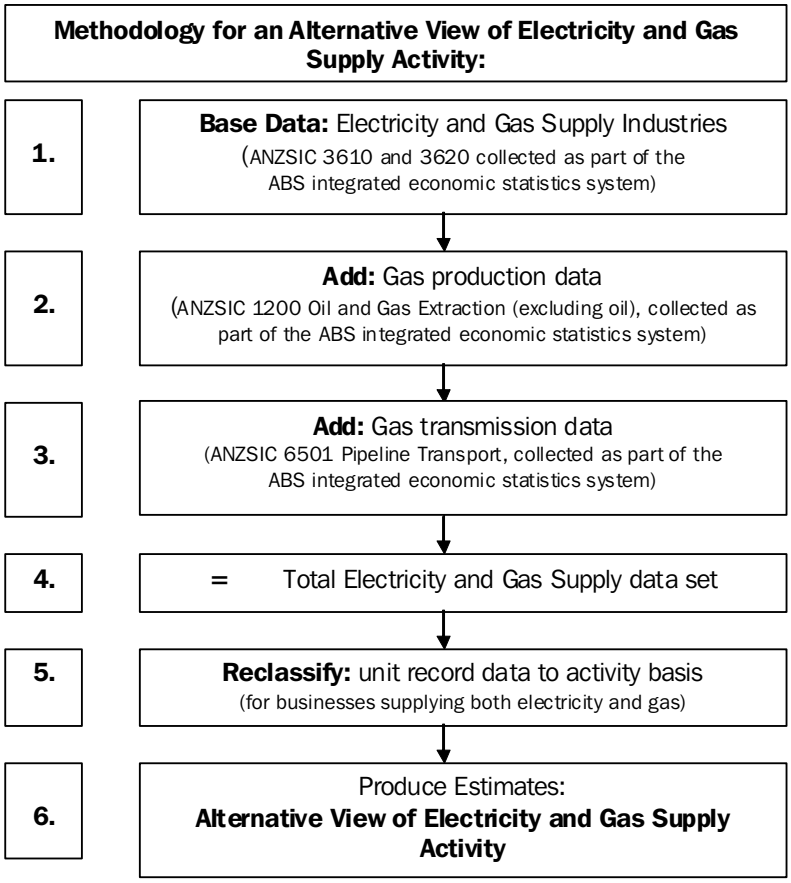
- electricity supply, including electricity generation, transmission and distribution, and electricity wholesaling and retailing activities; and
- gas supply, including gas extraction, transmission and distribution, and gas wholesaling and retailing activities.

4.2 Methodology for an alternative view of electricity and gas supply activity

The proposed methodology for an alternative view of electricity and gas supply activity is illustrated in diagram 4.1. Data on the gas supply industry is supplemented with data on gas extraction and transmission from the mining and transport industries, as discussed in Section 3.1.4. To produce more accurate activity estimates for components of the electritcity and gas supply industries, the data for businesses engaged in the supply of both electricity and gas are then reclassified on an activity basis as discussed in Section 3.2.4.

Due to lack of supporting data, secondary activity in relation to gas extraction and transmission from the mining and transport industries could not be separately identified and reallocated. Data for the electricity and gas supply industries also contain a small number of transmission and distribution companies unable to be split and reclassified by secondary activity as discussed in Section 3.2.4.

4.1 Methodology for an alternative view of electricity and gas supply activity



4.3 Preliminary estimates and findings

Table 4.2 presents preliminary estimates for an alternative view of electricity and gas supply activity, based on the above methodology. The table presents key data items for current ABS statistics on the electricity and gas supply industries, as well as preliminary estimates relating to electricity supply activity and gas supply activity of the alternative view. The data presented are for illustrative purposes and are based on national data for the 2003–04 financial year.

The preliminary estimates indicate that the gas supply activity is higher under the alternative activity view, compared to the original industry data for 2003–04. This is due to the inclusion of gas extraction and transmission data. Employment for gas supply increases by 3,324 persons (174%), wages and salaries increase by $0.3 billion (421%), and industry value added increases by $5.5 billion (563%).[13]

For electricity supply, the alternative activity view shows a slight decrease in all key data items due to the reclassification of secondary gas activities.

13 Wages and salaries in gas extraction and transmission are significantly higher than in other gas supply sectors, thus increasing overall wages and salaries per employee in alternative industry view.

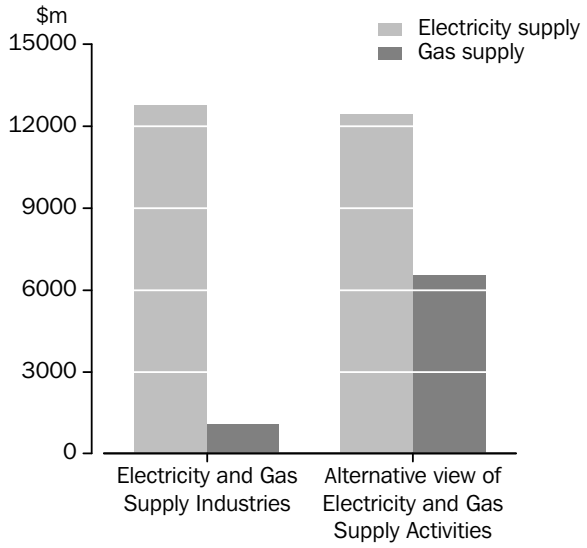
4.2 Key data, electricity and gas supply industries and preliminary estimates for alternative activity view, 2003–04

	Employment at end of June no.	*Wages and salaries (a) $m*	*Industry value added $m*
Current ABS industry statistics (b)			
Electricity supply industry	36 791	2 654.9	12 861.9
Gas supply industry (c)	1 906	81.4	985.9
Total	38 697	2 736.3	13 847.7
Alternative activity view (Preliminary estimates)			
Electricity supply (e)	36 587	2 633.4	12 579.5
Gas supply (d)(e)	5 230	424.2	6 531.6
Total	41 817	3 057.6	19 111.1

(a) Excludes the drawings of working proprietors.
(b) Sourced from *Electricity, Gas, Water and Sewerage Operations, Australia, 2003–04* (ABS cat. no. 8226.0).
(c) Excludes gas extraction and transmission activities.
(d) Includes gas extraction and transmission activities. Gas extraction includes exports of $2 830m (ABS 2004b).
(e) Includes reclassification by activity (see Section 3.2.5)

Overall, while electricity supply contributes the most to the electricity and gas supply industry across all key data items, the alternative activity view shows that the gap between electricity supply activity and gas supply activity is smaller than indicated by industry statistics. This is illustrated in diagram 4.3 which provides a comparison of industry value added between the original data in table 2.1 and the alternative view data.

4.3 Industry Value Added, 2003–04 (Preliminary estimates)



5. CONCLUSIONS AND FURTHER WORK

5.1 Conclusions

This research paper highlights two issues with current electricity and gas supply industry data and outlines methods to address them; (1) including gas extraction activity and transmission industry data with gas supply, and (2) separating combined electricity and gas supply data, into activity specific estimates. It also demonstrates the impact of combining both methods to create an alternative view of electricity and gas supply activity. This meets a critical user requirement for improved detailed analysis of these separate activities. To this end, an alternative view of electricity and gas supply activity and a methodology to compile the statistics was developed.

The alternative activity view provides analytically useful activity statistics which differ significantly to current ABS industry statistics, particularly for gas supply. However, the alternative activity view should be considered to complement, rather than replace, the existing ANZSIC-based electricity and gas industry statistics. These existing statistics are essential for producing consistent industry statistics that are utilised for national accounting purposes and for macro-level industry analysis.

5.2 Further work

Work is currently being undertaken to investigate the possibility of producing a time series for an alternative view of electricity and gas supply activities. Feedback on the usefulness of these alternative view estimates will be critical for demonstrating support for further work.

It would also be desirable to include physical data on the supply of electricity and gas to complement ABS economic and financial data. Investigations are being conducted regarding the collection of physical data on electricity and gas supply as part of the ABS' integrated economic collections for 2007–08.

ACKNOWLEDGEMENTS

The authors would like to thank Ian Bobbin from ABS Economic Analysis and Reporting and Louise Perkins from ABS Economic Standards and Classifications for the feedback and assistance provided over the course of the paper. Peter Rossiter provided invaluable assistance during the final stages of the paper. We would also like to particularly thank David Skutenko from ABS Environment and Energy and Michael Sharpe and Mark Wise from ABS Annual Integrated Collection BSC for the detailed knowledge they provided during the investigation.

REFERENCES

Allen Consulting Group (ACG) (2005) *A Nationally Consistent Framework for Greenhouse and Energy Reporting: Issues and Options*, Allen Consulting Group, Canberra.

Australian Bureau of Agricultural and Resource Economics (ABARE) (2007) *Australian Energy Statistics – Australian Energy Update 2007*, electronic database, Canberra.

Australian Bureau of Statistics (1981) *Electricity and Gas Establishments Details of Operations, Australia, 1979–80*, ABS cat. no. 8208.0, ABS, Canberra.

—— (1998a) *Electricity, Gas, Water and Sewerage Industries, Australia, 1995–96*, ABS cat. no. 8208.0, ABS, Canberra.

—— (1998b) *Electricity, Gas, Water and Sewerage Operations, Australia, 1996–97*, ABS cat. no. 8226.0, ABS, Canberra.

—— (1999) *Electricity, Gas, Water and Sewerage Industries, Australia, 1997–98*, ABS cat. no. 8208.0, ABS, Canberra.

—— (2000a) *Australian National Accounts: Concepts, Sources and Methods*, ABS cat. no. 5216.0, ABS, Canberra.

—— (2000b) *Australian National Accounts: Concepts, Tourism Satellite Account, 1997–98*, ABS cat. no. 5249.0, ABS, Canberra.

—— (2000c) *Electricity, Gas, Water and Sewerage Operations, Australia, 1998–99*, ABS cat. no. 8226.0, ABS, Canberra.

—— (2001) *Australian Culture and Leisure Classifications, 2001*, ABS cat. no. 4902.0, ABS, Canberra.

—— (2002a) *Electricity, Gas, Water and Sewerage Operations, Australia, 2000–01*, ABS cat. no. 8226.0, ABS, Canberra.

—— (2002b) *Western Australian Statistical Indicators, June 2002*, ABS cat. no. 1367.5, ABS, Canberra.

—— (2003) *Australian System of National Accounts, 2002–03*, ABS cat. no. 5204.0, ABS, Canberra.

—— (2004a) *Electricity, Gas, Water and Sewerage Operations, Australia, 2001–02 and 2002–03*, ABS cat. no. 8226.0, ABS, Canberra.

—— (2004b) *International Trade in Goods and Services, Australia, June 2004*, ABS cat. no. 5368.0, ABS, Canberra.

—— (2005) *Electricity, Gas, Water and Sewerage Operations, Australia, 2003–04*, ABS cat. no. 8226.0, ABS, Canberra.

—— (2006a) *Australian National Accounts: Information and Communication Technology Satellite Account, 2002–03*, ABS cat. no. 5259.0, ABS, Canberra.

—— (2006b) *Australian National Accounts: Tourism Satellite Account, 2004–05*, ABS cat. no. 5249.0, ABS, Canberra.

—— (2007a) *Economic Activity Survey* <http://www.abs.gov.au/Ausstats/abs@.nsf/12ce1aabe68b47f3ca256982001cc5da/f3614b9bb5a9f1ddca256bd000287ca7!OpenDocument>

—— (2007b) *Western Australian Statistical Indicators, March 2007*, ABS cat. no. 1367.5, ABS, Canberra.

Australian Bureau of Statistics and New Zealand Department of Statistics (1993) *Australian and New Zealand Standard Industrial Classification, 1993*, ABS cat. no. 1292.0 and NZ cat. no. 1.005.0092, ABS, Canberra and Department of Statistics, Wellington.

—— (2006) *Australian and New Zealand Standard Industrial Classification, 2006*, ABS cat. no. 1292.0 and NZ cat. no. 1.005.0092, ABS, Canberra and Department of Statistics, Wellington.

Commonwealth Bureau of Census and Statistics (1973) *Electricity and Gas Establishments Details of Operations, by States, Territories and Australia, 1968–69 and 1969–70*, reference no. 12.30, Commonwealth Bureau of Census and Statistics, Canberra.

Energy Networks Association (ENA) (2007a) *Energy Networks Association: Electricity Chain* <http://www.ena.asn.au/webc/factsandfigures/?0,0,a001,251>

—— (2007b) *Energy Networks Association: Gas Chain* <http://www.ena.asn.au/webc/factsandfigures/?0,0,a001,240>

APPENDIX

A. SALES AND SERVICE INCOME

This Appendix presents alternative activity view results for sales & service income. The data in table A.1 shows the impact of including gas extraction and transmission activity within the definition of the gas supply industry – as discussed in Section 3.1. Table A.2 shows the impact of reclassifying data by activity – as discussed in Section 3.2.

The value of sales and service income includes the value of goods and services used up in the production process. For this reason, sales and service income is not a precise measure of industry value, size or contribution to GDP. Industry Value Added (IVA) on the other hand, excludes the value of goods and services that are used in the production process, and for this reason, is a more appropriate measure of the productive value of an industry.

A.1 (Table 3.4) Key data (including sales and service income) for electricity and gas supply industries, including gas extraction and transmission activities, 2003–04 (preliminary estimates)

	Employment at end of June no.	*Wages and salaries (a) $m*	*Industry value added $m*	***Sales & service income (b)(h) $m***
Electricity supply industry (c)	36 791	2 654.9	12 861.9	**31 687.3**
Gas supply industry (d)	1 906	81.4	985.9	**5 298.3**
Gas extraction and gas transmission (e)(f)	3 120	321.3	5 263.4	**6 237.3**
Total Gas Supply industry (alternative view) (g)	5 026	402.7	6 249.3	**11 535.6**

(a) Excludes the drawings of working proprietors.
(b) Includes rent, leasing and hiring income.
(c) Data for ANZSIC 1993 Class 3610, which includes electricity generation, transmission & distribution activities.
(d) Data for ANZSIC 1993 Class 3620, which includes gas distribution activities only.
(e) Data derived from ANZSIC 1993 Classes 1200 and 6501.
(f) Gas extraction includes exports of $2 830m (ABS 2004b).
(g) Data derived from ANZSIC 1993 Classes 1200, 3620 and 6501, and includes gas extraction, transmission and distribution activities.
(h) Not appropriate measure as includes the gross value of goods and services used up in the production process.

The data in table A.1 are repeated from table 3.4 in Section 3.1.5 and demonstrate the impact of including gas extraction and transmission activity within the definition of the gas supply industry. Sales and service income associated with the gas supply activity increases by 118% when gas extraction and transmission estimates are included within the industry definition of the gas supply industry. This compares with 164% for employment and 534% for IVA.

A.2 (Table 3.5) Key data (including sales and service income) for electricity and gas supply industries, by activity, 2003–04 (preliminary estimates)

	Employment at end of June no.	*Wages and salaries (a) $m*	*Industry value added $m*	***Sales & service income (b)(f) $m***
Before reclassification by activity				
A. Electricity supply (c)	27 684	2 040.3	10 705.0	**24 230.7**
B. Gas supply (c)(d)	1 516	78.9	978.4	**5 270.7**
C. Electricity and gas supply (d)(e)	9 497	617.1	2 164.3	**7 484.2**
Total	38 697	2 736.3	13 847.7	**36 985.6**
After reclassification by activity				
D. Electricity supply	36 587	2 633.4	12 579.5	**30 157.5**
E. Gas supply (d)	2 110	102.9	1 268.2	**6 828.1**
Total	38 697	2 736.3	13 847.7	**36 985.6**

(a) Excludes the drawings of working proprietors.
(b) Includes rent, leasing and hiring income.
(c) Excludes businesses that are engaged in both electricity and gas supply activities.
(d) Gas supply data excludes gas extraction and transmission activities.
(e) Includes only those business that are engaged in both electricity and gas supply.
(f) Not appropriate measure as includes the gross value of goods and services used up in the production process.

The data in table A.2 are repeated from table 3.5 in Section 3.2.5 and demonstrate the impact of applying the alternative activity view methodology to sales and service income estimates for the gas supply industry. Sales and service income increases by 29%, compared to 29% for IVA and 11% for employment.

The data from table 4.2 in Section 4.3 cannot be repeated here with the inclusion of sales and service income. The alternative view consists of extraction, transmission, and distribution activity relating to gas supply. With sales and service income including the gross value of goods and services used up in the production process the overall sales and service income cannot be reliably calculated.

FOR MORE INFORMATION . . .

INTERNET **www.abs.gov.au** the ABS website is the best place for data from our publications and information about the ABS.

LIBRARY A range of ABS publications are available from public and tertiary libraries Australia wide. Contact your nearest library to determine whether it has the ABS statistics you require, or visit our website for a list of libraries.

INFORMATION AND REFERRAL SERVICE

Our consultants can help you access the full range of information published by the ABS that is available free of charge from our website, or purchase a hard copy publication. Information tailored to your needs can also be requested as a 'user pays' service. Specialists are on hand to help you with analytical or methodological advice.

PHONE 1300 135 070

EMAIL client.services@abs.gov.au

FAX 1300 135 211

POST Client Services, ABS, GPO Box 796, Sydney NSW 2001

FREE ACCESS TO STATISTICS

All statistics on the ABS website can be downloaded free of charge.

WEB ADDRESS www.abs.gov.au

2000001568613
ISBN 9780642483713

RRP $11.00