

Bill Gates' Favorite Toilet

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Everyone knows Microsoft's Bill Gates made his billions developing high-tech products the world had never dreamed of before. What is less well-known is that through the Bill and Melinda Gates Foundation, he is spending those billions developing some of the most humble and basic devices the world has ever known — toilets.

It's hard to resist potty humor, especially when there's an opportunity to fling it at billionaires, but basic sanitation is no laughing matter. More than half of the world's population still does not have access to safe sanitation systems. Globally, more people [own cell phones](#) than functional toilets.

The untreated poop of 4.5 billion people is more than just an inconvenience, and it's more than just gross; nearly [300,000 children under age five die](#) each year from diseases caused by poor sanitation.

Flushing a Fortune

To end open defecation by 2030, at least [60 million people](#) need to gain access to toilets each year. And if the world is going to have enough [clean water](#) to support its growing population, those toilets cannot be the hugely wasteful flush toilets of the 20th century.

The Gates Foundation has [invested more than \\$200 million](#) in toilet R&D to lower barriers to and risks from adopting new sanitation solutions.

Competitive Toilets

Since adopting the sanitation cause, the Gates Foundation has sponsored contests with prize money and development grants for the winners. In 2012, the winners of a "[Reinvent the Toilet Challenge](#)" displayed prototypes that met the contest criteria: capture and process human waste without piped water, sewer, or electrical connections, and transform human waste into useful resources, such as energy and water, at an affordable price.

Most recently, the Gates Foundation co-hosted a [Toilet Expo in Beijing](#). The 2018 Expo displayed 20 toilet and small-scale waste treatment plant designs that Gates described as the first scalable, "business-ready" off-grid toilet systems.

Real-World Use

More than 4,000 [Tiger Toilets](#) have been deployed in rural areas of India since 2015. Similar in design to a traditional pit toilet, they cost about \$350 to install. The difference is that their pit contains tiger worms (*Eisenia fetida*), a species that feeds on mammalian waste.

The worm castings are 99 percent pathogen-free, which is better than a septic tank, and weigh only 15 percent as much as the original waste. The castings are usable as fertilizer. Or they will be, when the tank is eventually cleaned out. The first Tiger Toilets are approaching five years old, and have not required maintenance yet.

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The Tiger Toilet's extreme simplicity and low maintenance make it a winner for community toilets in rural areas. But there is no room for a pit toilet in urban areas. That's part of the reason that the toilet on display at the Gates Foundation Discovery Center in Seattle is the waterless [Nano Membrane toilet](#) developed by Cranfield University in England.

The Nano Membrane uses a fine filter to separate liquids into nonpotable water. The toilet incinerates solids in a small combustion chamber, generating pathogen-free ash and enough energy to charge a cell phone.

See how the Nano Membrane toilet works in this video.

Feature image: the [Nano Membrane toilet](#)

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