

## All about Geothermal Energy

### Why we need clean energy

Australia's stationary energy sector, which includes electricity derived from coal-fired power, is responsible for around 50 percent of our greenhouse gas emissions. Australia's environmental, economic and energy security is at risk from climate change unless we can compete in a low carbon world. Any successful climate change solution must first target the energy sector specifically.

Australia has some of the world's best clean energy sources, many of which are already powering Australian homes and businesses. Our superior clean energy resources, like geothermal, have the capacity to meet Australia's growing energy needs while providing a clean powered, sustainable economy.

### Geothermal – how it works

Geothermal energy is produced by extracting the natural, internal heat of the earth to create electricity.

Heat is naturally generated in special granite rocks located deep below the Earth's surface and is trapped there by layers of insulating sedimentary rocks. These are also known as Hot Dry Rocks (HDR), Hot Fractured Rocks (HFR) or Enhanced Geothermal Systems (EGS).

- Wells are drilled to a depth of 3-5 kilometres below the surface to locate the heat-producing granite.
- Water is then pumped down into the wells and through cracks in the rocks.
- The water is heated to a temperature of up to 300°C and pumped back to the surface where the heat is used to drive a turbine and produce electricity.
- The water used is then recycled.

### Greenhouse gas savings

Geothermal power is a zero-emission electricity source. One megawatt hour (MWh) of geothermal-derived electricity avoids approximately one tonne of CO<sub>2</sub>.

### In Australia

Australia's geothermal resource is plentiful and falls into two categories: hydrothermal (from hot groundwater) and hot fractured rock. The Australian Geothermal Energy Association estimates Australia's industry could potentially provide up to 2,200 megawatts (MW) of electricity by 2020.

The Australian geothermal industry is still in its development phase and the only working power station thus far can be found in Birdsville Queensland. It uses hot water from the Great Artesian Basin and is rated at 120 kilowatts.



Currently 48 companies nationally have applied for 400 licences to work on geothermal exploration in Australia. Only a small number of geothermal companies have commenced drilling and exploration and several of these expect to have working hot rocks geothermal generators working within the next 2 - 5 years.

The major areas of exploration in Australia are:

- Cooper/Eromanga Basin in South Australia;
- Hunter Valley near Newcastle;
- Otway Basin in Victoria; and
- Tasmania

## Potential

Once fully established, geothermal energy in Australia will have the capacity to provide clean, continuous and reliable power to homes and businesses.

According to estimates from Geoscience Australia, hot rocks within five kilometres of the earth's surface contain energy sufficient to deliver 2.6 million years worth of energy to Australia, based on the nation's total current energy supply. If just one per cent of this energy could be tapped, it would be the equivalent of 26,000 times Australia's annual power consumption.

## Global View

In global terms, 24 countries are currently generating geothermal energy, with a 2007 capacity of 9732MW producing over 50,000 GWhs every year. Significant producers are the USA, Iceland, Italy, New Zealand and Japan. The majority of this generation comes from hot springs associated with volcanic activity. As many as 46 countries could be generating geothermal power by 2010.

Several new hot rock projects are already underway with France currently hosting the world's largest geothermal plant.

***Did you know?*** 90% of all housing in Iceland is heated with geothermal energy.

## Current Issues

The future success of geothermal power in Australia is dependent upon government policies to support the development and deployment of these emerging technologies. This funding will enable geothermal to set up infrastructure, such as grid connections and compete with more carbon-intense energy sources, like fossil fuels. Work needs to be undertaken to ensure that network access arrangements do not discriminate against more remote locations of this technology source.



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These funding initiatives as well as the national Renewable Energy Target (RET) which aims to ensure that 20 per cent of Australia's electricity supply comes from renewable energy sources by 2020 are important to drive research and development into geothermal power technologies.

### About the Clean Energy Council

The Clean Energy Council is the peak industry body in Australia, creating a united strategy built on strong policy and direction in the clean energy sector.

We aim to find solutions that deliver abundant and affordable clean energy and efficiency solutions to Australia, as quickly as possible. For more information please visit [www.cleanenergycouncil.org.au](http://www.cleanenergycouncil.org.au)



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