

Compact Steam Generator Based on Linear Concentrated Solar Collector for Polygeneration Plants

Summary/Characteristics

A researcher at Universidad Carlos III de Madrid has developed a system that enables two basic functions of absorption machines to be performed simultaneously:

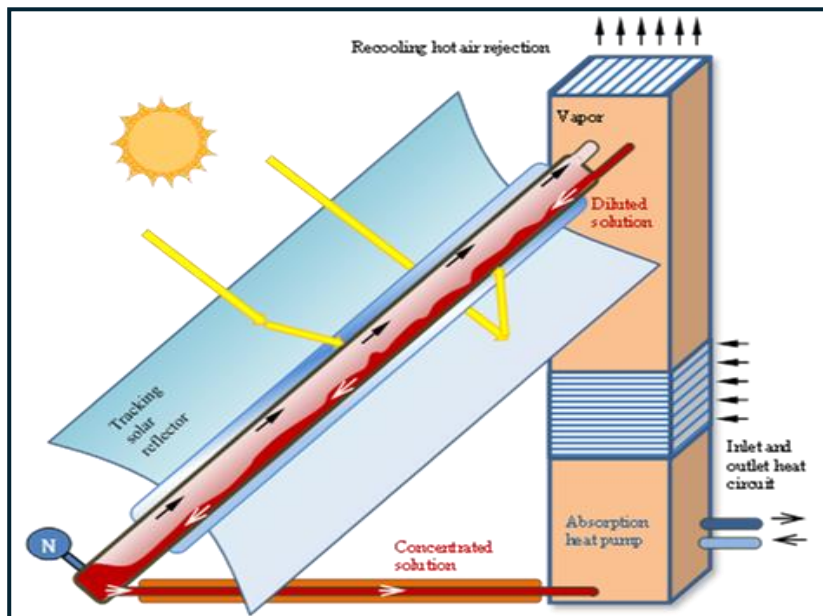
- Direct generation of refrigerant steam using captured solar energy, without a heat transfer fluid circuit.
- Separation of steam from the solution, making the system simpler, more compact, cost-effective, and efficient.

The device follows the “prosumer” concept, as it can produce heat, cooling, and electricity when combined with a hybrid absorption machine, while also consuming electricity when solar input is insufficient.

Support is sought to commercialize the device and scale it for industrial production.

Innovative Aspects

- Solar collector integrated into a compact system with a multifunctional absorption machine.
- Performs two functions simultaneously: generates refrigerant steam and separates the steam from the solution.
- Eliminates the need for heat transfer fluids such as glycol water or thermal oil.
- No heat transport circuits are required.
- Uses stratified two-phase flow driven by gravity.



Schematic operation of the compact steam generator based on a solar collector

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Competitive Advantages

- Production of heat, cooling, and electricity, enabling year-round profitability.
- Can be integrated into the electrical grid, providing complete energy coverage.
- No thermal oil or toxic antifreeze fluids required.
- Reduced size, weight, costs, and lower installation and maintenance complexity.
- Enables users to act as prosumers—both producing and consuming energy.

Grado de desarrollo de la tecnología:

Device ready for demonstration, with field tests completed. TRL 7.

Estado de la Prop. Industrial e Intelectual:

Granted Spanish patent. Title: “Generador-separador de vapor mediante energía solar.”

Colaboración solicitada:

Collaboration is sought with companies and technology centers to establish investment agreements, commercial agreements with technical assistance, R&D cooperation agreements, or to identify licensees for industrial scaling and commercialization of the technology.