
NON TECHNICAL SUMMARY

Future Earth Energy Ltd (the 'Applicant' or the 'Operator') is making a New Bespoke Installation Permit Application for the proposed operation of a renewable energy generation facility at their site on Walton Road, Burton upon Trent.

The proposed Installation is located on land at Walton Road, Burton upon Trent, DE15 9UA (SK 23250 19810).

The proposed development is a renewable energy generation facility which has been designed to recover energy from Refuse Derived Fuel (RDF) feedstocks using gasification specifically for the production of electricity. The gasification facility is an Advanced Thermal Treatment (ATT) process that will produce a combustible synthesis gas, which is then used to raise steam and generate electricity, through steam cycle turbine generation.

The Advanced Thermal Treatment (ATT) plant is designed to use Refuse Derived Fuel (RDF) feedstocks to produce heat to raise steam in a conventional tube boiler for utilisation in a steam turbine for the production of renewable electricity with an average export capacity of 15MWe.

The Installation has been designed to process approximately 169,000 tonnes of pre-prepared Refuse Derived Fuel (RDF) per annum.

The treatment process will be permitted by the Environment Agency as a Waste Co-Incineration Activity and will be operated in accordance with the Environmental Permitting Regulations 2016 and Chapter IV of the Industrial Emissions Directive (IED).

The proposed process meets the definition of an Installation as defined by Section 5.1 'Incineration and Co-Incineration of Waste' paragraph A(1)(b) namely:

'The incineration of non-hazardous waste in a waste incineration plant or waste co-incineration plant with a capacity exceeding 3 tonnes per hour.'

General Overview

Refuse Derived Fuel (RDF) will be delivered directly into the enclosed tipping hall. The vehicles will enter backwards into the fuel tipping hall and discharge the waste into a sub-surface reception bunker. A crane will then transfer the RDF to the Mechanical Polishing Plant.

The Mechanical Polishing Plant consists of two parallel RDF handling lines, both lines consisting of a shredder, a Ferrous Metal Separator and a Non-ferrous Metal Separator. The RDF will then be stored within the fuel mixing bunker until required by the gasification plant

The gasification plant will be coupled to a single steam turbine and generator. The steam turbine has been designed to recover all available thermal energy from the steam and subsequently generate on average 15MWe to the national grid distribution network.

Detailed Computational Fluid Dynamic modelling (CFD) of the gasification/combustion process will be carried out to ensure complete combustion of the fuels under varying conditions, and also guarantee the 2 seconds minimum combustion gas retention time above 850°C stipulated by the Industrial Emissions Directive (IED) Chapter IV under the worst operating conditions.

Flue gas cleaning and pollution control consists of Selective NO_x Catalytic Reduction (SNCR) through liquid ammonia containing solution injection, hydrated lime injection for acid gas neutralisation and activated carbon powder injection for absorption and removal of heavy metals, dioxins, volatile organic compounds (VOC's) and other harmful substances.

The gasification line will have a dedicated hot gas filtration plant (baghouse) designed with sufficient capacity to remove all submicron dust particles.

The steam turbine is fed with the superheated steam from the gasifier and used to generate electricity. With the exception of a small portion of the steam which is extracted from the turbine for the supply of heat to the 'deaerator' and the feedwater preheater respectively, all steam is used for the generation of power.

An air cooled condenser circuit is employed to cool the exhaust steam from the turbine exit back to liquid state (condensate) to be re-used by the boiler.

Emissions to Air

The gasifier has a single flue (A1) which forms a single 55m high chimney for the discharge of cleaned flue-gas to atmosphere.

All combustion products / flue gases are passed through multiple gas clean up stages and abatement stages resulting in all emissions to atmosphere being comfortably within the stipulated Emission Limit Values (ELVs) for Chapter IV IED activities.

Odour

Due to the design of the building structure and the fully enclosed RDF handling activities, there is very little potential for offsite odour emissions and impacts to arise from the site.

To avoid any odour emissions from the tipping hall and RDF reception bunker, the reception bunker is kept at slight negative pressure. The air within the bunker is sucked by means of two exhaust fans towards a biofilter. The biofilter consists of a pre-scrubber and two layers of organic matter. The pre-

scrubber is cleaned by means of water circulated by a circulation pump and the organic matter is kept wet regularly with potable water.

Emissions to Controlled Water

There will be no direct process emissions to controlled water arising from the Installation.

Uncontaminated clean surface water runoff captured from roof drainage and external roadways / car parking areas will be discharged to the existing surface water drainage system.

The main process effluent on site is derived from the water / steam system and the demineralisation (boiler feedwater) plant, which will have similar composition to potable water. The effluent will be collected and the pH and temperature will be continuously monitored. Spot sampling to ensure chemical composition is acceptable will also be undertaken daily. As long as the monitoring demonstrates that the water is acceptable standard (i.e. meets UK DWS), the effluent will be discharged via the oil separator to the existing surface water drainage system.

All domestic effluent arising from the plant and collected in the effluent collecting tank and tankered off site for disposal.

Emissions to Land

There will be no emissions to land arising from the Installation.

Waste Management

There are two principle types of solid by-products produced from the operation of the gasification facility. These are:

- Boiler Fly Ash; and
- APC Ash (Air Pollution Control (APC) residues).

The high temperature boiler fly ash from the plant is collected and cooled with a water cooled mechanical conveyor. It is combined with the economiser and multiclone ash and transported to an ash silo via ash transfer conveyors.

The second ash collection system for the APC ash is of similar design, however without water-cooling, and transports the APC ash to a separate ash silo.

Due to the nature of the gasification plant and associated recirculating fluidised limestone bed, minimal bottom ash is produced by the plant.

Impact

The air emissions from the proposed development have been modelled using ADMS 4.2 and AERMOD atmospheric dispersion modelling software.

The air quality impact assessment considered the air impact to all identified residential, sensitive habitat and ecological receptors.

It is the conclusion of the modelling that the Installation is unlikely to have a significant impact at any of the receptor locations examined and is unlikely to have a significant impact on the environment.

All of the air emissions from the Installation have been risk assessed against their potential impact on human health. The results of the assessment are that the proposed installation will not present any risk to human health.