

# THE °CLIMATE GROUP

## Weekly Greenhouse Indicator Winter Report 2009

Victoria, New South Wales, Queensland and South Australia

7 September 2009

### Overview

The Climate Group is now in its third year of tracking greenhouse gas emissions from energy use in Victoria, New South Wales, Queensland and South Australia on a weekly basis through its Greenhouse Indicator.

The Greenhouse Indicator provides accurate and real time information on greenhouse gases produced each week from energy use. It is a unique tool designed to bring greater understanding to the issue of climate change and to help track greenhouse gas emissions in selected Australian states. Each and every week we release greenhouse gas emissions into the atmosphere. Because they can't be seen, it is difficult to understand how much is being produced.

All countries provide a detailed annual report of their greenhouse gas emissions but such reports are normally released long after the emissions have occurred. As a result, this information, while comprehensive and critical for policy planning and scientific assessment, arrives much later than the emissions are produced. The Greenhouse Indicator puts a figure on what is happening now, and enables everyone to follow how much we are collectively emitting in our state each and every week.

Greenhouse emissions traditionally peak in summer and winter months due to extra energy used to heat and cool our homes. This Winter Report covers greenhouse emissions from energy during the 2009 winter and also compares them to emissions over winter from the previous year.

### 2009 winter results

Across Victoria, New South Wales, Queensland and South Australia emissions this winter were 74.69 million tonnes. This was 3.1 million tonnes lower than in winter 2008, with each states' emissions falling by between 2.5 and 8.2 per cent.

The greatest absolute decline in emissions was in NSW, which saw a decline of 1.56 million tonnes or 5.8 per cent.

Winter emissions in Victoria fell in 2009 by 700,000 tonnes or 2.5 per cent. Emissions in Queensland and South Australia fell by 484,000 and 375,000 tonnes respectively or 2.5 per cent and 8.2 per cent.

The overall reduction in emissions was due to a substantial decline in emissions from all fuel types with reduced emissions from coal-fired generators providing the biggest single decline. This winter, emissions from across all energy sources were lower in each state, with the exception of emissions from gas-fired generation, which grew in NSW.

These reductions come despite population growth in each of the states and growth in Gross State Product in each state except Queensland.

One of the major causes for the reduction in winter emissions was the extraordinarily warm weather, which saw the highest average daily maximum temperatures ever recorded in winter across all four states ) leading to reduced demand for gas and electricity for heating. Electricity demand fell across all states and overall was down by 3.4 per cent on last winter.

## Petroleum

Total emissions from petroleum were 23.484 million tonnes across all four states.

This winter has seen a decrease in petroleum sales across all four states compared with the previous winter with resulting emissions in each state falling by between 1.5 and 3.1 per cent. The 2008 winter had seen petroleum sales increase across all states compared with the previous year. This Winter Report shows a significant reduction in emissions from petroleum products of 643,000 tonnes in total across all four states when compared with the 2008 winter. This was primarily due to the fall in sales in NSW and Queensland where the resulting petroleum emissions fell by 3.1 and 3.0 per cent respectively. Together they accounted for 75 per cent of the 643,000 tonne emissions reduction.

Across the different main types of fuels results were mixed. Compared with 2008, diesel sales were down or remained at much the same level. Overall petrol sales fell or remained the same in all states except SA, which experienced a slight rise. Sales of LPG grew across all states except Queensland.

## Electricity

Across the four states the total electricity generated during the 2009 winter was 4.9 per cent lower than in 2008. The share of total scheduled generation from coal-fired power stations remained the same at 89 per cent. The shares of gas-fired and renewable generation also remained the same.

In Victoria, electricity demand fell by 4.2 per cent in the 2009 winter compared with the previous winter. Generation from brown coal-fired generators decreased by 1.5 per cent, while electricity produced from gas-fired generation was 43 per cent lower. A fall in demand combined with a smaller decline in generation meant that Victoria's net export of electricity to other States was 68 per cent higher this winter compared with 2008.

In NSW, electricity demand fell by 4.3 per cent this winter. Generation from black coal-fired generators in NSW fell by 9.0 per cent with gas-fired generation achieving a 266 per cent growth. This figure, however, comes off a very low base and gas still only made up 5.0 per cent of NSW's electricity generation. Net imports from other states grew by 47 per cent compared with 2008 levels.

In Queensland, electricity demand fell by 1.2 per cent this winter compared with last winter. Generation from black coal-fired generators fell by 1.2 per cent while gas-fired generation decreased by 17 per cent. The net export of electricity to other states from Queensland was 15 per cent less than the amount exported in winter 2008.

In South Australia, electricity demand decreased by 3.6 per cent in the 2009 winter. Generation from coal-fired generators fell by 3.9 per cent while electricity produced from gas-fired generation was 21

per cent lower. South Australia went from being a net exporter of electricity over the 2008 winter to a net importer in 2009.

## Temperatures

Winter 2009 was exceptionally mild over much of Australia. Average maximum daily temperatures over the continent were the highest on record; while seasonal mean temperatures were the second highest on record, falling just short of the 1996 record.

**Table 1**

Temperature Summary Winter 2009							
Maximum Temperatures				Minimum Temperatures			
Area	2008 Anomaly (°C)	2009 Anomaly (°C)	2009 Comment	Area	2008 Anomaly (°C)	2009 Anomaly (°C)	2009 Comment
<b>National</b>	↑0.32	↑1.64	Highest; previous record +1.41 (2002)	<b>National</b>	↓0.03	↑1.02	
<b>VIC</b>	↑0.22	↑1.12	3rd highest	<b>VIC</b>	↑0.25	↑0.88	Highest since 1991
<b>NSW</b>	↑0.51	↑1.61	2nd highest; record +1.96 (2002)	<b>NSW</b>	↑0.17	↑1.34	
<b>QLD</b>	↑0.26	↑2.33	Highest; previous record +1.27 (1973 and 2003)	<b>QLD</b>	↑0.25	↑0.72	
<b>SA</b>	↑0.01	↑1.69	2nd highest; record +1.89 (2002)	<b>SA</b>	↑0.14	↑1.83	Highest; previous record +1.81 (1996)

**Source: Bureau of Meteorology**

Maximum daily temperatures averaged over Australia for winter were 1.64°C above the long-term average, well above the previous record of +1.41°C set in 2002. Each of the states recorded very high average daily maximum temperatures over the season, with Queensland registering its highest ever, both NSW and SA registering their second highest and Victoria also achieving its third highest for winter on record. Significantly higher than average minimum temperatures were also achieved across all states, with SA recording its highest and Victoria achieving its highest since 1991.

As mentioned earlier in the report, the warmer weather across all states is highly likely to have had a major influence over the fall in demand for energy over the season and thus the levels of emissions from energy use over winter 2009.

## Victoria

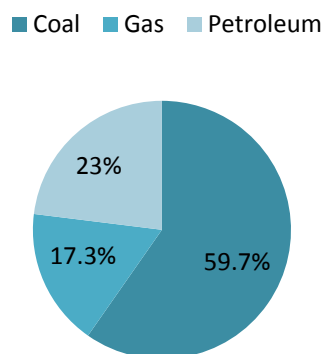
### Greenhouse Gas Indicator, Victoria

**Winter 2009: 26.629 million tonnes CO<sub>2e</sub> down 0.700 million tonnes on 2008**

Coal-fired electricity: 15.899 million; 59.7 per cent down 1.4 per cent on 2008

Natural gas: 4.594 million; 17.3 per cent down 7.1 per cent on 2008

Petroleum: 6.136 million; 23.0 per cent down 2.1 per cent on 2008



The 2009 winter Victoria Indicator was 2.6 per cent lower than winter 2008 levels.

The Greenhouse Indicator accounts for just about all of Victoria's emissions from energy and about 85 per cent of the state's total greenhouse gas emissions. Remaining emissions come from agriculture, waste and industrial processes. Forestry also acts as a sink for about 2 per cent of the total emissions. Greenhouse gas emissions in Victoria not included by the Indicator for this period are estimated to be approximately 4.9 million tonnes.

**Total weekly emissions** were fairly stable over the winter at between 1.9 and 2.1 million tonnes, just less than the range of the 2008 winter. Emissions from all sources were lower this year despite modest growth in Gross State Product of 1 per cent and positive population growth of 1.9 per cent over 2008. The Weekly Indicator recorded its highest figure in the third week of winter with 2.149 million tonnes, 3.1 per cent lower than the highest figure in the previous winter (2.219 million tonnes). Emissions from both coal and gas-fired generation were at high levels in that week, with emissions from gas at particularly high levels to meet the high demand for heating that week because of the particularly cool weather. The lowest Weekly Indicator (1.917 million tonnes) was recorded during the last week of winter and was due primarily to low levels of emissions from coal-fired generators (with a major generation unit going offline) and also the lowest petroleum emissions for winter. This was 3 per cent lower than the lowest week in the 2008 winter. Victoria exported 68 per cent more electricity to other states than it did over the 2008 winter - due to demand falling by a greater amount than the decline in generation. Victoria's domestic demand accounted for 98 per cent of their generation.

**Electricity from coal** causes the majority of emissions in Victoria and accounted for 96 per cent of electricity generated in the state during winter 2009. The average weekly emissions from coal-fired power stations were 1.223 million tonnes, down 1.4 per cent on 2008. Peak emissions from coal were recorded during the fourth week of winter, with 1.314 million tonnes emitted that week from a large number of generation units operating at high capacity. However, this was 0.8 per cent lower than the highest Indicator during the previous winter. The lowest weekly level recorded this winter was in the last week of winter and was 1.131 million tonnes, 1.5 per cent lower than the lowest level during the 2008 winter. This was due to a major generation unit going offline and resulted in Victoria importing electricity in that week.

**Natural gas** causes the lowest level of emissions of the three energy sources. Natural gas is used in industrial and commercial applications as well as for domestic use (largely heating) and to fuel electricity generation. Gas use is traditionally high during winter due to greater heating needs. During the 2009 winter the average weekly emissions from gas use were 353,000 tonnes, down 7.1 per cent on 2008 levels. This was due both to reduced direct gas combustion as well as 43 per cent less gas-fired generation.

**Petroleum** emissions during winter 2009 were on average 472,000 tonnes per week – 2.1 per cent less than in 2008. These emissions include sales of LPG, automotive transport fuels, aviation fuel, industrial diesel and fuel oil. Sales of aviation fuel, fuel oil and LPG rose while diesel and petrol fell.

Figure 1 below charts the slight decline in emissions from all fuels compared to winter 2008.

**Figure 1**

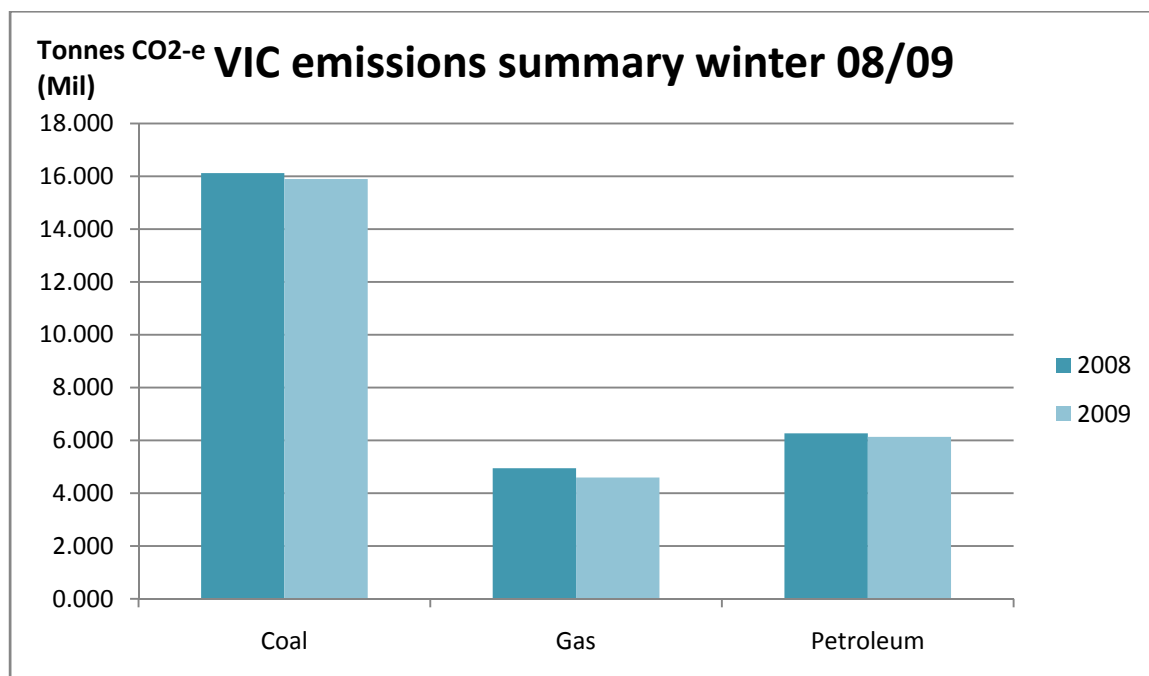
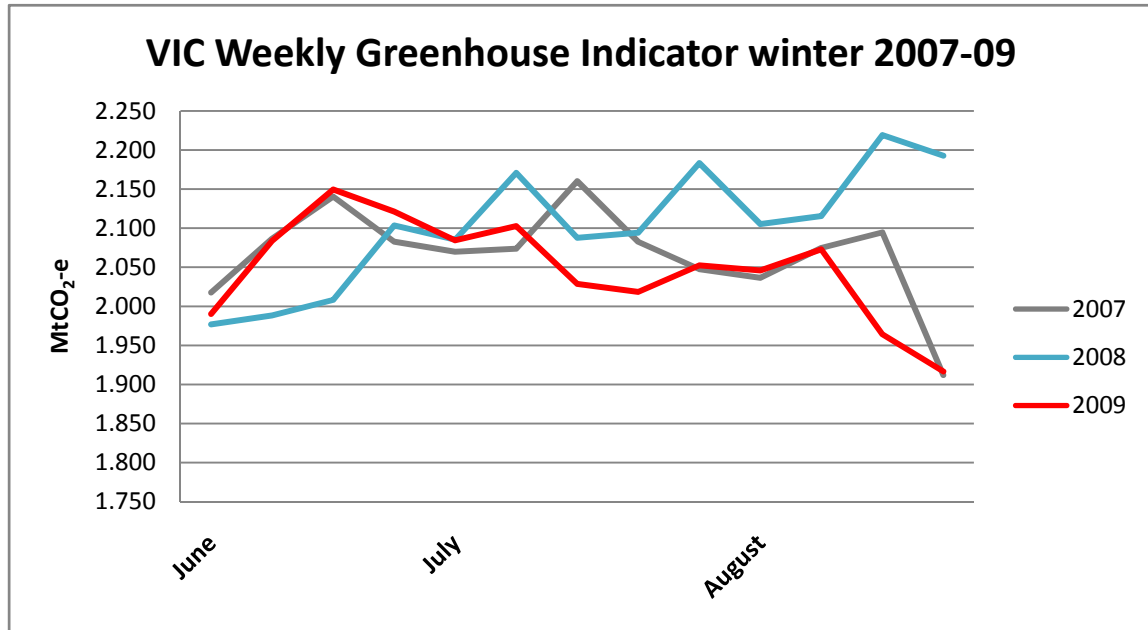


Fig 2



## New South Wales

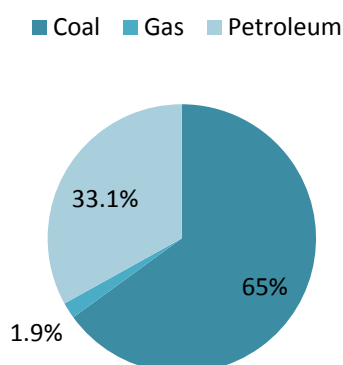
### Greenhouse Gas Indicator, New South Wales

#### Winter 2009: 25.202 million tonnes CO<sub>2e</sub> down 1.560 million tonnes on 2008

Coal-fired electricity: 16.383 million; 65.0% down 9.1% on 2008

Gas-fired electricity: 0.488 million; 1.9% up 241% on 2008

Petroleum: 8.332 million; 33.1% down 3.1% on 2008



The 2009 winter NSW Indicator was 5.8 per cent lower than winter 2008 levels.

The Greenhouse Indicator accounts for more than 80 per cent of NSW's emissions from energy use and 60 per cent of the State's total greenhouse gas emissions. Remaining emissions come from agriculture, land use, waste, industrial processes and fugitive emissions from coal mining. Unlike Victoria, no regular accurate data is currently available for gas consumption other than gas used for electricity generation in NSW. Greenhouse gas emissions in NSW not included by the Indicator are estimated to be approximately 15.6 million tonnes for the period covered.

**Total weekly emissions** fluctuated over the winter between 1.8 and 2 million tonnes. Total emissions for NSW in the 2009 winter fell compared with the previous year, due to a decline in emissions, primarily from coal-fired generation but also from petroleum use. Unlike the other states, emissions from gas-fired generation grew due to the commissioning of new generators. The overall decline occurred despite positive population growth and marginal growth in Gross State Product (0.2 per cent) over the last year. The highest Weekly Indicator recorded was 2.037 million tonnes in mid June. This was 5.6 per cent lower than the highest Indicator during the previous winter, despite emissions from coal-fired generators peaking in that week. The lowest Weekly Indicator recorded was 1.819 million tonnes, 2.4 per cent lower than the lowest week for the previous winter. This was in the last week of winter and was primarily due to the lowest coal-fired emissions for winter and a decline in demand for electricity for heating due to mild weather. NSW experienced a 4.3 per cent drop in demand for electricity compared with the previous winter, although NSW increased its net imports of electricity from other states over the period with a substantial fall in electricity generation from both coal and large hydro power stations.

**Electricity from coal** causes the most emissions from energy for NSW and accounted for 91 per cent of electricity generated in the 2009 winter. During the 2009 winter the average weekly emissions from coal-fired power stations were 1.260 million tonnes, down 9.5 per cent on the previous winter. This was the result of a 9.0 per cent fall in coal-fired generation due to more electricity being able to be provided by other states. Peak emissions from coal occurred during mid-June, with 1.366 million tonnes emitted that week, 7.6 per cent lower than the peak for the previous winter. The peak resulted from a rise in demand and less of electricity available for import from other states. The lowest week recorded this winter was 1.139 million tonnes during the last week of winter; 6.2 per cent lower than the lowest week recorded in the 2008 winter.

**Electricity from natural gas** causes the lowest level of emissions of the three energy sources. Natural gas is also used in industrial and commercial applications as well as for domestic use (largely heating) however no regular accurate data is currently available on this. During the 2009 winter the average weekly emissions from gas-fired generation was 38,000 tonnes. This is up significantly from the 2008 average due to the commissioning of three new gas-fired generators, but is still a very small contributor to total emissions. Natural gas is also used in industrial and commercial applications as well as for domestic use (largely heating) however no regular accurate data is currently available on this.

**Petroleum** emissions during 2009 were on average 641,000 tonnes per week – this was 3.1 per cent lower than in winter 2008. Petroleum emissions include sales of LPG, automotive fuels, aviation fuel, industrial diesel and fuel oil. Sales of LPG grew while average fuel sales fell and petrol and diesel stayed much the same.

Figure 3 below charts the decline in emissions from coal and petroleum, and the rise in emissions from gas compared with winter 2008.

**Figure 3**

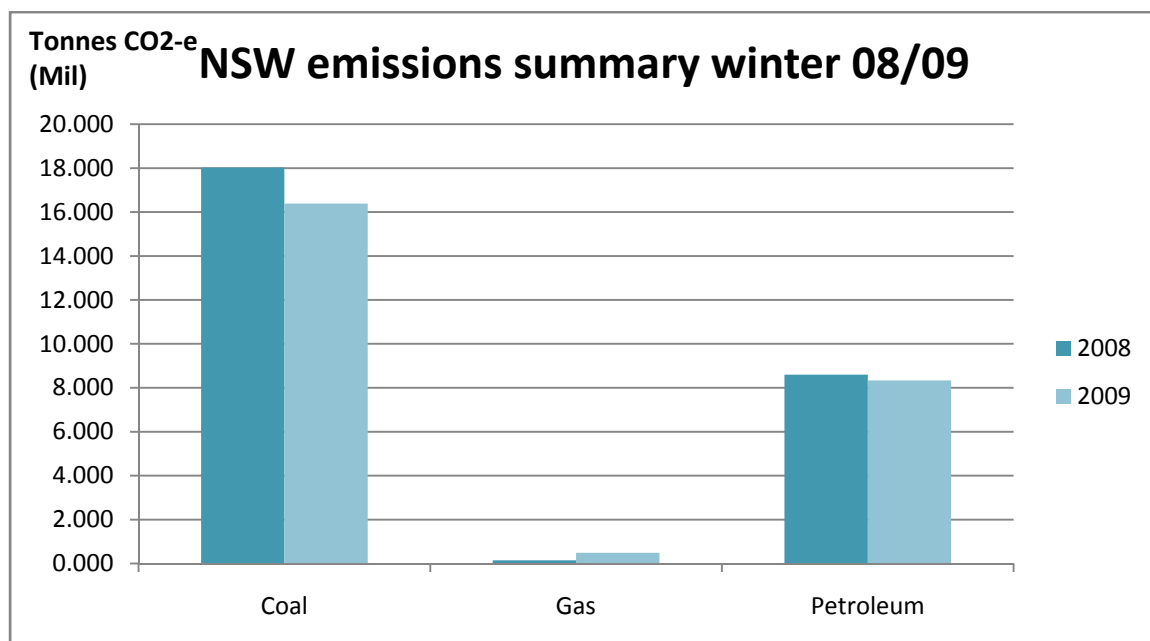
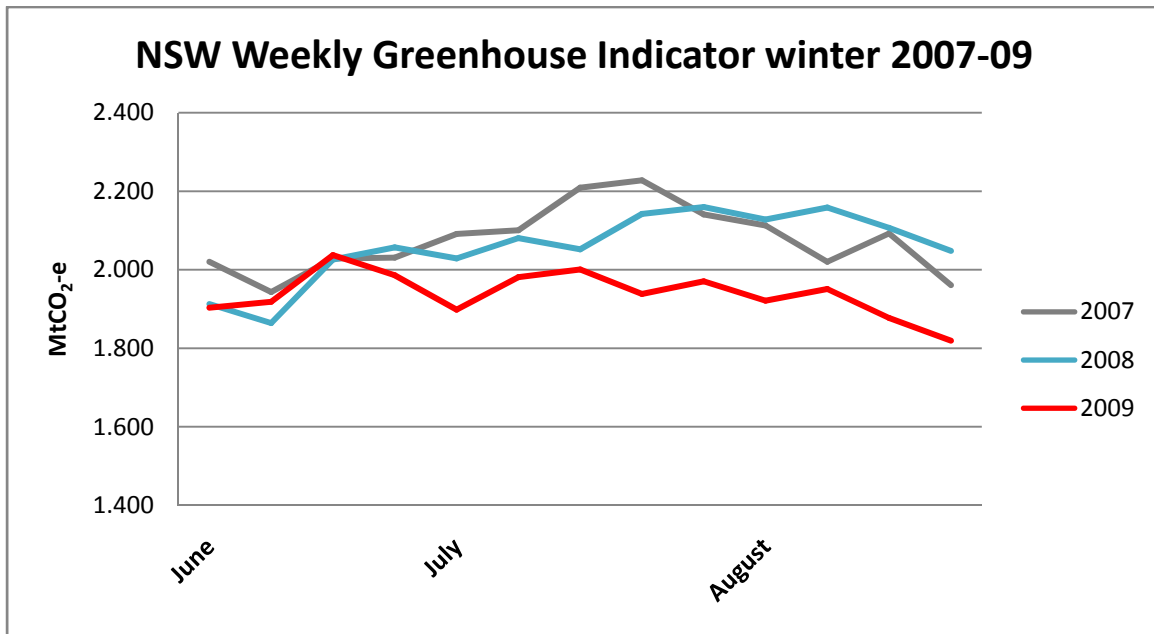


Fig 4



## Queensland

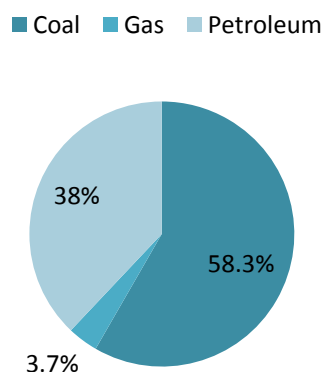
### Greenhouse Gas Indicator, Queensland

#### Winter 2009: 18.681 million tonnes CO<sub>2</sub>e down 0.427 million tonnes on 2008

Coal-fired electricity: 10.895 million; 58.3 per cent down 1.5 per cent on 2008

Natural gas: 0.695 million; 3.7 per cent down 11.8 per cent on 2008

Petroleum: 7.091 million; 38.0 per cent down 3.0 per cent on 2008



The 2009 winter Queensland Indicator was 2.5 per cent lower than winter 2008 levels.

The Weekly Indicator accounts for about 75 per cent of Queensland's total energy emissions and 40 per cent of the state's total greenhouse gas emissions. Remaining emissions come from agriculture, land use, waste, industrial processes, electricity generated on-site by industry and fugitive emissions from coal mining. Unlike Victoria, no regular accurate data is currently available for gas consumption other than gas used for electricity generation in Queensland. Greenhouse gas emissions in Queensland not included by the Indicator are estimated to be approximately 27.3 million tonnes for the period.

**Total weekly emissions** in Queensland were fairly stable over the 2009 winter, with the majority between 1.4 and 1.5 million tonnes per week. Total emissions for Queensland in the 2009 winter fell compared with the previous year, with declining emissions from all sources but primarily due to the decline in emissions from petroleum and gas-fired generation. A decline in Gross State Product of 2.7 per cent over the period will have contributed to a decline in generation and emissions. As with other states, Queensland still registered positive population growth over 2008. The highest Weekly Indicator recorded was 1.480 million tonnes in the first week of June. This was due to high emissions from both coal and gas-fired generation with net gas emissions at a high for the period. This high was 2.2 per cent less than the highest Weekly Indicator during the previous winter. The lowest Weekly Indicator (1.392 million tonnes) was in the second last week of winter and was 0.9 per cent higher than the lowest Weekly Indicator in the previous winter. The low of that week was due primarily to the lowest weekly emissions from coal-fired generation that winter. Queensland experienced a 1.2 per cent drop in demand for electricity this winter with a 2.7 per cent decline in

generation compared to the previous winter. This resulted in 15 per cent less electricity being exported to other states compared with the previous winter.

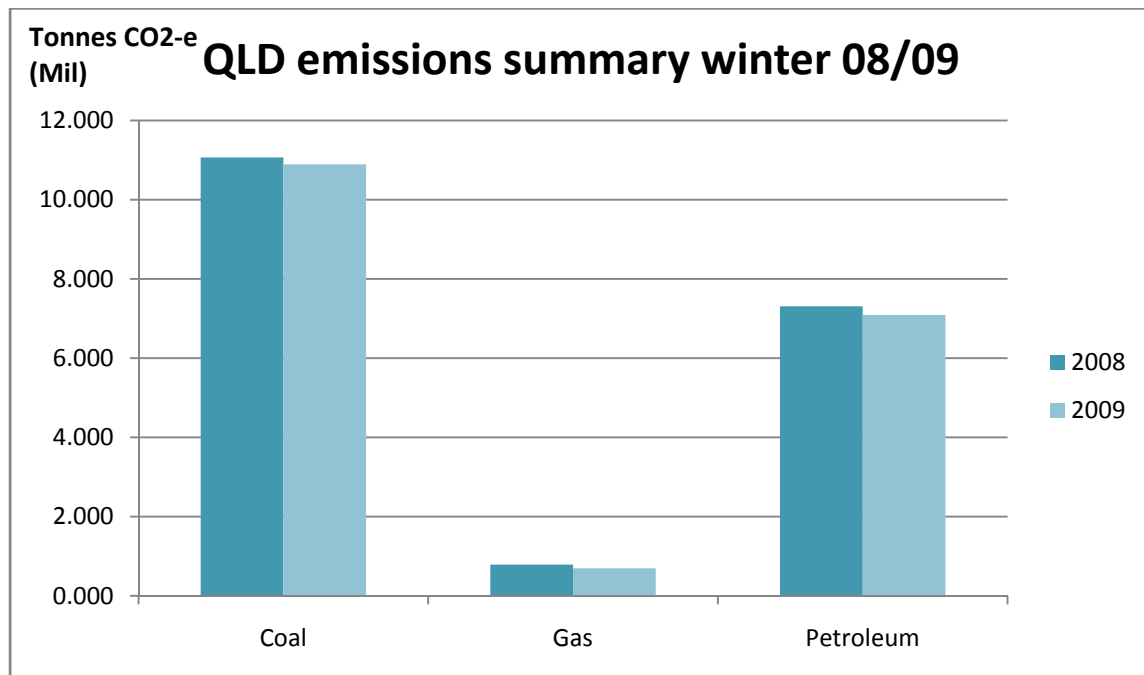
**Electricity from coal** causes the most emissions in Queensland and accounted for 90 per cent of electricity generated during the 2009 winter. The average weekly emissions from coal-fired electricity was 838,000 tonnes, down 1.5 per cent on 2008. Peak emissions from coal occurred during early July with 890,000 tonnes emitted that week, with more coal-fired generation units online over a period of high total electricity demand on the National Electricity Market. This peak was 0.7 per cent greater than peak for the previous winter. The lowest Weekly Indicator was in the second last week of August and was 3.5 per cent greater than the lowest Indicator last winter.

**Electricity from natural gas** causes the lowest level of emissions at only 53,000 tonnes on average per week this winter. This is down by 12 per cent from winter 2008 and is due to a decline in gas-fired generation of 16 per cent on 2008 levels combined with more emissions intensive gas-fired generation. This decline in generation occurred despite the commissioning of two new generators over the autumn/winter period. Natural gas is also used in industrial and commercial applications as well as for domestic use (largely heating) however no regular accurate data is currently available on this.

**Petroleum emissions** during winter 2009 averaged 545,000 tonnes per week, 3 per cent less than in winter 2008. Petroleum includes sales of LPG, automotive fuels, aviation fuel, industrial diesel and fuel oil. Only aviation fuel sales grew compared with the previous winter, with sales of all other fuel types falling.

Figure 5 below charts the slight decline in emissions from all fuels compared to winter 2008.

Figure 5





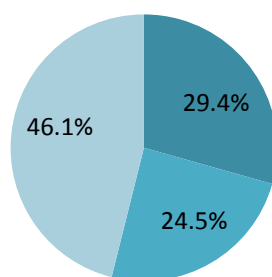
## South Australia

### Greenhouse Gas Indicator, South Australia

**Winter 2009: 4.178 million tonnes CO<sub>2</sub>e down 0.375 million tonnes on 2008**

Coal-fired electricity:	1.227 million; 29.4 per cent	down 2.6 per cent on 2008
Natural gas:	1.025 million; 24.5 per cent	down 23.4 per cent on 2008
Petroleum:	1.926 million; 46.1 per cent	down 1.5 per cent on 2008

■ Coal ■ Gas ■ Petroleum



The 2009 winter South Australia Indicator was 8.2 per cent lower than 2008 levels.

The Weekly Indicator accounts for just over three quarters of South Australia's emissions from energy and about 60 per cent of the State's total greenhouse gas emissions. Remaining emissions come from agriculture, waste and industrial processes. Unlike Victoria, no regular accurate data is currently available for gas consumption other than gas used for electricity generation in South Australia. Greenhouse gas emissions in South Australia not included by the Indicator are estimated to be approximately 3 million tonnes for the period.

**Total weekly emissions** in South Australia were fairly stable over the 2009 winter, at between 300,000 and 335,000 tonnes per week. Total emissions for South Australia in the 2009 winter fell compared with the previous year, due to a decline in emissions from all sources, but predominately from gas-fired generation. This was despite strong growth in Gross State Product of 3.9 per cent and positive population growth of 1.2 per cent over 2008. The highest Weekly Indicator recorded was 334,000 tonnes in the second week of June. This was due to high emissions from gas-fired generation combined with higher than average coal-fired emissions in that week. This was 8.9 per cent less than the highest Indicator during the previous winter. The lowest Weekly Indicator (301,000 tonnes) was, like NSW and Victoria, in the last week of winter and was 8.1 per cent lower than the lowest Indicator in the previous winter. The low of that week was primarily due to low emissions from gas-fired generation. South Australia experienced a 3.6 per cent fall in demand for electricity over the winter, but despite this went from being a net exporter of electricity last winter to a net importer of electricity this winter due to a greater absolute decline in generation.

**Electricity from coal** does not account for the most emissions in South Australia unlike in other states. Coal accounted for 38 per cent of electricity generated during the 2009 winter. The average weekly emissions from coal-fired electricity was 94,000 tonnes, down 2.6 per cent on 2008, due to a 3.9 per cent decline in generation. Peak emissions from coal occurred during mid-July with 107,000 tonnes emitted that week. This peak was 3.5 per cent greater than the peak for the previous winter. The lowest Weekly Indicator was in the first week of June and was 30 per cent lower than the lowest Indicator last winter.

**Electricity from natural gas** causes the lowest level of emissions at only 79,000 tonnes on average per week. This is down by 24 per cent from winter 2008, with the 21 per cent decline in gas-fired generation primarily responsible for this. However gas still accounts for 50 per cent of the states' electricity generation. Peak emissions from gas occurred during the first week of winter with 113,000 tonnes emitted that week, this peak was 9.3 per cent lower than the previous winter. The lowest Weekly Indicator was in the second last week of August and was 25 per cent lower than the lowest Indicator last winter. Natural gas is also used in industrial and commercial applications as well as for domestic use (largely heating) however no regular accurate data is currently available on this.

**Petroleum emissions** account for the highest proportion of South Australia's emissions. During winter 2009 petroleum emissions averaged 148,000 tonnes per week, 1.5 per cent less than in winter 2008. Petroleum includes sales of LPG, automotive fuels, aviation fuel, industrial diesel and fuel oil. Aviation and diesel sales both fell, while LPG and automotive fuel sales grew.

Figure 7 below charts the slight decline in emissions from all fuels compared to winter 2008.

**Figure 7**

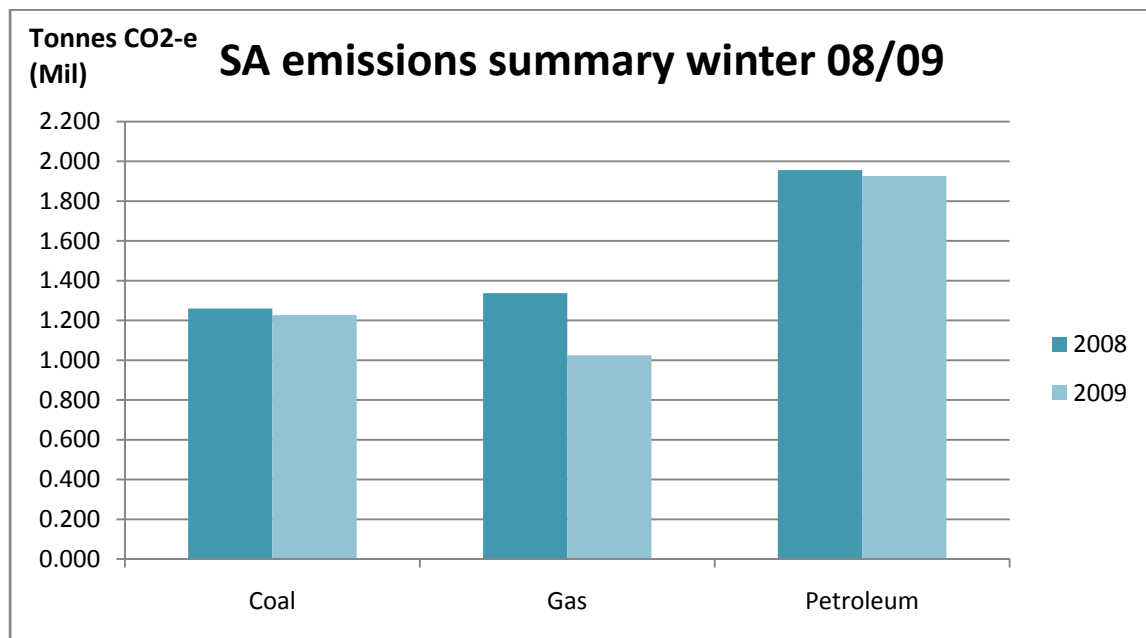
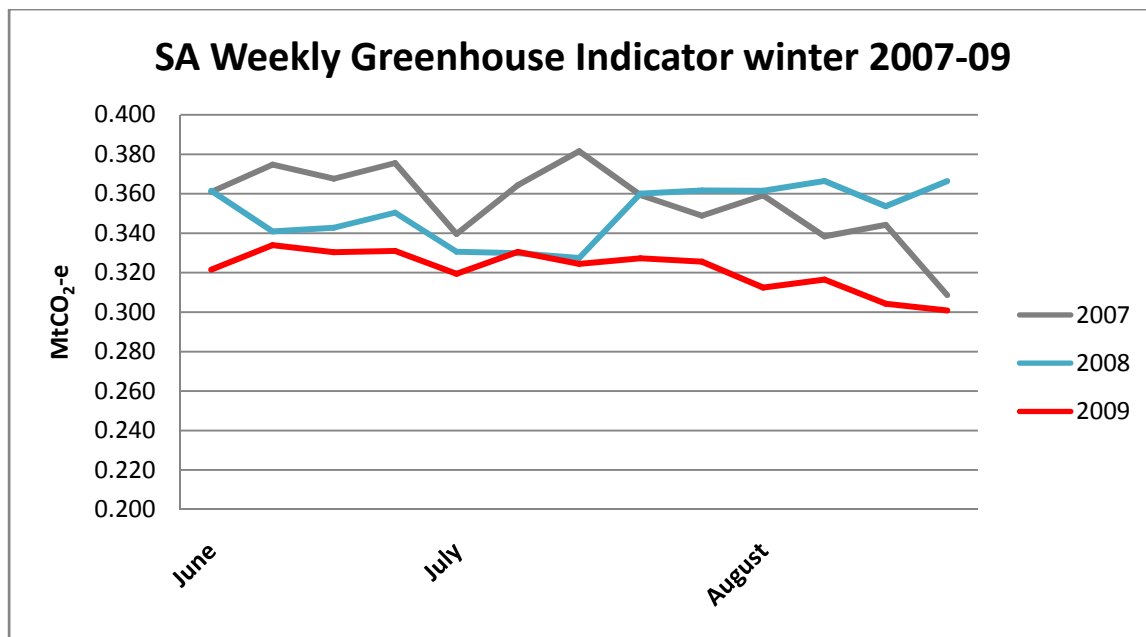


Fig 8



For more information:

[www.theclimategroup.org/indicator](http://www.theclimategroup.org/indicator)

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## Appendix 1

### Greenhouse Indicator 2009 Winter Summary

Greenhouse Emissions  
(million tonnes CO2 equiv)

	2008	VIC	NSW	QLD	SA	Combined
Coal		16.119	18.025	11.065	1.260	46.469
Gas *		4.944	0.143	0.788	1.337	7.213
Petroleum		6.267	8.594	7.311	1.956	24.128
<b>TOTAL</b>		<b>27.330</b>	<b>26.762</b>	<b>19.164</b>	<b>4.553</b>	<b>77.809</b>

	2009	% change	% change	% change	% change	% change				
Coal	15.899	-1.36%	16.383	-9.11%	10.895	-1.54%	1.227	-2.61%	44.404	-4.44%
Gas *	4.594	-7.08%	0.488	240.91%	0.695	-11.82%	1.025	-23.38%	6.801	-5.70%
Petroleum	6.136	-2.09%	8.332	-3.06%	7.091	-3.01%	1.926	-1.52%	23.484	-2.67%
<b>TOTAL</b>	<b>26.629</b>	<b>-2.56%</b>	<b>25.202</b>	<b>-5.83%</b>	<b>18.681</b>	<b>-2.52%</b>	<b>4.178</b>	<b>-8.24%</b>	<b>74.690</b>	<b>-4.01%</b>

Change from 2008	-0.700	-1.560	-0.484	-0.375	-3.119
Change ('000s tonnes)	700.44	-1560.19	483.51	-375.22	-3119.36

Breakdown by source					
Coal	59.7%	65.0%	58.3%	29.4%	59.5%
Gas *	17.3%	1.9%	3.7%	24.5%	9.1%
Petroleum	23.0%	33.1%	38.0%	46.1%	31.4%
<b>TOTAL</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>

\* In NSW, Qld and SA gas only includes that used for electricity generation.