



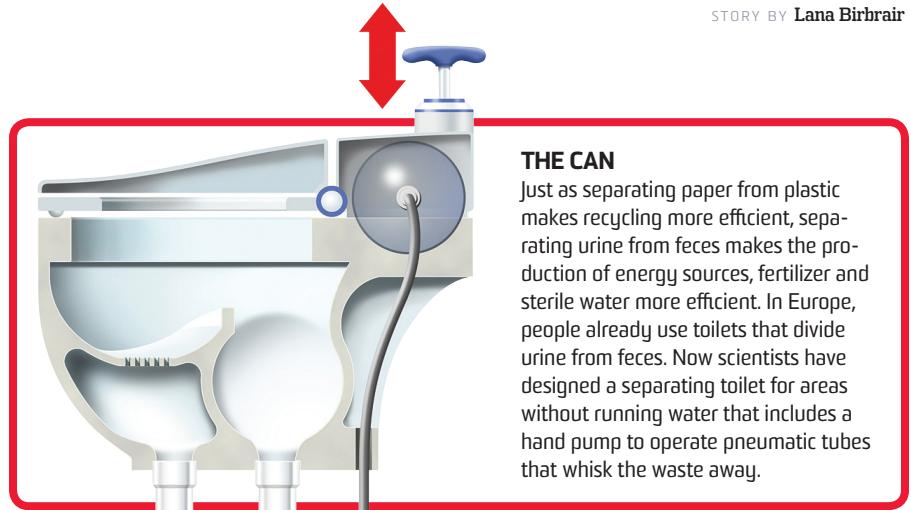
THE ANNOTATED MACHINE

## New Tubes

Redesigning the toilet to produce water, fertilizer and energy

STORY BY Lana Birbrair

About 2.6 billion people worldwide do not have access to a sanitary toilet. To fix this, the Bill and Melinda Gates Foundation awarded eight grants last year to scientists and engineers to invent a toilet that could function without piped water, a sewer system or outside electricity—and would cost less than 5 cents a day to operate. With the funding, scientists are working on using processes such as evaporation, combustion, pyrolysis and anaerobic digestion to break down waste in toilets into three essential resources: water, fertilizer and fuel.



### THE CAN

Just as separating paper from plastic makes recycling more efficient, separating urine from feces makes the production of energy sources, fertilizer and sterile water more efficient. In Europe, people already use toilets that divide urine from feces. Now scientists have designed a separating toilet for areas without running water that includes a hand pump to operate pneumatic tubes that whisk the waste away.

