



Ancient designs lead to cutting edge sustainability

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An exciting technology has engineers and conservationists celebrating. Microturbines provide sustainable energy to hospitals, wastewater plants and much more, while reducing emissions and costs.

With a planet of 7 billion people, and the third world demanding its share of earth's bounty, sustainability has never been more crucial for our children and the planet at large.

Roland Pabst, an energy engineer for microturbines and solar energy at the Tech Performance Group, said, "Microturbines compress air until it is so highly pressurized it becomes combustible. An electric spark ignites fuel, creating a burning mixture that rotates the turbine shaft, producing electricity with a generator. A Capstone microturbine only has one moving part. That's the key! There is no friction, so there is no need for lubrication. So there's no need for oil. It's incredible!"

Columbia University recently promoted the Capstone Microturbine that powers its residential buildings, along with four restaurants, two dry cleaners, a hair salon, and every other building on the block. Pabst said, "A microturbine eight feet high and 30 inches wide can provide 65 kilowatts of energy. A 6,500 s/f roof with solar panels would be necessary to create the same amount of energy."

Ironically, this cutting edge technology derives from the biblical era. Ancient tinkerers created a propulsion device to spin an orb on an axis, but not for mechanical purposes. Age-old texts from India describe saucer shaped aircrafts, and Egyptians from 200 BCE sketched planes much like modern jets. Aboriginal Americans sculpted similarly accurate planes in gold 1,000 years ago.

The Chinese invented gunpowder in the 13th century and launched the first propulsion rockets in history to stop a Mongol invasion, only to abandon rocketry due to the high cost of gunpowder.

The next 450 years produced Newton's Laws of Motion and a patented design for an Internal Combustion Engine (an I.C.E.). In the mid 1880's, Gottlieb Daimler and Karl Benz respectively patented the first motorcycle with a gas engine and the first car with an I.C.E, to create Mercedes-Benz. After 30 years of jet engineering, two world wars led to innovative jet fighters flying at 540 mph, with better aerodynamics and radar.

Predictably, jet engines soon spawned a model aviation community of people we now affectionately call "nerds." They set up "Jet Meets" for model jet plane engineers to show off their designs. By 1983, Jerry Jackman's British team produced the world's first micro-turbojet engine for model jet engines. Germany's Kurt Schreckling later produced a microturbine with basic tools to power a toy plane. The toy engine soon became a prototype for commercial jets.

I.C.E.'s mix in highly pressurized air to conserve petroleum. Microturbines run mostly on compressed air. These self-sustaining engines already power agriculture, chocolate manufacturers and federal buildings. They will soon be fueling hybrid electric vehicles and providing energy to homes hit by natural disasters.

Yet, Pabst said, "The U.S. is so far behind Europe with regard to sustainability, we may not catch up for 25 years." With regulators around the world adopting very low emission standards, highly efficient microturbines offer a chance to step up.

The microturbine may find itself competing with power authorities and independently owned power plants. As NPR reports, much of this infrastructure has aged, but demand for electricity only rises. The companies are upgrading, but citizens need to reduce their own wasteful energy habits, while suggesting their employers do the same.

Such minor changes require little sacrifice, but save money. Like backpackers, we should leave the world to our children in at least as good a state as we found it.

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