



LONGANNET POWER STATION SITE INFORMATION



OVERVIEW

Longannet Power Station, with its landmark 183-metre chimney, is the second largest coal-fired power plant in the UK. The station,

which has an installed capacity of 2,400 MW generated from four 600 MW units, has played an important role in meeting

Scotland's energy needs since it opened in 1972.

ScottishPower Energy Wholesale is fitting new abatement measures to

ensure Longannet will meet tightening emissions limits and investigating new technologies that could extend the station's life.

INTRODUCTION TO LONGANNET POWER STATION

Longannet Power Station occupies a 89-hectare site on the north shore of the Firth of Forth near Kincardine, Fife.

It is the largest generator in Scotland – with capacity to power two million households – and is critical to the security of the nation's energy supply.

Although principally a coal-fired station, Longannet co-fires biomass fuels – such as wood pellets – and combustion can be supported by firing natural gas.

In 2009, Longannet burned 3,171 tonnes of coal and 64 tonnes of biomass – resulting in the supply of 8,260 GWh of electricity.

Ash produced as a byproduct of the combustion process is recycled on site for use in construction products or piped to storage lagoons at Low Valleyfield.

The station operates an Environmental Management System (EMS) that is accredited to the international standard, ISO 14001.

Its EMS has also been verified as meeting the requirements of the European Union Eco-Management and Audit Scheme (EMAS) and the station produces an EMAS statement each year to inform stakeholders about aspects of the site's environmental performance.

CONTACT US

Longannet Power Station

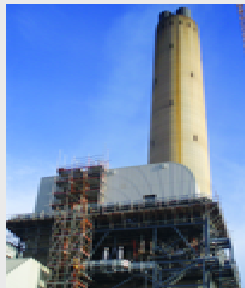
Kincardine on Forth,
Fife, FK10 4AA

telephone: 01259 730631

web: www.spenergywholesale.com



■ *Monitoring stack emissions in the control room*



■ *FGD absorber tower during its construction*

A PART OF THE COMMUNITY

Longannet operates at the heart of the West Fife community and strives to be a good and trusted neighbour by aiming for zero community complaints and keeping people informed about site operations.

To this end Longannet staff attend meetings of Kincardine Community Council and Valleyfield Liaison Committee to respond to any environmental issues.

The station is active in raising and distributing funds for good causes and operates a biodiversity action plan to manage its landholdings to benefit wildlife.

REDUCING OUR ENVIRONMENTAL IMPACT

Longannet 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 approaching 40 years old, ScottishPower is investing in solutions to extend Longannet's lifespan and promote improved efficiency and environmental performance.

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

In 2009, a new abatement system was commissioned on all four units to reduce emissions of oxides of nitrogen (NO_x).

Boosted Over Fire Air (BOFA) will cut emissions of NO_x by up to 25% by reducing the amount of thermal NO_x formed during coal combustion.

Meanwhile, in 2010, the station will commission Flue Gas Desulphurisation (FGD) on two of its units to cut emissions of sulphur dioxide (SO₂) by up to 94%. The system will use the alkaline properties of seawater from the Forth Estuary to absorb and neutralise acidic SO₂ from the flue gases, resulting in a harmless soluble sulphate (SO₄) that can be discharged back to the Firth of Forth.

Combustion of fossil fuels, such as coal, also results in the release of the greenhouse gas carbon dioxide (CO₂).

Longannet 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-



■ *The MTU at its launch at Longannet*

neutral biomass fuels.

In future, Longannet has ambitions to become a centre of excellence for carbon capture and storage (CCS).

ScottishPower is leading a consortium that is bidding to secure part-funding from the UK Government to build the UK's first, commercial-scale CCS demonstration project at Longannet.

To support the bid, a prototype mobile test unit (MTU) began in 2009 to capture a small percentage of CO₂ emissions from the station's flue gases – the first time this has been done in the UK.

The MTU is enabling ScottishPower to test the complex chemistry involved in carbon capture. It is hoped a commercial-scale CCS plant can be operational at Longannet in 2014.

The station is also looking at fitting Selective Catalytic Reduction (SCR), a further method of reducing NO_x emissions that would meet future emission limits and potentially extend the station's working life by 30 years.

LONGANNET POWER STATION SITE INFORMATION

Coal for Longannet is either shipped to Hunterston on the Clyde coast and delivered by rail or locally-sourced coal can be delivered by lorry.

Once at Longannet, up to two million tonnes of coal can be stored in the coal store area.

If required, the coal can be co-fired along with biomass products, such as wood pellets.

1 The coal is transferred to bunkers in the boiler house by a 1.5 kilometre long conveyor system.

2 Roller mills pulverise the coal to a fine powder, before it is mixed with preheated air, blown into the furnaces and burned at very high temperatures.

3 Each boiler is made up of a large number of water-filled tubes. As the hot gases from the coal combustion pass over the tubes, the water inside boils to form steam.

4 The steam – up to 1,800 tonnes an hour per boiler – is “super heated” to 568°C before being piped to the high pressure cylinders of the turbines. The force of the steam striking the turbine blades causes the turbine shaft and attached generator rotor to spin at around 3,000 rpm.

The turning of the rotor within the tightly-fixed coils of the generator stator creates electricity.

5 Water for steam generation comes from the townwater supply and is purified using a strictly-controlled amount of chemicals.

6 Steam leaving the turbines is converted back to water in the condensers then re-circulated back to the boilers.

7 The condensers use cooling water extracted

HOW IT WORKS

from the Firth of Forth – up to 327,000 cubic metres of seawater is required per hour.

8 This cooling water is later discharged back to the Firth of Forth.

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

10 Electrostatic precipitators capture dust particles from the flue gases to prevent them reaching the atmosphere.

Our new BOFA system is reducing NO_x emissions and, from 2010, FGD will begin to scrub emissions of SO₂.

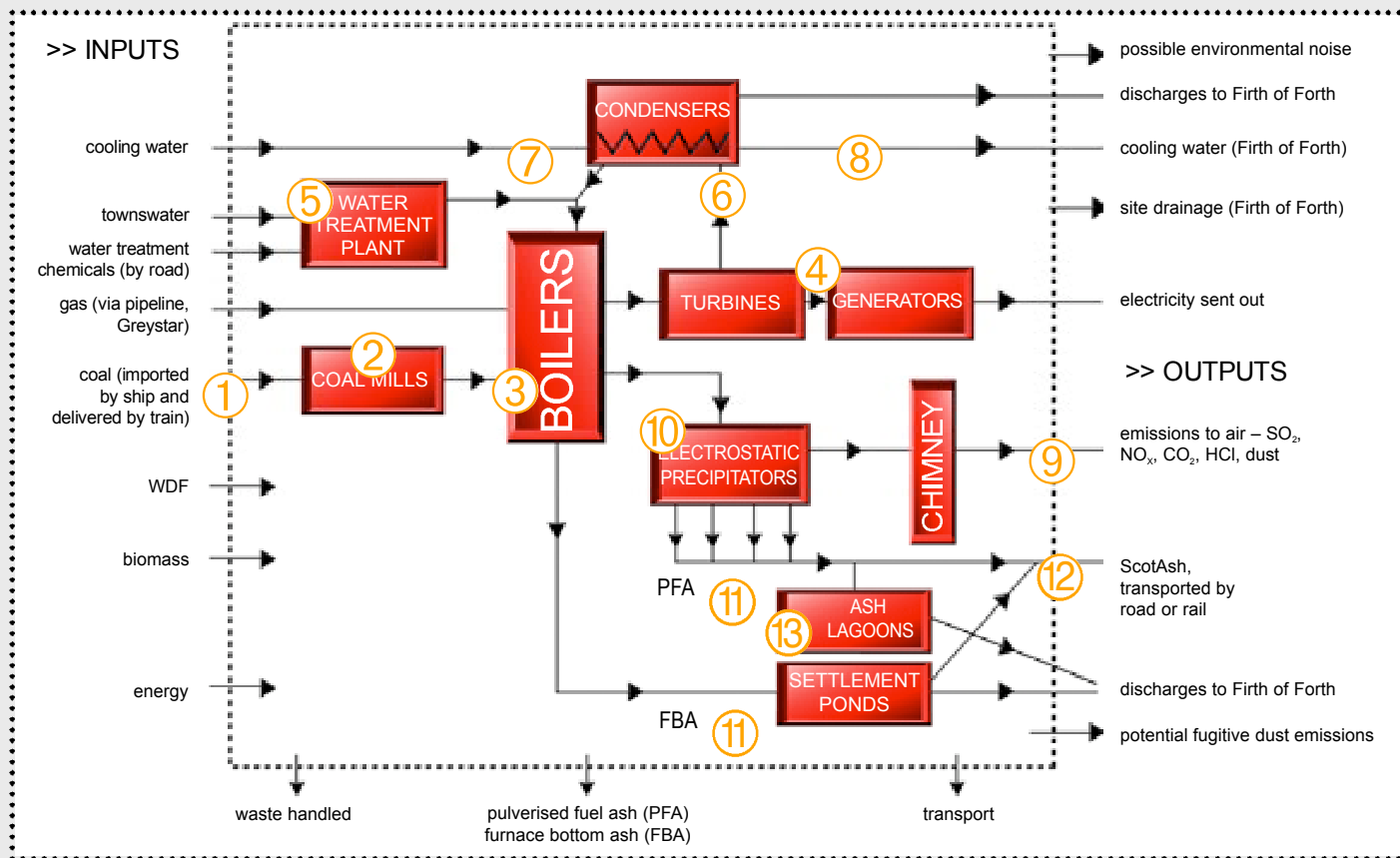
11 Two types of ash are produced – pulverised fuel ash (PFA) is captured in the electrostatic precipitators and the heavier furnace bottom ash (FBA) which collects at the bottom of the boiler.

12 Much of the ash produced at Longannet is re-used to make construction products by Longannet-based ScotAsh.

13 The rest of the ash is transferred to storage lagoons at Valleyfield.



■ We increased the amount of waste recycled in 2009 to 58%



ENVIRONMENTAL PERFORMANCE HIGHLIGHTS 2009

Longannet’s environmental performance and management came under increased scrutiny during 2009 as SEPA introduced its 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 compliance rating for Longannet Power Station was “good” while the rating for Valleyfield Lagoons

was “excellent”. SEPA consider both sites as having a “high performance” of environmental management.

There were four minor incidents in 2009 – two smoke escapes from fires, a small leak of oily water to the Firth of Forth and a release of seawater and fire hydrant water.

There were four justified community complaints in 2009 – one less than in 2008. All were fully investigated and feedback given to the complainant.

Environmental achievements

during the year included:

- A new economiser was fitted to Unit 4 during an upgrade in 2009 to improve boiler efficiency. This helped reduce the station’s controllable losses to 4.6% against a 2009 target of 5.5%.
- A new high pressure turbine rotor with redesigned blades that ensure more efficient use of the steam energy was fitted to Unit 1, improving efficiency from 86% to more than 92% – making better use of each tonne of coal.
- Efforts continue to improve thermal efficiency by preventing

air ingress to the combustion cycle.

- Investment in new equipment for the refurbished coal exchange hopper, such as gravimetric feeders and paddle feeders, is improving combustion controls and compliance while new dust suppression was installed.
- Improved waste segregation facilities across the site resulted in 58.5% of all Longannet’s waste being sent for recycling, including 1,500 tonnes of steel following an upgrade of Unit 4.