How to find us

Didcot A and B power stations are just off the A4130 on the outskirts of the town of Didcot in Oxfordshire.

From Oxford and the north

Take the A34 south bypassing Abingdon until the junction with the A4130 is reached. Take the second exit at the roundabout and travel to the next roundabout. Take the first exit across the bridge to the next roundabout. For the B station, take the first exit left and follow the signs for the B Station Security Gatehouse. For the A station, take the second exit left and follow the signs for the A Station Security Gatehouse.

From High Wycombe and the east via the M40

Leave the M40 at Junction 7. Take the A329 to Wallingford. At Wallingford take the A4130 to Didcot. At Didcot follow the relevant signs for both stations.

From London or the west via the M4 and Newbury and the south

Leave the M4 at Junction 13 and follow the A34 northwards until the junction with the A4130. Take the 4th exit at the roundabout and travel to the next roundabout.

Take the first exit across the bridge to the next roundabout. For the B station, take the first exit left and follow the signs for the B Station Security Gatehouse. For the A station, take the second exit left and follow the signs for the A Station Security Gatehouse.

Visit www.npower.com/education to:

- Find out more about our 'Energy to live, energy to learn' education programme.
- Order online npower's free educational Power Pack resources for Key Stages 1–4, which focus on energy and power.
- Get helpful lesson ideas and activities from our Renewable Energy education web link.

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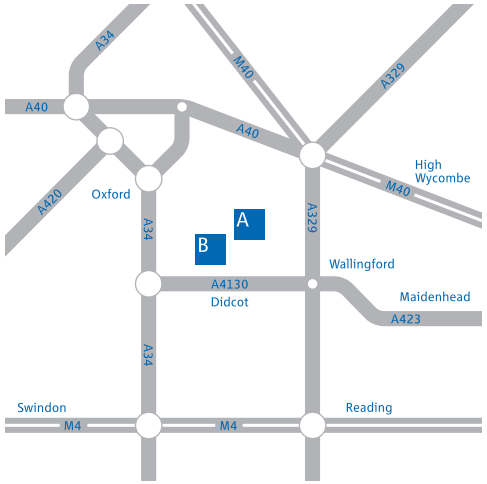


Design WPA Pinfold 0061/09/04

Didcot Power Stations

Flexible power from coal and gas

The npower site at Didcot is host to two power stations – the 2,000MW dual-fired A station and the 1,360MW combined cycle gas turbine B station.

Together the two power stations are capable of producing enough electricity to meet the needs of over 3 million people – equivalent to the demand of three counties the size of Oxfordshire.

RWE npower, part of the RWE Group, is a leading integrated UK energy company. We are one of the UK's largest energy suppliers. We have over 8,000MW of generation capacity in the UK from our diverse portfolio of flexible, low-cost generation assets, sell our expertise in power generation in key markets and are market leaders in renewable energy development.

npower, one of the UK's leading energy suppliers serves around 6 million residential and business customers. We are also commited to developing innovative products which allow our customers to make sustainable energy choices, such as our domestic green energy product, npower Juice.

We are market leaders in both onshore and offshore wind energy developments and operation and small-scale hydroelectric generation in the UK.

Our current operational wind farms have a combined capacity of 267MW, with many other projects at various stages of development. We have nine hydroelectric power stations in Scotland and Wales, with a combined capacity of some 50MW.

01 Coal supply
The coal is delivered to the station by train and placed on the stockpile or taken by conveyor to the boiler house.

02 Pulverising mill
The coal is ground as fine as face powder in a pulverising mill, picked up by a powerful stream of hot air and blown into the boiler to burn like a gas.

03 Boiler
The heat produced converts extremely pure boiler feedwater into steam in the 500 kilometres of tubing that form the boiler walls. The steam leaves the boiler at a temperature of 568°C and at 165.5 bar.

For greater efficiency, the steam passes through the boiler twice.

Three of Didcot A's four boilers have been modified to burn gas as well as coal. Special burners have been fitted that reduce the amount of oxides of nitrogen in the boiler gases.

04 Turbine
The steam passes through the blades of the turbine's high pressure stage, turning the blades and turbine shaft at 3000 revolutions per minute. The turbine shaft is linked to the generator. The steam returns to the boiler for reheating, and then goes back to the turbine's intermediate pressure stage and three low pressure stages.

05 Generator
The generator rotor is directly coupled to the turbine shaft and rotates within the stator. As the turbine shaft spins, it rotates the generator rotor, an electro-magnet weighing 74 tonnes. The electromagnet is energised by direct current from the exciter, a small generator situated at the outboard end of the main generator.

Electricity is generated in the stator: a series of hollow, insulated, copper conductor bars that are cooled by extremely pure water. Power is produced at 23,500 volts alternating current. Each of the four generators produces 500MW when running at full capacity.

06 Generator transformer
Electricity from the generator is produced at a voltage of 23,500 volts. For transmission along the national grid system, the voltage is increased to 400,000 volts in the generator transformer.

07 Condenser
The spent steam from the turbine exhaust goes to the condenser, where it is turned back into water by passing over tubes containing cold water drawn from the River Thames. The condensate is pumped back to the boiler for re-use.

08 Cooling towers
The warmed river water from the condensers passes to the six cooling towers, where it is sprayed over packing in the base of the tower, and cooled by evaporation in the natural up-draught of air. Some of the cooling water condenses into tiny floating droplets, like an early morning mist. This creates the water vapour plume that can be seen coming from the top of the towers. Lower winter temperatures increase condensation making the plume larger.

09 Electrostatic precipitators
Before the boiler gases are discharged from the main chimney, some 99% of the fine dust, produced by burning pulverised coal, is removed from the flue gases by electrostatic precipitators.

Coarse ash falls to the bottom of the boilers where it is sluiced out, crushed and carried by high pressure water to settling pits.

The ash and dust is sold for use in civil engineering projects or for the manufacture of building blocks. Surplus pulverised fuel ash is pumped to Radley to reclaim disused gravel pits.

Didcot A began commercial operation in 1970 as a coal-fired power station. It developed the capability to operate flexibly in response to the variation in demand for electricity.

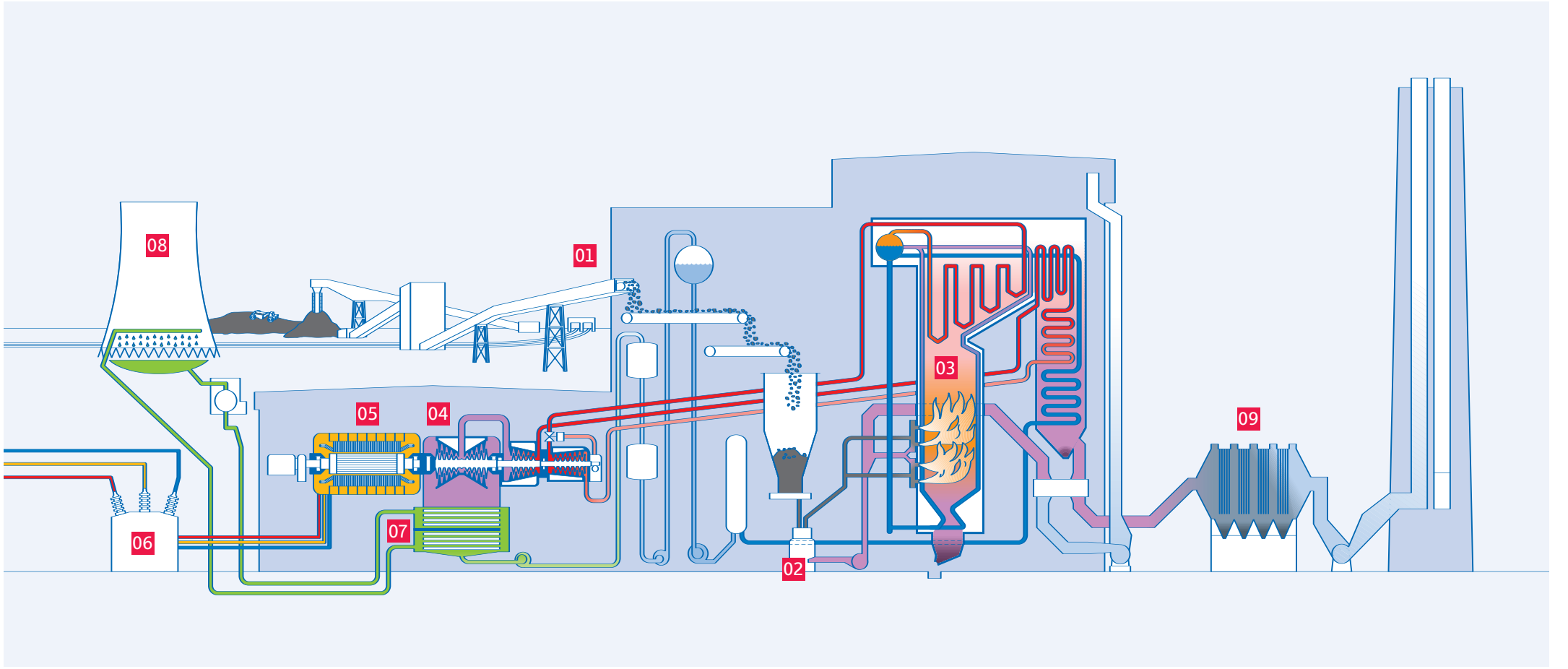
Didcot A is a dual-fired power station, owned and operated by npower part of RWE npower. Commercial operation began in 1970 and the station can generate 2,000MW of electricity – enough power to meet the needs of some 2 million people, equivalent to twice the total population of Oxfordshire.

Didcot A was originally designed as a coal-fired power station operating at base load, and has subsequently developed a capability to operate flexibly in response to variable power demands at lower load factors.

Because of changing market and environmental factors, three of its four 500MW generating units were converted to dual-firing, in order that they can burn natural gas as an alternative to coal. Didcot A became the first large power station in the UK to have this facility.

The station is at the forefront of technological innovation in the way plant is controlled. The main control room has the latest computer-based systems, to assist the operations staff to maximise plant performance and to minimise costs.

The power process at Didcot A



As part of the UK's commitments to CO_2 reductions under the Kyoto Protocol, the government has set an indicative target of 10% of electricity to be supplied by eligible renewable sources by 2010. The Renewables Obligation (RO), which came into effect in April 2002, is a key policy instrument in the government's strategy to achieve these targets. Renewable targets can be met from a variety of sources, including wind, hydro and biomass generation.

Following successful wood biomass co-firing trials at Didcot A Power Station to determine if there were any environmental and operations impacts, we received approval from the Environment Agency (EA) for commercial operation of wood (as sawdust) co-firing. Since gaining EA approval we have constructed a biomass/coal blending facility that could replace up to 2% of the coal we burn with biomass (Didcot A burnt 3.7mt of coal in 2003).

Co-firing of biomass in an existing power station provides a much more immediate source of renewable generation and clearly has a role in meeting both the electricity suppliers. It can also play an essential role in providing an initial market for biomass, supporting both the forestry industry and sustainable agriculture through the encouragement of energy crops.

Didcot B is one of a new generation of highly efficient, gas-burning stations, owned and operated by npower part of RWE npower.

The station is powered by natural gas and uses the latest generating technology (combined cycle gas turbines or CCGTs for short) to produce electricity in an environmentally-friendly way.

Didcot B, a flagship site for npower, is one of the most efficient, commercially-operating power stations in the world and is designed to operate to the highest environmental standards.

CCGT power stations are more efficient than conventional power stations as they make double use of the heat produced by burning natural gas: firstly in gas turbines, secondly because the waste heat from the gas turbines is used to raise steam to drive the steam turbine generators.

Didcot B has two electricity generating modules. Each module consists of two gas turbines (which are similar in principle to a jet engine) and a steam turbine – each turbine has an associated generator. The exhaust gases from the gas turbines pass through special boilers, known as heat recovery steam generators (HRSGs), where steam is raised to supply the steam turbines.

01 Filters
The air needed by the gas turbine is drawn in through an intake filter and then compressed in the turbine compressor.

02 Combustion chamber
The compressed air enters the combustion chamber at over 16 times atmospheric pressure. The air is mixed with natural gas and burned in the combustion chamber.
The burning air-gas mixture is at a temperature of 1160°C – hot enough to melt glass.

03 Gas turbine
The exhaust gas expands through the blades of the gas turbine turning the blades and turbine shaft at 3,000 revolutions per minute. The turbine shaft is linked to the compressor and the generator.

04 Generator
Inside the generator, the rotor (an electro-magnet) turns inside the stator (made up of copper bars) and creates an electric current. Each gas turbine generator has an output of 225MW of electricity.

05 Heat recovery steam generator (HRSG)
On leaving the turbine, the exhaust gas (now at around 545°C) passes through the HRSG (which is a dense matrix of finned tubes), where up to 320 tonnes of high pressure steam per hour is raised for the steam turbine. Finally, the waste gas (now at a temperature of 93°C) is discharged to the atmosphere through the chimney.

06 Steam turbine
Steam from the HRSG is fed to the steam turbine where it turns the blades on the turbine shaft.

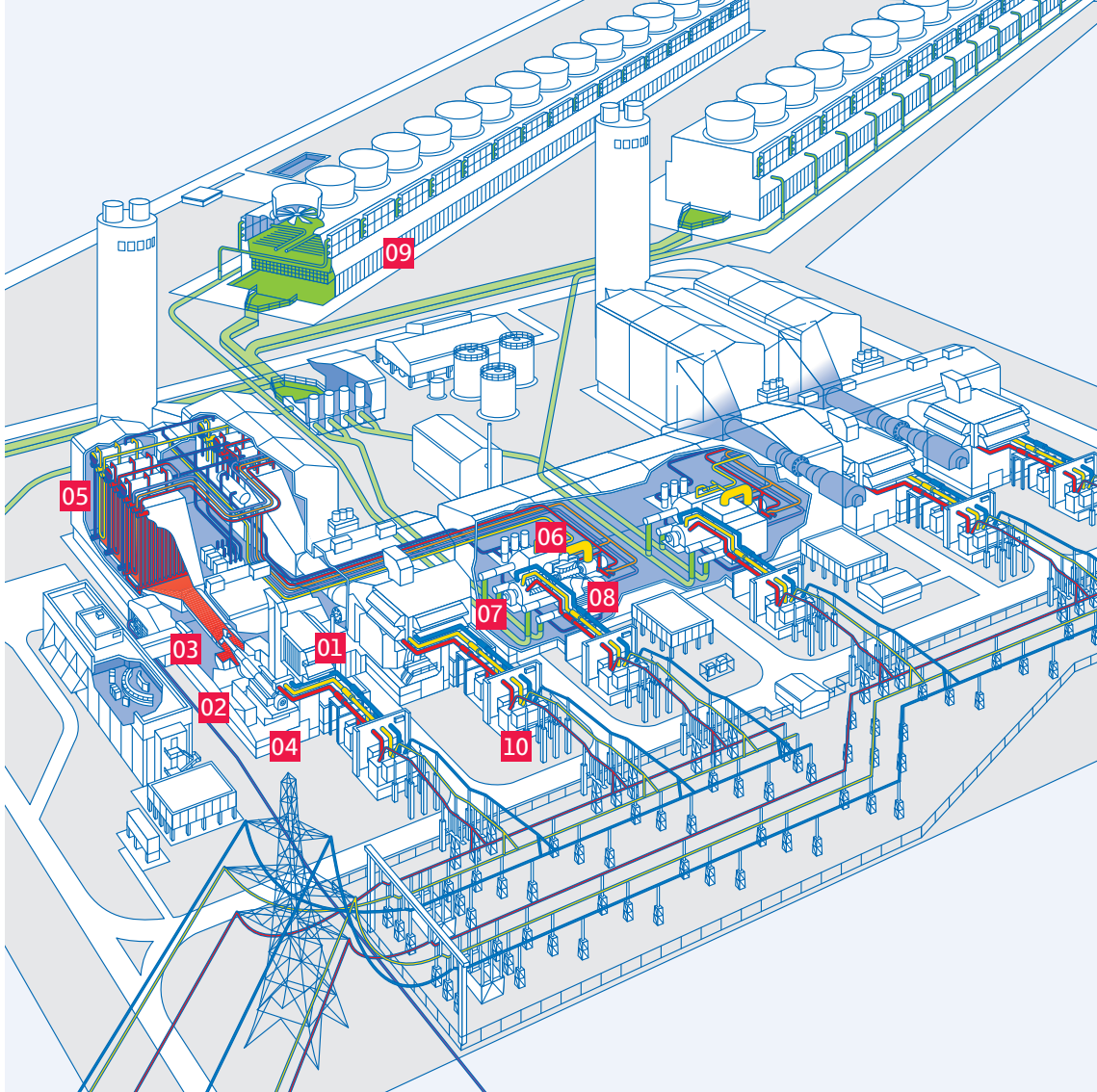
07 Steam turbine generator
The turbine shaft turns the generator rotor to produce 230MW of electricity.

08 Condenser
The spent steam from the turbine exhaust goes to the condenser, where it passes over tubes containing cold water drawn from the River Thames. The condensate is pumped to the feedwater storage tank and then back to the HRSGs and used again in a continuous cycle.

09 Cooling towers
Warmed river water from the condenser passes to 31 low-level cooling towers. The river water passes through side radiators, cascades through plastic packing, and is cooled by a stream of cold air. The air is drawn in by low-noise fans, which are set in the top of the cooling towers.

The towers are specially designed to minimise the frequency of visible plumes of water vapour, normally associated with traditional cooling towers, and they are plume free for most of the year.

10 Generator transformer
Electricity from the three generators on each module is produced at a voltage of 15,750 volts. This is stepped up to 400,000 volts in the generator transformer, before the electricity is passed to the National Grid Company's substation on the Didcot A site for transmission around the country.



Great Crested Newt – a protected species carefully moved to a new home on the Didcot site.

Caring for the community and the environment

Didcot A and B power stations play a major role in the local community. Rather than downplay our presence, we aim to work in harmony with our neighbours, and we meet regularly with representatives from Didcot and surrounding villages to consider the views of local people.

We have valued links with local authorities and educational establishments. We sponsor a number of local educational projects and environmental initiatives. We also support a wide range of community groups and charities through our charitable giving programme and employee volunteer scheme.

We offer guided tours of the site to interested parties, to foster a greater understanding of the power generation process and our care for the environment.

Didcot A has always been at the forefront in recognising the importance of environmental care. A Field Study Centre and Nature Reserve were established on an area to the west of the site. This natural habitat for wild plants, birds and animals is visited by thousands of schoolchildren each year.

Conservation work is continuing by the protection of wild orchids that have a special place in the ecology of the Didcot site. A colony of the protected Great Crested Newt was relocated from the Didcot B site to the Nature Reserve prior to the construction of Didcot B.

Landscaping included the preservation of as many existing trees as possible. A substantial programme of planting has been undertaken on both sites, with some 30,000 trees and shrubs being planted to date at Didcot B.

The high efficiency of Didcot B power station, together with the composition of the natural gas fuel, results in the station having minimal environmental impact.

Compared with an equivalent-sized, coal-fired power station, Didcot B produces virtually no emissions of sulphur dioxide, half the carbon dioxide and less than a fifth of the amounts of oxides of nitrogen.

At Didcot A, major improvements have been made by the installation of low NOx burners, the capability to burn gas on three of the four generating units, and a £20 million investment project in dust capture efficiency.

While Didcot A is less efficient than Didcot B, it plays a vital part in balancing demand for electricity throughout the day.

Great care is taken to limit the environmental impact of both stations. We endeavour to keep noise and nuisance to a minimum. Extensive monitoring is carried out of site noise levels, emissions to the atmosphere, and discharges of cooling water into the River Thames.

Both A and B stations operate under licences granted by the Environment Agency and operating conditions agreed with the local authority. The environmental record of both stations is open to public scrutiny through the publication of independently-verified, annual Environmental Performance Reviews.

Environmental management systems at Didcot A and B are certified to international standard ISO 14001.

Field study centre at Sutton Courtenay.