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Second life sludge

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It's potent stuff, sewage. And valuable too, if you turn it into fertiliser, green electricity and renewable heat.

Beyond the U-bend sewage is treated 24 hours a day, seven days a week, 365 days a year. But what's left over from this vital - and inevitably constant - process is a sludge by-product that has an interesting afterlife. Rich in nutrients and energy, thousands of tonnes of this organic material are already being used as fertiliser on fields and to produce green electricity.

"Once you remove the water from sewage and treat the remaining material, you're left with an organic matter,"• explains **Thames Water's** Sarah-Jane Hadlow. She's a senior environmental advisor at the country's largest water and wastewater services company, which produces around 250,000 tonnes of treated sewage sludge, or "biosolids", a year.

"These biosolids are nutrient-rich,"• she explains. "So most are recycled to agricultural land where they return this benefit to the soil."• Of course that's after a treatment that meets strict microbiological standards. Hadlow points out that these are among the most researched of all organic materials applied to land and their use is tightly regulated.

In 2007/08, the company recycled around 60% of its biosolids across more than 28,000 hectares of farmland in southeast England. Thames believes farmers may find switching to biosolids as an alternative to chemical fertiliser a more sustainable choice in a tough economic climate. Unlike synthetic fertilisers, which are often imported from Europe or beyond, biosolids come from a local source, are less expensive and, needless to say, there's a guaranteed supply.

This agricultural use remains the cornerstone of Thames's 25-year sludge strategy, but it's only part of the picture. The company is increasingly using sludge to produce renewable energy. In 2007/08, it generated enough renewable energy to power around 90,000 homes. In total, 19 combined heat and power plants and two sludge-powered generators put out 437 gigawatt-hours - about

two-thirds as heat and a third in the form of electricity.

The process offers other environmental benefits too. During sewage sludge treatment, capturing methane (a greenhouse gas over 20 times more potent than carbon dioxide) helps Thames cut its own emissions. Waste heat recovered from incineration of sewage sludge means less need to burn fossil fuels. The process is also useful where there's a lack of farmland for recycling.

But the future is not without its challenges. Increasingly stringent effluent quality standards mean the volume of material to be processed is on the up - something that's compounded by population growth. Competition for agricultural land from other organic materials diverted from landfill further complicates the picture. Perhaps the biggest risk is public perception of agricultural recycling. "It's a potential challenge despite the UK Government and EU regarding recycling to land as the best practicable environmental option in most circumstances,"• states Hadlow.

Thames is currently in negotiation about its plans to address these issues with the water regulator, Ofwat, as part of the industry's 2010-15 price review. Its plans include increasing sludge processing capacity and investing in new 'enhanced digestion technology'. This will minimise the volume of sludge produced - by reducing its water content, for example, and thereby simplifying storage and cutting down on vehicle movements. "It also produces more biogas, which in turn can be used to generate renewable energy, and means there's less potential for odour nuisance to our customers,"• adds Hadlow.

"Our customers rightly expect high standards when we're managing sewage sludge,"• sums up Hadlow. "The challenge is that this is a waste stream we can't switch off, so safe and sustainable ways of managing it are critical. It may be a social and environmental challenge, but that's where the solutions lie too."

Darren Towers, sustainability strategy manager at Thames Water.

Thames Water is a Forum for the Future partner.