Emissions control and data

The flue gases generated by the combustion process are processed through a series of filters to remove particulates, they are then drawn via a large induced draught fan and discharged through the stack to the atmosphere. The flue gases are monitored continually to ensure that the emissions fall within permitted limits set by the environmental permit, issued by the Environment Agency.

These filters work in a similar way to a vacuum cleaner bag.

The filters have been designed so they can be removed at intervals when they need replacing.

A pneumatic/compressed air cleaning system is used to ensure the filters don't become clogged. The dust removed by this process is then transported to a silo. This material is known as **Air Pollution Control residue (APCr).**

The APCr is conditioned with soils and used at a reclamation site to return an open cast mine to its former natural beauty.

EnviRecover undergoes a maintenance refurbishment each year to ensure it is kept running at its maximum efficiency.

Emissions data for the previous calendar month can be found on our website:
https://www.severnwaste.com/recovery/emissions-data/

EnviRecover - Energy from Waste

EnviRecover, our Energy from Waste (EfW) Plant opened in May 2017.

EnviRecover recovers energy from **Municipal Solid Waste (MSW)** from across Herefordshire and Worcestershire. MSW is waste that cannot be recycled and includes the contents of black kerbside bins locally. Waste is now viewed as a resource and is a valuable source of energy. Landfill should only be used as a means of disposal once other options have been explored.

The primary focus with waste management is ***Reduce, Reuse, Recycle.*** Once these have been exhausted, then the process of ***Recovery*** should be considered.

Construction of EnviRecover began in 2014 and it formally opened in 2017.
The EfW process is an established practice for capturing the energy content of residual waste.

EnviRecover processes over 215,000 tonnes of MSW each year. This takes up a volume of around 600,000 cubic metres and would fill 240 Olympic-sized swimming pools.

Using MSW as an energy source has displaced over 90,000 tonnes of coal-fired generation every year. Coal-fired generation produces 2.2 tonnes of CO_2 per tonne of burnt coal, our CO_2 figure for MSW burnt is 0.56 per tonne burnt.

So, what actually happens?

Municipal Solid Waste/Residual Waste is first weighed in on our weighbridge. It is then delivered to the waste reception hall and stored in a large bunker. The bunker is the equivalent size to five Olympic-size swimming pools.

The waste is mixed by two cranes to ensure an even spread of calorific (energy) value it is then loaded into the feed hopper before being fed on to the main combustion grate. EnviRecover has a shredder to process any bulky waste before it goes to the feed hopper. One crane grab of MSW can be converted to enough energy to power an average house for one year.

Once waste reaches the combustion grate it passes through four combustion zones: drying, ignition, main combustion and burnout.

During start-up, fuel burners heat the furnace up to a minimum operating temperature of 850 degrees before the combustion process becomes self-sustaining and the fuel burners are no longer needed. Once up to temperature, EnviRecover is designed to run in this self-sustaining mode for as long as twelve months.

After the burnout stage the residual ash reaches the end of the grate and drops into an ash extractor. This contains a quench bath that both cools the ash and acts as an air seal for the furnace. The cooling ash is then moved on conveyors to another storage bunker. During this stage the ash passes under an overband magnet which extracts any ferrous (magnetic) metals, which are then sent for recycling. This process takes around six hours from the feed bunker to the ash storage bunker.

The ash is called **Incinerator Bottom Ash (IBA)** and is removed from EnviRecover and taken to our Hill and Moor site, where it is stored ready for processing to remove any non-ferrous/non-magnetic metals which are sent to be recycled.

The remaining ash is then processed into different sized grades of aggregate for use in land reclamation projects.

But how is energy made?

The walls of the furnace surrounding the combustion grate contain carbon steel boiler tubes with constantly flowing water inside. The water is heated by the furnace and turns to steam. The walls of the furnace are covered in thermal tiles which ensure an efficient transfer of heat and also protect the tubes.

Eventually, the steam reaches a temperature of 415 degrees Celsius and creates 60 bar pressure. 60 bar pressure is the equivalent of 870lbs pressure per square inch/psi.

The steam then travels to the turbine hall and drives the turbine. The turbine then drives the generator which creates electricity. This electricity is exported to the National Grid.

EnviRecover uses a conventional steam turbine. This works by the steam flowing past the turbine's blades, the steam expands and cools, releasing most of the energy it contains. As the steam continuously spins the blades, the blades convert most of the steam's potential energy into kinetic energy. Kinetic energy is energy resulting from movement or motion. In this case it's the movement of the turbine blades when driven by steam power. (Incidentally, a windmill is the earliest form of a wind turbine.)

After the steam's energy has been used to drive the turbine, the steam then moves through to the air-cooled condenser which condenses it back to water. This water is then pumped though the boiler and through the tubes within the walls of the furnace. It is then turned back to steam to drive the turbine and the cycle of creating energy continues.

Did you know...?

EnviRecover is self-powered, as it is powered by the electricity it generates.

EnviRecover

Municipal Energy from Waste Recovery across Herefordshire and Worcestershire

LET'S WASTE LESS

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