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model-it10-organic-rankine-cycle-turbine-generator-system-from-infinity-turbine

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Infinity Turbine LLC

IT10 Waste Heat to Power System ORC

This webpage QR code

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Company Name: Infinity Turbine LLC
Product: IT10 System
Working Fluid: Refrigerants such as R245fa
Machine: ORC and ROT Radial Outflow Turbine System
Industry: Energy
Applications: Waste heat to power, utilities, server farms, hot geothermal

PDF Version of the webpage (first pages)

https://infinityturbine.com/model-it10-organic-rankine-cycle-turbine-generator-system-from-infinity-turbine.html

IT10 kW ORC System

Waste Heat Power: For years we've been hearing requests from customers who would like to use their waste heat to generate power, both on land and marine applications. To meet that demand, we formed Infinity Turbine LLC in 2008 and developed the IT10, the worlds first production 10 kw ORC (Organic Rankine Cycle) waste heat to power generator.

New developments in CO2 Brayton Cycle may allow efficiencies to reach 30-50 percent, but only for high grade heat (way above 300 F). This is a huge increase from the legacy ORC process which has a system efficiency (bottoming cycle) of 5-15 percent). We now offer a CO2 Turbine Development Platform for educators and energy developers.

IT10 Revenue based on gross sales or grid savings, not including cost of acquiring waste heat flow or pumps.

Revenue from IT10 (24 hours x 365 days per year x 10 kWh = 87,600 kWh per year):
at $.20 per kWh = $17,520 USD per year
at $.40 per kWh = $35,040 USD per year
at $.80 per kWh = $70,080 USD per year

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Value:

The value in waste heat to power is that it's a free energy source. The advantages are fuel, or electrical savings, but also displaces fossil fuel electrical production, and hence, reduces CO2 emissions. If you have to pay for your heat source, then ORC doesn't make economic sense. If you have high-grade heat, consider a topping cycle (Brayton Cycle using CO2).

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Efficiency:

The real question to ask is whether or not deploying a ORC power generator is a financially wise decision. Because you are utilizing low grade heat, your efficiency will be low (between 3-8 percent). Consider a solid state 20 percent efficiency solar PV panel instead.

Utilizing low grade heat only makes sense in the following circumstances:

1. High price grid or stand-alone power. The break-even in many cases is about $.20 / kwh. If you have to pay for diesel of propane to fire your generator, finding other methods of generating power are worth seeking.
2. Remote or island based power generation.
3. 24 hour supply of waste heat. Keep in mind that harvesting that heat may cost money and resources.

Advantages:

The advantages may go much further than cost savings. Waste heat can now be used to produce rotary shaft horsepower, to spin a generator, a pump, or without any moving parts, to generate static electricity. The heat can be used many times, including CHP applications such as chillers, desalination, CO2 harvesting from the ocean (via off-the-shelf membranes), and CO2 Fluid Extraction machines (which can be used for extracting oil from botanicals, regenerating catalysts, and methanol or other alcohol production via the use of catalysts).

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CO2:

Infinity Turbine LLC already develops ORC green energy systems and is developing CO2 energy modules (in high temperatures can be over 40 percent efficient in the Brayton Cycle). Infinity is seeking funding to further this development. Until we get funding, we'll continue to develop the CO2 Rankine cycle.

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Triboelectric Effect:

Infinity Turbine is also working on some new remarkable technology called TriboElectric Effect. Currently we have a patent-pending oil separation device that is used in the CO2 Fluid Extraction industry. Commonly referred to as electrostatic precipitation, Infinity discovered a way to passively generate static charge using CO2. This helps to apply a static charge to entrained oil in a gas, which allows it to adhere to the first thing it comes in contact with (collection/filter vessel).

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Modular Fluid Handling Device:

Infinity Turbine uses rapid prototyping and development using the patented Modular Block (National Science Foundation quoted as saying it’s an Industrial LEGO) allows fast deployment into the market.

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