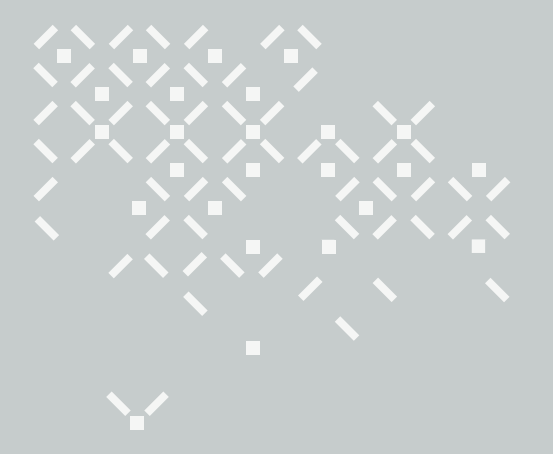


Queensland's Energy Future





The Queensland Government is committed to developing reliable, cost competitive and environmentally sustainable energy sources for the future.

More than 1500 people move to Queensland each week. Rapid migration coupled with our state's impressive rate of economic growth, creates challenges in continuing to meet increasing demand for electricity, whilst protecting our environment.

The Queensland Government is investing in gas, renewable energy and low emission coal technology to secure environmentally sustainable energy for Queensland's future.





Gas

Gas is an important clean-burning energy resource for Queensland, fuelling domestic and industrial energy needs.

The Queensland Government has identified gas as a key fuel source for reducing the greenhouse gas emissions intensity of generating electricity, while low emission coal technology and emerging renewable energy sources are being developed.

Household gas

More than 400 000 Queenslanders use gas to cook their meals, heat water, and in the cooler regions—warm their homes. The average household's energy use is responsible for about eight tonnes of carbon dioxide (CO₂) per year. Changing from electricity to gas for heating water and cooking can reduce a household's CO₂ emissions by about 2.3 tonnes a year.

There are two types of gas for use in homes—natural gas or liquefied petroleum gas (LPG). Natural gas consists mainly of methane and is sourced from conventional natural gas deposits and from coal seam methane deposits. LPG is produced as a by-product of oil refining. It can be either piped to your home (reticulated) or supplied in cylinders.

Gas is efficient, safe, environmentally friendly and Queenslanders are increasingly considering gas as part of their home's energy mix.

The Queensland Government is offering a Residential Gas Installation Rebate of up to \$500 to Queensland homeowners installing gas appliances in existing homes. The rebate is available to householders replacing electric, and some non-electric appliances, with gas.

Gas to produce electricity

Gas-fired power stations produce up to 50 per cent fewer carbon dioxide emissions than conventional coal-fired electricity plants. There is an increasing trend towards the use of gas to generate electricity. The power stations at Swanbank (in south-east Queensland), Yabulu (near Townsville), Daandine, Mica Creek (Mt Isa), Barcaldine, Braemar, Roma and Oakey operate on gas from conventional and coal seam methane gas deposits.

According to the National Electricity Market (NEM), Queensland's installed gas-fired power generation capacity is over 2000 megawatts. In the next three years, approximately 2000 megawatts of additional gas-fired generation is scheduled to be built.

Queensland Gas Scheme

The Department of Mines and Energy administers the Queensland Gas Scheme, formally known as the 13% Gas Scheme. The scheme is designed to diversify the state's energy mix towards the greater use of gas, and reduce the greenhouse gas emissions intensity of Queensland's electricity sector. The scheme, which requires electricity retailers and other major users to source 13 per cent of electricity from gas-fired generators, has helped boost Queensland's gas-fired generation capacity from 900 megawatts to over 2000 megawatts in seven years.

The scheme has also encouraged the development of new gas resources, particularly coal seam gas, and gas infrastructure such as new pipelines and pipeline interconnections.

Building on the success of this scheme, the government introduced the *Clean Energy Act 2008* on 29 April 2008, increasing the mandatory gas-fired electricity generation target from 13 to 15 per cent in 2010, and creating the power to allow further increases up to 18 per cent from then on.

The expansion of the scheme should provide further stimulus to the gas industry in Queensland, and contribute to reducing the state's reliance on coal-fired electricity generation.

The Queensland Government has committed to transitioning the Queensland Gas Scheme into the Australian emissions trading scheme as soon as practicable.



Renewable energy

The development of renewable energy is central to the Queensland Government's strategy to manage climate change.

Renewable energy sources include:

- solar (e.g. photovoltaic and solar thermal)
- wind
- geothermal (dry geothermal – heat energy extracted from hot rocks deep in the earth's crust, wet geothermal – energy derived from hot groundwater or steam—artesian bores, hot springs).
- biomass (e.g. bagasse from sugar cane waste and methane from land-fill and sewerage treatment plants)
- hydroelectricity
- wave and tidal power.

All may play a part in Queensland's future renewable energy mix.

Currently, most of Queensland's renewable energy is provided by sugar cane waste (bagasse). It accounts for 70 per cent of Queensland's renewable energy generation.

Queensland also has plentiful solar and geothermal resources, which have the potential to, with further development, produce more energy in the future than any other renewable energy source in Queensland.

Investment in renewable energy

Geothermal Centre of Excellence

The Queensland Government is investing \$15 million over five years in the Geothermal Centre of Excellence, in partnership with the University of Queensland. The centre will be the biggest of its type in the nation and, through research and development, will make Queensland and Australia a leading technology provider in the growing geothermal energy sector.

Birdsville geothermal power station

Australia's only geothermal (wet) power station in Birdsville (western Queensland) provides approximately one quarter of the town's energy supply, reducing diesel consumption by about 160 000 litres per year, and reducing greenhouse gas emissions by 430 tonnes. Ergon Energy is currently exploring options for a new geothermal power station that may provide all of Birdsville's power needs.

SolarGas One Project

The Queensland Government has committed \$7.5 million towards the CSIRO SolarGas One Project, which will build the world's first multi-tower solar array system deploying

SolarGas technology. Developed by the CSIRO, the technology combines solar energy with natural gas to boost the energy in the gas, reducing emissions when used to produce electricity. The project will be built with joint investment from the Queensland Government, the CSIRO and private enterprise.

Windorah Solar Farm

Queensland Government-owned Corporation, Ergon Energy, is investing \$4 million in Queensland's first solar farm at Windorah, a remote town in Queensland's south-west. When complete, the town's existing diesel-fired power station and the solar power station will be integrated to minimise the use of diesel generators. The project's goal is to power the town entirely by solar energy during peak sunshine hours in winter. Replacing diesel-generated electricity with solar power will lead to savings of up to 100 000 litres of diesel fuel and 350 tonnes of greenhouse gas emissions a year.

Government initiatives

Townsville: Queensland Solar City Project

The Queensland Government has committed \$5 million to the \$30 million Townsville: Queensland Solar City Project. The Ergon Energy lead project involves, installing 500 residential solar photovoltaic (PV) systems, 2500 smart meters and delivering 1700 energy audits on Magnetic Island and in the Townsville area. These measures will reduce greenhouse gas emissions by more than 50 000 tonnes over the life of the project (2007–2013).

Solar Bonus Scheme

The Queensland Government Solar Bonus Scheme pays households and other small customers for the surplus electricity generated from roof-top solar photovoltaic (PV) panel systems, that is exported to the Queensland electricity grid. The scheme rewards customers whenever they generate more electricity than they are using. Customers are paid 44 cents per kilowatt hour for surplus electricity that they export to the grid. The scheme is designed to make solar power more affordable for Queenslanders, stimulate the solar power industry and encourage energy efficiency.

Queensland Renewable Energy Fund

The Queensland Renewable Energy Fund is a \$50 million funding program that supports the development and deployment of renewable energy generation technologies in Queensland. Funds are allocated annually as grants and loans to support the development and deployment of proven renewable energy technologies statewide.



Low emission coal technology

Low emission coal technology is an important part of the Queensland Government's strategy to reduce greenhouse gas emissions from power stations.

Low emission coal technology aims to:

- secure Queensland's future energy needs
- reduce greenhouse gas emissions
- ensure the ongoing viability of the state's coal industry, which is projected to earn \$40 billion in the 2008–09 financial year, and employ more than 20 000 people.

With growing electricity demand and an abundant supply of low-cost, high-quality black thermal coal, Queensland is well-placed to pioneer low emission coal technology.

Low emission coal technology reduces the level of greenhouse gas emissions generated from coal-fired power stations. Low emission coal technology projects being explored in Queensland include the capture and permanent storage of carbon dioxide emissions in deep underground rock formations, and technologies that modify the way electricity is generated to allow the capture of carbon dioxide emissions.

The Queensland Government and industry are gearing up to demonstrate commercial-scale low emission coal technology in Queensland by 2020. The continued commitment of governments and industry to research, develop and demonstrate the technologies—reducing uncertainty, and paving the way for more commercial investment—will ensure this vision is realised.

Government funding for low emission coal technology

In July 2007 the Queensland Government formalised a flagship partnership with the coal industry, to fund accelerated research, development and deployment of low emission coal technology in Queensland.

This partnership and the associated \$900 million funding contributed by the Queensland Government (\$300 million) and coal industry (\$600 million over 10 years), is by far the most significant commitment to low emission coal technology development in the region.

Projects

Queensland's commitment to low emission coal technology is underscored by two demonstration projects of national and international significance.

The projects will use integrated carbon capture and storage, the key technology recommended by the Intergovernmental Panel on Climate Change.

ZeroGen Project

The world-first ZeroGen Project will demonstrate integrated gasification combined cycle power plant with carbon capture and storage to generate near zero emission electricity from coal.



The ZeroGen Project was reconfigured in March 2008 into two stages. In Stage One an 80 megawatt integrated gasification combined cycle demonstration plant with carbon capture storage will be developed by 2012. It is designed to achieve 75 per cent carbon capture, significantly reducing CO₂ emissions.

Stage Two could be ready for completion as early as 2017. It will draw on the technical improvements gained through Stage One to demonstrate the technologies on a commercial-scale 300 megawatt integrated gasification combined cycle plant, projected to achieve 90 per cent carbon capture. Stage Two of the project is expected to capture approximately two million tonnes of CO₂ a year.

The project has conducted significant test drilling in the Northern Denison Trough (west of Rockhampton) to identify suitable sites to demonstrate permanent and safe storage of carbon dioxide.

Callide Oxyfuel Project

The \$206 million CS Energy lead Callide Oxyfuel Project at the existing Callide A Power Station in Central Queensland, has the potential to significantly reduce the cost of capturing CO₂ from conventional coal-fired power stations.

The oxyfuel technology will combust the coal in oxygen and recirculated flue gas to produce a concentrated flow of CO₂, improving the effectiveness of the carbon capture process.

The technology is of particular importance to the coal and electricity industries because it can be retrofitted to existing power stations. It has been endorsed by the Asia Pacific Partnership on Clean Development and Climate (APP) and is supported by a diverse consortium of global partners. The Callide Oxyfuel Project will start capturing CO₂ in 2011 and will demonstrate the safe storage of approximately 50 000 tonnes of CO₂ over a three year period.

The project is funded by the Queensland Government-owned CS Energy, the Australian Coal Association Low Emissions Technologies Limited (ACALET), the Australian Government's Low Emission Technology Demonstration Fund, and a large and active consortium including Schlumberger, Xstrata Coal, the Japanese IHI Corporation, JCoal, JPower, Mitsui and Co., the CO₂CRC and the Cooperative Research Centre for Coal in Sustainable Development.

Images supplied courtesy of CS Energy, Ergon Energy and ZeroGen.

Further information

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