

Unconventional Gas Facts: Renewable Energy & Power Generation

Australia's electricity sector is the nation's single largest source of greenhouse gas emissions*. Gas power generation is promoted by the gas industry as a transition fuel, yet research is putting that myth to rest.

Rapid advances and falling costs in renewable power and storage technologies means that a secure, dependable, cost effective power system can now be achieved without gas.

Gas mining releases large amounts of polluting methane

- Unconventional gas extraction produces high levels of fugitive methane emissions – a potent heat trapping greenhouse gas that escapes during extraction, processing and transport¹.
- The latest measurements² of fugitive emissions above US unconventional gasfields suggest they range from 5-10% of production.
- When emissions are above 3 to 4% of production, the climate impacts of using gas to generate electricity are actually *worse* than for coal powered generation³.
- In Australia, there has been little direct measurement⁴ and reporting of *actual emissions* from existing unconventional gas operations and as a result the Australian gas industry claims that its fugitive emissions amount to only 0.1% of production⁵.
- If the measured rates of emissions from the US are applied here, experts estimate that fugitive emissions could equate to 92MT per annum of carbon dioxide equivalent, which is equivalent to annual emissions from our entire transport sector.

Gas is an expensive & destructive non-renewable fuel

- Increasing gas power generation in Australia would require significant⁶ investment in new power plants, pipeline infrastructure, and gas supplies, including a massive expansion in unconventional gasfields with tens of thousands of new gas wells*.
- Unconventional gas is expensive to extract and process*, particularly in remote regions where most of Australia's shale and tight gas deposits are located⁷.
- The new liquefied gas export terminals in Gladstone QLD mean our domestic gas prices are now linked with the expensive North Asian market and much of our available gas is now being exported overseas.
- This, along with the cartel type behaviour⁸ of the three major gas producers in Eastern Australia, has led to gas price rises up to five times the historic average for Australian gas users and electricity generators*.
- Higher gas prices, and a lack of competition between gas power companies, have already led to increased gas power prices, power price spikes and volatility, and the mothballing of gas power plants*.

¹ For more detailed info. on fugitive emissions see our [Fact Sheet: http://www.lockthegate.org.au/methane_leakage_and_venting](http://www.lockthegate.org.au/methane_leakage_and_venting)

² Lafleur, D., Forcey, T., Saddler, H., and Sandiford, M. (2016) A Review of Current and Future Methane Emissions from Australian Unconventional Oil and Gas Production. Melbourne Energy Institute.

³ See, for example, Hardisty, P. E., T. S. Clark and R. G. Hynes (2012). "[Life cycle greenhouse-gas emissions from electricity generation: A comparative analysis of Australian energy sources.](#)" *Energies* 5(4): 872-897.

⁴ Ibid

⁵ Clark, T., R. Hynes, P. Mariotti, A. P. Production and E. Association (2011). Greenhouse gas emissions study of Australian CSG to LNG, Australian Petroleum Production & Exploration Association Limited.

⁶ According to the [Climate Council of Australia](#), this investment would be in the order of tens of billions of dollars.

⁷ Cook, P, Beck, V, Brereton, D, Clark, R, Fisher, B, Kentish, S, Toomey, J and Williams, J (2013). [Engineering energy: unconventional gas production. Report for the Australian Council of Learned Academies.](#)

⁸ Institute for Energy Economics and Financial Analysis (IEEFA), [IEEFA Update: Australia's Natural Gas Cartel is Bleeding Australia.](#)

A Secure, Dependable, Cost Effective, Zero Emissions Electricity System Can Be Achieved Without Gas

In its report [*Pollution and Price: The cost of investing in gas*](#), the Climate Council of Australia shows that renewable energy and storage can provide a secure, affordable alternative to new fossil fuels. The electricity system must balance power supply and demand and withstand disturbances to the power system such as severe weather. These challenges can be addressed without increasing reliance on expensive, polluting gas power.

Renewable Energy Alternatives

There are many renewable energy technologies that can provide around-the-clock, on-demand power, including solar thermal, sustainable biomass, and pumped hydropower. Combining these technologies with wind, solar PV, and largescale energy storage can meet electricity demand 24 hours a day and meet technical requirements for grid stability*.

Modelling of Australia's National Electricity Market (outlined in *Pollution and Price*), shows that accelerated renewables uptake, storage, a smart grid and energy efficiency will achieve lowest consumer prices and reliability, and also meet Australia's emissions reduction commitments. New renewable energy power generation, such as wind and solar, is now cost competitive with new gas or coal, and avoids fuel costs.

Large scale Solar Thermal power, renewables and storage

- Internationally, concentrated solar thermal power plants with storage have proven successful in many countries. These plants provide a consistent source of power, or power available on-call to meet periods of high electricity demand such as during heatwaves*.
- Concentrated solar thermal power plants use mirrors to concentrate energy from the sun in order to heat a fluid (such as water, oil or sodium), to produce steam and drive a turbine, generating electricity.
- Combining large-scale energy storage with wind and solar brings further options to deliver reliable renewable power to meet demand when needed. There are a number of largescale integrated solar, wind and battery storage projects currently under construction across Australia*.

Distributed energy generation and storage systems

- The uptake of energy generation and storage systems is rapidly taking off across Australian households and businesses. In 2016, more than 6,500 households installed a solar and battery system in response to the dramatic cost reductions for solar and storage technology and increasing power bills*.
- Battery storage systems (or other forms of small-scale energy storage) enable households and businesses to maximise their use of rooftop solar panels by storing excess power generated during the day for use anytime.
- Smaller scale, distributed solar and energy storage systems reduce pressure on the wider electricity grid by smoothing out the demand at peak times, making more effective local use of solar generation.
- Distributed energy systems reduce the need for investment in expanding the electricity network, and decrease overall costs for consumers.
- Large, concentrated energy assets – like huge coal and gas power stations, are particularly vulnerable to extreme weather, increasing supply risks if one or more fail at times of extreme demand.
- In contrast, distributed energy generation and storage systems have the advantage of being more adaptable to extreme weather, particularly storms and droughts, because they do not rely on corridors of high voltage power lines or large water supplies.