

Waste strategy aims to rejuvenate landfill sites

Covering of ash will help generate electricity and regenerate the land

BY STEPHEN HARRIS

An energy-generation scheme that makes use of domestic, plant and industrial waste could help give new life to former landfill sites.

The plan involves covering sites with fly ash from coal power plants

turning them into land for agriculture and leisure while generating heat and electricity for local housing and retail developments.

'The idea is to integrate waste strategy, methane emissions and renewable energy all into one,'

to produce quite a large percentage of the artificial soil you put on top, so if you're going to be doing that you might as well integrate it all together,' said Gill.

The gas collected from the capped landfills will generate elec-

the first site of around 10 hectares.

The company is in discussions with the local authority and the developer of a planned nearby housing site, which would use the energy produced.

If planning permission is granted



Landfill sites emit methane

to stop landfill gas leaking into the atmosphere and instead using it to turn garden waste into a nutrient-rich soil component called biochar.

The company behind the idea, Cheltenham-based Lichen Renewal, is in advanced talks to regenerate two sites in south-east England,

Ranbir Gill, the company's founder and director, told *The Engineer*.

He initially just wanted to use pulverised fuel ash (PFA), a component of concrete produced by coal power stations, as a cap to stop landfill sites from emitting methane.

'We found that you need energy

to produce quite a large percentage of the artificial soil you put on top, so if you're going to be doing that you might as well integrate it all together,' said Gill.

The gas collected from the capped landfills will generate electricity for the grid and heat that will dry out the plant waste, break it down into biochar via pyrolysis, and create a hydrogen and carbon-monoxide mixture called syngas.

This gas can in turn be used to produce more electricity and heat for houses and businesses. The biochar will be combined with fly ash, sewage sludge and other material to produce a fertile soil while effectively sequestering carbon for centuries.

'If we could cap 500 sites that would stop the equivalent emissions of around 11m-15m tonnes of carbon per annum,' said Gill.

There is also an economic incentive to the plan, as the government currently pays eight times the subsidy for syngas-sourced electricity as it does for energy generated from landfill gas.

The biochar will be combined with sewage sludge to produce fertile soil

quickly, the facility could be operating by the end of next year following field trials to determine the correct mixture of soil components.

'All of the technologies to create the system already exist but no one has yet integrated them in this way,' said Corder Peacocke, director of biomass consultancy CARE, which is working with Lichen Renewal.

'The biggest issue with these technologies is feedstock preparation and handling. It's crucial that you match the feedstock with the right technology for what you want to do. It can cost you a lot of money if you get it wrong.'

The gas will be extracted from the ground using vertical extraction wells, typically 40m apart. Capping the landfill means less air will be drawn into the system from the atmosphere.

The cap will also prevent water flowing through the landfill, allowing waste to biodegrade faster.

Many landfills were designed to allow water to flow through them, picking up soluble waste components to produce leachate that is meant to disperse as water drains from the site. Dispersal can be problematic so preventing water from initially entering the landfill should limit groundwater contamination.

The challenge will be designing a landscape that diverts run-off water without causing flooding, while allowing enough moisture to reach the fly ash cap to keep it moist.