



NORTHUMBRIAN
WATER

Bright sparks using the power of poo!

Northumbrian Water is the award-winning national industry leader for generating green power from what comes naturally from all of us.

It's the first waste water company in the UK to use all the sludge remaining after sewage treatment to produce renewable power.

Methane and carbon dioxide released by bacteria digesting the sludge is used in our gas engines to create electricity.

And now in yet another innovative move to maximise energy production, the biogas is going to be upgraded to remove the carbon dioxide so the purified gas can be directly injected into the gas grid.

Propane will be added, if necessary, so the calorific value of the existing gas in the grid is replicated by our gas to ensure continuity for consumers.

Grid injection at this scale will be industry-leading and is also in line with the Government's new Renewable Heat Incentive (RHI) initiative.

Pioneering environmental plants have been built at Tees Port on the river's south bank and at Howdon at the mouth of the Tyne.

The recent £70m dual investment will be increased further as the new gas to grid plants are built but results in multi-million savings in operating costs and further generation of renewable power.

The science uses a natural biological process. The normal anaerobic digestion process has been improved using thermal hydrolysis. This involves pre-treating the sludge remaining after sewage treatment, heating it to 165 degrees Celsius under six bars of pressure – like putting it in giant pressure cookers.

This destroys any pathogens and breaks down the cell structure, which makes it better to be fed to billions of bacteria in giant digester tanks – and easier for them to eat.

The two plants reduce two million cubic metres of sludge, resulting from the treatment of domestic sewage and biodegradable industrial effluent from a population equivalent to about four million people, to about 150,000 cubic meters.

The resulting methane and carbon dioxide released by the bacteria is collected in 11 metre diameter biogas storage bags before being burned in a gas engine to produce nearly six megawatts of electricity.

Currently some of this is used in the process, making it self-sufficient, but there is enough excess to meet most of the whole sites total energy requirements.

Waste heat and steam generated from the process are also captured and recycled for use elsewhere in the process.

It also means less energy used for transportation of sludge leading to significant carbon savings. And what remains of the sludge afterwards is an excellent Class A biosolid fertiliser for farmers. Northumbrian Water now has two sites which are cutting the company's annual £40m electricity bill by nearly 20% and bringing the company significantly closer to having a fifth of its energy produced from self-generated renewable sources by 2015.

Innovation is at the forefront of this leading green initiative. Northumbrian Water is currently looking at further re-use of any remaining waste heat from the process.

