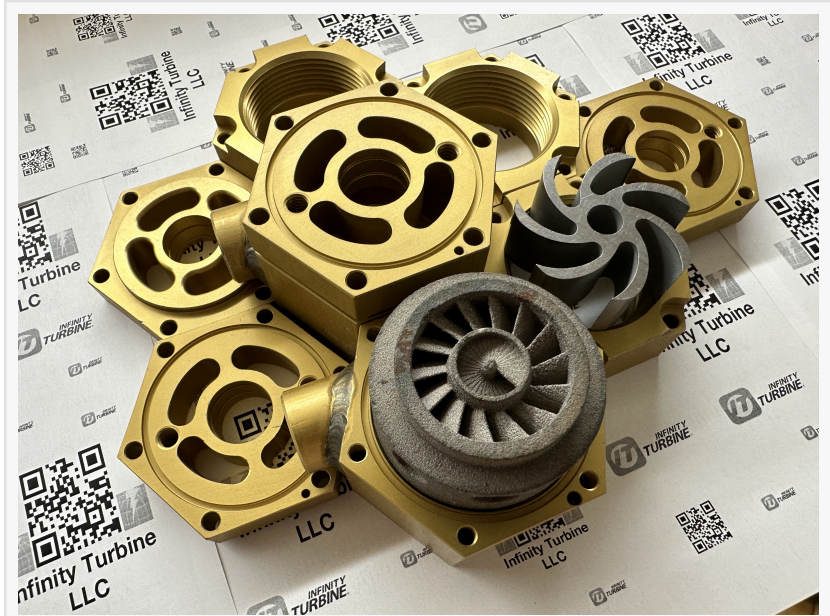


Infinity Turbine Announces Cluster Mesh Power Generation for Ultra-Efficient Data Center Cooling from Waste Heat

Breakthrough solution harnesses waste heat from the GPUs providing significant savings and operational benefits for data centers worldwide.

MADISON, WI, UNITED STATES, October 1, 2024 /EINPresswire.com/ -- [Infinity Turbine](https://www.infinityturbine.com/) LLC is proud to introduce its Cluster Mesh Power Generation System, an innovative approach to cooling and energy efficiency for data centers. Utilizing [supercritical CO2](#) (sCO₂), this breakthrough solution harnesses waste heat from the processors to achieve an unprecedented Coefficient of Performance (COP) for cooling—providing significant savings and operational benefits for data centers worldwide.

The Cluster Mesh Power Generation System offers a flexible, high-efficiency approach to cooling that compares two unique methods of utilizing waste heat: directly heating CO₂ before turbine expansion, or compressing and heating CO₂ before turbine expansion. The results clearly indicate that the inclusion of a compression step yields significantly enhanced cooling performance, driving industry-leading efficiency in data centers.



Optimized Cooling for Data Centers

Data centers are major energy consumers, with a significant portion of energy use attributed to cooling their servers and hardware. Infinity Turbine's Cluster Mesh Power Generation technology takes advantage of low-grade waste heat (between 31°C and 50°C) to deliver efficient cooling, reducing both energy consumption and costs. The system's two scenarios demonstrate the impact of compression on cooling efficiency:

- Scenario 1: Heating Only of CO₂

In this scenario, CO₂ is heated directly without prior compression and expanded through the turbine. With a lower pressure differential, this approach yields a smaller enthalpy drop, resulting in reduced cooling efficiency with a COP of 9.94—approximately half the efficiency of Scenario 2.

- Scenario 2: Compression + Heating of CO₂

In this scenario, CO₂ is first compressed, then heated using available data center waste heat, and subsequently expanded through a turbine. The turbine is directly attached to the compressor (like a jet turbine). This approach increases the CO₂ pressure before heating, enabling a larger enthalpy drop during expansion and maximizing the cooling effect. The result is a COP of 19.88, meaning almost 20 units of cooling are produced for each unit of energy input (twice the efficiency of the first approach).

Benefits of Cluster Mesh Power Generation for Data Centers

- Significant Energy Savings: The Cluster Mesh Power Generation System effectively doubles the cooling capacity by including a compression step. This enhanced efficiency translates to substantial energy savings, reducing the overall operational costs for data centers.
- Utilization of Waste Heat: By leveraging waste heat from data center operations, Infinity Turbine's technology not only provides high-efficiency cooling but also promotes sustainability, helping data centers minimize their carbon footprint.
- High COP for Optimal Performance: With a COP of nearly 20, the Cluster Mesh system sets a new standard for cooling efficiency, providing data centers with an optimal solution to meet the growing demands of high-performance computing while reducing environmental impact.
- Focussed Savings: Uses AI to optimize electrical power generation or cooling, depending on the value of a kWh versus the savings in cooling.

Water Conservation: A Game-Changer for Sustainability

AI data centers typically rely on evaporative cooling processes, which consume significant amounts of water. The Cluster Mesh Power Generation System mitigates this need by utilizing waste heat for power generation, drastically reducing water consumption.

For a medium-sized data center, the system's cooling capability can save approximately 108,000 liters of water per hour, equivalent to:

- Daily Water Savings: 2,592,000 liters per day
- Annual Water Savings: 946,080,000 liters per year (nearly 1 billion liters annually)

For a larger data center, these savings are even more profound, contributing significantly to global water conservation efforts.

Total Impact: Power and Water Savings Combined

The combined benefits of the Cluster Mesh Power Generation System include both energy and water savings, making it an ideal solution for modern AI data centers that seek to reduce their environmental footprint while improving operational efficiency.

For a Medium-Sized AI Data Center:

- Annual Energy Savings: \$1,494,696
- Annual Water Savings: 946,080,000 liters

For a Large-Sized AI Data Center:

- Annual Energy Savings: \$3,756,840
- Annual Water Savings: 2,365,200,000 liters

These figures highlight the system's ability to generate substantial cost savings while also conserving critical natural resources.

Infinity Turbine's Cluster Mesh Power Generation System is a forward-thinking solution designed to meet the increasing need for energy efficiency in data centers. By incorporating supercritical CO₂ and innovative thermal management technologies, Infinity Turbine is driving the industry towards a more sustainable future while providing tangible operational savings.

About Infinity Turbine

Infinity Turbine is a pioneering company dedicated to developing innovative energy solutions that harness waste heat and other renewable energy sources. With a focus on Organic Rankine Cycle technology, Infinity Turbine offers a range of customizable turbines and energy systems designed to improve efficiency and sustainability across various industries.

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This press release highlights the effectiveness of Infinity Turbine's Cluster Mesh Power Generation in transforming the efficiency of data center cooling using supercritical CO₂ and

waste heat—achieving industry-leading COP values that underscore the system's operational and environmental benefits.

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