

The (waste) paper trail

Wastewater treatment plants could soon be turning used toilet paper into a renewable form of energy

Could human waste one day be fuelling our homes and businesses?

The average person in Western Europe produces between ten to 14kg of waste toilet paper annually. Currently the primary destination for this sewage will be local wastewater treatment plants, which are simply paid to filter and disinfect it until it reaches a state where it can be safely disposed of in landfills. However, innovative plans by researchers at the University of Amsterdam (UvA) are underway to develop mechanisms that are capable of building a 'circular economy' around waste toilet paper, by turning it into a source of renewable energy.

'A lot of people don't want to think about waste toilet paper; most people actually don't care what happens to sewage after it leaves their house,' says Dr Gadi Rothenberg, professor at the Van 't Hoff Institute for Molecular Sciences at UvA. 'But you can view it as a resource. It has a negative cost, that's why I like it so much.'

Toilet paper that has been treated and separated from the rest of the sewage is rich in cellulose, as much

as 80 per cent, which is capable of releasing energy just like wood or other forms of biomass. Rothenberg, along with colleague Els van der Roest, has developed a technique, funded by Sustainable Chemistry (a research priority area at UvA), whereby the waste cellulose becomes gasified before being converted directly into electricity in a solid-oxide fuel cell, at a cost comparable to current solar installations.

While acknowledging that the relatively low levels of waste toilet paper currently generated by the world's cities means this technology is unlikely to ever become more than a niche source of renewable electricity (the researchers estimate that the volume of waste toilet paper produced annually in the Amsterdam region, for example, could power 6,400 homes), Rothenberg argues that as well as being economically profitable and reducing the need for landfills, one of the major benefits could be psychological. 'It makes people think,' he says. 'If we want to be a sustainable society, we should actually not throw anything away. Nature does not throw anything away; nature works in cycles. Everything is being reused.' ●