

# From waste to energy

Lichen Renewal specialises in landfill site recovery and restoration. **Quinton Richards** explains how his company takes waste ash from coal plants and uses it to cap landfill sites, helping to cut carbon emissions while also generating green energy

**I**t is a concept that could hand local authorities a win-win solution to a long-standing environmental problem. At a time when local government budgets face swingeing cuts, Lichen Renewal, a Cheltenham-based company proposes a sustainable solution to council-owned former landfill sites that are leaching pollutants into local groundwater and releasing damaging greenhouse gases.

Using pulverised fly ash (PFA), a redundant by-product from burning coal, Lichen Renewal plans to start capping landfill sites next year – extracting the trapped methane gas to generate electricity as well as converting local green waste into biochar. What is more, once capped, the

restored sites would be re-landscaped and used for leisure, agricultural or local renewable energy projects.

This approach offers one solution to the environmental problems caused by the 22,000 historic landfill sites that litter the UK. Thanks to the 'dilute and disperse' approach advocated between the 1960s and early 1990s, former landfill sites continue to be a problem today.

## Green approach

Set up last year by Quinton Richards, a planning barrister and environmental scientist; Ranbir Gill, a businessman with expertise in real estate and property; and advised by Ged Duckworth, an environmental consultant who specialises in waste management and land contamination, Lichen Renewal's unique approach centres on

a redundant by-product from the coal industry – PFA.

Six million tonnes of PFA is produced each year by the coal industry and while three million tonnes is sold to other industries, the rest is sent to landfill beside coal-fired power plants.

Lichen Renewal takes this unused PFA to engineer a low permeability layer to cap the landfill sites. There are many potential benefits. First, the applied PFA prevents methane from escaping from the landfill and stops the groundwater from becoming contaminated. Not only that, but the waste ash could enable the coal industry to use its remaining three million tonnes of PFA to partially offset its carbon emissions.

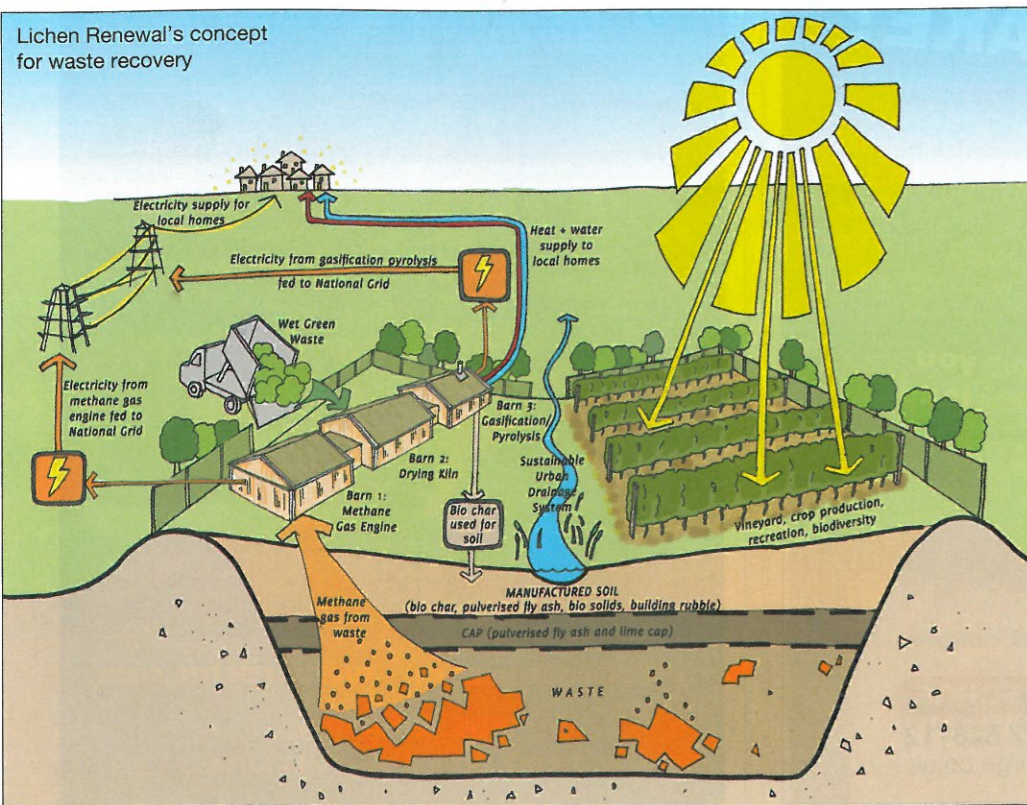
Above the capping layer, Lichen Renewal creates a soil horizon comprised of diverse materials, including biochar, biosolids and brick rubble, which protects the underlying PFA cap from drying out and damage from root penetration.

Biochar (biological charcoal) is created onsite using local organic waste delivered through green waste contracts with local authorities. Biochar locks in carbon for hundreds of years and provides a free draining structure within the soil. It also absorbs nutrients like a sponge and then slowly releases those nutrients into the surrounding soil.

## Nutrients

Biosolids, which include sewage sludge cake and dewatered paper sludge, provide the nutrients to the artificial soil. The brick rubble provides the drainage layer immediately above the low permeability cap.

The methane extracted from the former landfill site can be used in a gas engine to generate electricity for the local community. To make this process far more efficient, the waste heat pro-



## Potential benefits

- Environmentally damaged land is remediated and the re-landscaped site used for leisure, agricultural or local renewable energy projects
- Millions of tonnes of unused PFA can be used to engineer a low permeable layer to cap landfill sites
- Thousands of tonnes of carbon emissions are prevented from being released
- Methane and syngas can be used to generate renewable heat and electricity
- Municipal green waste converted into biochar locks carbon into the soil for hundreds of years
- Lichen Renewal absorbs the local authority's costs for remediation, restoration and on-going environmental monitoring

duced from generating electricity from the methane can be applied to dry the local green waste before the process of gasification – burning green waste in controlled amounts of oxygen to produce biochar and syngas – and/or pyrolysis, an identical process, which does not use oxygen but produces greater quantities of biochar.

## Incentives

As an added incentive for local authorities, this approach supports a number of government directives.

To start with, Lichen Renewal's concept chimes with the revised Waste Framework Directive by moving waste up the Waste Hierarchy. It also ticks another important box: the Renewable

Energy Directive through its promotion of gasification and pyrolysis to produce syngas, creating a platform for local renewables.

As the process involves the remediation of some sites that might meet the definition of contaminated land, it also meets the requirements of the draft Soil Framework Directive and current UK domestic regime for contaminated land, such land being remediated via the planning regime as opposed to direct regulation.

Finally, it sits well with the Water Framework Directive in terms of protecting groundwater from polluting leachate.

For cash-strapped local authorities looking to resolve environmental challenges posed by landfill sites, an offer to convert these liabilities into valuable resources may well provide the solution that they need.

[www.lichenrenewal.com](http://www.lichenrenewal.com)

*Quinton Richards is director of planning and communications at Lichen Renewal*



01367 899 556 01367 242 491 info@shawcity.co.uk  
www.shawcity.co.uk/products/phocheck-tiger

## The PhoCheck Tiger - Photo Ionisation Detector For VOC's

Hire Buy Service Training Support



ENHANCED MiniPID TECHNOLOGY

Contact Us For Pricing Or Demonstration

01367 899 556

## The PhoCheck Tiger Photo Ionisation Detector For VOC's

- Dynamic Range ppb To 20,000 ppm For Specific Volatiles
- ATEX Approved Intrinsically Safe
- Lightweight, Rugged & Water Resistant
- Data & Event Logging Plus Health & Safety Mode Options (STEL & TWA)
- 5 Year Warranty



Dust



Vibration



Noise



Gas



VOC's