

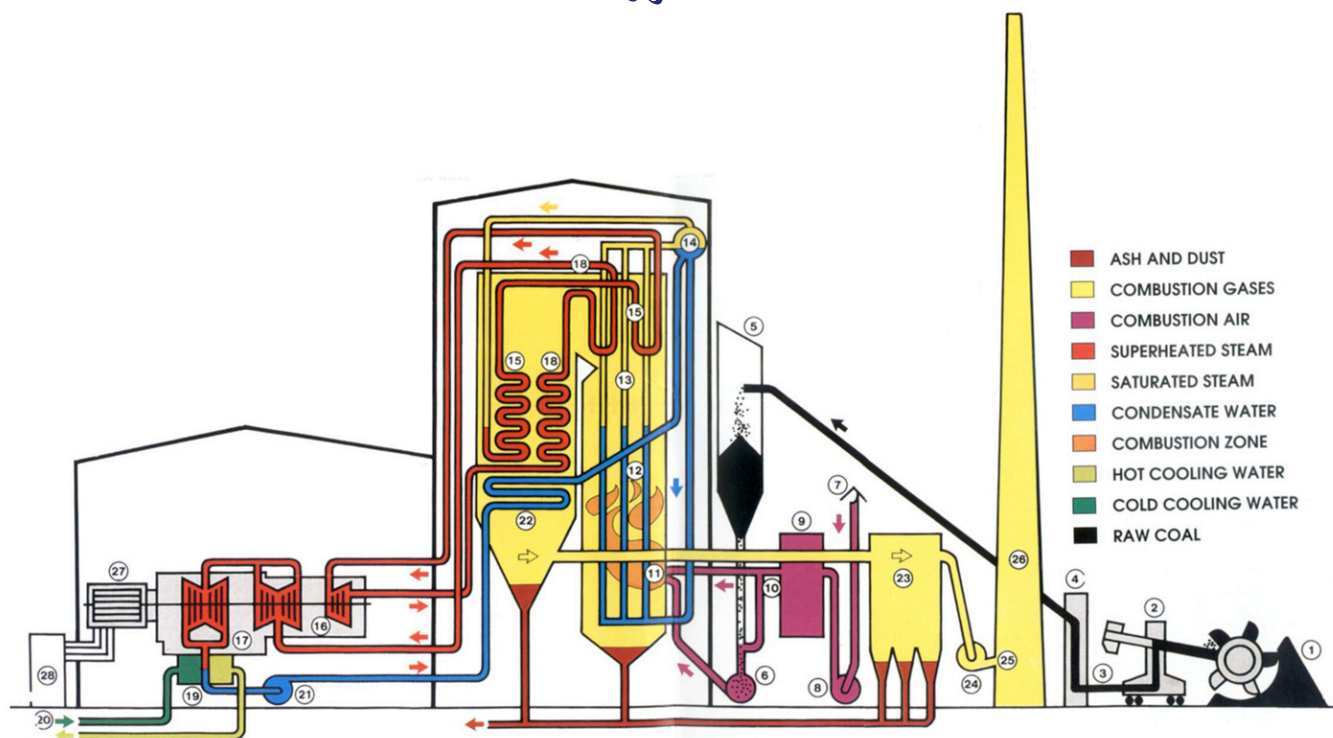


Did you know electricity cannot be stored – it is virtually produced as consumers require it!

Gladstone Power Station has six operating units, each consisting of a boiler, turbine and generator.

The station is a coal fired using black coal. In Queensland around 80% of electricity produced is generated by coal-fired power stations.

The Energy Process



1. Coal arrives on site by train and is dumped onto a system of conveyor belts to be checked and weighed before being moved to the **coal bunkers** or the **stockpile**.
2. The coal is dispersed to and from the stockpile by two **stacker reclaimers** at a rate of 800 tonnes per hour.
3. The coal travels on **conveyor belts**.
4. Coal transfer tower.
5. **Coal bunkers**, where coal is fed into pulverising mills.
6. At the **pulverising mills** the coal goes through **pulverisers** and crushed into a fine granular state by crusher hammers. This granular coal then passes through a two-stage pulverising process: first it gets rubbed on coal pegs to reduce the particle size, and then it is rubbed on other coal until the right minute particle size is reached.
7. **Air Inlet**: An electric air heater is used to completely dry the coal. The coal and hot air mix in the chute to the mill, and all the moisture is driven off as steam in the crusher-dryer section of the pulveriser.
8. The **forced draught fan** forces air through pre-heaters.
9. **Air pre-heaters**.
10. **Hot air duct** where hot air is directed to burners or pulverising mills.
11. **Burners**.
12. **Furnace**, where coal mixes with hot air and burns at high temperatures.
13. **Tubes** inside the boiler. (Heat produced in the boiler raises the temperature of water circulating in the tubes to produce steam.)
14. **Steam drum** where steam passes through at high pressure (16,890 kilopascals)



The Energy Process – Continued

15. Steam is heated further in **superheater**.
16. Steam is fed through **high pressure cylinder** of the steam turbine at 541°C, returned to the reheater and then passed through the intermediate and low pressure cylinders of the turbine. (The steam turbine converts steam energy into mechanical energy in the form of a turning rotor).
17. **Intermediate and low pressure cylinders.**
18. **Reheater.**
19. Steam cooled in **condenser**.
20. **Seawater** from Auckland Inlet is used to cool steam in the condenser.
21. **Feed pump** pumps condensed steam (condensate) through the economiser.
22. Condensate pumped through the **economiser** goes back to the steam drum (14) to be reheated.
23. Combustion gases pass through the air preheaters to the **fabric filters** consisting of 7,500 bags that remove any ash dust particles before discharging it up the stack.
24. The **induced draught fan** forces cleaned gases into the main flue and out through the 153 metre chimney.
25. **Chimney.**
26. **Rotating alternator** converts mechanical energy into electrical energy, generating electricity.
27. Generator transformer **converts electricity to high voltage for connection to state power grid.**