‘Sanitation isn’t just an issue for developing countries’: how a company is reinventing the loo

Toilet technologies are ripe for a rethink, whether used in remote communities or closer to home where Victorian sewers can no longer cope. So what have inventors dreamed up?

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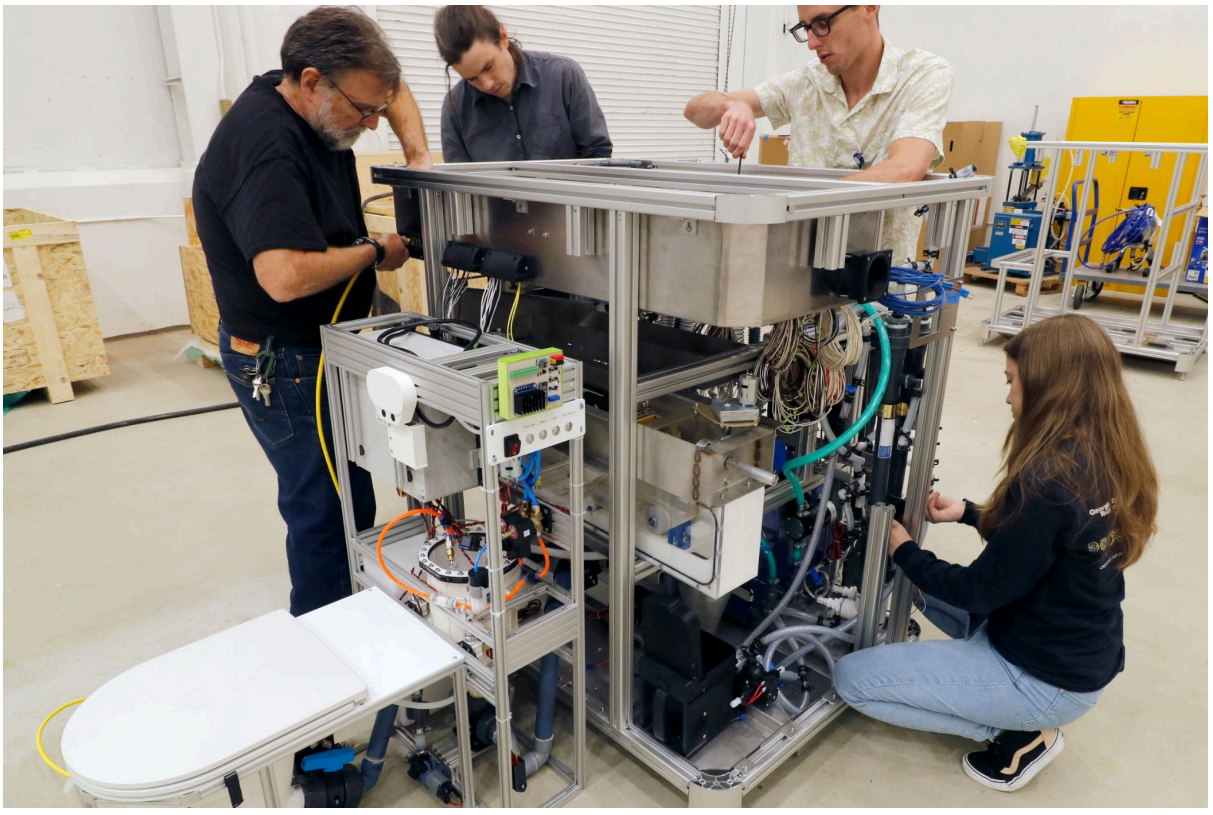


A Georgia Institute of Technology team works on the assembly of the Generation 2 Reinvented Toilet. Photo: Courtesy of Georgia Tech Research Institute (GTRI)

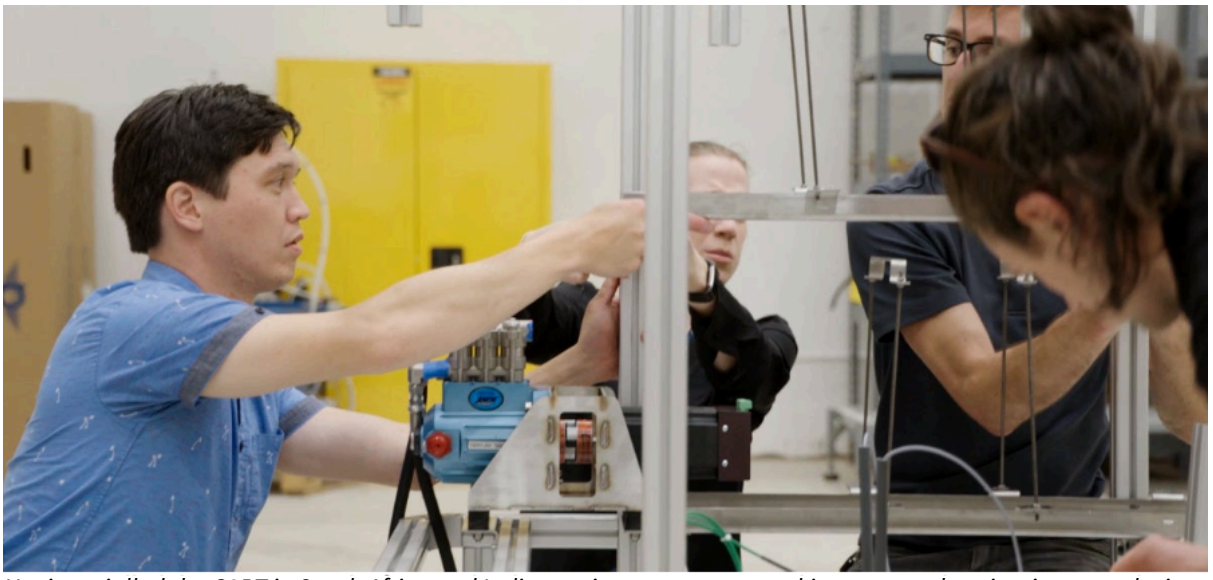
First conceived in the 16th century, the flushing toilet has remained relatively unchanged for more than 400 years. But as urban populations swell and antiquated sewage and water systems groan under the strain, the humble lavatory is long overdue a makeover.

It’s understood that about 3.5 billion people worldwide lack safely managed sanitation, including 420 million people who must still defecate outdoors. This brings huge negative impacts, standing in the way of economic growth and also spreading diseases such as typhoid and cholera.

But these are not just problems faced by the poorest areas of the globe. In the UK, the sight of sewage overflowing into rivers is now all too common. Even natural gems such as Lake Windermere in the Lake District have been subject to huge levels of raw sewage as a waste water system – generally considered as no longer fit for purpose – was inundated. In the US, the costs of maintaining wastewater, stormwater and other clean water infrastructure has risen by more than 73% in the last decade.

“It’s important that sanitation is not just seen as a challenge for developing countries but as something that every community has to face,” says Erin McCusker, senior vice president and leader, Sato and Lixil Public Partners (LPP), Lixil, a global pioneer of water and housing products. “There is a huge opportunity to change the way we think about sanitation, and improve the lives of millions of people.”

This starts with ways of working and collaborating, and with creating new ways to address how and where waste is treated. LPP is leading on this work at Lixil as its dedicated platform to engage with the public sector, such as municipalities and local authorities, to develop new solutions to issues around water, sanitation and hygiene. LPP taps into the growing focus of governments around the world on social and environmental challenges to create a new way of partnering – to bring technology, services, and solutions into communities most in need. LPP links to Lixil’s own global commitment to improve access to sanitation and hygiene for 100 million users by 2025.



Having trialled the G2RT in South Africa and India, engineers are now working on to reduce its size, complexity and cost. Photo: Courtesy of Georgia Tech Research Institute (GTRI)

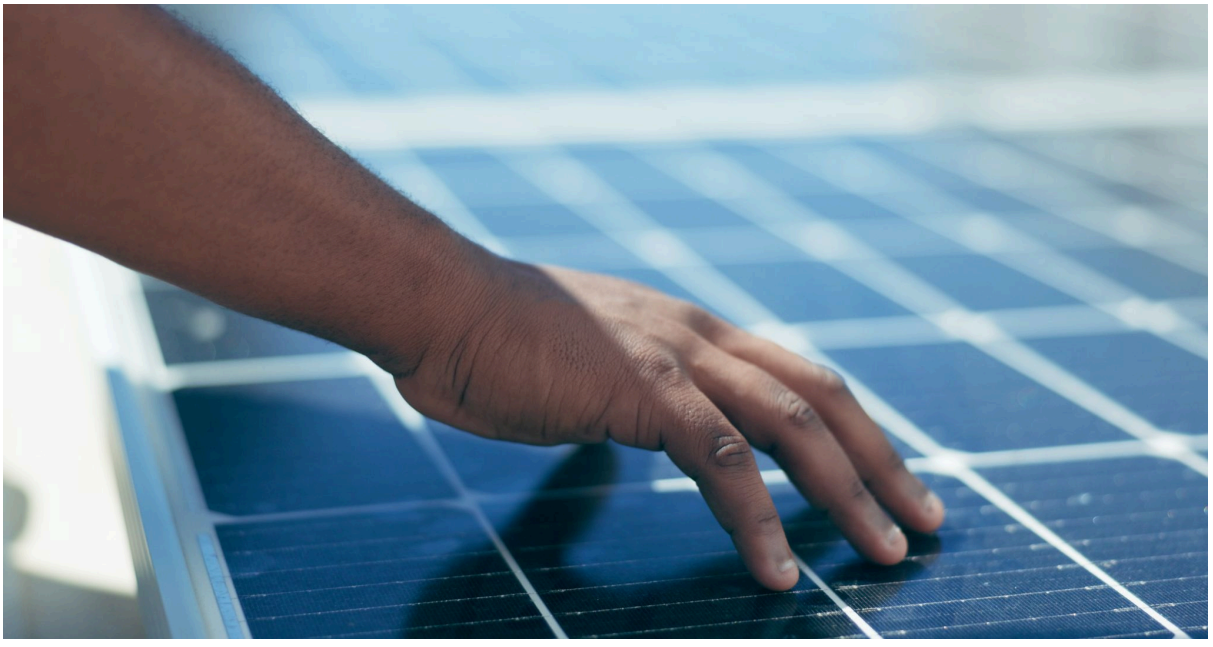
For one solution, LPP teamed up with the Georgia Institute of Technology to further develop the Generation 2 Reinvented Toilet (G2RT), a standalone lavatory that doesn’t need a water supply or connection to a sewage system. The G2RT is one technology that emerged from the Bill & Melinda Gates Foundation’s Water, Sanitation, and Hygiene

programme to advance toilet technologies that safely and effectively manage human waste.

Unlike conventional toilets that rely on plumbing, or an on-site septic tank or cesspool, the G2RT operates independently, with its own self-contained processing unit, which can treat waste directly at the source. The unit purifies liquids and recycles them for flushing, while solid waste is subjected to high heat and pressure, killing pathogens and leaving dry, odour-free ash that can be safely composted. By neutralising the waste, the process prevents the risks of leaks and discharges that can pollute and contaminate water systems.

“The G2RT is all about on-site sanitation and bringing the treatment as close to the user as possible,” says McCusker. “By cutting out the need to connect up to a sewage or water system, we are making this basic level of sanitation more affordable and accessible, and reducing the need for authorities to undertake expensive infrastructure projects.”

The G2RT has been tested in laboratories across the US and Europe, and successfully trialled in homes in South Africa and India. Engineers are now fine-tuning the unit to improve the usability and lifespan, while reducing its overall size, minimising maintenance needs and working to bring down costs so that the toilet is affordable for consumers. They are also looking at the possibility of running the new generation of loos on solar power. As development continues, the next prototype may go into testing within the next year, with a working product predicted to be on the market within three to five years.



Lixil is also looking at the possibility of running the new generation loos on solar power.
Photo: Hiraman/Getty Images

However, to achieve the commercialisation of the product, other challenges need to be addressed. Technology companies are usually hampered by the fact that most countries implement their own laws and regulations around waste treatment, meaning there are no uniform, internationally agreed rules. In the US, for instance, on-site waste treatment regulations are set at the state and local level, which means that companies must pilot and prove their systems multiple times, which can be costly and time-consuming.

To enable the commercialisation of the G2RT and other potential treatment solutions, it is important for Lixil and industry partners to work with regulators to overcome barriers to distribution and installation.

“Because the product is so different to current toilet technologies, it’s not only about bringing a new product to market but disrupting the whole sanitation ecosystem, and that includes looking at current regulations and making it easier to install the reinvented toilet,” says McCusker.

Barriers include building regulations that are yet to embrace the idea of treating waste on site, and the role this can have in making high standards of sanitation affordable and accessible. In the US, for instance, there are restrictive plumbing codes and regulations, while the EU has recently updated its laws around the ways that urban wastewater must be collected.

Tapping into the idea of a stronger public and private sector partnership to address a country’s sanitation challenges can also help the market for improved sanitation to meet its full potential, says McCusker. Lixil recognises the need for partnering with the public sector to help accelerate affordability and access to the communities most in need.

Composite: Courtesy of EOOS NEXT and Water Research Commission (WRC)

McCusker is confident they will overcome these hurdles. “As a private sector leader, we’ve been offered a seat at the table to talk about issues around sanitation, and work with governments and the public sector to start to overcome barriers,” she says. “We’re no longer on the outside, we’re part of that conversation.”

Building a comprehensive product ecosystem is important. This includes developing distribution networks and training technicians for installation and maintenance. Lixil is also supporting training programmes in Europe and the US to ensure the next generation of plumbers have the technical skills needed. The work has included research into the importance of a trained workforce of plumbers to a successful economy, as well as challenging the stereotypes in the industry, and creating programmes dedicated to introducing women to the industry.

As well as household use, Lixil also sees a role for the treatment technologies such as the G2RT as public toilets, as part of emergency response efforts, and for use in underserved communities. There is also growing interest from the private sector, with construction companies, hotel chains and design agencies keen to find out more about bringing waste treatment closer to the source, says McCusker.

“There’s a lot of excitement around the idea,” she adds. “Key stakeholders are really starting to see the potential of on-site sanitation, and how it can give people the choice and the opportunity to have a safe and more dignified toilet.”

To find out more about Lixil’s partnering on the G2RT, visit lixil.com/en/stories/stories_38/

Safely managed sanitation is the use of improved facilities that are not shared with other households and where excreta are safely disposed of in situ or removed and treated offsite. (Ref: washdata.org/monitoring/sanitation)