



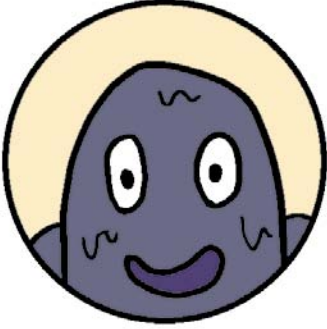
WORLD
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A Comic Uncovering Waste's Hidden Potential

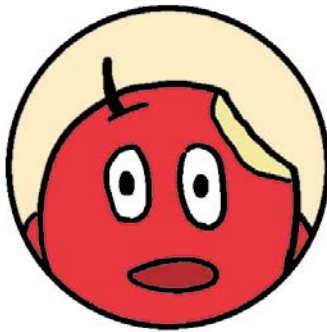
MEET THE WASTES

Organic wastes from plant or animal products can pollute the air, land and water—or, they can be used for energy instead.



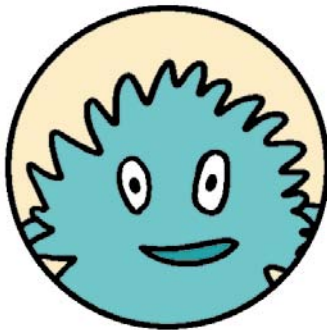
SEWAGE SLUDGE

Sewage sludge is the solid byproduct of wastewater treatment. It contains pollutants like phosphorus, nitrogen and pathogens that can damage the environment.



FOOD WASTE

Restaurants, food companies, farms and home kitchens all produce food wastes. While it would be best not to waste food in the first place, any unavoidable food scraps can be used in waste-to-energy systems.



OTHER ORGANIC WASTES

From cow manure to farm wastes to yard clippings, there are plenty of other organic wastes that can be used for energy.



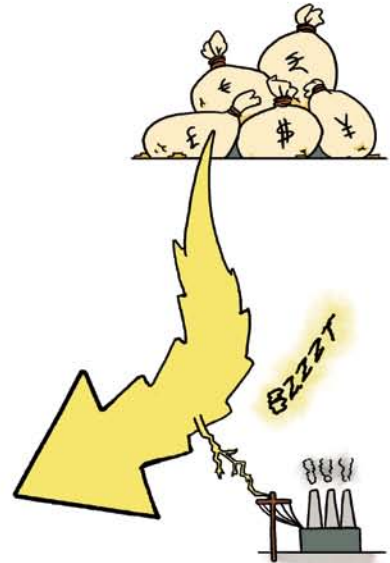
We don't often think about where waste goes once it's out of our sight.



But a lot of time, energy, and money are needed to manage waste.

Wastewater treatment is especially expensive due to the large amount of electricity it requires.

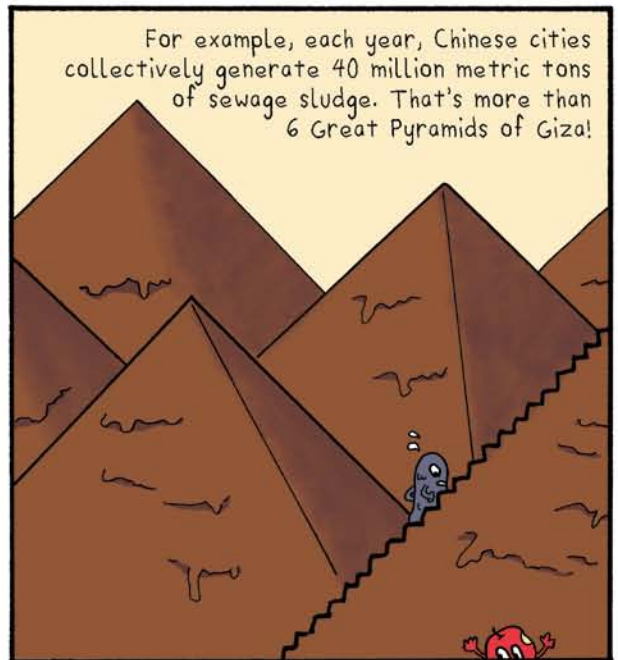
Cities often face high electricity bills for wastewater treatment. Most of this electricity comes from fossil fuels, which produce greenhouse gases.



Around the world, urban populations are growing rapidly — in many cases, so rapidly that waste treatment cannot keep up.



For example, each year, Chinese cities collectively generate 40 million metric tons of sewage sludge. That's more than 6 Great Pyramids of Giza!

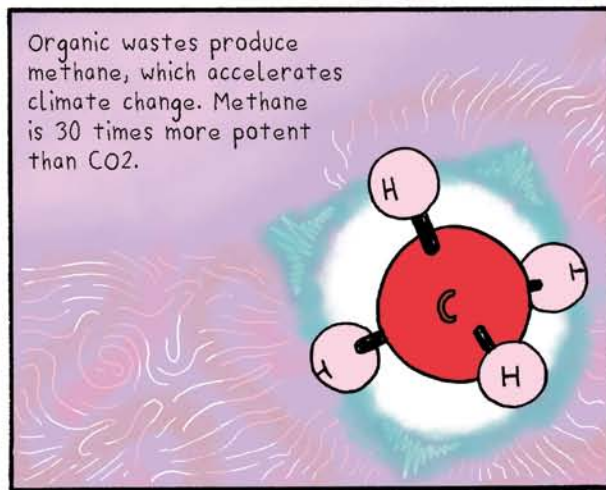
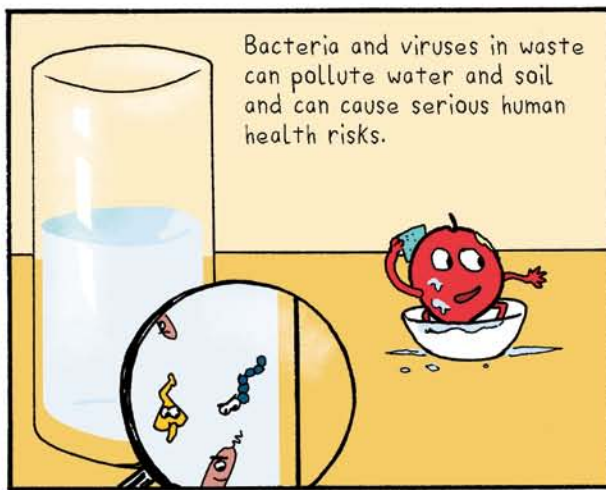


When communities can't afford to manage wastes properly, untreated waste may be discharged back into waterways.

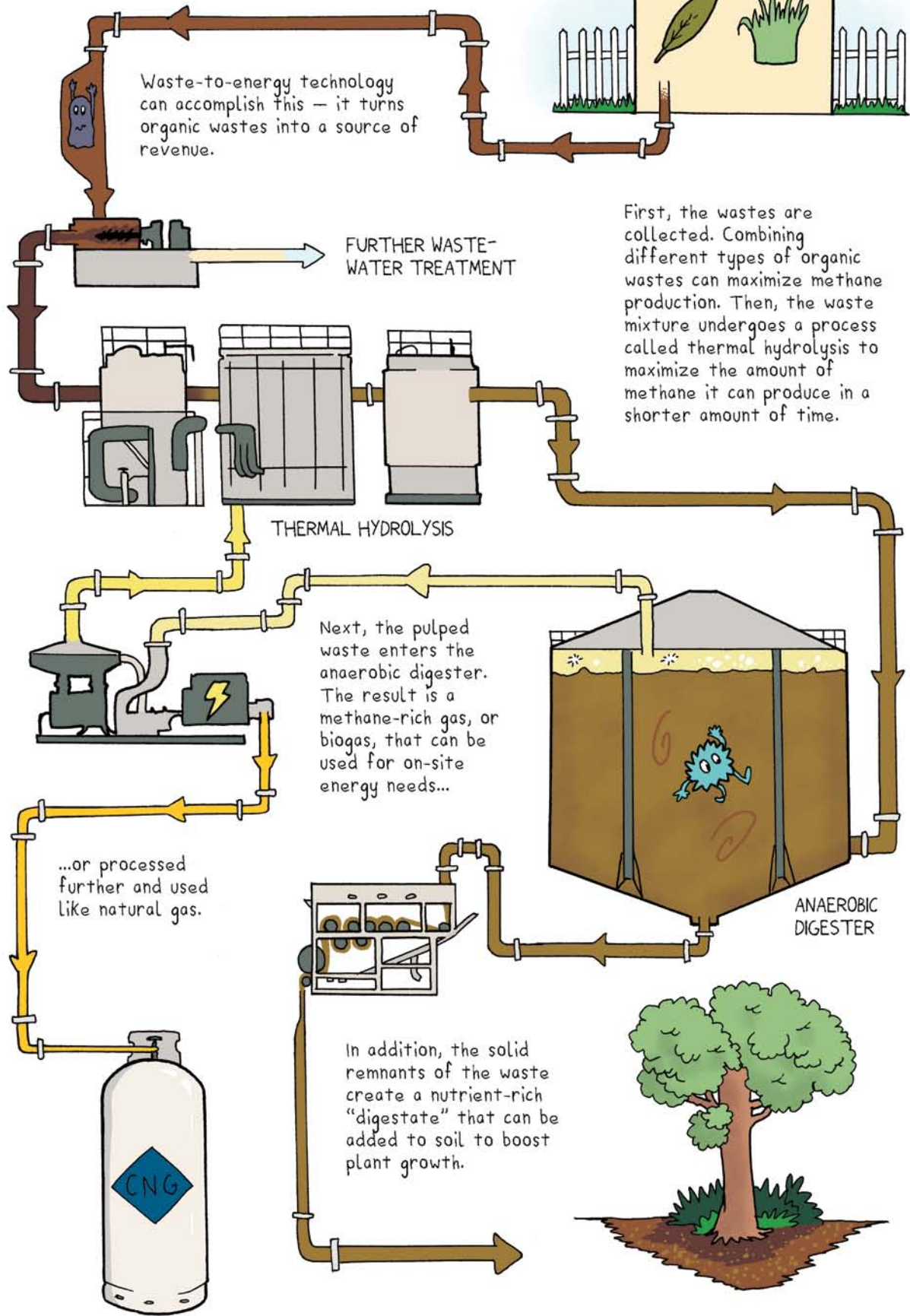


Or, sludge (the solid product resulting from sewage treatment) is dumped on land or in bodies of water, or in landfills. Other organic wastes, like food from restaurants, are dumped in landfills as well. In the US, food makes up the biggest share of waste in municipal landfills.

This poses several risks...

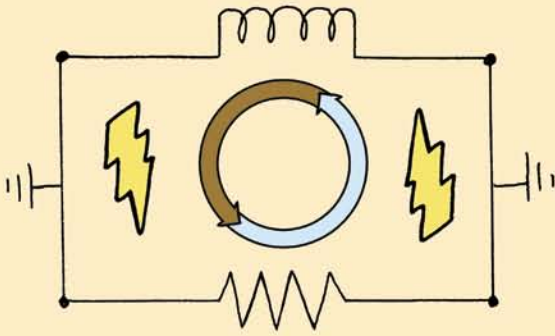


Luckily, methane is more than just a pollutant — it's a fuel we call natural gas. What if we could capture the methane released from waste and use it for power, instead of letting it escape into the atmosphere and cause warming?

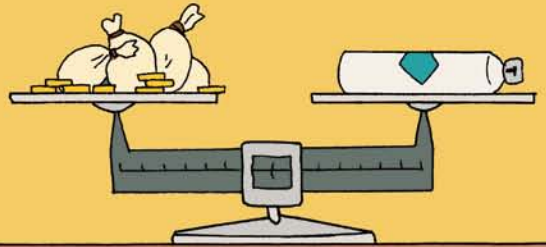


Benefits of using waste-to-energy systems:

Energy: Wastewater treatment plants can become energy self-sufficient.



Economic: Plants can sell the gas and solid digestate.

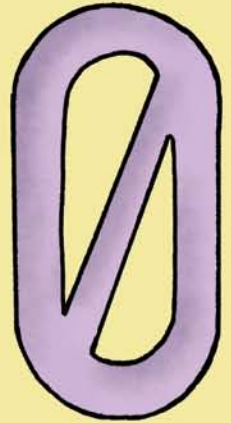


Health: Sludge is used, not dumped! Thermal hydrolysis heats and kills more pathogens than traditional sludge treatment.

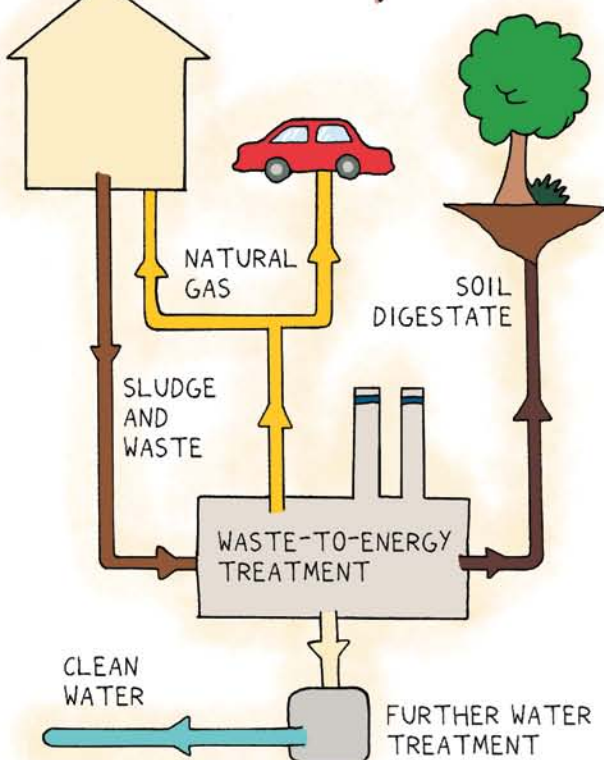


Emissions: Prevents methane from escaping into the atmosphere, and lowers the amount of fossil fuels used at treatment plants.

Some projects have achieved near-zero net carbon emissions.



WASTE → RESOURCE



These benefits can be huge:

WRI estimated that if all the sludge and kitchen waste produced in Chinese cities was treated using a waste-to-energy approach, 6.6 billion cubic meters of methane could be captured and used to power wastewater treatment.

In addition to meeting the energy demands of the treatment plants, the remaining methane could meet the annual energy demands of 2.8 million cars.

When cities around the world stop viewing waste as a nuisance, but as a resource, we can unlock solutions to waste management, water treatment, and clean energy.

World Resources Institute is a global research organization that turns big ideas into action. Its global Water Program provides governments, civil society and companies with research, cutting-edge tools and top-notch expertise to pinpoint and manage water risks—like floods and droughts—that affect billions of people around the world.

Learn more about WRI’s work on sludge-to-energy: <http://bit.ly/2iaPo3T>

Find out more about WRI’s Water program: www.wri.org/water
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