BILL & MELINDA GATES foundation

Frequently Asked Questions—Transformative Sanitation Technology Portfolio

Q: Why does safe sanitation for the poor matter?
A: Sanitation is one of the most destructive and systemic inequalities of our time. Today, about 4.5 billion people—more than half the world's population—use sanitation facilities and services that are not safely managed.[1] This means that—even if a person has access to, and uses, a toilet or pit latrine—their waste is not contained, transported, or treated in a way that eliminates harmful pathogens. If you visit many poor, urban areas today, you will see that people are often surrounded by human waste that is not disposed of safely. This has devastating impacts on people's lives. Bad sanitation means contaminated water, soil, and food. It makes people sick, and it keeps them from work and school —with real impacts on the human and economic potential of entire communities, and even nations.

Consider these facts:

- Sanitation-related diseases, including diarrhea, cholera, and typhoid, kill nearly 500,000 children under the age of five, each year.[2]
- Global costs related to unsafe sanitation, including losses in productivity and income, and increased healthcare costs, were estimated to equal $220 billion (U.S.) in 2015. In India alone, annual sanitation-related losses were projected to be more than $100 billion – equivalent to 5.2 percent of the nation's GDP.[3]

Safe sanitation is essential for keeping people, communities, and the environments around them safe and clean. In fact, the United Nation's Sustainable Development Goals (SDGs), which set and track global progress towards standards for human and environmental health and well-being, mandate universal access to safely managed sanitation, by 2030.

Q: Why reinvent sanitation technologies? What's wrong with traditional approaches like sewers?
A: As a philanthropy in the global health space, we believe that unless you improve sanitation, it's hard to stop preventable diseases. We are working with our partners around the world, to develop and accelerate sanitation services and technologies that can radically improve sanitation for the urban poor in developing countries, where the health impacts of unsafe sanitation are the highest, and the need for innovation is the greatest.

New, innovative technologies, such as the reinvented toilet, which eliminate pathogens onsite, and do not require intensive use of scarce resources to operate, can be transformative for cities and government leaders who want to provide safer, cost-effective sanitation systems for their communities. We envision a future where stand-alone toilets that don't require a connection to a sewer, electricity or water supply become a new category—and global standard—for safe and cost-effective sanitation, much the way that smartphones in Africa and Asia have obviated the need for landline phone networks.

[1] WHO/UNICEF Joint Monitoring Program for Water Supply, Sanitation and Hygiene, "2017 Update and SDG Baselines," June 2017.
[2] IHME, The Global Burden of Disease, 2016

Q: What exactly is the reinvented toilet?
A: Reinvented toilets are a new generation of toilets that contain and turn waste into pathogen-free byproducts – without the need for connections to costly sewers, treatment plants, water lines, or the electrical grid. These new toilets use a variety of innovative technologies—from electrochemical to dry combustion to biological—to break down human waste and destroy germs, leaving behind clean water and solids that are safe to use as fertilizer or dispose of safely without further treatment. And many of them have the flexibility to scale from individual households to multiple stall facilities that can serve local communities, schools, apartment buildings, and commercial enterprises.

Q: What is the omni-processor?
A: The omni-processor is a small-footprint human waste treatment plant that uses new technology to process waste, kill pathogens, and convert the resulting materials into products that can be sold, such as clean water, electricity, or fertilizer. Omni-processors can be used to augment existing sanitation services within a city, as part of a fecal sludge treatment plant or complementing a waste-water treatment plant.

Q: Are there standards that define the technical requirements of the reinvented toilet and other non-sewer technologies?
A: International standards are critical for guiding the development of reinvented toilets and other sanitation products. The Bill & Melinda Gates Foundation is working with the International Organization for Standardization (ISO) to define specifications for non-sewered sanitation systems and technologies. These standards will set the bar for high-quality innovation. They can also help foster competition within commercial sectors, speed up the adoption of new technologies, boost consumer confidence, and reinforce the safety and function of reinvented toilets. Experts from industry, government, academia, and non-governmental organizations representing 31 countries are leading the development of these standards, which will be published in late 2018.

Q: How much will these new sanitation products cost? How will they be affordable for the poor?
A: The cost will vary, depending on the functions and features of each product. Because the Bill & Melinda Gates Foundation is focused on making these toilets available to the urban poor, from the beginning we and our partners have focused on developing products that cost no more than $0.05 per user per day, over the lifetime of the product. For a household of five this target equals about $7.50 per month, which is on par with how much the urban poor around the world currently pay to empty their pit toilets or for pay-per-use toilets. We don't expect to hit this target immediately, but we expect to see higher volumes and learning curves drive down costs over time.

Q: What progress has been made so far?
A: The Bill & Melinda Gates Foundation's transformative-technology portfolio currently includes 14 innovations in the reinvented toilet portfolio and three in the omni-processor portfolio. These technologies are in varying stages from first prototypes to multiple pilot-tested units operating in real-world conditions. The majority of these technologies are currently available for licensing by commercial entities for product development, test piloting, or commercial launch. These will be featured at the Reinvented Toilet Expo in Beijing, China, November 6-8, 2018. For more information go to: stepsforsanitation.org/rte.

Q: What happens next?
A: The next step is for commercial entities—product manufacturers, home and white goods companies, sanitation service and product businesses, and others—to develop transformative technology products that meet the ISO standard – either by taking commercial licenses for technologies developed with Bill & Melinda Gates Foundation's support or by innovating from their own research and existing products, then to pilot, and ultimately bring the products to market in the places that need them most.

Q: Is this a good business opportunity?
A: Reinvented toilets represent a huge business opportunity. An analysis by the Boston Consulting Group shows that they present a $6 billion-per-year global market opportunity in the combined consumer and municipal sectors by 2030, with over half of that coming from emerging economies like India, China, and countries across Africa. Developed countries with well-established sanitation systems and commercial forces that support green building and innovative building practices have much to gain as well: the market opportunity for the U.S. and Europe is an estimated $1.7 billion per year.[4]

Q: How long do you think it will take for the reinvented toilet to be adopted globally?
A: We don't know exactly how long it will take, but we do know it can't happen soon enough, because billions of lives are on the line. The reason that the Bill & Melinda Gates Foundation brought our partners to Beijing is to share the great progress that has been made in getting these transformative technologies to be market-ready with a set of stakeholders who are in positions to accelerate their commercialization and scale-up. Our market studies show strong demand for products ranging from reinvented toilets for the home to multi-unit public, community, or school toilets to small and large omni-processors for waste treatment at the community level. Ultimately, how quickly they scale up will depend on how attractive the products are, how easy they are to buy, and how bold the overall sanitation sector and governments are in embracing these new solutions. See stepsforsanitation.org/rte for market study research.

Q: What's the role of the private sector in reinventing the toilet? Shouldn't the government ultimately be responsible for providing sanitation services to communities?
A: The private sector has a crucial role to play in advancing innovative technologies and helping governments improve their sanitation services. Companies can build, develop, and test new technologies. They will also ultimately be key players in bringing new products to market, and partnering with governments—which are likely to be among the first wave of purchasers of these new sanitation products—to ensure uptake.

Q: What is the role of governments/utility companies in supporting these technologies?
A: Governments will always play a central role in developing effective, equitable sanitation systems and utilities that can deliver reliable, safe sanitation for communities. National governments that support non-sewered sanitation will put into place the right institutional set-ups, service models, policies, and regulations to hold sanitation operators accountable for expanding safe sanitation services now, and will lay the groundwork for future sustainable progress. Governments are looking for new ways to accelerate safe sanitation for more people. Testing and adopting a mix of sanitation approaches, including the reinvented toilet, omni-processors, and other technologies, will be an important way of providing sanitation services for diverse communities.

[4] "Global RT Market Opportunity," Boston Consulting Group, March 2018.

A: How much funding is available for the continued development of the reinvented toilet?
Q: The Bill & Melinda Gates Foundation has invested over $200 million in support of the development and piloting of transformative sanitation technologies since 2011. The foundation has shared its plans to invest an additional $200 million to support continued research and development that can help bring down costs of new products for the poor, and to support market development in regions where new, non-sewered sanitation products can have the greatest impact. Donor countries and institutions like the World Bank provide critical funding for sanitation systems and infrastructure planning globally. However, aid commitments for water and sanitation have declined since 2012 from $ 10.4 billion to $ 8.2 billion in 2015. Those donors are beginning to direct a portion of those funds to support innovative technologies like the reinvented toilet. The Reinvented Toilet Expo and the foundation's ongoing partnerships with donor institutions will support this kind of collaboration in the coming years.