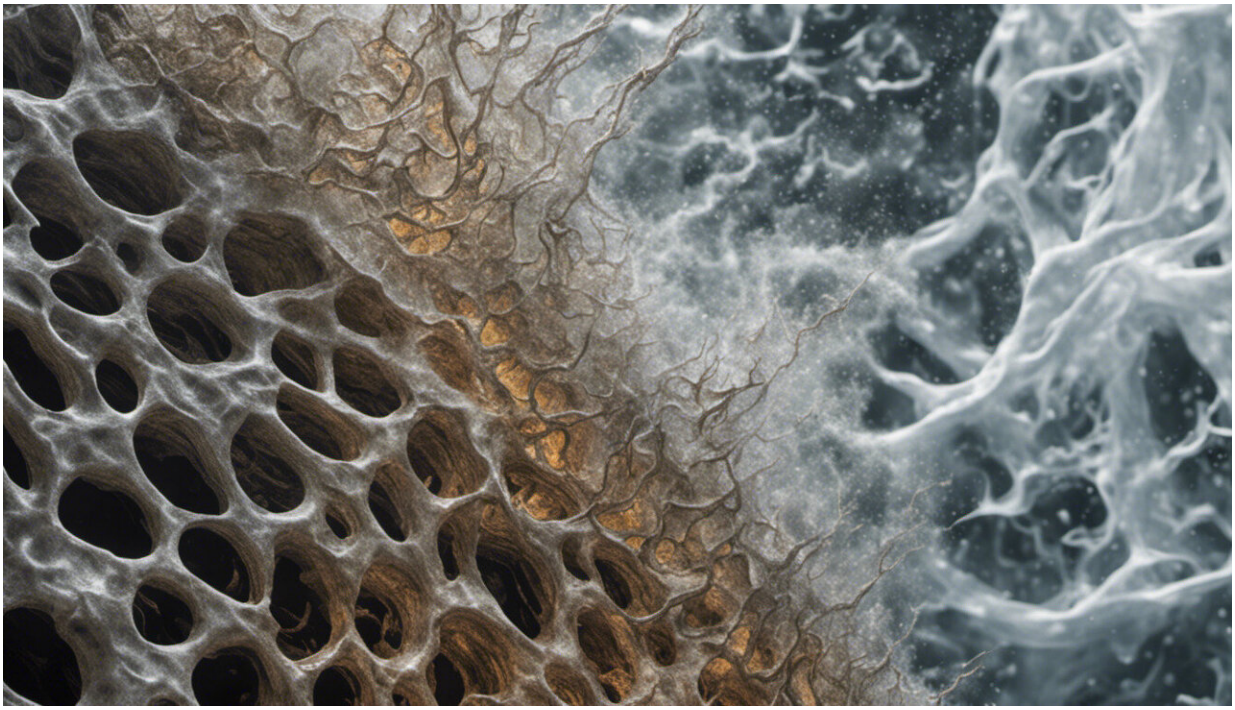
To fight the fatbergs, we have to rethink how we treat sewage waste

September 28 2017, by Thomas Philip Fudge



Credit: AI-generated image (disclaimer)

A 250m-long, 130 tonne, "fatberg" was recently discovered clogging up the sewers below Whitechapel in east London. Fatbergs are made up of solidified fat and oils combined with wet wipes, nappies and sanitary products that are disposed of in sinks and toilets.

This wasn't a unique find: another monstrous fatberg was found in a London suburb in 2013 and, a week after Whitechapel, a slightly smaller "berg" was found under the city's Chinatown. No doubt there are many more fatbergs still out there, blocking up the sewage system and waiting to be discovered.

There is a simple way to avoid the build up of fatbergs and it relates to everything listed above: bin it, don't flush it. But many people inevitably adopt the mentality of "out of sight out of mind" and assume it's not their problem as someone else will sort it. The reality is that clogged-up sewers affect us all, sometimes even causing road closures and flooding.

The UK government has called on London to update its Victorian-era network of pipes and tunnels as, after heavy rainfall, lots of sewage is spilling out into the Thames. To help the capital's creaky infrastructure cope with a growing population, Thames Water, the local utility, has started work on a huge £4.5 billion pipeline that will follow the river through the heart of the city.

But this entire model of large centralised sewers and treatment plants is already starting to looks outdated. London's sewers don't just need updating – the city needs an entirely new approach to reducing the strain on its sewers.

The problem with big sewers

The key flaw to standard sewers systems is they combine all different kinds of waste into one big mixing pot of chemicals, bacteria and organic waste. A typical household, for instance, has one wastewater stream from the toilet which contains dangerous pathogens, another from the kitchen sink with food waste, and a third from the dishwasher which contains chemicals. All of these require different types of treatment before it is safe to put the water back into the environment.

It's actually relatively easy to treat one specific highly-concentrated waste stream. Dishwasher waste, for instance, will be around eight to 15 litres of water containing a variety of chemicals to make your cutlery sparkle and, in this concentrated form, UV or ozone treatment can be used to easily remove 99% of them.

But when dishwasher water is combined with all other sorts of waste it then creates a complex cocktail that is much more difficult to treat. Currently, the next step is to dilute everything with rainwater, which vastly increases the volume of water that needs all these elements removed. By the time the waste reaches the treatment plant, dangerous chemicals or substances may make up just one part in a billion of water particles. For instance, a typical sewage works may have to identify and remove just a single raindrop's worth of benzene, a known carcinogen commonly found in laundry detergents, from a tank of toilet waste the size of a swimming pool.

A sewage works near you

But if treatment was decentralised, with lots of smaller sewage works rather than one big one, most of the contaminants could be removed while they were still in high concentrations. This in turn means waste becomes more useful. Wastewater with lots of food and faeces contains high amounts of energy that can be extracted as "biomethane" gas which can be used for heating or cooking just like regular gas. But when this wastewater is combined with other sources, its energy content is diluted making it more difficult and less efficient to extract.

The solution is to build small treatment plants in new developments or renovations that service smaller areas. A variety of new technologies are being developed: some use electricity to combine different waste particles together into larger clumps so it can be extracted, while others use UV light to breakdown all the chemicals. Some designs let friendly

bacteria breakdown the organic compounds producing methane or hydrogen, while others heat up the waste to extremely high temperatures turning it into a gas that can be used to produce electricity or to cook your dinner.

Depending on the needs of the site they could focus on recovering energy or removing chemicals and they could be designed to produce different qualities of water depending on its final use. These small plants could be completely sealed to stop the smell escaping, and quick treatment times would avoid large amounts of smelly waste being stored near the communities.

This way, waste wouldn't need to travel for miles, mixing with other sources. Instead, it could be treated locally, providing both sustainable energy and clean water.

Sewage networks were invented by the Victorians and ultimately changed society for the better. But everything evolves and improves with time, and Britain's water infrastructure should be no exception.

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