



## Media Release

18 August 2011

### **The relative GHG intensity of coal-fired power versus gas-fired power generation in Australia is a subject on which no uncertainty exists**

Statement by Origin, Executive General Manager, Corporate Affairs, Mr Carl McCamish.

There has been commentary over the last two days around the relationship between the greenhouse gas emissions (GHG) from coal versus gas for the generation of electricity.

The relative GHG intensity of coal-fired power versus gas-fired power generation in Australia is a subject on which no uncertainty exists. The attached document provides links to some of the many sources of information available to evidence this.

Evidence to assess the more specific question of how the “lifecycle” emissions of a baseload gas-fired plant fuelled by coal seam gas compare to the “lifecycle” emissions from a coal-fired plant is less readily available. This is in part because interest in the issue has only arisen recently and in part because actual results will vary according to specific plant and equipment being used by different owners and operators along the supply chain.

However, the conclusion that lifecycle emissions from coal seam gas are substantially lower than from coal is clear in all but the most improbable scenarios - this is also addressed in the attached document.

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##### **About Origin Energy**

Origin Energy is Australia’s leading integrated energy company focused on gas and oil exploration and production, power generation and energy retailing. Listed in the ASX top 20 the company has approximately 4,400 employees and is a leading producer of gas in eastern Australia. Origin is Australia’s largest energy retailer servicing 4.6 million electricity, natural gas and LPG customer accounts and has one of the country’s largest and most flexible generation portfolios with more than 5,800 MW of capacity, through either owned generation or contracted rights. Origin’s strategic positioning and portfolio of assets provide flexibility, stability and significant opportunities for growth



across the energy industry. Through Australia Pacific LNG, its 50:50 incorporated joint venture with ConocoPhillips, Origin is developing one of Australia's largest CSG to LNG projects based on Australia's largest CSG reserves base.

In New Zealand, Origin is the major shareholder in Contact Energy, the country's leading integrated energy company, operating geothermal, thermal and hydro generation facilities and servicing electricity, gas and LPG customers across both the North and South islands. Origin also operates several oil and gas projects in New Zealand and is one of the largest holders of petroleum exploration acreage in the country.

Origin has a strong focus on ensuring the sustainability of its operations, is the largest green energy retailer in Australia and has significant investments in renewable energy technologies.

For more information go to [www.originenergy.com.au](http://www.originenergy.com.au)



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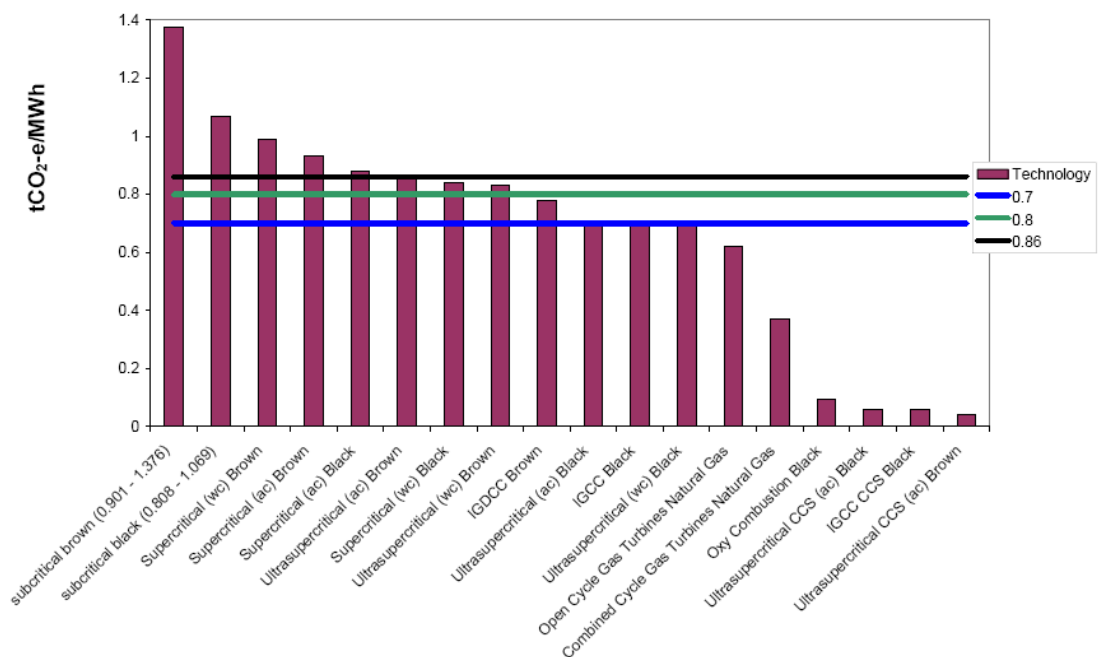
## Emissions from coal-fired electricity plant vs emissions from gas-fired electricity plant

The relative GHG intensity of coal-fired power versus gas-fired power generation in Australia is a subject on which no uncertainty exists.

The following table from the government’s own report ‘Enhancing Australia’s Economic Prosperity’ lays out the relative intensities of different generating plant.

[Source: Department of Energy, Resources and Tourism Report](#)

Graph 1: Emissions-intensity of generation technologies



The least intensive GHG coal plants listed on this table - IGCC and Ultra-supercritical Black Coal Fired Power Stations - are cutting edge technology not currently used in Australia and for which only two demonstration plants exist across the whole of the United States. Even this cutting edge technology emits approximately twice the emissions of an equivalent baseload Combined Cycle Gas plant such as Origin’s Darling Downs Power Station.

As the table shows, the coal-fired power stations operational in Australia and most of the world emit greenhouse gases in the range two to three times higher than a baseload gas-fired power station.

They are also well above the emissions even from “peaker” gas plant (Open Cycle Gas Turbine plant). Peaker gas plant plays a crucial role in securing Australia’s electricity supply when demand is at its highest and when power from intermittent renewable technologies

such as wind is not available. Because they run for only up to a few days every year, they emit only tiny amounts of greenhouse gases.

ACIL Tasman’s “Impact of an ETS on the energy supply industry” did a similar analysis in 2008 for the Electricity Supply Association of Australia and reached conclusions very similar to those of the government.

Source: [ACIL Tasman Report](#)

Table 5 Cost of emissions saved by substitution, Victoria, NSW and Queensland in 2010 (\$2008)

	LRMC \$/MWh	Emissions tonnes CO <sub>2</sub> -e./MWh	Cost of emissions saved (\$/tonne CO <sub>2</sub> -e)
<b>Victoria</b>			
Coal fired plant (brown coal)	46	1.2	
Gas fired CCGT	54	0.4	10
Wind turbine	100	0	45
Solar thermal	200	0	128
Solar PV	240	0	162
<b>NSW and Queensland</b>			
Coal fired plant (black coal)	44	0.75	
Gas fired CCGT	60	0.40	46
Wind turbine	100	0	75
Solar thermal	200	0	208
Solar PV	240	0	261

Data source: ACIL Tasman modelling

Note: Victorian CCGT has lower LRMC due to lower gas price.

These are comparisons regarded as uncontroversial within the electricity industry. For example the Australian Energy Regulator states without feeling the need for any citation in its report, [State of the Energy Market 2009](#), that “Natural gas produces around half the greenhouse emissions of coal when used in combined cycle gas turbines for electricity generation” (page 26).

#### Lifecycle greenhouse gas emissions

Many people are rightly interested in the emissions comparison between coal and gas on a “lifecycle” basis, i.e. including the emissions that result from getting the fuels from under the ground through to the power station where they are burnt.

In the case of comparing electricity emissions from coal seam gas to those from coal, this requires an understanding of emissions from the power station (discussed above) plus:

- For coal seam gas: the emissions from gas compressors; from the gas processing plant; and from transporting the gas
- For coal: the emissions from the coalmine; from the machinery used in coal mining; and from the transport of coal

In both cases, the sum total of these emissions is significantly less than the emissions caused by burning fuel at the power station - so on average the general relativities remain largely unchanged.

In both cases, however, emissions from any one plant or mine or project will vary according to factors such as the natural “gassiness” of the coal mine or the age and efficiency of the plant, pipeline or machinery being used.



Furthermore, interest in this subject is relatively recent and so there are fewer comparative studies that take actual data from specific plant, mines or projects.

For these two reasons, the ranges of uncertainty and estimation are inevitably higher in making a lifecycle comparison than they are in comparing emissions from electricity generation alone.

A report was released yesterday, however, by Citi, which addresses these issues and which surveys some of the existing literature. Comparisons in the report show:

- even when the most pessimistic possible assumptions are used for CSG to LNG, lifecycle emissions are broadly the same as the base case scenarios for cutting-edge ultra-supercritical coal;
- when “base case” assumptions are used for both coal seam gas and coal, the report shows the very significant advantage of coal seam gas even when cutting-edge ultra-supercritical coal plant is used. When more common coal plants are used, lifecycle emissions are slightly less than double those from coal seam gas;
- when the most pessimistic assumptions are used for both coal seam gas and coal, emissions from coal are between 200% and 250% those from coal seam gas

Given that nearly all the equipment used by the Australian CSG to LNG industry will be brand new, including processing plants and pipelines, it is almost inconceivable that actual emissions will be near the worst-case scenario. Moreover (and unlike coal seam gas operators or shale gas operators in the US, for example) coal seam gas companies in Australia have a very clear incentive, in the form of the impending carbon price, for investing in and maintaining equipment that reduces GHG emissions.

By contrast, most of the world’s coal plant remains solid equipment whose emissions are much higher than the assumed emissions from cutting-edge ultra-supercritical coal plant.