NRG Gladstone Operating Services and the Joint Venture participants are committed to protecting the environment. The participants have taken a proactive role by investing millions of dollars in environmental programs to ensure Gladstone Power Station continues to meet or exceed World Environmental Best Practice.

Fabric filters have been fitted to remove dust from the flue gas. This dust (flyash) is then reclaimed and a significant portion is sold. Other waste products from the station are recycled where possible or are monitored and controlled to avoid harmful effects on the environment.

These improvements have greatly benefited the station and the surrounding community.

As part of the environmental response strategy, NRG is participating in the Greenhouse Challenge, a voluntary program to reduce emissions of greenhouse gases. Regular Environmental Awareness training conducted at NRG actively encourages all employees to consider energy consumption and protection of the environment in all their day-to-day activities.

Customers

The Gladstone Power Station sells most of its electricity to Boyne Smelters under a long-term contract. The station remains interconnected with the Queensland electricity grid and the remainder of the power generated is committed to the State.

Key Facts

- The station is located on an 80 hectare site, five kilometres north-west of Gladstone.
- The station contributes 1,680 megawatts (6 x 280) capacity to the State grid. The Boyne Smelters consume 60% of the station’s output.
- Approximately 1,000 tonnes of coal are used each day.
- Commissioning dates: Unit 2 August 1976, Unit 1 August 1977, Unit 3 April 1978, Unit 4 February 1979, Unit 5 January 1981 and Unit 6 February 1982.
- Each of the three chimney stacks is 153 metres high.
- Concrete used in the main foundations is equal to the amount used for the bases of approximately 10,000 homes.
- Steel used in construction of the station is equal to the amount used to make approximately 32,500 motor vehicles.
- The station requires 245 million litres of cooling water every hour—enough to fill the Gladstone Swimming Pool every 30 seconds.

Community

NRG fosters and maintains a positive relationship with the local community. NRG’s community assistance program supports and investments into quality of life in the Gladstone area by funding on the needs of disadvantaged groups, promoting health and well-being programs, education, public safety and environmental programs. NRG aims to support programs that promote community participation and prevention efforts.

NRG has provided funding and incentives for the development of a bicycle path to the station and been a major supporter of community events such as Clean-up Australia Day and the Gladstone Harbour Festival.
History

The 1960s saw the beginning of a new era of decentralised settlement in Queensland. The Gladstone Aluminium Refinery and the proposed aluminium smelter, together with massive nearby mining ventures, highlighted Central Queensland’s status as the state’s major growth area. Gladstone’s central location in the growth of the Gladstone region for many years to come.

Ownership and Operation

The Gladstone Power Station is a world-class facility providing—customers with safe, reliable, low-cost electricity. Since 1994, the station has been operated by NRG Gladstone Operating Services Pty Ltd (4.75%), GPS Pty Ltd (7.125%) and YKK GPS (Queensland) Pty Ltd (37.5%), SLMA GPS Pty Ltd (8.50%), Ryowa Venture participants Comalco Ltd (42.125%), NRG Energy Inc (37.5%) and AES GPS Pty Ltd (12.73%) A announcement of the station’s operation and construction.

Following extensive and detailed negotiations the sale of power to the GPS Joint Venture was finalised in 1988. Gladstone Power Station’s complex operations are controlled by modern computer systems, allowing all operations to be monitored in a single control room.

Cooling Water Supply

The station requires 245 million litres of cooling water every hour—enough to fill the Gladstone swimming pool every thirty minutes. Cooling water is discharged into the Calliope River.

Turbogenerators

Each of the six 280 megawatt turbogenerators weighs about 700 tonnes and is comprised of three steam turbines directly coupled to a generator. Hydrogen is used as the generator’s prime air which is 99.95% pure.

Plant Description

Gladstone Power Station is Queensland’s largest, with a generating capacity of 1,680 megawatts. The station is sited to take advantage of seawater for cooling and to be near Central Queensland’s vast coal resources. The station’s six, 280 megawatt turbogenerators each output 1,670 megawatts, in turn to change the power to a level suitable for transmission at 350,000 or 275,000 volts.

Stacks

The stacks are chimney stacks providing a natural draught that assists in the removal of the boiler flue gas. Two boilers are connected to each of the three stacks.

Boilers

Coal is buried in the boilers to produce steam from water at high pressure and temperature. Each of the six boilers has been designed with high dynamic response, to enable the unit to change load quickly.

How Electricity is Made

1. Coal loaded to power station and stockpiled
2. Stacker reclaimer loads coal onto conveyor
3. Coolers
4. Coal transfer tower
5. Bunkers fed coal into pulverising mills
6. Pulverising mills grind coal into a fine powder
7. Air fans
8. The forced draught fan forces air through preheaters
9. Air preheaters
10. Air fan duct where air is directed to burners or pulverising mills
11. Burners
12. Furnace where coal mixes with air and burns at high temperatures
13. Tubes inside the boiler. Heat produced in the boiler tubes raises the temperature of water circulating in the tubes to produce steam
14. Steam drum where steam passes through high pressure (16,920 kilopascals)
15. Steam is fed further in superheater
16. Steam is fed through high pressure cylinders of the steam turbine at 541.4°C. Steam is returned to the accelerator then passed through the intermediate and low pressure cylinders of the turbine
17. Intercondenser and low pressure cylinders
18. Reheater
19. Steam cooled in condenser
20. Steam water from Auckland Inlet used to cool steam in the condenser
21. Feed pumps convey condensate through economiser
22. Condensate pumped through economiser back to steam drum
23. Condensation goes through the air preheaters to the fabric filters
24. Induced draught fan forces cleaned gases into the main flue and out through the 153 metre chimney
25. Chimney
26. Rotating alternator generates electricity
27. Generator transformers convert electricity to high voltage for transmission to state power grid

1. Air inlet
2. Forced draught fan
3. Air preheaters
4. Preheaters
5. Steam cooled in economiser
6. Steam cooled in condenser
7. Steam cooled in drum
8. Steam cooled in drum
9. Steam cooled in drum
10. Steam cooled in drum
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