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UC RIVERSIDE: New technology turns human waste into clean energy

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Published: November 19, 2013; 06:25 PM

UC Riverside engineers on Tuesday, Nov. 19, unveiled a system that uses heat and pressure to turn human waste into clean energy – a technology they say will save millions of dollars and cut pollution.Researchers at the university's Center for Environmental Research and Technology have been working since 2002 to develop a commercially viable steam hydrogasification system. Their two-story reactor is the only one operating in California, officials said.A ribbon-cutting ceremony drew a host of dignitaries, including UCR Chancellor Kim A. Wilcox, Sen. Richard Roth, Assemblyman Jose Medina and Riverside Mayor William "Rusty" Bailey, who held a sealed jar of sludge and joked about the lid coming off.UCR is perfecting the first stage of the system, which pumps a combination of municipal sewage, sawdust and water into a pressurized reactor that is heated to almost 1,400 degrees.

The heat burns the organic material, turning it into carbon dioxide, methane and carbon monoxide, said Junior B. Castillo, a senior development engineer at the center.

In the two later stages of the system, which are under development, the gases will be processed further to create substitute natural gas, he said.At this point, the scientists are using electricity to heat the reactor, but once the system is fully developed, it would be powered by the natural gas that it creates."The natural gas can be turned in to hydrogen, electricity or diesel fuel to run other equipment," Castillo said.California generates about 83 million dry tons of biomass, including municipal and agricultural waste, per year. Most of it is taken to landfills or burned, which pollutes the air and water, state officials say. Processing the waste into renewable energy would save a lot of money, said Robert Weisenmiller, chairman of the California Energy Commission.

The city of Riverside pays $80 per ton to truck its treated sewage to farmland in Arizona, or to a composting facility in Helendale.

In three to five years, UCR expects to build a pilot plant with the city of Riverside to handle its sewage, Castillo said.Weisenmiller praised the development as a significant step toward curbing greenhouse gas emissions and meeting state requirements for more renewable energy. He hopes the technology will become widely available in places such as China, which now creates air pollution that travels across the Pacific Ocean to the United States.

The California Energy Commission and the Air Quality Management District have invested several million dollars in the UCR technology.“We need a variety of tools to deal with energy challenges,” Weisenmiller said. “Our forests are stressed by climate change and, as that happens, we have a certain amount of dead trees.” If those trees were harvested, they could create the sawdust used in the hydrogasification process, he said. For example, the system currently is using trees from San Bernardino County that were killed by pests.“If you can convert that into energy so it’s a resource, not waste, that’s good for all of us,” Weisenmiller said