

Method For Converting Solar and Waste Heat into Usable Energy (#4930)

An approach to harvesting solar and waste energy by exploiting and enhancing the inherent instabilities of stratified, thermally buoyant air layers in both open and closed spaces

Georgia Tech inventors have developed an approach to harvest solar and waste energy by exploiting and enhancing the inherent instabilities of stratified, thermally buoyant air layers in both open and closed spaces. These unstable heated layers can lead to intense vertical-column vortices, similar to tornados and dust devils although considerably less violent in strength. Inducing and “anchoring” these vortices to a turbine sustains power continuously, as long as thermal stratification (buoyancy) of the air layer is maintained. It has been demonstrated that the momentum generated by these vortices can be harnessed to drive a vertical-axis turbine coupled with electric power generators. The technology provides a method for inducing and sustaining a vortex by arranging turbine blades around a central heating source that creates an initial thermal plume. As the heat rises through the boundary layer, the turbine blades impart sufficient angular momentum to draw the air back through the vanes and impart power to the attached turbine generator.

Benefits/Advantages

- **Cost effective** - Efficiently converts readily available solar/waste heat to energy without the need for optical concentrators or tall turbine towers.
- **Scalable** - Multiple turbines can be arranged to harvest power across a vast area.
- **Sustainable** - Capturing readily available solar and industrial waste heat is renewable and green.
- **Safer** - Equipment is located within 100 feet of the ground, easing installation and operation.

Potential Commercial Applications

- Solar energy
- Distributed power generation
- Grid power generation
- Waste heat recycling

Background/Context for This Invention

This technology is an improved method for capturing vast amounts of readily available low-grade heat and converting it into reusable energy. Man-made waste heat is a byproduct of many industries, and solar

energy is abundant in vast desert regions around the globe. Low-grade heat converters are not as efficient as converters for high-grade fuels, so this form of energy is largely untapped. This innovative approach to harvesting solar and waste energy is sustainable, efficient, and less aesthetically disruptive than current technologies.

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More Information

Publications

For more information about this technology, please visit:

<https://licensing.research.gatech.edu/technology/method-converting-solar-and-waste-heat-usable-energy>

Images:

The automated sequential delivery of multiple fluids. A varying number of delay gates imprinted in the branches are shown in the figure.

COVID-19 and flu saliva test on paper: (A) The automatic sequential delivery of multiple reagents required for virus test; (B) Water pouring into the device triggers the virus assay, allowing the presence of SARS-CoV-2 and influenza A & B viruses to be visually identified by the color changes in the corresponding detection spot

