SA Government Energy Use

Annual Report 1999/2000

ENERGY ACTION
SA GOVERNMENT

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1 Introduction

The SA public sector is a major energy consumer expending over $100 million annually on electricity, gas, and petroleum. A Government Energy Management Program aimed at reducing this expenditure, has operated since the mid 1980's.

Subsequently concern over the impact of energy use on global warming has led governments internationally to implement actions, the Kyoto Protocol, to reduce levels of fossil fuel use. In Australia, all State and Territory governments jointly prepared the National Greenhouse Strategy (NGS) as the principal mechanism to address the issue.

One obligation the NGS places on governments is the preparation of an inventory of public sector energy use and greenhouse gas emission. This report addresses the requirement.

This report provides information on the energy use for the whole of the South Australian State Government. Building on the 1998/1999 Annual Energy Report, this report includes all of the Government's operational energy use, expenditure, and related greenhouse gas emissions.

2 Energy Demand

2.1 Overall

Measured energy demand for State Public sector operations, excluding Major Pumping, totalled 5 300 000 GJ, for the 1999/2000 financial year. This is a reduction of 2.8 per cent over the previous year's measured energy demand of 5 450 000 GJ. Table 2.1 outlines the composition of the energy demand for these two years. While there has been no significant change in energy use in the Non-commercial sector there has been an apparent reduction in energy demand in the Vehicle Fleet. Part of this decrease in Vehicle Fleet usage is due to the increased accuracy of information that was available for the 1999/2000 financial year, compared to previous years.

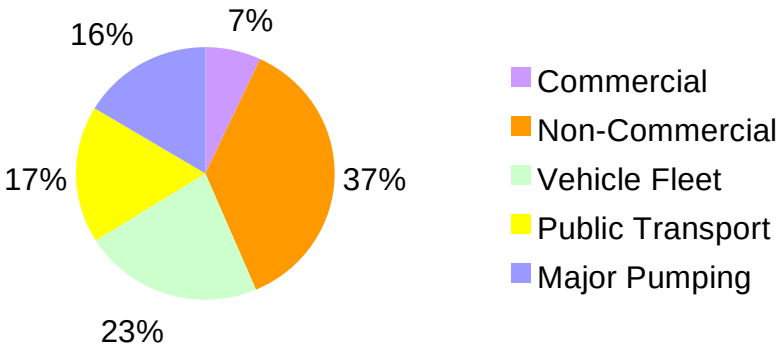
Table 2.1 State Public Sector Energy Demand - 1998/99 and 1999/00

Sector	Demand (GJ)		Expenditure ($ mill)		CO_2 Emissions (t)	
	1998/99	1999/00	1998/99	1999/00	1998/99	1999/00
Commercial[1]	430 000	440 000	10.7	11.8	119 000	122 000
Non-Commercial	2 320 000	2 320 000	41.4	43.2	428 000	445 000
Vehicle Fleet[2]	1 600 000	1 440 000	28.2	28.9	110 000	100 000
Public Transport[3]	1 100 000	1 100 000	17.0	18.7	85 000	86 000
Street Lighting	n/a	n/a	2.9	3.9	n/a	n/a
Major Pumping[4]	1 110 000	1 040 000	n/a	n/a	342 000	319 000

Notes:
1 SA Water Corporation and Ports Corporation SA.
2 Values for 1998/99 calculated on a pro rata basis using available data.
3 1998/99 cost is an estimate based on average distillate price per litre from 1998.
4 Expenditure for Major Pumping is unavailable.

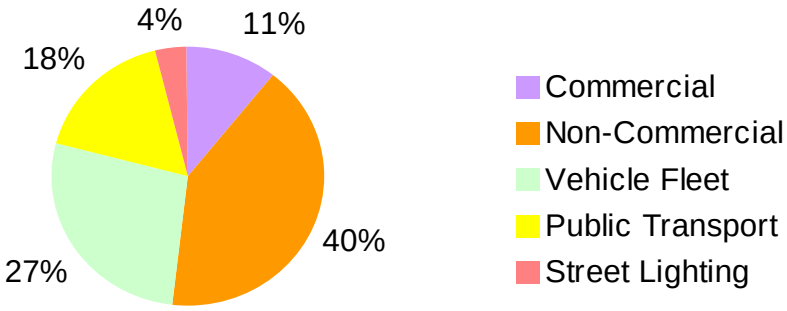
The following figures represent the relative weighting of each of the components that make up the State Government's energy demand, expenditure and greenhouse gas emissions.

Figure 2.1 State Government Energy Demand by Sector 1999/2000



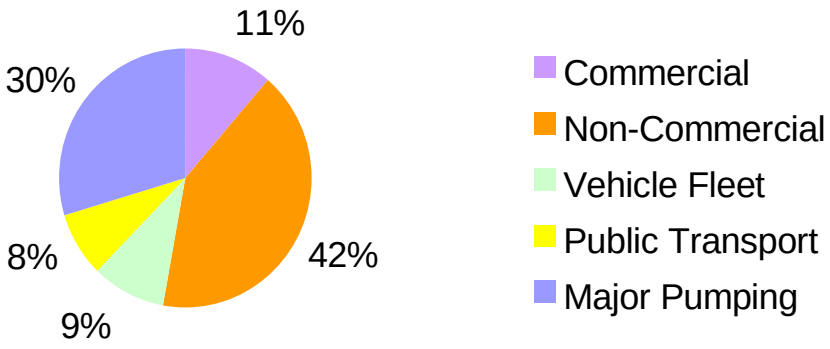
Source: Government Energy Consumption Database, Mobil petroleum contract data (includes Mobil card data), Data supplied by public transport operators.

Figure 2.2 State Government Expenditure on Energy by Sector 1999/2000 (Excluding Major Pumping)



Source: Government Energy Consumption Database, Mobil petroleum contract data (includes Mobil card data), Data supplied by public transport operators.

Figure 2.3 State Government CO_2 Emissions by Sector 1999/2000



Source: Government Energy Consumption Database, Mobil petroleum contract data (includes Mobil card data), Data supplied by public transport operators.

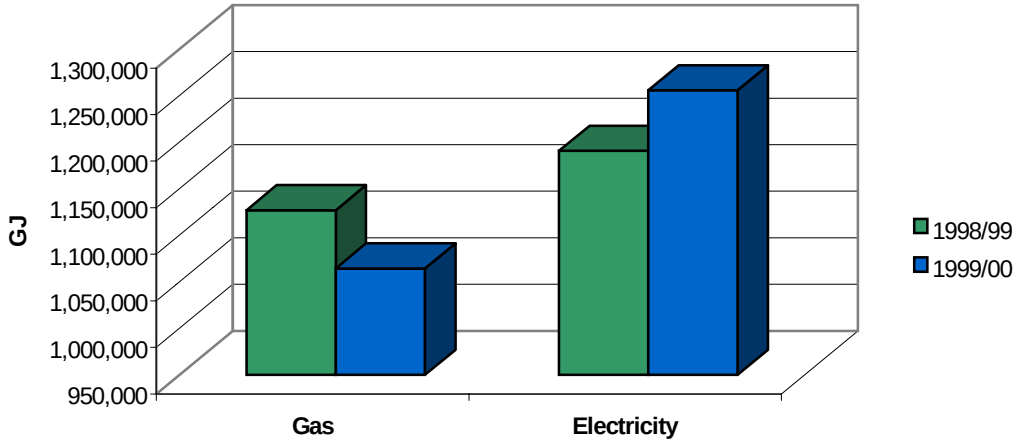
2.2 Non-commercial

The Non-commercial sector of State Government, for the purpose of this report, has been defined as all State Government operations except those administered by SA Water Corporation and Ports Corporation SA. Previously the electricity utilities have been accounted for in the Commercial sector, however they have been omitted in this report due to their recent long term leasing to the private sector.

There was no growth in actual energy demand over the year, but an increase in the level of CO_2 emissions. Greenhouse gas emissions climbed from 428 000 tons in 1998/99 to 445 000 tons in 1999/00, an increase of 4 per cent. Expenditure on energy in the Non-commercial sector was in excess of $43 million for the 1999/2000 financial year. This is an increase of approximately 4 percent on the previous financial year.

These results are reflective of the increase in electricity use and decline in the use of gas as represented in Figure 2.4. Health and Education both have had significant decreases in gas use over the period while increasing the level of electricity demand significantly. As a whole, the Non-commercial sector was responsible for 38 percent of the State Government's energy demand and 42 per cent of its greenhouse gas emissions.

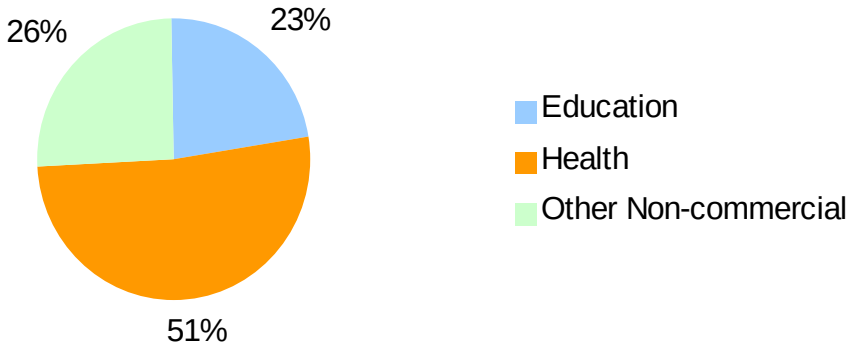
Figure 2.4 Comparison of Gas and Electricity Demand in the Non-Commercial Sector for 1998/99 and 1999/00



Source: Government Energy Consumption Database

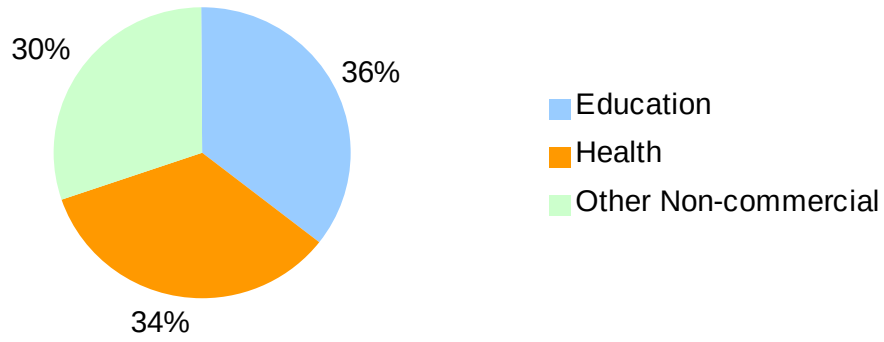
A breakdown of the Non-commercial sector into its main components of Health Education and Other non-commercial is produced in the three diagrams below. As can be seen in Figure 2.5, Health and Education account for approximately three-quarters of the Non-commercial's electricity and gas demand.

Figure 2.5 Electricity and Gas Use within the Non-commercial Sector 1999/2000



Source: Government Energy Consumption Database

Figure 2.6 Expenditure on Electricity and Gas within the Non-commercial Sector 1999/2000

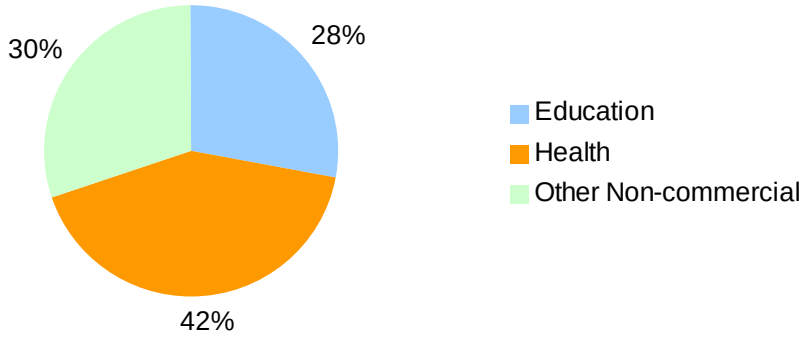


Source: Government Energy Consumption Database

Given their relative demand levels, Health and Education should account for most of the energy expenditure in the non-commercial sector. This is in fact the case and is illustrated by Figure 2.5. Health and Education account for 70 per cent of Non-commercial expenditure on electricity and gas, and are the key areas.

Table 2.1 shows that while energy demand in the Non-commercial sector has had no change, there has been an increase of $1.8 million in expenditure, of which $1.3 million, approximately 70 per cent, can be attributed to rising costs in the Education and Health sectors. The rising cost of energy in these two components can be attributed to the increase in electricity demand, even though there has been a reduction in demand for gas. Therefore while the total amount of energy demanded stays relatively stable, the shift in the energy mix has caused an increase in energy expenditure for the Non-commercial sector.

Figure 2.7 Relative Sources of CO_2 Emissions within the Non-commercial Sector

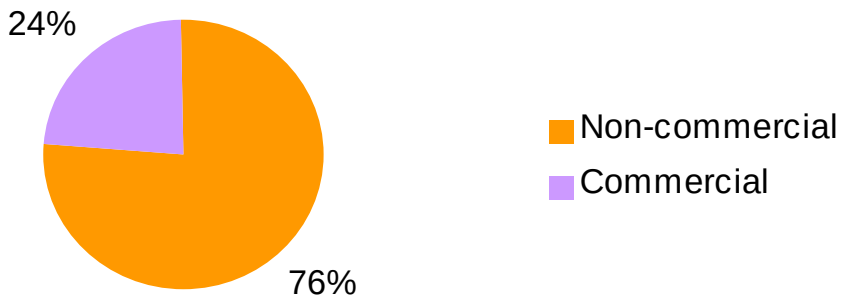


Source: Government Energy Consumption Database

2.3 Vehicle Fleet

The following two diagrams represent the expenditure on vehicle fleet operations for the 1999/2000 financial year. As Figure 2.6 demonstrates, the Non-commercial sector accounts for just over three-quarters of the State Government's fuel use expenditure. Expenditure on petroleum products for the operation of State Government vehicles has increased by 2.5 per cent compared to the figure calculated for the 1998/99 financial year.

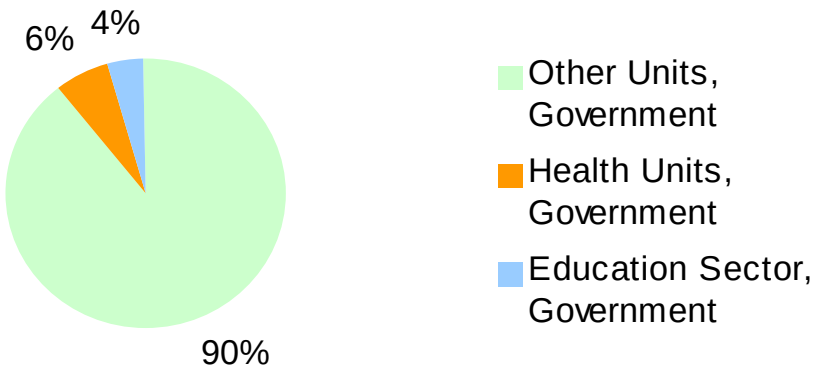
Figure 2.8 Expenditure on Vehicle Fleet Operations 1999/2000



Source: Mobil card and contract data

Figure 2.7 breaks the non-commercial sector down into its three core components. Education and Health combined, account for only 10 per cent of vehicle fleet expenditure. Other non-commercial operations account for the remaining 90 per cent of expenditure.

Figure 2.9 Expenditure on Vehicle Fleet Operations within the Non-commercial Sector 1999/2000



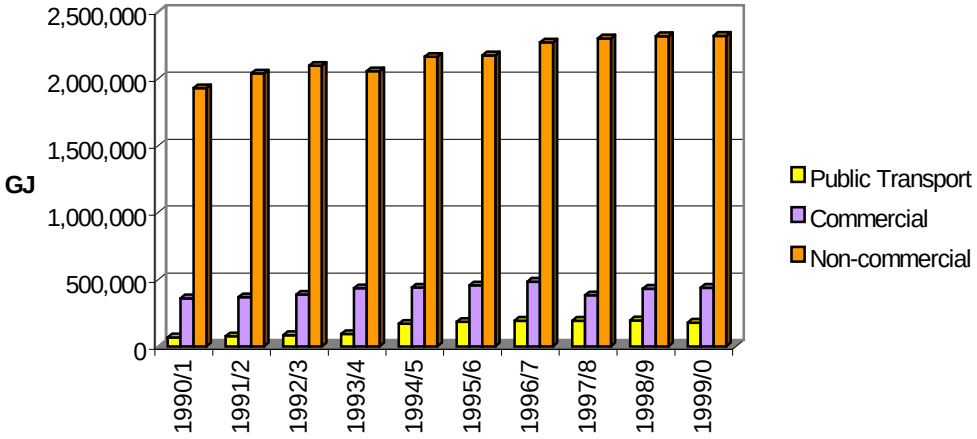
Source: Mobil card and contract data

3 Trends in Demand

3.1 Overall

Overall demand for electricity and gas over the period 1990/91 - 1999/00 increased from an annual figure of 2 355 000 GJ to 2 941 000 GJ. These figures exclude all assets that have been sold during the period, including ETSA utilities, major pumping electricity use and street lighting. This is an average growth rate of 2.5 per cent for the period. Electricity and gas demand decreased slightly, approximately 0.2 per cent, between 1998/99 and 1999/00. No assets that were sold within this time frame have been included. Electricity demand for street lighting has been omitted because it is not metered. Figure 3.3 shows the trend in expenditure on street lighting. Major pumping has also been omitted, because demand fluctuates according to seasonal variations. Figure 3.2 provides an indication of the long-term trend in energy demand for water pumping.

Figure 3.1 Trends in Overall Electricity and Gas Demand

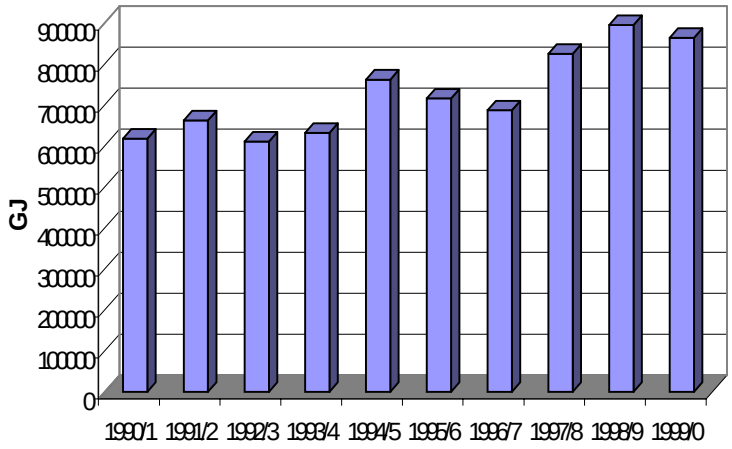


Source: Government Energy Consumption Database

Within the Commercial sector demand for electricity and gas increased between 1990/91 and 1996/97 by an average annual rate of just over 5 per cent. Between 1996/97 and 1997/98 there was a significant drop in electricity and gas demand form 484 000 GJ to 382 000 GJ, that is a decrease of 21.1 per cent. Since then demand has continued to increase at an average annual rate of 4.7 per cent over the last three years. Demand in the Non-commercial sector has flattened out over the last three years with an annual average growth rate of 0.3 per cent, compared to an average of 2.1 per cent per annum for the entire nine year period.

Electricity demand for major pumping can vary significantly from one year to another. For this reason figure 3.2 provides a graphic of the five running average, in order to identify any underlying trend. The figures indicate a trend averaging about 3.7 per cent increase per year or 40 per cent over the last 9 years.

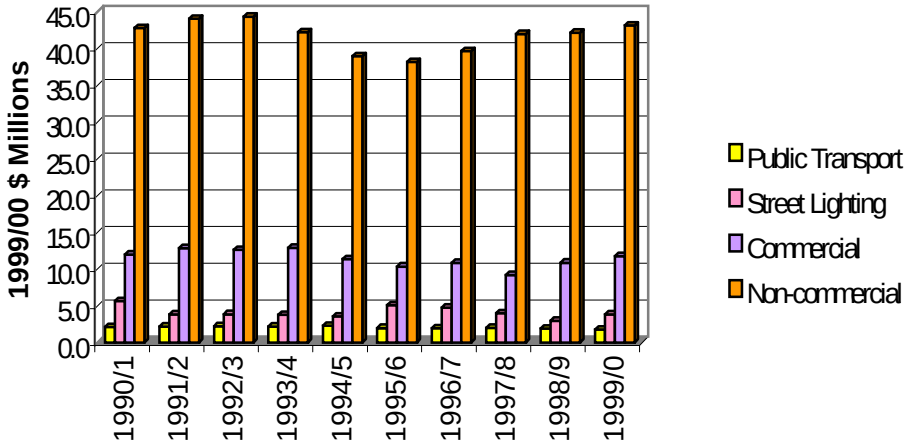
Figure 3.2 Five Year Running Average for Major Pumping Electricity Use



Source: Government Energy Consumption Database

Energy costs, given in 1999/00 dollars, over the period are shown in Figure 3.3. While there has been only a small real increase in expenditure from 1990/91 to 1999/00, about 1.2 per cent for the period, there was a significant reduction in between 1992/93 and 1995/96 due to electricity tariff restructuring.

Figure 3.3 Trends in Electricity and Gas Costs (1999/2000 Dollars)

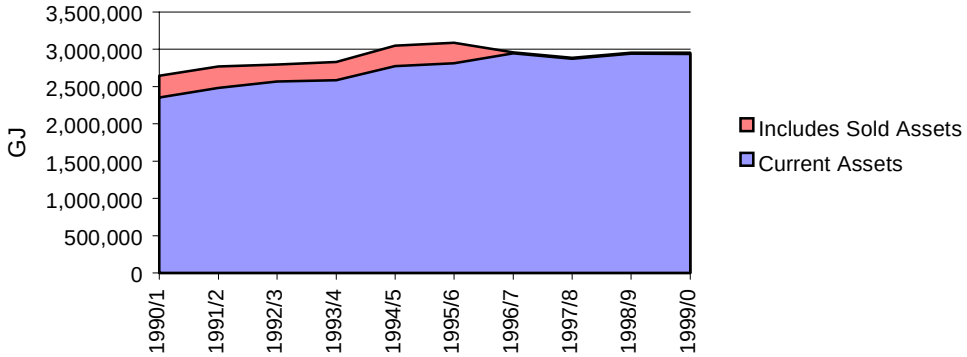


Source: Government Energy Consumption Database

For comparative purposes, Figure 3.4 shows the actual public sector energy use throughout the 9-year period. It includes the energy used (during their period of public ownership) by assets subsequently sold by the Asset Management Task Force.

The energy use of current assets has increased by 25 per cent over the last nine years or an average of 2.5 per cent annually.

Figure 3.4 Historical Electricity and Gas Demand[1] versus Normalised Electricity and Gas Demand.



Notes:
1 Includes data on the Non-commercial, Commercial, and Public Transport sectors.

3.2 Non-commercial

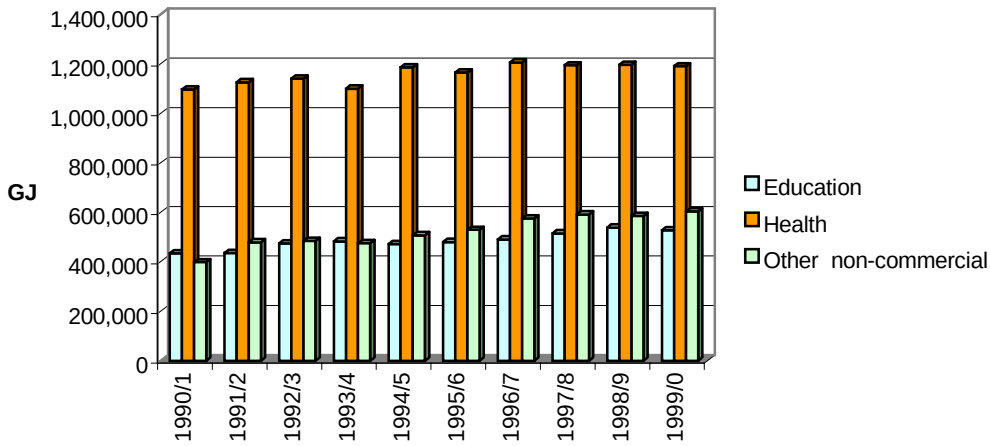
The Non-commercial sector has had an overall increase in the demand for electricity and gas from 1 929 000 GJ to 2 320 000 GJ. This is an increase of 20.2 per cent over the past nine years at an average rate of 2.1 per cent per annum. Energy demand has increased marginally over the past twelve months.

Of the various areas that make up the Non-commercial sector, those that are not directly related to Health or Education, have had the most significant increase in electricity and gas demand, 52 per cent, over the last nine years, at an average rate of 4.7 per cent annually. This has decreased significantly over the last four years with demand increasing by 4.9 per cent, over the four-year period, at an average rate of 1.2 per cent.

The largest user of electricity and gas within the Non-commercial sector is Health. Over the last nine years energy demand in the Health sector has increase by 8.5 per cent. This represents an annual growth rate of approximately 0.9 per cent per year on average. Over the last four years Health has reduced its demand for electricity and gas by 1.3 per cent, the only non-commercial sector to do so.

Education has increased its demand for electricity and gas since the 1990/91 financial year by 22%, at an average annual growth rate of 2.2 per cent.
There has been an increase in energy use in the Education sector over the last four years of approximately 7.6 per cent.

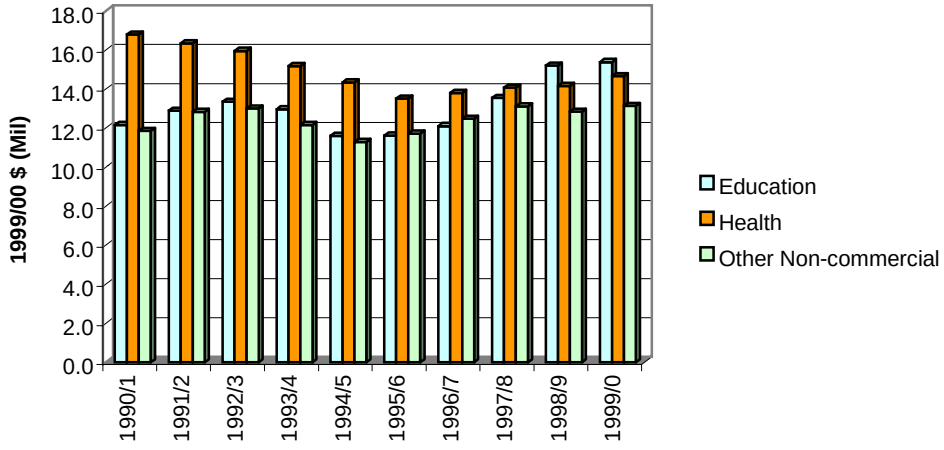
Figure 3.5 Non-commercial Sector Trends in Demand for Electricity and Gas



Source: Government Energy Consumption Database

In real terms, total expenditure on electricity and gas in the Non-commercial sector has increased from $40.8 to $43.2 since 1990/91. Figure 3.6 shows a breakdown of expenditure on electricity and gas within the non-commercial sector. Since 1995/96 Education has had the largest increase, in real terms, in energy expenditure, 32.8 per cent from 1995/96 to 1999/00, at an annual average growth rate of 7.3 per cent. The health sector has had an increase in real expenditure of 8.9 per cent over the same four-year period, while Other non-commercial's real cost has increased by 12 per cent since 1995/96.

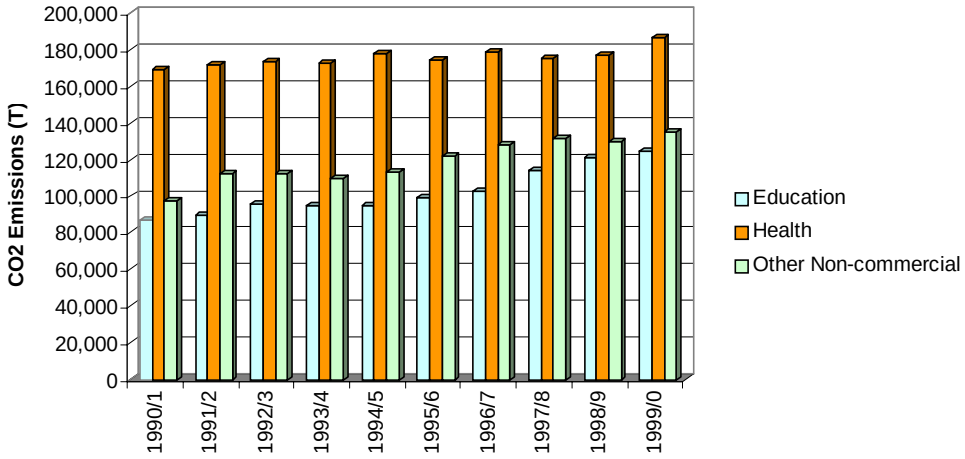
Figure 3.6 Non-commercial Sector Expenditure Trends for Electricity and Gas (1999/00 Dollars)



Source: Government Energy Consumption Database

Figure 3.7 shows the trend of greenhouse gas emissions for the various components of the non-commercial sector over the last nine years. As a whole emissions for the non-commercial sector have increased by 26.2 per cent over the period at average annual rate of 2.6 per cent.

Figure 3.7 Non-commercial Electricity and Gas Based CO_2 Emissions



Source: Government Energy Consumption Database

Out of the three components, Education has had the largest increase, 43 per cent, in greenhouse gas emissions since 1990/91 at an average rate of 4.1 per cent per annum. This is closely followed by Other non-commercial operations, which has increased emissions by 38 percent over the period at an average annual rate of 3.7 per cent. Health has had the least amount of growth in greenhouse gas emissions with a total over the last nine years of 10 per cent at a rate of 1.1 per cent annually.

4 Government Energy Management Initiatives

4.1 Agency Greenhouse Targets Program

The Agency Greenhouse Targets program was launched in April 1998. The program requires all agencies to set targets for emission reductions and to report annually on measures undertaken to meet the targets. The Office of Energy Policy provides a technical input to the program and coordinates the reporting process.

The program has a target of reducing annual emission levels by 15000 – 20000 tonnes over the three-year period to June 2001. This target is based on savings of approximately 10 per cent of electricity and gas demand for office purposes, and 5 per cent of electricity and gas demand for institutional purposes.

As part of the Agency Greenhouse Targets program, individual agencies were asked to report directly on their energy use for the 1999/00 financial year. Information was gathered from a number sources including the OEP and REM (DAIS) in order to assist agencies with the task.

At the time of writing this report, all agencies have submitted an energy use report to the OEP. Work is currently under-way consolidating the results from all the returns and a summary of the findings will be produced once reviewing of the data's integrity has been completed.

Agencies will now be required to record and report their own energy use each year. The data collected for the 1999/00 year will provide the base for producing the *2000/01 Annual Energy Report.*

4.2 National Greenhouse Strategy

In mid 1998 State Cabinet endorsed the National Greenhouse Strategy (NGS), a program of measures to assist in the amelioration of greenhouse gas emissions. The Commonwealth announced the program in November 1998. The document is available on the net at http://www.greenhouse.gov.au/pubs/ngs.

Measure 3.1 relates specifically to reducing greenhouse gases from public sector operations and requires that governments:

- develop an inventory of greenhouse emissions;
- develop and implement an action plan to reduce emissions;
- have performance under the *Action Plan* independently verified;
- monitor and publicly report on performance.

Specific actions include:

- setting mandatory targets for government agencies;

- minimum energy performance standards for new and refurbished government buildings, appliances and equipment;
- use of energy performance contracting;
- adopting purchasing guidelines that include consideration of operating costs;
- consideration of environmental issues in vehicle fleet purchases/lease arrangements;
- cost effective utilisation of renewable energy technologies.

Cabinet approved the Implementation Plan for the NGS in October 1999.

4.3 Government Energy Management Action Plan

As part of the requirements of the National Greenhouse Strategy, OEP and DAIS have prepared a comprehensive Government Energy Management *Action Plan*. The *Plan* addresses energy management measures throughout public sector operations including new and refurbished buildings, asset operations and maintenance, vehicle fleets and office equipment. The *Plan* will be considered by Senior Management Council prior to being submitted for Cabinet approval.

Conclusion

From the figures presented in this report it is clear that even though growth in energy demand has held steady, energy management needs to be given a higher priority by agencies to actually reduce energy use. The importance of this is highlighted even more by the fact that energy costs continue to rise as a result of changes in the fuel mix. The results from the last financial year show very little increase in demand from the previous year and in some areas an actual reduction.

Within the Non-commercial sector Education and Health are the main consumers of electricity and gas, accounting for approximately 75 per cent of total consumption. These two areas provide the greatest potential for energy savings. The benefits realised through effective energy savings measures will continue to rise as the per-unit costs of electricity, and to a lesser extent, gas continue to rise, as the trends in this report suggest.

South Australia's greenhouse gas emissions intensity for electricity continues to rise as we import more electricity through the interconnector with Victoria. This makes it increasingly more important to reduce electricity demand within public sector organisations if they are going to achieve their greenhouse gas targets. With State Government departments becoming more active in collecting their energy use data, and the results obtained from the exercise from this year, it should be possible for them to identify an increasing number of opportunities to reduce their energy use.

Glossary of Terms

Carbon Dioxide (CO_2): While not as effective at trapping heat in the atmosphere as methane or nitrous oxide, the quantity of CO_2 being released makes it a major contributor to the greenhouse effect.

Gigajoule (GJ): Unit equivalent to one million kilojoules.

Greenhouse Gas: Any gas that absorbs outgoing heat radiation from the surface of the earth, and thereby tends to warm the lower atmosphere. Greenhouse gases include; carbon dioxide; methane and; nitrous oxide. These gases are of particular concern because they take a long time to be removed from the atmosphere.

Kilowatt hour (kWh): Unit most often used to measure electricity consumption. The average cost of a kilowatt hour, for a regular household, is about thirteen cents.

Tonne: A unit of mass equal to 1000 kilograms.

Energy and GHG Emissions Conversion Table

Fuel/Energy Type	SI Unit	Energy Content of Fuel	CO_2 emission factor
Purchased Electricity	KWh	3.6 MJ/kWh	1.109 kg/kWh
Natural Gas	MJ	N/a	.0544 kg/MJ
LPG (transport)	L	25.7 MJ/L	1.53 kg/L
Petrol	L	34.2 MJ/L	2.26 kg/L
Automotive diesel	L	38.6 MJ/L	2.69 kg/L

Source: The Greenhouse Challenge Workbook and personal correspondence with the Australian Greenhouse Office.

Appendix A- Energy Management Contacts

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