

A black and white photograph of a city skyline with various skyscrapers and buildings, positioned at the top of the page.

# SA Government Energy Use Annual Report 2001/02

Contact Officer:  
Mark Pedler: 8226 5501  
4 March 2003



Government  
of South Australia

## Executive Summary

This Annual Government Energy Use Report has been prepared under Action 5: Verification and Reporting from the Government Energy Efficiency Action Plan. As such this report includes agency performance in relation to energy use and also progress in implementing measures identified in the action plan.

Government energy use for the financial year 2001/02 was 4,701,129 GJ and related greenhouse emissions were approximately 683,000 tonnes. The portfolio with the highest energy consumption was Transport, Urban, Planning and the Arts, primarily due to the inclusion of public transport fuel use in their reported figure. This portfolio used 1,530,782 GJ of energy, which is 32.56% of the total energy use of Government. The Human Services portfolio used 1,525,751 GJ of energy, which is 32.45% of the total Government figure.

Hospitals were the largest end-use category for the 2001/02 financial year, responsible for 1,277,041 GJ and 201,585 tonnes of greenhouse gas emissions. These figures represent 27.16% and 29.50% of the Government totals respectively..

Under the Action Plan, Agencies are required to reduce energy use in Government buildings by 15% before 2010. Overall Government energy use in buildings increased by 12,759 GJ (or 0.50%), from 2,538,908 GJ in 2000/01 to 2,551,667 GJ in 2001/02.

Energy use in SA Government buildings was reduced in eight of the 10 portfolios, including a reduction of almost 2% in the Department of Human Services, which alone accounts for over 50% of the Whole-of-Government total. The portfolios of Education & Children's Services (referred to as DECS, and including Further Education, Employment, Science & Technology) and Administrative & Information Services (DAIS) increased their energy use by 12.81% and 1.59% respectively, contributing to an overall increase of 0.5% across Government.

DECS believe that a portion of the growth in energy use is due primarily to its asset renewal program, in which many existing schools are being up-graded with reverse-cycle air conditioning services to meet both community expectations and legislative requirements. In addition, the former Government's DECS-Tech program that aims to achieve a standard of one personal computer per five students in every school, is increasing the number of IT systems in DECS assets.

2001/02 was the first year that the Energy Data Gathering And Reporting (EDGAR) software was used to collect data for reporting. EDGAR replaces the previous Government Energy Consumption (GEC) database as the primary source for Government energy use data.

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# 1. Introduction

The primary mechanism through which Australia's greenhouse targets defined in the Kyoto Protocol are to be met is the National Greenhouse Strategy (NGS). The Commonwealth and all State and Territory Governments developed the NGS jointly. It was endorsed by State Cabinet in July 1998 and released by the Commonwealth Government in November 1998.

Measure 3.1 of the NGS relates to reducing greenhouse gas emissions associated with government operations through improving energy efficiency. Under this measure, Cabinet required the development of an Action Plan that addresses the energy use in the operation of its building assets, office equipment and vehicle fleet.

The Premier launched the SA Government's Energy Efficiency Action Plan on 3 May 2002 and announced reduction targets for energy use in buildings of 15 per cent before 2010. The Plan defines basic energy efficiency measures for new Government buildings and major refurbishments, incorporates energy efficiency practices into maintenance programs and procurement policies and addresses energy use in the vehicle fleet.

This report falls under *Action 5 of the NGS: Verification and Reporting* and meets the specific action of:

- An annual Government Energy Use report is to be prepared and published by Energy SA and is to include Agency Performance and Action Plan Progress

This report is the first to be compiled under the scope of the Action Plan and is the first to use data provided by Portfolios through the Energy Data Gathering And Reporting (EDGAR) system.

The aim of this report is to present in a clear and simple fashion an overview of the SA Public Sector's energy use and related greenhouse gas emissions. This report will focus primarily on analysis of building energy use but will also include some passenger vehicle and Public Transport information.

## 1.1 EDGAR

Data for the 2000/01 and 2001/02 financial years was collected using EDGAR (Energy Data Gathering And Reporting). EDGAR provides an internet based user interface to a central database system. It has been developed for the Commonwealth Department of Industry, Tourism and Resources and is also being used by New South Wales, Western Australia and Victoria. EDGAR replaces the Government Energy Consumption (GEC) database, a centralised system that had been managed by Energy SA since the late 1980's. The new system was introduced because the GEC program was obsolete and EDGAR provides agencies with a convenient and flexible means of reporting energy use.

A small number of modifications to customise EDGAR were made due to basic differences between Commonwealth and State Government operations and different policy requirements.

The modifications made to adapt EDGAR for SA included:

- Adding new end use categories for Police, Fire and Emergency Services, Health Care Facilities, Educational Facilities and Custodial Facilities, which are not applicable to the Commonwealth.

- Normalisation factors (such as staff number) were not made mandatory. Reporting requirements under the Action Plan do not require the use of normalisation factors. In future this may be added to the existing reporting requirements.
- A new contact role Energy Efficiency Reference Group Members was added.

*All tables and figures in this report are derived from data stored in EDGAR by all portfolios, unless otherwise stated. Data in EDGAR is updated up until the beginning of the drafting of this report and therefore may be different to figures previously published.*

## 1.2 Reporting Structure used for EDGAR

Individual portfolios chose the reporting structure that would be used for EDGAR. Some portfolios reported at an agency level while others simply reported as a portfolio. The reporting structure differed between portfolios due to the varying ways of capturing energy use data and whatever was the most convenient reporting method for each portfolio.

It is important to note that the reporting structure used for EDGAR is not necessarily the same as the portfolio's corporate structure.

## 2. Overall Energy Use Performance

### 2.1 Outcomes for 2001/02

Table 1, on the next page, provides information on the energy consumption of individual portfolios for 2001/02. These figures include all building and transport energy consumption including public transport. It does not include energy use from commercial public trading enterprises such as SA Water.

Total expenditure on reported Government energy use was \$109,000,000 for the 2001/02 financial year.

**Table 1: Energy use by portfolio**

Portfolio	Total Energy Use		Greenhouse emissions	
	GJ	% of SA Government	Tonnes	% total
Transport, Urban Planning and the Arts	1,530,782	32.56%	160,000	23.41%
Human Services	1,525,751	32.45%	228,000	33.36%
Education, Training and Employment	667,612	14.20%	139,000	20.34%
Justice	491,629	10.46%	72,000	10.53%
Administrative and Information Services	249,140	5.30%	50,000	7.32%
Primary Industries and Resources	136,277	2.90%	19,000	2.78%
Environment and Conservation and the River Murray	67,306	1.43%	9,000	1.32%
Premier and Cabinet	14,451	0.31%	2,000	0.29%
Office of Economic Development	11,102	0.24%	2,000	0.29%
Treasury and Finance	7,079	0.15%	2,500	0.37%
<b>Total</b>	<b>4,701,129</b>		<b>683,500</b>	

Total reported energy consumption for 2001/02 was 4,701,129 GJ with related levels of greenhouse gas emissions of 683,500 tonnes. The portfolio Transport Urban Planning and the Arts has the highest energy consumption out of all the portfolios. This is primarily due to the fact that energy consumption used in public transport operations is recorded under this portfolio.

Table 2 provides information on energy consumption and related greenhouse gas emissions by end-use category for the 2001/02 financial year in descending order of energy demand.

**Table 2: Energy consumption and greenhouse gas emissions by end use category**

End-use category	Energy Use		Greenhouse emissions	
	GJ	% Total	Tonnes	% total
Hospitals	1,277,041	27.16%	202,000	29.55%
Public Transport	1,175,440	25.00%	87,000	12.73%
Passenger Vehicles	922,303	19.62%	67,000	9.80%
Educational facilities	530,433	11.28%	124,000	18.14%
Office - Tenant Light and Power	191,337	4.07%	58,000	8.49%
Police, Fire and Emergency Services Facilities	117,965	2.51%	29,000	4.24%
Infrastructure - roadways	97,222	2.07%	30,000	4.39%
Office buildings - combined services	77,227	1.64%	23,000	3.37%
Custodial facilities	69,841	1.49%	14,000	2.05%
Office - Central Services	63,535	1.35%	19,000	2.78%
Laboratories	46,951	1.00%	7,000	1.02%
Other Transport	38,994	0.83%	3,000	0.44%
Public Buildings	33,970	0.72%	10,000	1.46%
Law Courts	32,327	0.69%	7,000	1.02%
Other Uses	20,555	0.44%	3,000	0.44%
Other Buildings	5,988	0.13%	500	0.07%
<b>Total</b>	<b>4,701,129</b>		<b>683,500</b>	

As Table 2 demonstrates, the largest single end-use category in the 2001/02 financial year was "Hospitals", which accounted for 27.16% of the public sector's total energy use. The second largest end-use category relating specifically to building energy use is "Educational Facilities", which accounts for 11.28% of the total energy use. Transport accounts for 45% of all energy use.

Figure 1 shows the six end-use categories responsible for the highest energy use in 2001/02 as percentages of total energy use. The "Others" category is the total of the ten remaining end-use categories displayed as a percentage of overall energy use.

**Figure 1: Energy consumption by end-use category as percentage of total**

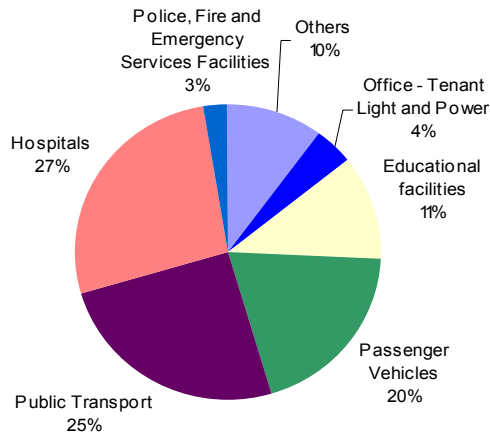
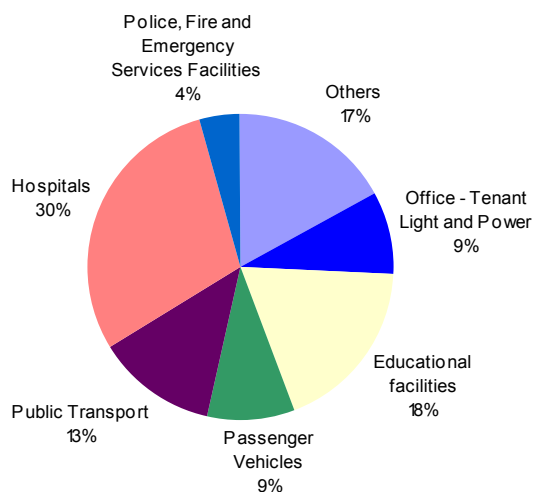


Figure 2 contains the same end-use categories as above but represents greenhouse gas emissions relating to energy consumption.

**Figure 2: Energy greenhouse gas emissions by end-use category as percentage of total**



Hospitals account for the largest proportion of energy use and related greenhouse gas emissions. Educational facilities are the fourth largest user of energy by percentage but are the second largest



related to greenhouse gas emissions. This is due to the higher greenhouse intensity of electricity compared to other fuel sources.

Table 3 provides detail on the energy use and related greenhouse gas emissions from the various fuel types. Table 4 lists energy use and greenhouse gas emissions by fuel type specific to transport functions.

**Table 3: Energy consumption and greenhouse gas emissions by fuel type**

Fuel Type	Energy use		Greenhouse emissions	
	GJ	% total	Tonnes	%total
Electricity	1,538,562	32.73%	474,000	69.35%
Automotive Diesel	1,233,389	26.24%	92,000	13.46%
Natural Gas	1,170,171	24.89%	64,000	9.36%
Petrol	639,793	13.61%	46,000	6.73%
LPG	100,260	2.13%	6,000	0.88%
Heating Oil/Fuel Oil	16,150	0.34%	1,000	0.15%
AVGAS	2,806	0.06%	500	0.07%
<b>Total</b>	<b>4,701,129</b>		<b>683,500</b>	

**Table 4: Transport, public transport and, passenger vehicle energy consumption and greenhouse gas emissions by fuel type**

Fuel Type	Energy Use		Greenhouse emissions	
	GJ	% total	Tonnes	% total
Automotive Diesel	1,197,010	58.19%	90,000	61.02%
Petrol	601,985	29.27%	43,000	29.15%
Natural Gas	226,206	11.00%	12,000	8.14%
LPG	28,930	1.41%	2,000	1.36%
AVGAS	2,806	0.14%	500	0.34%
<b>Total</b>	<b>2,056,937</b>		<b>147,500</b>	

## 2.2 Energy Use Trends in Government Buildings

As this is the first year where data collected through the EDGAR system has been used, most of the comparison will be between the 2000/01 and 2001/02 financial years. As this system is used into the future the range of available data will increase allowing for more detailed trend analysis.

Under the Action Plan, Agencies are required to reduce energy use in Government buildings by 15% before the year 2010. The base year against which this target has been set is the 2000/2001 financial year. All portfolios (covering non-commercial agencies) reported their energy use for the 2001/2002 to Energy SA during October 2002.

Energy use in Government buildings increased by 12,759 GJ (or 0.50%) in 2001/2002. This is shown in Table 5 below.

**Table 5: Energy use in government buildings for 2000/01 and 2001/02 by portfolio**

Portfolio	Energy Use (GJ)		% Change
	2000/01	2001/02	
Human Services	1,339,459	1,314,119	-1.89%
Education, Training and Employment	492,218	555,278	12.81%
Justice	237,223	235,631	-0.67%
Transport Urban Planning and the Arts	207,862	200,785	-3.40%
Administrative and Information Services	134,507	136,640	1.59%
Primary Industries and Resources	78,373	72,372	-7.66%
Environment and Conservation and the River Murray	33,346	21,997	-34.03%
Treasury and Finance	7,701	7,079	-8.08%
Office Economic Development	5,716	5,281	-7.61%
Premier and Cabinet	2,503	2,485	-0.72%
<b>Total</b>	<b>2,538,908</b>	<b>2,551,667</b>	<b>0.50%</b>

As can be seen in Table 5, there was a decrease in energy use in all portfolios other than DETE and DAIS. There was also a decrease in energy use in the largest portfolio, Human Services, whose facilities account for over 50% of total energy use in SA Government buildings.

A portion of the growth in the DETE portfolio's energy use is likely to be attributable to its asset renewal program. Under this program many existing schools are being up-graded with reverse-cycle air conditioning services to meet both community expectations and legislative requirements.

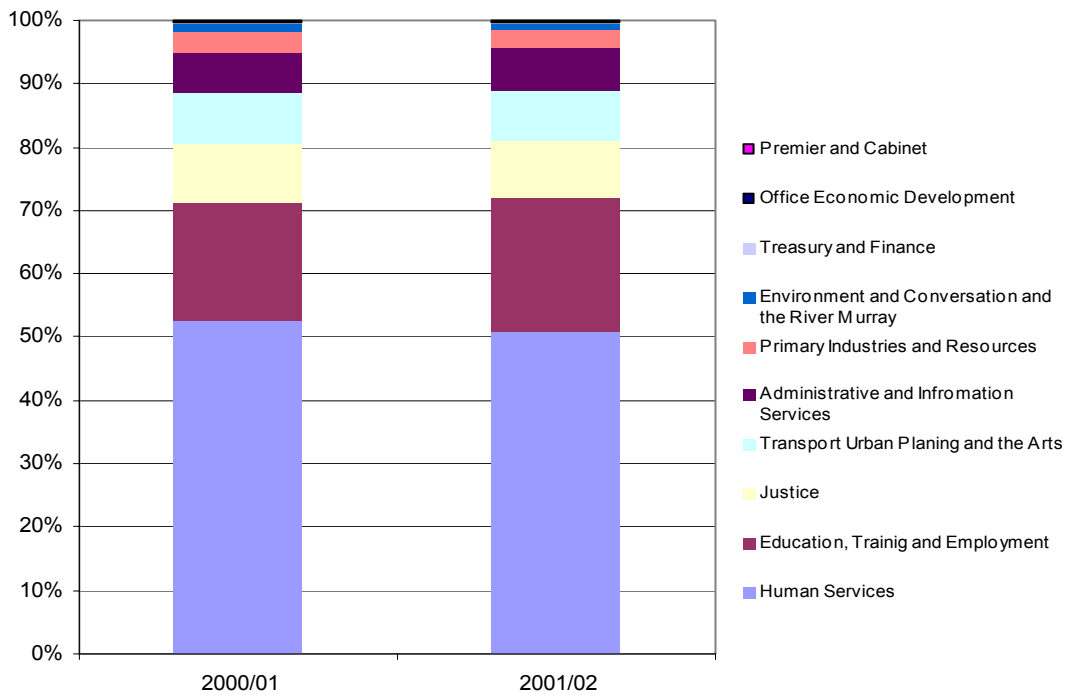
In addition to the above, the former Government's DECS-Tech program that aims to achieve a standard of one personal computer per five students in every school is increasing the number of IT systems in DETE assets.

The Department of Environment, Conservation & River Murray (DECRM) reduced its energy use by almost 34.03%. The majority of the portfolio's energy use occurs at the Botanic Gardens Complex. DECRM advised that heating levels were reduced at the Bi-Centennial Conservatorium during 2001/2, thus contributing to the large reduction. It is likely that heating levels will be restored in 2002/3, however due to DECRM's relatively small energy use, this will be unlikely to impact significantly on the Whole-of-Government performance.

The energy use reduction target at present is absolute and not normalised against any other factor such as floor area, number of students, hospital beds etc. Clearly there is potential for weather and other productivity indicators to influence energy use, which could, in turn, have an impact on Government's ability to achieve the 15% target.

Figure 3, on the next page, displays the percentage make up by portfolio of the total energy use in government. Data is represented for both the 2000/01 and 2001/02 financial years. As demonstrated in the graph there has been no significant change in the portfolio contributions to overall energy use between 2000/01 and 2001/02.

**Figure 3: Portfolio contribution to total government building energy use by percentage**



The portfolio that accounts for the largest percentage of building energy use in Government is Human Services. This particular portfolio is responsible for approximately 50 percent of public sector building energy use, with the majority of the energy used in provision of health services.

Education, Training and Employment is the next largest user of energy in the Government accounting for 22 percent of total energy use. Approximately 95 percent of this energy use is attributable to educational facilities such as primary and secondary schools and TAFE institutes.

Justice, and Transport, Urban Planning and the Arts and, Administrative and Information Services, responsible for approximately 9, 8 and, 5 percent respectively, dominate the remaining 30 percent of Government energy use.

The remaining 4 percent of Government building energy use is related to the operations of; Primary Industries and Resources, Environment and Conservation and the River Murray, Treasury and Finance, Office of Economic Development and, Premier and Cabinet.

Table 6 includes energy consumption for each end-use category for the financial years 2000/01 and 2001/02. It also includes the percentage change from the baseline year to 2001/02.

**Table 6: End-use category energy consumption by financial year**

End-use category	Energy use (GJ)		% Change
	2000/01	2001/02	
Hospitals	1,301,156	1,277,041	-1.85%
Public Transport	1,120,168	1,175,440	4.93%
Passenger Vehicles	1,005,550	922,303	-8.28%
Educational facilities	461,851	530,433	14.85%
Office - Tenant Light and Power	198,555	191,337	-3.64%
Police, Fire and Emergency Services Facilities	115,918	117,965	1.77%
Infrastructure - roadways	97,842	97,222	-0.63%
Office buildings - combined services	84,126	77,227	-8.20%
Custodial facilities	70,095	69,841	-0.36%
Office - Central Services	64,596	63,535	-1.64%
Laboratories	52,011	46,951	-9.73%
Other Transport	39,910	38,994	-2.30%
Public Buildings	35,162	33,970	-3.39%
Law Courts	35,789	32,327	-9.67%
Other Uses	7,915	20,555	159.70%
Other Buildings	13,895	5,988	-56.91%
<b>Total</b>	<b>4,704,539</b>	<b>4,701,129</b>	<b>-0.07%</b>

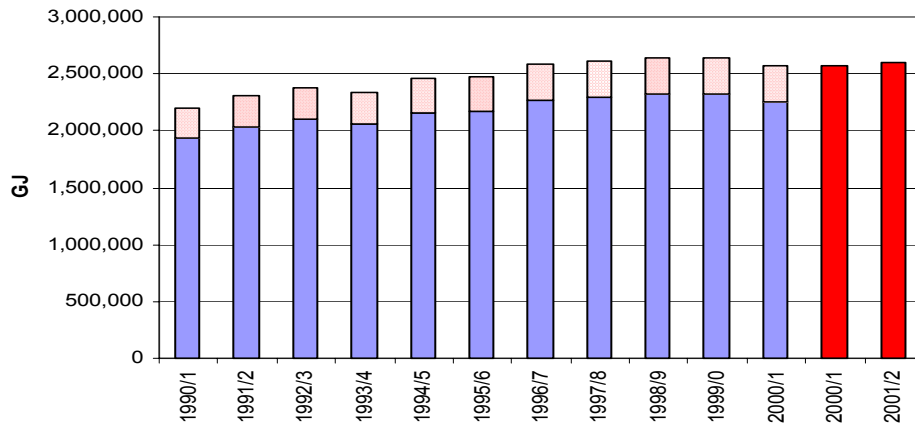
While there is an overall, although minor, reduction in energy-use from 2000/01 to 2001/02, the percentage change for each end-use category varies significantly. This may be due in part to the progressive refinement of asset registers over the past 12 months, and will be examined closely in the coming period.

The five largest end-use categories, Hospitals, Public Transport, Passenger Vehicles, Educational facilities and, Office – Tenant Light and Power have had changes of –1.85%, 4.93%, -8.28%, 14.85% and –3.64% respectively.

The most significant change is the 14.85% increase in energy demand for Educational facilities. The possible reasons for this were previously outlined on page 10 in reference to the Education, Training and Employment portfolio increase.

Figure 4 is a graphical representation of the building energy use data contained in the Government Energy Consumption (GEC) database, from 1990/01, and the data contained in EDGAR. The solid blue sections represent GEC data while the solid red sections represent EDGAR data. The financial year 2000/01 has been represented twice to give a comparison between the results obtained from GEC and EDGAR for a same year.

**Figure 4: GEC building energy use data vs EDGAR building energy use data**



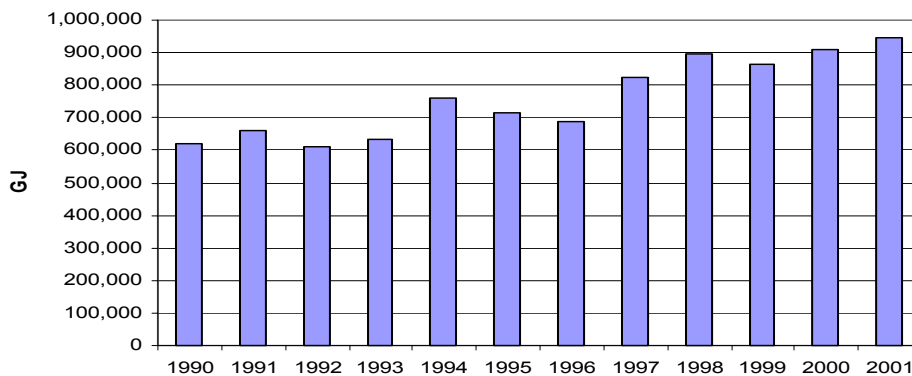
As can be seen in the graph, data from EDGAR gives a significantly higher result than that obtained from data stored in the GEC database. The thatched sections of the graph represent estimates of energy use that would not have been included in the results obtained using GEC data. These estimates are based on the percentage difference between EDGAR and GEC results for 2000/01.

Differences in results from the two systems may be attributed to a number of reasons. GEC contains only direct-billed electricity and gas usage for buildings; it does not contain information on charges made for leased premises where the property manager bills the tenant. GEC is restricted to capturing electricity and gas data sourced directly from AGL and Origin. Any site not identified as Government property and undertakings outsourced to private operators were not always captured by GEC.

This demonstrates that having the individual portfolios conduct detailed reviews of their asset registry's to determine their baseline data, and having a data gathering system that is flexible, contributes to a more complete set of data than was previously possible.

Electricity demand for major pumping can vary significantly from one year to the next. For this reason Figure 5 provides a graphic of the five-year running average, in order to identify any underlying trend. The figures indicate an increase of 53 percent over the last 10 years

**Figure 5: Five year rolling average for major pumping electricity use**



Source: Government Energy Consumption database and SA Water

## 3. Key Achievements

The following information has been provided by the EERG members of each portfolio, based on the information presented in 2001/2 Annual Reports. EERG has been focussed more on data and process-related activities until now. Project-related activity is expected to increase in the next year.

### 3.1 Department of Human Services

The focus during 2001-02 has been on the development of a database that will record departmental energy use down to site level.

Seven energy audits and energy opportunity reviews were undertaken at major metropolitan and regional hospitals. A number of potential projects have been identified out of these audits.

Modifications to the air-conditioning system and extensive use of solar shading devices have seen energy consumption at the Barmera hospital drop by nearly 30% during 2001-02.

### 3.2 Department of Transport, Urban Planning & the Arts

Transport SA has formed an internal Energy Efficiency Reference Group to identify energy reduction opportunities across the agency and promote awareness within business units.

Guidelines for procuring energy efficient products and the Energy Management Plan are available on the Transport SA Contracting and Procurement Intranet site.

Transport SA is pursuing an Energy Performance Contract initiative. A detailed feasibility study is to be completed by October 2002 on the Walkerville Building.

Investigation of a program replacing traffic signal globes with LED's, which would reduce energy consumption by 80%, is underway. Lamp type efficiencies for road lighting are also being continually evaluated. Pole layout, pole design and lamp sizes are being investigated as ways to reduce energy consumption.

### 3.3 Department of Justice

The Justice Portfolio has established an "Energy Managers Group" with representatives from all Justice agencies.

Energy audits have been completed at the largest nine sites in the Justice Portfolio. A Project Plan for implementing energy efficiency measures was drafted and endorsed by the Justice Portfolio Leadership Council.

In conjunction with Real Estate Management, opportunities to negotiate leases for major leased sites are being pursued with the objective of engaging the building owner in energy savings initiatives to achieve mutually beneficial outcomes.

SAPOL has commenced equipping patrol vehicles with a new style light bar with improved aerodynamic qualities as a means of reducing fuel consumption.

### **3.4 Department of Education & Children's Services**

A cross-directorate Energy Conservation Working Group to explore implementation energy efficiency initiatives has been established.

An "Energy Matters" newsletter is published once per term across DECS, and includes communication on issues relating to the Action Plan. An Energy Column is also published fortnightly in "X-press" publication.

Designs of new buildings and refurbishment projects in accordance with Action 2.1 of the Energy Efficiency Action Plan are being phased in via briefings for new projects.

DECS has recently received international and national awards for energy efficient design and ESD at the Playford Primary School, and based its briefing for the Mawson Lakes School on the outcomes achieved on the project.

A schedule of works for mandatory preventative maintenance required to be undertaken across DECS sites has been prepared. Energy audits were conducted at seven schools and TAFE Institutes.

On-going implementation of the Schools Energy Program aims to conserve energy resources through active environmental stewardship.

The Minister announced a \$1m budget provision in 2001 as a contribution towards the implementation of Ecologically Sustainable Development (ESD) projects.

### **3.5 Department of Environment, Conservation & the River Murray**

A portfolio-wide Energy Efficiency Task Force was established during 2001/02, which will report to the Portfolio Chief Executives on possible energy efficiency projects within the portfolio

DEH has developed a baseline data model of the agency's energy usage. The data contained in this model is now being used to build a system for ongoing energy use data capture and collection.

DEH has taken initial steps to engage an energy auditor to review its major installations including the Botanic Gardens, Chesser House and tenancies at 77 Grenfell Street.

### **3.6 Department of Primary Industries & Resources**

A PIRSA Energy Management Steering Group has been established to facilitate implementation of the Action Plan within the portfolio. The Steering Group has overseen the development and implementation of an internal communication strategy on energy efficiency matters

Energy audits will be undertaken on all contestable sites to identify opportunities for energy savings. A capital works program will be developed to realise opportunities in energy audits. Minor capital works have already been completed at two sites.

A review of vehicle fleet is currently underway to determine fuel usage, opportunities for vehicle fleet reduction and conversion to LPG to optimise vehicle efficiency.

### **3.7 Department of Premier & Cabinet**

An Energy Efficiency Working Party was formed and has developed a DPC Energy Efficiency Action Plan

The Senior Management Group endorsed this Action Plan. Each division is responsible for monitoring its performance against its own Action Plan

An educational presentation has been designed by the Energy Efficiency Working Party to be given at divisional worksite meetings.

DPC is working with DAIS Real Estate Management on reducing energy use at the State Administration Centre, where the major part of the department is located

### **3.8 Department of Treasury & Finance**

An Implementation Plan has been developed and endorsed by Senior Management, and is currently being promulgated throughout the Agency.

An educational program encouraging staff participation in reducing energy use is being developed.

### **3.9 Office of Economic Development**

Base line data for 2000/01 has been compiled and procedures established to accurately record all future energy consumption.

An internal working party has been formed to lead the implementation of the Government Energy Efficiency Action Plan.

A policy has been developed whereby all office machinery is purchased with Energy Star ratings as one of the selection criteria and life cycle operating costs are incorporated into the assessment of costs.

### **3.10 Department for Administrative & Information Services**

Reporting procedures have been established to report consumption of energy in leased and owned sites

Current reports have been included as a component for the proposed upgrade of Real Estate Management's Property Management System during 2002/03.

Energy Audits of the State Administration Centre, Education Centre and Netley Commercial Park have been completed.

Initiatives have been incorporated into planned building refurbishment works at the Forensic Science Building and 60 Wakefield House.

REM has provided agencies with a range of tenant initiatives to reduce energy consumption that can be implemented within leased or owned sites.



# Appendix A - End Use Category Definitions

## Office Buildings – Tenant Light and Power

This category covers energy used for tenant operations in buildings whose primary function is office space. It includes tenancy lighting, office equipment, supplementary air conditioners, boiling water units etc. However, additional building factors that contribute to higher energy consumption, such as computer server rooms, or localised areas of extended operating hours, are not separated from office consumption. Agencies also do not report on a building-by-building basis but on the aggregate performance of their entire building estate.

## Office Buildings – Central Services

This category covers energy used for services in office buildings common to all tenants. It includes building air conditioning, lifts, security and lobby lights, domestic hot water etc.

## Laboratories

This category covers all energy use in buildings that, as their primary function, are used as laboratories and research facilities.

## Other Buildings

The energy performance of buildings not reported elsewhere is included in the Other Buildings category. These buildings range from simple storage sheds through to radio transmitters.

## Passenger Vehicles

This category includes the energy consumption of passenger cars, light commercial vehicles and mini buses.

## Other Transport

The energy consumption of all forms of transport, other than Passenger Vehicles, is reported in this category. Energy used for general public transport such as trains and buses is not included.

## Law Courts

The Law Courts category includes all types of court facilities, whether a relatively small space in a larger building or a specialised building.

## **Public Buildings**

This category includes energy consumed in buildings whose primary function is to be visited by the public in significant numbers. Typical buildings in this category are public libraries, museums or art galleries. Frequently, there is a requirement to maintain close control of internal environmental conditions on a 24-hour basis in these buildings.

## **Other Uses**

This category includes the energy consumption of facilities that do not fit into any of the other categories.

## **Office Buildings – Combined Services**

This category relates to the energy consumed in office buildings where tenant services and central services consumption can not be separated. This is often the case for smaller office buildings.

## **Educational Facilities**

The Educational Facilities category includes all types of educational facilities from schools to TAFE Institutes.

## **Custodial Facilities**

The Custodial Facilities category includes all types of custodial facilities for adults or juveniles.

## **Infrastructure – Roadways**

This category includes energy consumption for street lighting, traffic lights and other facilities in the road network that are the direct responsibility of a Government agency.

## **Public Transport**

This category covers the energy consumption in vehicles and infrastructure used primarily for conveying the public, including trains, trams, buses, ferries and their operating stations. It is intended for the agencies responsible for the *operation* of the public transport system, rather than the energy consumed by individual *users* of the public transport system.

## **Hospitals**

This category covers the energy consumption in buildings and facilities primarily used as hospitals and in the delivery of health care services.

## **Police, Fire and Emergency Services Facilities**

This category covers the energy consumption in buildings and facilities primarily used as police, fire and emergency services facilities such as police stations, fire stations and ambulance stations.

## Appendix B - Conversion Factors

**Table B.1 – Measurement Units**

Unit	Abbreviation	Measures	Equals
megajoule	MJ	energy	10 <sup>6</sup> joules
gigajoule	GJ	energy	10 <sup>9</sup> joules
petajoules	PJ	energy	10 <sup>15</sup> joules
Metre	m	length	
kilogram	kg	mass	
Tonne	t	mass	1000 kg
Litre	L	volume	0.001m <sup>3</sup>

**Table B.2 – Energy Conversion Factors**

Energy Type	Typical Measured Units	Abbreviation	To convert to Gigajoules, multiply by	CO <sub>2</sub> Intensity kg/GJ
Electricity	kilowatt hour	kWh	0.0036	308.0
Natural Gas	megajoule	MJ	0.001	54.4
Natural Gas	cubic metre	m <sup>3</sup>	0.039 approximate	54.4
LPG (Liquefied Petroleum Gas)	tonnes	T	50	59.4
LPG	litre	L	0.0257	64.7
LPG	kilogram	kg	0.0496	59.4
Heating Oil/ Fuel Oil	litre	L	0.0373	69.7
Automotive Diesel	litre	L	0.0386	74.9
Petrol	litre	L	0.0342	71.3
AVGAS	litre	L	0.0331	73.3
Greenpower	kilowatt hour	kWh	0.0036	0

