



COCKENZIE POWER STATION SITE INFORMATION



OVERVIEW

Cockenzie Power Station is a coal-fired generating plant situated at Prestonpans in East Lothian, on the south shore of the Firth of Forth.

The station, with its landmark twin chimneys each 149 metres tall, has an installed capacity of 1,200 megawatts (MW)

comprising four 300 MW units.

Opened in 1968, Cockenzie continues to play a vital strategic role in

securing the nation's energy supply by operating flexibly in the market to meet peak and seasonal demand for electricity.

INTRODUCTION TO COCKENZIE POWER STATION

Cockenzie Power Station has for more than 40 years played a vital role in securing the nation's energy supply.

The 1,200 MW plant, co-firing coal with a small quantity of renewable biomass materials, can generate enough electricity for 500,000 homes.

The station building occupies a 93-hectare site on the south shore of the Forth Estuary. Its fuel-handling plant is located nearby, while ash produced as part of the combustion process is piped to settling lagoons at Musselburgh.

Redundant lagoons have been handed over to East Lothian Council who manage the area as a special amenity for the public and wildlife.

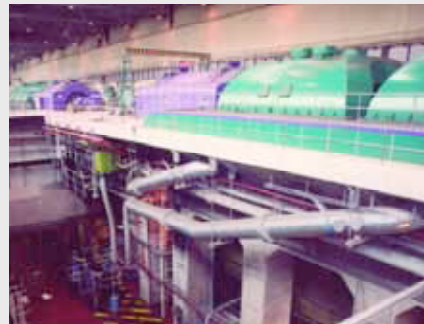
The station strives to be a good and trusted neighbour to residents in Port Seton, Cockenzie and Prestonpans, and meets local representatives at least four times a year to discuss operations.

Cockenzie is, however, nearing the end of its operational life and must close by the end of December 2015.

In 2009, ScottishPower started a series of community consultations over its proposals to redevelop the existing Cockenzie site as a new, highly-efficient Combined Cycle Gas Turbine (CCGT) power station.



■ Cockenzie Power Station seen from the Forth Estuary (above, by Craig Yorkston) and from the air (below left) and, below right, the generating site's immense turbine hall



WE'RE COMMITTED TO REDUCING OUR ENVIRONMENTAL IMPACT

Cockenzie Power Station is committed to reducing its environmental impact – including emissions to air, waste to landfill and use of natural resources.

Although the station is more than 40 years old, ScottishPower is continuing to invest in solutions to improve Cockenzie's efficiency and environmental performance.

The station operates subject to conditions contained in Pollution Prevention Control (PPC) permits issued and enforced by the Scottish Environment Protection Agency (SEPA).

Combustion of fossil fuels, such as coal, results in the release of carbon dioxide (CO₂), a greenhouse gas that is linked with long-term climate change.

Cockenzie is reducing its carbon impact by improving its thermal efficiency and offsetting up to 5% of the amount of coal consumed by co-firing carbon-neutral biomass fuels, such as wood pellets and sunflower husks.

Other emissions to air include sulphur dioxide (SO₂), oxides of nitrogen (NO_x) and dust. A sulphur trioxide (SO₃) injection plant enables Cockenzie to burn coal with a low sulphur content while minimising dust emissions.

A Boosted Over Fire Air (BOFA)



■ The station's control room

system was commissioned on all four units at Cockenzie in 2009 and is achieving a reduction in NO_x emissions of between 20% and 25%.

Other site environmental initiatives include setting annual targets for waste reduction, recycling and reducing on-site water use and energy consumption.

Most of the ash produced by the station is recycled by ScotAsh, our joint venture with Lafarge Cement, who use the ash to manufacture sustainable construction products.

Cockenzie operates an Environmental Management System, which is certified to the international standard, ISO 14001, and also operates a site biodiversity action plan (BAP).

CONTACT US

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COCKENZIE POWER STATION SITE INFORMATION

Cockenzie burns coal and biomass products sourced from throughout the world then delivered to the station by ship, road and rail.

① Coal is delivered to the station stock yard, which can hold around 900,000 tonnes, while biomass arrives at a handling facility before being fed in to the coal stream on a conveyor system.

② The fuel mix passes into ball mills where it is pulverised to fine powder and mixed with preheated air. It is then blown to the furnaces where it is burned at very high temperatures to heat the boilers.

③ The boilers contain a large number of tubes filled with townswater that has been purified in the station's water treatment plant.

As the very hot gases from combustion of the coal pass over the boiler tubes, the water boils to form steam.

④ The steam is "super heated" to 556°C then piped to the high pressure cylinders of the turbines. The force of the steam striking the turbine blades causes the turbine shaft to spin at 3,000 revolutions per minute within the tightly-fixed coils of the stator, creating electricity.

The steam is returned for reheating, then directed to the intermediate pressure and then the low pressure cylinders of the turbine.

⑤ Afterwards the steam is condensed back into water using cooling water from the Firth of Forth – up to 136,000 cubic metres (30 million gallons) every hour.

HOW IT WORKS

⑥ This cooling water is later discharged back to the Forth Estuary.

⑦ Generating electricity from coal produces a significant amount of ash, dust and other emissions to air.

An SO₃ injection plant enables the station to burn low-sulphur coal while minimising dust, and electrostatic precipitators capture particles from the flue gases to prevent them reaching the atmosphere.

⑧ Two types of ash are produced – pulverised fuel ash (PFA) is captured in the electrostatic precipitators and the heavier furnace bottom ash (FBA) which collects at the bottom of the boiler.

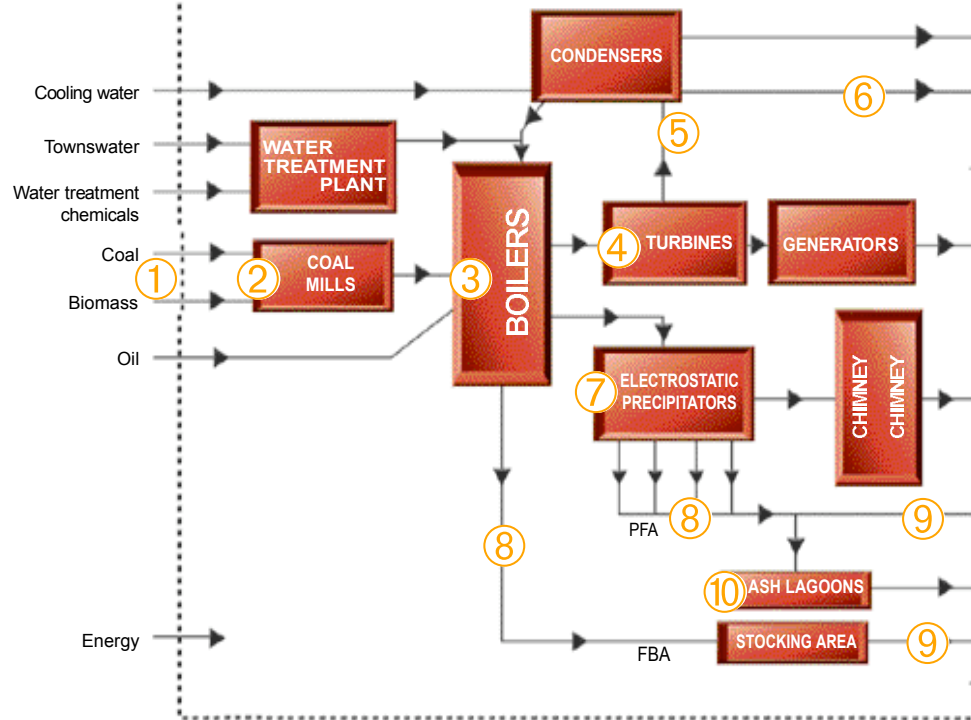
⑨ Much of the ash produced at Cockenzie is recycled by ScotAsh, ScottishPower's venture with Lafarge Cement UK, for use in construction and products like grout and cement.

⑩ The rest of the ash is transferred to storage lagoons at Musselburgh.



■ Stack emissions testing

>> INPUTS



>> OUTPUTS

Discharges to water
Cooling water
Waste
Electricity generated
Emissions to air – CO₂, SO₂, NO_x and dust
Ash recycling via ScotAsh
Discharges to Firth of Forth
Ash recycling via ScotAsh
Potential fugitive dust emissions

Cockenzie commissioned new abatement measures in 2009 to reduce emissions of oxides of nitrogen (NO_x).

All four units are now equipped with Boosted Over-Fire Air (BOFA) technology that is reducing the station's NO_x emissions by about 25%.

BOFA reduces the amount of thermal NO_x formed during combustion by improving the mixture of fuel and air.

The technology is performing to design, achieving a NO_x reduction from 650mg/Nm³ to a value of below 500mg/Nm³, and contributed to a reduction in NO_x emissions per GWh in 2009.

BOFA will help ensure

ENVIRONMENTAL PERFORMANCE HIGHLIGHTS 2009

Cockenzie remains within its NO_x bubble set by the LCPD until the end of 2015 when the station is due to close.

Cockenzie's environmental performance and management came under increased scrutiny during 2009 as part of SEPA's Compliance Assessment Scheme (CAS).

The scheme is a more rigorous method of assessing an operator's compliance with Pollution Prevention and Control (PPC) permits and other authorisations and licences.

The CAS end-of-year rating for Cockenzie was "good" while the

rating for Musselburgh Lagoons was "excellent".

There were 12 incidents and 40 community complaints, mostly as a result of dust flakes escaping to the atmosphere from Cockenzie's stacks.

Staff and contractors are working to remedy this issue and in 2009, the station's east stack and ductwork were cleaned to help reduce the likelihood of dust flakes arising.

A trial was also carried out of a fuel oil additive that will improve combustion during start-up and shut-down operations to reduce soot deposits. Although an

improvement has been noted, further work will be carried out.

Other works in 2009 included:
● Inspections of noise monitors have been carried out and plans are in place for their upgrade
● A management plan for Musselburgh Ash Lagoons was produced and submitted to SEPA

● Weekly checks have been carried out of the site's oil management equipment
● Work continued to optimise the dust suppression system at the coal plant to minimise fugitive dust emissions.