



ABERTHAW POWER STATION



An **RWE** company

FLEXIBLE POWER FROM COAL

Aberthaw is a coal-fired power station, owned and operated by RWE npower. The station began full operation in 1971 and is located to the west of Cardiff, in the Vale of Glamorgan, on the north bank of the Bristol Channel. It can generate 1,500MW of electricity for the National Grid system. This is enough power to meet the needs of some 1.5 million people – equivalent to the total population of five cities the size of Cardiff.

We aim to maintain Aberthaw Power Station as one of the most efficient coal-fired power stations and recently completed a £230 million environmental upgrade.

RWE npower, part of the RWE Group, is a leading integrated UK energy company. We operate and manage a diverse portfolio of flexible coal-, oil-, biomass- and gas-fired power stations, with the capacity to produce over 11,000MW of electricity.

npower, one of the UK's leading energy suppliers, serves around 6.5 million residential and business customers.

We are also committed to developing innovative products which allow our customers to improve their energy efficiency and make sustainable energy choices.

RWE npower renewables is the UK subsidiary of RWE Innogy and is one of the UK's leading renewable energy developers and operators, committed to developing and operating wind farms and hydro plant to produce sustainable electricity. Our current operational wind farms have a combined capacity of over 500MW, with many other projects at various stages of development.

NPOWER BRIGHTER FUTURES

The aim of our npower Brighter Futures programme is to inspire young people, from their first day at school to their first day at work. We develop their skills and knowledge to help make their own choices, and empower them to reach their vision of a 'brighter future' for themselves and for the environment.

npower Brighter Futures brings together npower's education programmes – from primary schools through to universities. This includes our Power Technician Traineeship and Graduate recruitment schemes.

Our programmes focus on environmental education – energy generation, energy efficiency, climate change and sustainability – and includes our award winning npower Climate Cops programme.

We are committed to increasing the pool of Science, Technology, Engineering and Maths talent and meeting the recruitment challenges we face in the energy industry. To find out more about our education commitment and initiatives visit www.npower.com/education. Young children can visit www.npower.com/climatecops to play our interactive energy saving games.



CARING FOR THE COMMUNITY AND THE ENVIRONMENT



Through links maintained with local authorities, conservation groups and educational establishments, Aberthaw Power Station plays an active role in the community.

We support local educational initiatives, environmental projects, and encourage visits to our new ACE² centre from schools and other groups across South Wales. We also support a number of local junior sports clubs.

We work closely with our local stakeholders. Through our Local Liaison Committee, which brings together representatives from Gileston, St. Athan, East Aberthaw, Fonnon and Rhoose, we ensure an open dialogue with the communities close to our operations.

Our ongoing aim is to maintain Aberthaw as one of the most efficient coal-fired power stations in the UK. We have invested in Flue Gas Desulphurisation plant and equipment to reduce our sulphur dioxide emissions by 95%. We are also able to co-fire using carbon neutral biomass fuels such as sawdust and woodchips, producing up to 55MW of power that would otherwise have been generated using coal.

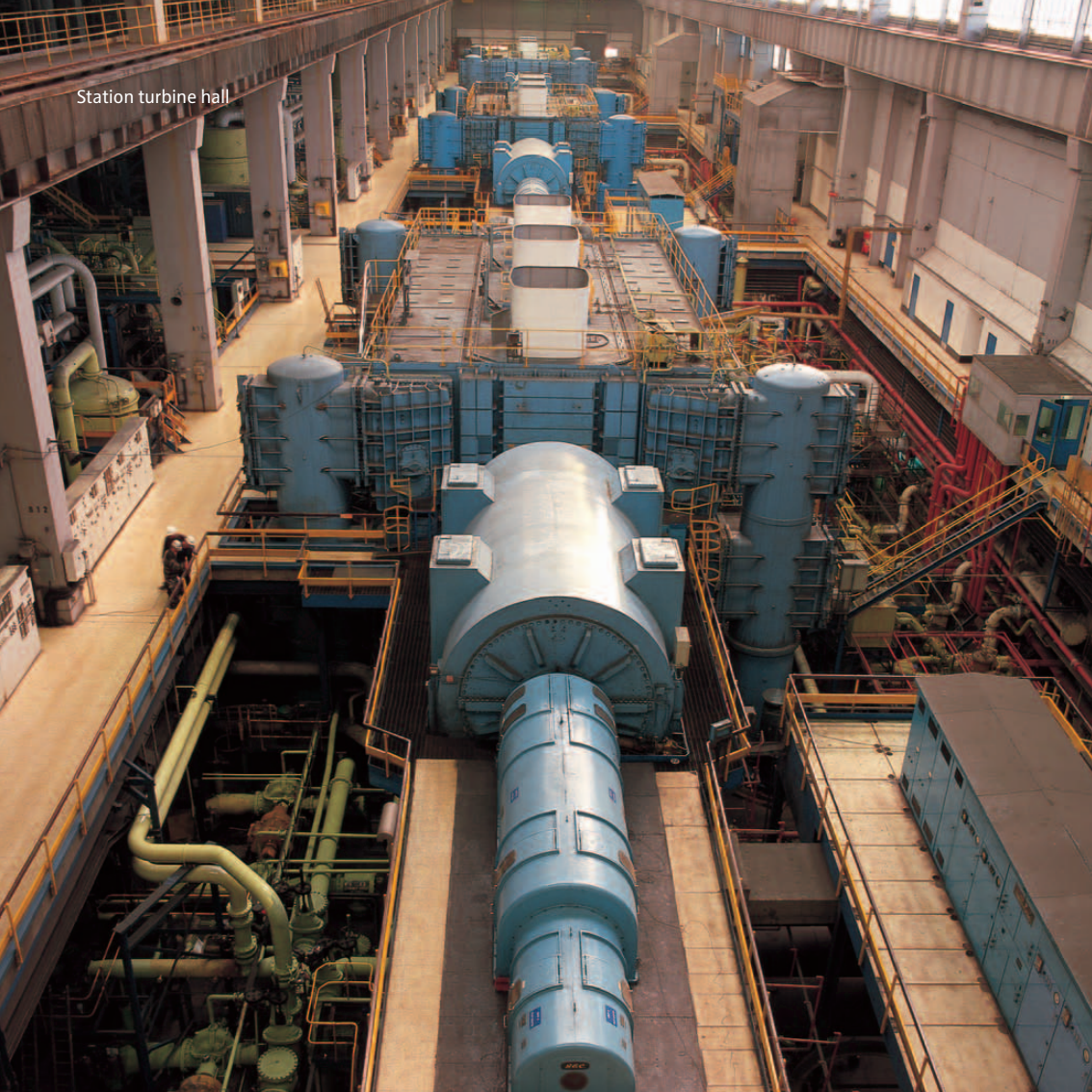
In January 2011 our new £1 million education centre was officially opened by the First Minister of Wales. The Aberthaw Centre for Energy and Environment (ACE²) provides an important new facility for schools, colleges and community groups throughout South Wales. ACE² will deliver interactive educational programmes, building on the work of RWE npower's Climate Cops programmes.

ACE² is partly powered by renewable energy and was built using sustainable and recycled sources. Keep Wales Tidy, who run the region's Eco-Schools programme, deliver stimulating sessions at the centre, linked to the National Curriculum.

Salt marshes on the Aberthaw site are home to a wide variety of wildlife



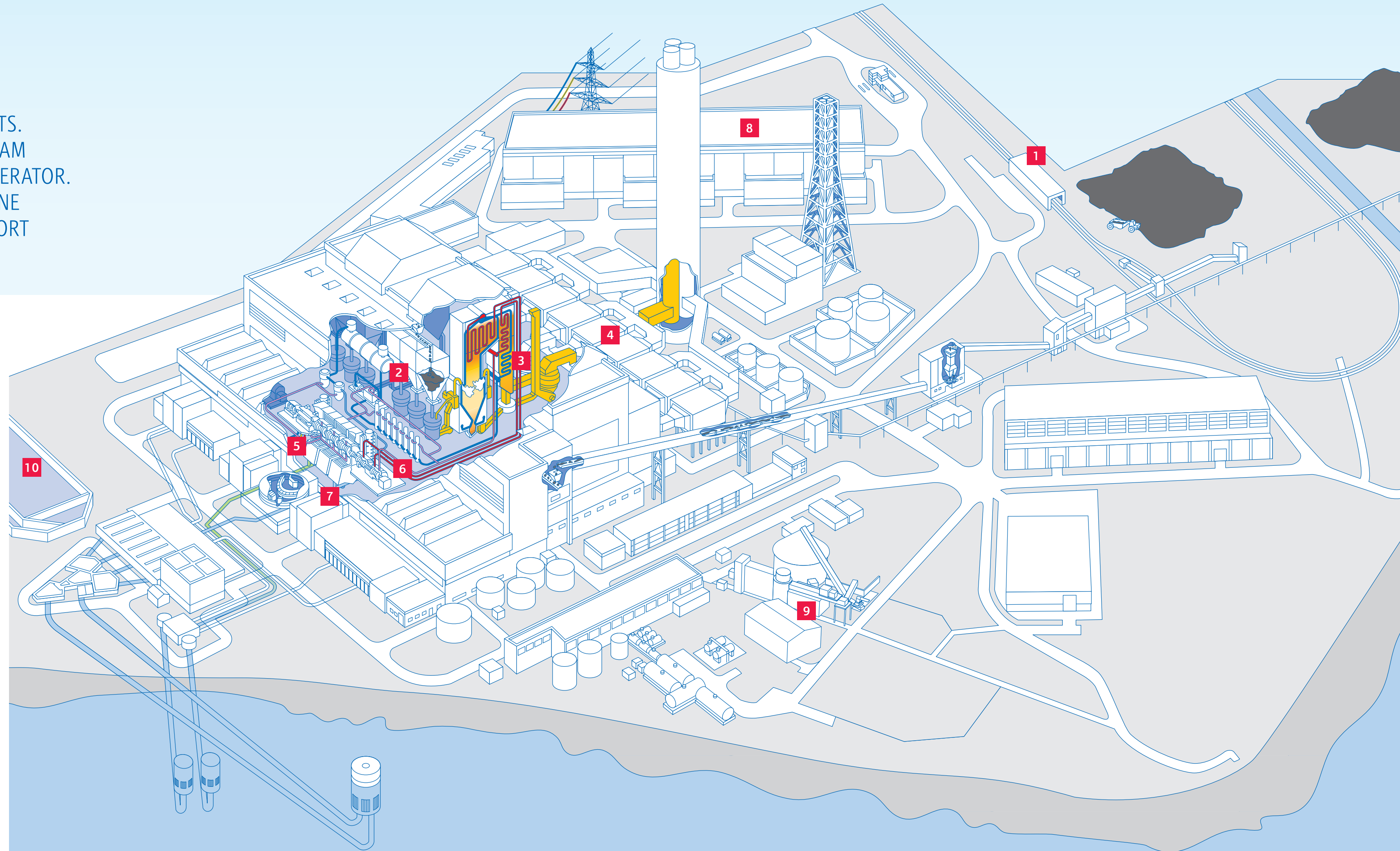
Station turbine hall



Coal scraper used to compact
and reclaim coal from the
station stockpile



ABERTHAW HAS THREE TURBINE GENERATING UNITS. EACH UNIT CONSISTS OF A BOILER SUPPLYING STEAM TO A TURBINE THAT POWERS AN ASSOCIATED GENERATOR. IN ADDITION, THE STATION HAS THREE GAS TURBINE UNITS CAPABLE OF PROVIDING ADDITIONAL SUPPORT TO THE NATIONAL GRID SYSTEM WHEN REQUIRED.



1 Coal supply

The station was designed to burn semi-anthracitic, low-volatile local coal. Coal is also delivered to the station by rail from the coal terminal at Bristol. It is unloaded and conveyed directly to the station or to the stockpile.

2 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.

3 Boiler

The heat produced converts water into steam in the tubes that line the boiler. For greater efficiency, the steam passes through the boiler twice. When it leaves the boiler, the steam is at 165 times atmospheric pressure and a temperature of 565°C.

4 Electrostatic precipitator

Fine dust, produced by burning pulverised coal, is removed from the boiler gases by equipment called electrostatic precipitators, before passing up the chimney. Coarser ash falls to the bottom of the boiler and is piped to settling pits. The ash and dust is sold for construction purposes and civil engineering projects. Some of the fine ash is disposed of at our on-site facility.

5 Turbine

The steam from the boiler passes through the blades of the turbine's high pressure stage, turning the blades and turbine shaft at 3,000 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.

6 Generator

Inside the generator, the rotor – an electromagnet – turns inside the stator (made up of copper bars) and creates an electric current. Each turbine generator has an output of 500MW of electricity.

7 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 Bristol Channel. The condensate is pumped back to the boiler for re-use and the cooling water returned to the sea. Further cooling water is drawn from the sea for use in the condenser when required.

8 Generator transformer

Electricity from the generator is produced at a voltage of 22,000 volts. For transmission along the National Grid system, the voltage is increased to 275,000 volts in the generator transformer.

9 Biomass storage and processing plant

The biomass is delivered to site in several forms, sawdust for Unit 7, wood chip and logs for Units 8 and 9. The boilers require the biomass as a fine particle in order to optimise the combustion process. Sawdust is suitable to be sent direct to unit 7 from the storage area without further processing. The logs are chipped and combined with delivered wood chip before being converted into sawdust by hammer mills and transferred to the boilers. This plant also facilitates storage areas to cater for the variation in demand and deliveries. Approximately 30,000 tonnes of biomass can be stored on site.

10 FGD seawater conditioning plant

10% of the sea water used for cooling in the turbine condensers is utilised in the FGD absorbers, to remove the sulphur dioxide from the flue gas before it is released into the atmosphere. The sulphur dioxide is absorbed into the water, and in a steady neutralisation process converted into a mixture of sulphates which are naturally occurring salts already present in huge concentrations in sea water. The final section of this neutralisation process occurs in a large aeration basin. It involves re-combining with the remaining 90% of the turbine cooling water, and bubbling oxygen through these waters, before being discharged into the Bristol Channel.

HOW TO FIND US

Aberthaw Power Station is just off the B4265, about three kilometres to the west of Cardiff Airport.

From Cardiff

Take the M4, leaving at junction 33. Follow the A4232, signposted Cardiff, then the A4050 and A4226 towards Cardiff Airport. Just before the airport take the B4265 towards Llantwit Major. The access road to the power station is a signposted left-turn, near the village of St Athan.

From West Wales

From the A48 take the B4265 towards Llantwit Major and continue towards Cardiff Airport and Barry. The access road to the power station is a signposted right-turn, past the village of St Athan.

ACE² training facility

To discuss or arrange a visit to our educational facility, ACE², please email aberthaw@rwenpower.com or contact us using the details below.



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