West Burton B CCGT Power Station

ENVIRONMENTAL STATEMENT 2017

EMAS
Validated Information
UK-000196

Welcome to the Environmental Statement for West Burton B CCGT Power Station

1. FROM THE STATION MANAGER

Welcome to the Environmental Statement for West Burton B Combined Cycle Gas Turbine (CCGT) Power Station. This has been prepared to inform our neighbours, visitors and other interested parties about our environmental performance during 2017, our fourth full year of operation.

West Burton B CCGT Power Station has been in commercial operation since August 2013 and is operated and maintained by EDF Energy Plc. Approximately 1,300 megawatts (MW) of electricity can be generated for use via the UK national transmission system, enough to meet the needs of 1.5 million homes (the equivalent of a city the size of Sheffield). This is one of a new generation of highly efficient, natural gas burning power stations using the latest CCGT technology. CCGT power stations are more efficient than conventional power stations as they make double use of the heat produced, first in gas turbine engines then, with the waste exhaust heat, by raising steam to power steam turbines. Both the gas and steam turbines rotate generators to produce electricity. The high efficiency achieved means less of the fossil fuel is consumed and lower levels of emissions are produced for every unit of electricity generated.

2017 has been another year to be proud of. Overall our environmental performance continued strongly throughout the year which included essential maintenance outages and the construction of Europe's largest Battery Energy Storage System developed to expand and diversify the electricity supply options provided on the site. CCGT was successful in winning two EDF Energy performance awards: the CGR Fleet Overall Performance Award and the Operational Availability Award for 2017.

We are committed to the continuing development and implementation of world-class environmental management practices and will continue to ensure that the environment and safety go "hand in glove" and be seen with equal importance.

At West Burton B CCGT Power Station, the Environmental Management System (EMS) is a key part of our Integrated Business Management System which is certified to internationally recognised standards.

These systems provide the foundation for this Environmental Statement, which complies with the requirements of the European Union's Eco-Management and Audit Scheme (EMAS) Regulation.

This information in this report is independently verified against the requirements of the EMAS Regulation and we update the data presented annually.

Tilly Spencer Head of Gas Operations

If you would like any further information regarding our environmental performance, or if you have any comments to make on our Environmental Statement, please contact us (details on p16) and we will do our best to help.

2. ENVIRONMENTAL POLICY

Our Environmental Policy relates to West Burton B Combined Cycle Gas Turbine (CCGT) Power Station, operated by EDF Energy PLC. This Policy is communicated to all staff and contractors and is made available to members of the public, on request. The policy was last issued in December 2017 and is reviewed annually.

We are committed to achieving the best possible environmental performance. This is important to everyone who works at West Burton B CCGT Power Station. Care and concern for the environment by preventing pollution is a permanent commitment by all staff and contractors for the sake of present and future generations.

To achieve this we will:

- Comply with all applicable legal requirements and other obligations which relate to our environmental activities;
- Seek effective working partnerships with relevant authorities and other interested parties;
- Engage with staff and contractors in a transparent way so as to maintain trust in working relationships concerning environmental matters;
- Protect the environment wherever reasonably practicable by seeking to reduce the impact of our activities on the environment and by adopting appropriate environmental management practices;
- Use resources and energy efficiently in a sustainable way through integrating environmental, social and economic factors into business plans whenever practicable so that we:
  - plan to maintain and where reasonably practicable improve on the efficiency of the plant by the purchase and use of energy-efficient products, services and process designs;
  - minimise the use of raw materials and of any subsequent waste arising by adopting avoidance, minimisation, re-use and recycling initiatives;
  - monitor emissions and any impacts arising from plant activities to assess performance and inform appropriate management and improvement;
- Pursue continual improvement of our environmental and energy performance and of our management system by including environmental action plans and measurable targets in our business planning arrangements;
- Maintain the integrated business management system to meet the requirements of the International Standard for Environmental Management Systems (ISO 14001) and for Energy Management Systems (ISO 50001) obtaining third party assurance and providing a framework for identifying risks and opportunities and for setting improvement objectives and targets;
- Ensure the availability of information and of necessary resources to achieve this policy, objectives and targets set out in the business plan.

3. ENVIRONMENTAL MANAGEMENT SYSTEM

Environmental management is an integral part of our business activities. It is one of eight key aspects of our business activities which also include: health and safety; people; asset management; finance and commercial; community; and quality.

The operation of the management system for West Burton B CCGT Power Station is independently certified according to the following standards:

- Occupational Health and Safety Assessment Series (OHSAS) 18001 Safety Management;
- International Standards Organisation (ISO) 14001 Environmental Management Systems;
- ISO 50001 Energy Management;
- ISO 55001 Asset Management;
- ISO 223001 Business Continuity;
- ISO 9001 Quality Management
- British Standards (BS) Publically Available Standard (PAS) 99 for Integrated Management systems.

Maintaining certification under these standards requires that the relevant management systems are subject to regular checking (auditing) by specialist accredited independent organisations. In 2017 annual surveillance auditing was undertaken against certification to the latest updated versions of the Environmental and Quality Management Standards published in 2015.

Our Integrated Business Management System (IBMS) considers:

- Legal and other requirements;
- The environmental aspect of all plant activities;
- The environmental characteristics of the site and surrounds;
- The views of interested parties including regulators (such as the Environment Agency and Bassetlaw District Council), of stakeholders and of local residents.

Responsibilities, accountabilities, and resources for implementing environmental policy and for improving environmental performance have been defined within the system.

The IBMS includes procedures for:

- The routine operation and maintenance of the Plant;
- 'Outage' activities (when the Plant is closed down for essential maintenance);
- Emergency situations;
- Communicating internally, with staff and contractors, and externally on all issues relating to environmental protection;
- Internal and external auditing and assessment of compliance against all identified legal and other requirements;
- Annual aspects review.

The annual CCGT business plan provides the means for identifying objectives and targets for continual improvement of environmental performance.

4. ENVIRONMENTAL ASPECT - CONSIDERATIONS AND IMPACTS

Environmental considerations have been key during the development and life of West Burton B CCGT Power Station. This includes the following:

- Site selection;
- Use of latest generating technology;
- Selection of a cooling system;
- Section 36 (Planning Permission) Application;
- Identification and management of the environmental aspects of significant activities;
- Consideration of protected species and biodiversity;
- The planned decommissioning of the plant after approximately 30 years of operation.

Environmental considerations associated with the long-term operation of West Burton B CCGT Power Station are described in Section 5 of this Environmental Statement.

4.1. Site Selection

The Power Station is sited on 187,000 square meters (18.7 Hectares or 21.5 acres) of land previously used for the disposal of pulverised fuel ash (PFA, the residue remaining from the combustion of coal) arising from the operation of the adjacent coal-fired power station. As such, the development of West Burton B CCGT has enabled the re-use and redevelopment of a so-called ‘brownfield’ site thus preserving other green field (undeveloped) land and it has been possible to make use of the existing infrastructure for the export of electricity. This has avoided the need to construct new overhead transmission lines.

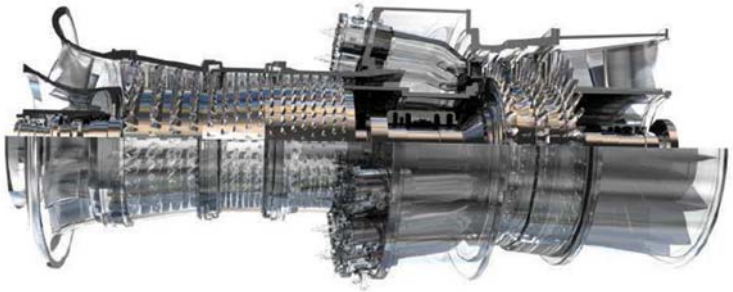
Natural gas is delivered by a buried gas pipeline connection, approximately 19 km in length, which is owned and operated by the station.

By locating the Power Station adjacent to the River Trent, it is possible to use this water resource for satisfying all of the process water needs of the plant. Water abstracted under licence is used primarily for cooling purposes and for the closed loop boiler water-steam cycle systems.

Site pre-development

4.2. Use of Latest Generating Technology

The Power Station comprises three electricity generating units of identical design. The principle feature of each of the three generating units are the modern technology gas turbine supplied by General Electric (GE). The '9FB' gas turbines are controlled by a computerised Dry Low NOx system which ensures that fuel gas combustion is very efficient and the emissions of oxides of nitrogen (NOx) and carbon monoxide are minimised.



A Gas Turbine Engine

The heat from the gas turbine exhausts is recovered by individual Heat Recovery Steam Generators (HRSG) to produce steam which is used to drive steam turbine generators. Spent steam leaving the steam turbines is condensed under vacuum in a water cooled condenser and the water is recycled back to the Heat Recovery Steam Generators (HRSGs) to produce more steam. The HRSG operate with three water-steam circuits – Low Pressure (LP) at 4.4 bar(g) and 270 °C Intermediate Pressure (IP) at 26 bar(g) 566°C and High Pressure (HP) at 128 bar(g) 566°C. An auxiliary boiler is available on site to provide start-up steam on the rare occasions that no other source is available for warming though the main systems.

4.3. Selection of a Cooling System

Condenser cooling systems are essential for efficient generation of electricity by the CCGT power plant. Potential cooling options included: Once-through or direct cooling, Indirect cooling involving the use of mechanical draught or hybrid cooling towers or Air cooled condenser.

The choice of cooling system has a significant impact on process efficiency and the environmental impact associated with the long-term operation of a power station.

Views of the Cooling Towers

A hybrid cooling tower was selected due to the relatively high efficiency of the process and the significantly smaller quantity of water abstracted and discharged compared with a once-through system.

4.4. Planning Application and Consents (Section 36)

Potential environmental issues associated with the siting, building and running of the Power Station were initially considered in 2006 as part of the application for consent for the development, as required under Section 36 of the *Electricity Act 1989*. The results of this process, known as Environmental Impact Assessment, were presented in an Environmental Statement which accompanied the planning application. The Environmental Impact Assessment considered a range of issues including air quality, land use; planning; socio-economic issues; water quality; ecology; visual and landscape issues; noise and vibration; traffic and transport and hydrology. Also considered were the significant aspects and impacts arising from operations and on the surrounding areas on completion of commissioning. Where potential environmental impacts were noted, measures were taken to either prevent the environmental effect from occurring or to reduce its significance where required to be implemented.

Power Stations are some of the most regulated industrial facilities in the UK. For example, West Burton B CCGT Power Station is operated according to limits and requirements specified by the Environment Agency in the Environmental Permit and Greenhouse Gas Emissions Permit and by conditions specified by Bassetlaw District Council in the Planning Permission for the plant. A list of the key consents for the plant is presented in the following table.

Table 1 Summary of Environmental Consents for West Burton B CCGT Power Station

Regulatory Body	Consent	Reference
Environment Agency	Environmental Permit	CP3035MK
Environment Agency	Greenhouse Gas Permit	UK-E-IN-11927
Environment Agency	Abstraction Licence	03/28/69/0070
Department of Trade and Industry	Section 36 Consent	GDBC/001/00255C
Department of Business, Enterprise and Regulatory Reform	Pipeline Construction Authorisation	30-10-2007
Natural England and English Heritage	Schedule 9 Statement	30-01-2014
Bassetlaw District Council	Planning Permission 49MW Battery Storage Facility	16/00954/FUL

In 2017 the environmental permit was varied for adaption to climate change. An additional limit for the temperature of water returned to the River Trent was introduced as the result of work on modelling the thermal plume of the discharge and ecological appraisal.

Measures have been adopted in the design of the Power Station to ensure that the long-term operation of the plant will not lead to a significant deterioration of the site land e.g. by the use of an engineered drainage system. Measures adopted during the build stage e.g. avoidance of underground storage tanks will minimise potential risks to the ground and ground water. To return the site to an appropriate condition after approximately 30 years

of operation (e.g. in 2043), a closure plan includes analysing soil and groundwater to assess conditions compared to that recorded prior to building the Installation. Eventually, the demolition plan is to remove all plant and structures back to ground level.

4.5. Significant Operational Environmental Aspects and Impacts

Assessment of our activities and our experience of power station construction, commissioning and operations has provided the basis for an on-going annual review, as part of the Environmental Management System. This has enabled us to identify significant impacts and provide a focus for environmental management and improvement.

The key environmental impacts associated with operating and maintaining the Plant are summarised below:

- Use of resources including natural gas, water from the River Trent, drinkable mains (potable) water and other materials such as water treatment chemicals, engineering and office supplies;
- Air emissions arising from the burning natural gas that releases carbon dioxide (a greenhouse gas, contributing to climate change) and nitrogen oxides (which relate to local air quality and the formation of acidic rain);
- Abstraction of water from, and discharges to, the River Trent for water treatment and cooling purposes
- Protection of land, ground and river water by avoiding leaks and spillage during the movement of chemical substances, oils and materials on site, by their proper storage and by maintenance of drainage interceptors.
- The use of transformers and switchgear.
- Production of small quantities of solid and liquid wastes, which are taken off-site for recycling, energy recovery or disposal at a landfill site.
- Planning considerations given to potential impacts which may arise in the case of unforeseen emergency.

4.6. Biodiversity and Protected Species

The potential for impacting on nature conservation as a result of power station activities is minimised at West Burton B CCGT as the Power Station is located on a brownfield site being previously of very limited nature conservation value. The CCGT site occupies 187,000 square meters (18.7 Hectares or 21.5 acres) of land which historically was used for the disposal of pulverised fuel ash (PFA, the residue remaining from the combustion of coal) from the operation of the adjacent coal-fired power station. There are no unbuilt areas of land available for wildlife habitat within the site security fencing. The site is occupied by buildings, plant, equipment roads, paths and areas covered with stones for technical, safety, storage and outage lay-down purposes.

Immediately outside of the site perimeter but within the area designated by the CCGT Environmental Permit there remains a small green area of only approximately 0.35 Hectares (<2% of the site area) which has been planted as a wildflower meadow. The final quantity of unused CCGT ground available to support a sustainable eco-structure is therefore so limited as to be a non-viable environmental management option. Consequently this core EMAS indicator is not relevant to the CCGT operations on the site.

The adjacent River Trent supports eels, a species protected under the requirements of the Eels (England and Wales) Regulations 2009. To minimise the potential for impacts on eels as a result of the abstraction of water from the river, the CCGT intake pipe is fitted with a ‘passive water intake screen’. Such screens are regarded as the best available technology for protecting juvenile and larval fish.

On site beekeeping

Two hives of honey bees are being maintained. These were originally donated to the site by a CCGT employee in 2016. The bees thrive on the local surrounding wild and other flowers. Honey tasting can be incorporated in the school visitor experience.

5. ENVIRONMENTAL PERFORMANCE

5.1. Control of Operations

Shift teams control plant operations continuously each day. Electricity is produced to satisfy commercial arrangements with the National Grid. This may involve 'two-shifting' that is starting and stopping electricity production each day, typically from 7am to 11pm or 'base loading' for continuous generation 24 hours a day when this is required. In addition to producing electricity the station may be called upon to assist with stabilising the National Grid power transmission system frequency. The new Battery Energy Storage System has been developed as a strategic facility for helping the National Grid's management of fluctuations on the grid, particularly in the context of the increased electricity supply from renewable, less predictable, sources deriving energy from variable wind and solar power.

New Battery Energy Storage System

Central Control Room Operations

As required by the Environmental Permit during 2017, one event was reported to the site regulator. River discharge limits of pH were exceeded with no environmental impact. A small quantity of low pH water was discharged for less than one minute during the time the automatic valve took to close. This was accepted and no further regulatory action was taken.

A report was also provided to the Environment Agency regarding the re-instatement of a certified meter for continuously monitoring the flow of water discharged to the River Trent. This concluded that the degree of uncertainty (measurement error) associated with the previously defective flow monitoring device indicated that compliance with the permitted discharge limit was maintained and therefore there was no indication of possible adverse impact to the river. These events were investigated internally and actions taken to prevent recurrence.

5.2. Electricity Production and Energy Efficiency

Electricity is generated at 24,000 volts and then stepped up to 275,000 volts by transformers before being exported from the site via the UK National Transmission System. CCGT power stations are more efficient than conventional power stations as they make double the use of the heat produced from burning fuel, first in the gas turbines then, with the HRSGs capturing the waste heat, raising steam to power steam turbines. The high efficiency achieved by West Burton B CCGT Power Station means less fuel consumption and lower levels of emissions for every unit of electricity generated.

As certification to the requirements of the Energy Management System ISO standard 50001 (2011) has been achieved, energy efficiency is monitored and opportunities for continual improvement in efficiency, and associated reductions in greenhouse gas emissions, are identified and implemented. Certification to ISO 50001 facilitates compliance with the Energy Savings Opportunity Scheme Regulations (ESOS) 2014. Electricity production decreased in 2016 due to a significant decrease in the hours of operation of the plant due to maintenance Outages.

Table 2 Summary of Electricity Production and Energy Efficiency

Energy Generation	2014 data	2015 data	2016 data	2017 data
Electricity generated, net	4,988 GWh(e)	6,209 GWh(e)	5,368 GWh(e)	6,521 GWh(e)
Net Efficiency	55.3%	53.7%	54.1%	53.7%

5.3. Air Emissions

West Burton B CCGT Power Station includes pollution control technology, known as dry low NOx (DLN) burners, to control emissions of nitrogen dioxide. Continuous Emissions Monitoring systems (CEMs) are installed on each of the station's three stacks (chimneys) to demonstrate to the Environment Agency that emissions limits are achieved. Computer modelling was used to select the height of the stacks (80 metres) to minimise visibility in the landscape whilst optimising the dispersion of emissions.

HRSG Stacks Units 1, 2 and 3

Combustion of natural gas gives rise to negligible emissions of sulphur dioxide and no dust or ash (which historically has been linked with 'acid rain' damage to ecosystems and respiratory irritation in people).

Mass emissions of carbon dioxide, oxides of nitrogen, carbon monoxide and sulphur dioxide increased in 2017, when compared with data for previous years, due to the associated increase in total electricity generated.

Table 3 Summary of Emissions to Air

Emissions to air	2014 data	2015 data	2016 data	2017 data
Oxides of Nitrogen (NO_x)	926 tonnes 0.186 t/GWh(e)	1,210 tonnes 0.195 t/GWh(e)	969 tonnes 0.181 t/GWh(e)	1,213 tonnes 0.186 t/GWh(e)
Carbon Monoxide (CO)	62 tonnes 0.012 t/GWh(e)	66 tonnes 0.0106 t/GWh(e)	43 tonnes 0.0081 t/GWh(e)	51 tonnes 0.0078 t/GWh(e)
Sulphur Dioxide (SO2)	2.4 tonnes 0.0005 t/GWh(e)	3.1 tonnes 0.0005 t/GWh(e)	2.6 tonnes 0.0005 t/GWh(e)	3.2 tonnes 0.0005 t/GWh(e)

Climate Change

Industrial installations and transport are important sources of the key greenhouse gas, carbon dioxide. Power stations, in particular, are recognised as being a major source of carbon dioxide. The emissions from West Burton B CCGT power station are subject to monitoring and reporting requirements specified in the Greenhouse Gas Emissions Permit issued by the Environment Agency, as required by the European Union's Emissions Trading Scheme (EU ETS). The EU ETS is one of the key policies that have been introduced by the EU to combat the serious threat of climate change. The scheme works on a 'cap and trade' basis. EU Member States set an emission limit (cap) for all installations covered by the scheme. Each relevant installation, such as the West Burton B CCGT Power Station, has to purchase Carbon Credits which must offset the quantity of carbon dioxide released and which is independently verified each year. Compared to a coal fired plant, West Burton B CCGT produces approximately half the carbon dioxide, for every unit of electricity generated due primarily to the higher energy efficiency of the CCGT plant.

Table 4 Summary of Emissions to Air of Greenhouse Gases

Emissions to air	2014 data	2015 data	2016 data	2017 data
Carbon dioxide (CO_2) from gas & diesel oil	1,842,770 t CO2 369 t/GWh(e)	2,371,371 t CO2 382 t/GWh(e)	2,029,550 t CO2 378 t/GWh(e)	2,491,134 t CO2 382 t/GWh(e)
Methane (CH4)	444 t CO2 eq. 0.09 t/GWh(e)	29 t CO2 eq. 0.005 t/GWh(e)	1,144 t CO2 eq. 0.21 t/GWh(e)	24 t CO2 eq. 0.004 t/GWh(e)
Nitrous Oxide (N2O)	9,677 t CO2 eq. 1.9 t/GWh(e)	12,399 t CO2 eq. 2.0 t/GWh(e)	10,650 t CO2 eq. 2.0 t/GWh(e)	13,027 t CO2 eq. 2.0 t/GWh(e)
Hydrofluorocarbons (HFCs)	31 t CO2 eq. 0.01 t/GWh(e)	0 t CO2 eq. 0.000 t/GWh(e)	0 t CO2 eq. 0.00 t/GWh(e)	0 t CO2 eq. 0.00 t/GWh(e)
Sulphur hexafluoride (SF6)	0 t CO2 eq. 0 t/GWh(e)	30 t CO2 eq. 0.005 t/GWh(e)	75 t CO2 eq. 0.014 t/GWh(e)	0 t CO2 eq. 0.000 t/GWh(e)

In line with EMAS III guidelines Greenhouse Gas emissions are reported in terms of CO_2 equivalent. Perfluorinated chemicals (PFCs) are not used at West Burton B CCGT Power Station.

5.4. Raw Material Consumption

West Burton B CCGT Power Station is only fuelled by natural gas and is supplied by a 19 kilometre underground pipeline connection to the national grid for gas. As a standby fuel, such as distillate oil, is not used, we avoid significant emissions of sulphur dioxide and particles (soot), minimise the releases of carbon dioxide and nitrogen oxides and eliminate environmental risks associated with the bulk storage of fuel oil. Chemicals are essential for water treatment purposes i.e. for water purification, corrosion prevention and cooling tower management. Other, small quantities of additional raw materials are used in the operation and maintenance of West Burton B CCGT Power Station by site personnel.

Table 5 Summary of Raw Material Consumption

Raw Materials	2014 data	2015 data	2016 data	2017 data
Natural Gas	9,992,737,141 kWh gross 2.003 GWh(g)/GWh(e)	12,799,919,357 kWh gross 2.062 GWh(g)/GWh(e)	10,997,329,522 kWh gross 2.049 GWh(g)/GWh(e)	13,450,700,362 kWh gross 2.063 GWh(g)/GWh(e)
Process Chemical Purchased and Use	3,292 tonnes 0.660 t/GWh(e)	3,852 tonnes 0.620 t/GWh(e)	4,087 tonnes 0.761 t/GWh(e)	2,810 tonnes 0.431 t/GWh(e)
Oil Lubricants & Hydraulic Fluids purchased	17 tonnes 0.003 t/GWh(e)	27 tonnes 0.004 t/GWh(e)	10 tonnes 0.002 t/GWh(e)	31 tonnes 0.005 t/GWh(e)

Consumption of natural gas increased in 2017 due to an increase in the hours of operation of the plant. The use of process chemicals decreased due to efficiencies in the use of treated water and continuing automation improvements for the dosing control systems.

Gas Reception Facility and River Trent

Chemical Tanker Delivery

5.5. River Water Abstraction and Discharge

Water is withdrawn (abstracted) from the adjacent River Trent in line with the controls of the Abstraction Licence issued by the Environment Agency. The abstracted water is purified by a river water treatment plant for cooling purposes and then by a demineralisation plant for the production of high quality water for the generation of steam by Heat Recovery Steam Generators (HRSGs) for the steam turbine generators.

To cool the plant, water passes through a new generation hybrid cooling system to reduce the temperature to an acceptable level prior to its return to the River Trent. Hybrid cooling eliminates the visible plume normally associated with conventional cooling under most weather conditions. Typically, water vapour from the hybrid cooling towers is only visible when the background air temperature is below 5 degrees centigrade and the relative humidity is above 95%. Water is returned to the River Trent in accordance with the limits specified by the Environment Agency in the Environmental Permit. A combination of continuous monitoring, comprising a Continuous Water Monitoring (CWM) system, and regular sampling of the discharge is undertaken to confirm compliance with permit limits.

Table 6 Summary of Emissions to Water

Water	2014 data	2015 data	2016 data	2017 data
Water taken (abstracted) from the River Trent	5,183,058 m3 1,039 m3/GWh(e)	6,121,111 m3 986 m3/GWh(e)	5,261,133 m3 980 m3/GWh(e)	6,108,022 m3 937 m3/GWh(e)
Net abstraction (abstraction minus return)	3,755,870 m3 753 m3/GWh(e)	4,032,982 m3 650 m3/GWh(e)	3,369,875 m3 628 m3/GWh(e)	4,240,618 m3 650 m3/GWh(e)
Water returned (discharged) to the River Trent	1,427,188 m3 28% 286 m3/GWh(e)	2,088,129 m3 34% 336 m3/GWh(e)	1,891,258 m3 36% 352 m3/GWh(e)	1,867,405 m3 31% 286 m3/GWh(e)

Overall consumption of water from the River Trent increased in 2017, when compared with 2016, due to increased operating hours of the plant. However the implementation of process improvements enabled a reduction in the amount of water needed per unit of power generated to be achieved.

5.6. Waste Management

No solid waste is generated as a result of the combustion of natural gas to produce electricity. Waste arising is limited to controlled (non-hazardous) solids from the operation of the river water treatment plant, plant maintenance activities particularly during plant outages and typical waste from occupation of offices.

Small quantities of hazardous waste arise when the use of hazardous substances is unavoidable. The quantity of waste requiring off-site disposal is minimised via the adoption of waste avoidance, minimisation, re-use and recycling initiatives. Waste materials are subject to segregation and temporary storage within marked containers located within specified areas. Waste is taken off-site by licensed contractors and disposed at licensed facilities.

Waste Segregation Area

Table 7 Summary of Waste Generation

Waste Arising	2014 data	2015 data	2016 data	2017 data
Controlled (general non-hazardous) waste	13,326 tonnes 2.67 t/GWh(e)	9,267 tonnes 1.49 t/GWh(e)	5,171 tonnes 0.96 t/GWh(e)	8,882 tonnes 1.36 t/GWh(e)
Hazardous waste	28 tonnes 0.006 t/GWh(e)	7 tonnes 0.001 t/GWh(e)	326 tonnes 0.061 t/GWh(e)	7 tonnes 0.001 t/GWh(e)
Quantity of waste recycled, recovered, re-used or incinerated with energy recovery	13,316 tonnes 99.9% 2.670 t/GWh(e)	9,260 tonnes 99.9% 1.491 t/GWh(e)	5,497 tonnes 100.0% 1.024 t/GWh(e)	8,842 tonnes 99.5% 1.356 t/GWh(e)

In 2017 total waste production increased, compared to 2016 data, mainly due to the civil engineering required for the construction of the new Battery Energy Storage System. Hazardous waste arising during 2017 was significantly reduced when compared to 2016 as the previous year's non-typical activities did not arise. The majority of waste arising in 2017 (controlled and hazardous) was disposed to facilities undertaking recycling, recovery, re-use or incinerated with energy recovery.

5.7. Environmental Enquiries

As part of the business management system all complaints received from the general public are logged and investigated as appropriate. During 2017 a residential neighbour complained about vibrations possibly associated with activities at West Burton B CCGT. This is subject to on-going dialogue and investigations.

6. COMMUNITY RELATIONS

The CCGT Visitors' Centre continues to provide an interactive and fun environment where all audiences can learn more about EDF Energy, the future of our energy mix and most importantly how we generate our megawatts at the gas fired power station.

This continued to be popular with 808 visitors throughout the year The Centre welcomed groups from the wider community and schools children with learning difficulties, a visit of 90 children over three days visiting from Nottingham and a party of Morgan car enthusiasts.

Support for Science Technology Engineering and Maths (STEM) continued with CCGT staff attending a number of Secondary School careers fairs.

For the third year running the centre provided the venue for the John Mann Summer School a reward event for high achieving children from surrounding schools.

Helping Hands

Throughout 2017 as part of EDF Energy's charity partnership, West Burton B CCGT continued to support Breast Cancer Now. Charitable donations raised by EDF Energy totalled over £197,000.

Charitable and Community events promoted by West Burton B CCGT employees and contractors in 2017 included the following:

- In April, an Easter raffle raised over £600.
- In October the local farmers' vintage tractor run, in aid of Wheatley Village Hall, included the CCGT site as part of the route for the parading vehicles.
- In October a 10K Power Surge family run raised over £2,000 for Misterton School.
- In December a Christmas jumper competition was held to support Save the Children and Make a Wish Foundation.

7. ENVIRONMENTAL IMPROVEMENT OBJECTIVES AND TARGETS

7.1. Performance against 2017 Objectives

Continual environmental improvement is achieved via the implementation of an annual programme of environmental improvements. At the beginning of each year, a programme is prepared and progress is monitored. Potential environmental improvements are identified based on the results of the annual environmental review.

The key 2017 environmental improvements are presented below with a description of progress in their completion.

2017 Environmental Improvement Objectives	Progress
Environmental Performance. Establish Zero Harm to the Environment by targeting zero environmental incidents and encouraging near-hit reporting.	• The design of the new on-site drainage route to river included new pH monitoring for additional protection against accidental spillage of hazardous chemicals. • Review the Lime bund overflow system has not been progressed. • Ways of reducing energy and costs continued to be investigated refer to Energy Efficiency below. • Drainage of blind pits improved with reduction of waste water and alternative methods of pumping out. • Bund maintenance arrangements were comprehensively reviewed and updated and further opportunities for improvement considered.
Site Infrastructure. Deliver improvements to the discharge to river enabling optimisation of plant performance.	• Consultation with the Environment Agency was completed to agree and implement variation to the permit limits for the temperature of the discharge to river and for re-direction of the water treatment effluent and cooling water drain's route. • The installation and commissioning of new river intake temperature monitoring was completed. • The design for an improved water treatment effluent and cooling water pump over was finalised. • The installation of a new oily water separator to protect the river against the risk of oil discharge by site drains was started.
Energy Efficiency. Plant Efficiency is optimal at all levels of the business reducing energy consumption wherever possible.	• Thermal efficiency was maintained above 53%. • A project to examine individual efficiency of site contributory processes was established. • Improved control of boiler feed pumps and installation of LED lighting was undertaken to reduce site load. • Energy efficiency reporting was developed and made more widely available.
Environmental Awareness. Ensuring future skills and capabilities for all to support the station's requirements.	• An Environmental Awareness training package was adapted for coal and gas for delivery to staff and contractors.
Raw Material and Waste Management. Identify opportunities with short term or long term benefit at minimal cost.	• Hybrid Cooling Tower (HCT) blowdown control logic was improved to automatically control based on the conductivity within the tower for the required set limits. HCT riser and booster drain logic was improved to preserve water in the tower at unit shut down. HCT clarified water supply conductivity monitoring planned for enhanced auto control of blowdown. • Heat Recovery Steam Generator (HRSG) blowdown control logic was improved to reduce water use whilst maintaining boiler chemistry. • Improvement in Water Treatment operations by a reduction in chemical use for regeneration ion exchange resins has been reviewed. • Fire Fighting System was surveyed for water leaks. • Zero loss of SF6 from switch gear apparatus was achieved. • Alternative disposal opportunities for waste 'silt' from Densadeg river water treatment 'silt' were investigated. • Consumption of raw materials and of waste production was reviewed and monthly waste management meetings instigated. • Conservation of resources was enacted by savings in the use of water which also reduces the use of water treatment chemicals and energy.

7.2. Improvement Objectives for 2018

The CCGT Business plan for 2017 considered input from all staff and permanent contractors; it covers all aspects of the business and includes the following key objectives for environmental improvement.

2018 Environmental Improvement Objectives	Consideration
Site Infrastructure. Deliver improvements to the discharge to river enabling optimisation of plant performance.	Establish new on site drainage route to the river by completing the installation of the new surface water drain oily water separator and commissioning the new cooling and process effluent pit pump over discharge design.
Energy Efficiency. Ensure Plant Efficiency is optimal at all levels of the business reducing energy consumption wherever possible.	• Optimise Main Cooling Water pump efficiency by trimming of the impellor. • Consider possibility of further reduction of Hybrid Cooling Tower fan blade angles for improved efficiency. • Feasibility study of further site lighting upgrades to LED.
Zero Harm & Quality. **Raw Material and Waste Management.** Be a responsible operator considering environmental impact of the CCGT and its activities	Reduce Silt production in the water treatment process and secure longer term multiple routes for recycling, targeting cost neutralisation.

8. Abbreviations

CCGT	Combined Cycle Gas Turbine
CEMS	Continuous Emissions Monitoring System
CO	Carbon Monoxide
CO_2	Carbon dioxide
CWM	Continuous Water Monitoring
EMAS	Eco-Management and Audit Scheme
EMS	Environmental Management System
ESOS	Energy Savings Opportunity Scheme
ETS	Emissions Trading Scheme
EU	European Union
GW	Gigawatt
HCT	Hybrid Cooling Tower
HRSG	Heat Recovery Steam Generator
IBMS	Integrated Business Management System
ISO	International Standards Organisation
LED	Light Emitting Diode
MW	Megawatts
NO_2	Nitrogen dioxide
NO_x	Oxides of nitrogen
OHSAS	Occupational Health and Safety Advisory Service
PAS	Publicly Available Specification
PFA	Pulverised Fuel Ash
SSSI	Site of Special Scientific Interest
SF_6	Sulphur hexafluoride
SO_2	Sulphur dioxide

9. VERIFICATION OF THIS STATEMENT

AFNOR UK Ltd (UK-V-0010) verified this statement against the requirements of the EMAS Regulation 1221/2009.

10. CONTACT DETAILS

If you require more information on our environmental activities please contact our site information line.

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This statement will be made available at:
www.edfenergy.com/energy/power-stations/west-burton-b-ccgt

Fishing Ponds adjacent to EDF Energy's West Burton B CCGT Power Station Cooling Tower 3

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