

Hot Wire

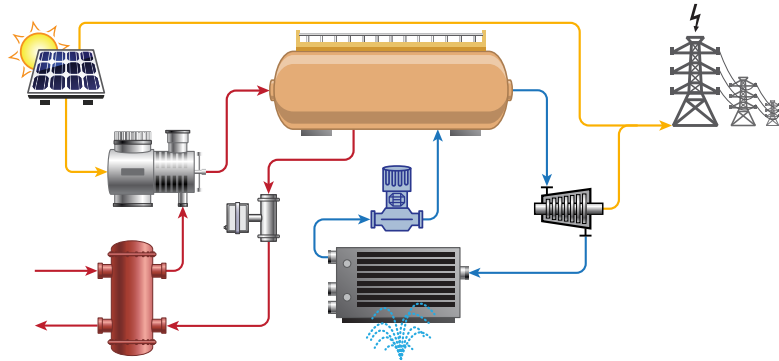
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News & Updates from green Thermal Energy Technologies

gTET is open for business as usual after COVID lockdowns

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Turn-key solutions to transform waste into useful energy, delivering economic and climate change benefits



gTET specialises in innovative solutions at industrial scale for thermal energy management, in particular redeploying waste or renewable streams to reduce opex and carbon footprint.

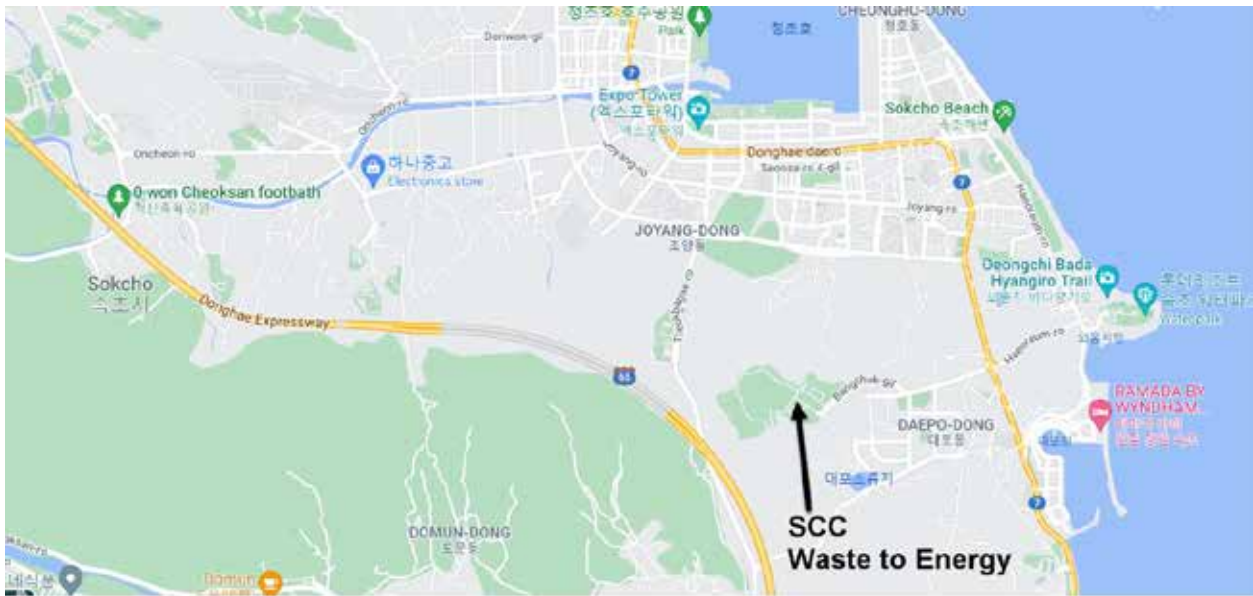
gTET's revolutionary ORC generators enable thermal energy to be effectively converted into electrical power where this is the most efficient and effective use of the energy.

As we like to say here "WASTE is the new OIL"

1. Projects:

SokCho City, Korean Republic Waste to Energy Facility

SokCho City is located on the north east coast of South Korea and is primarily known as a tourism hub for its beaches, natural hot springs and golf courses, as well as its fine fishery products. SokCho City is located between the mountains in the west and the Sea of Donghae in east. It is also renowned for its clean environment.



In 2013 the SokCho City municipal council approved a waste to energy project redepolying 80T/day municipal household waste into electrical power generation and steam. The total project cost was approximately US\$2.4m including the incinerator/boiler, site works, steam turbine generator, ORC generator and adjacent spa facility.



The incinerator/biomass boiler produces approximately 9T/h steam at about 15bar.

7T/h of steam is used in the power station which comprises a back pressure steam turbine generator (STG) producing 320kWe cascaded to gTET's ORC generator producing 170kW for a total of 490kWe of generation capacity. The plant was sized to keep below the 500kW threshold which would otherwise incur a higher level of regulatory control.



The remaining 2T/h of steam is used at the spa health facility with spa baths, sauna's etc



gTET's 170kW ORC generator comprises two of its high-speed twin radial turbo-alternators and high-speed turbine power modules and IEEE1547 certified grid inverter. The ORC is supplied 3.8T/h of 108°C saturated steam which is condensed in the evaporator and supplied back to the boiler feed water tank at 90°C. The ORC condenser is supplied cooling water from a cooling tower at a design point of 24°C at 48lps.



The power station and ORC generator was commissioned in 2014 and gTET can monitor operations remotely in Melbourne via the web connected SCADA.

2. Technical Brief:

Thermal Battery Opportunities in Combined Heat & Power Applications

gTET, via its joint venture TORC, is developing Thermal Battery technology that offers a great deal of flexibility to optimise the performance for specific CHP (combined heat & power) applications. Our Thermal Battery was explained in Hotwire issue #5 available at www.g-tet.com/news, and a video can be viewed at www.torc-cleanenergy.com. The technology can also leverage waste or renewable heat sources and efficiently deliver stored heat which further increases the overall performance of the VRE (variable renewable energy) storage effectiveness.

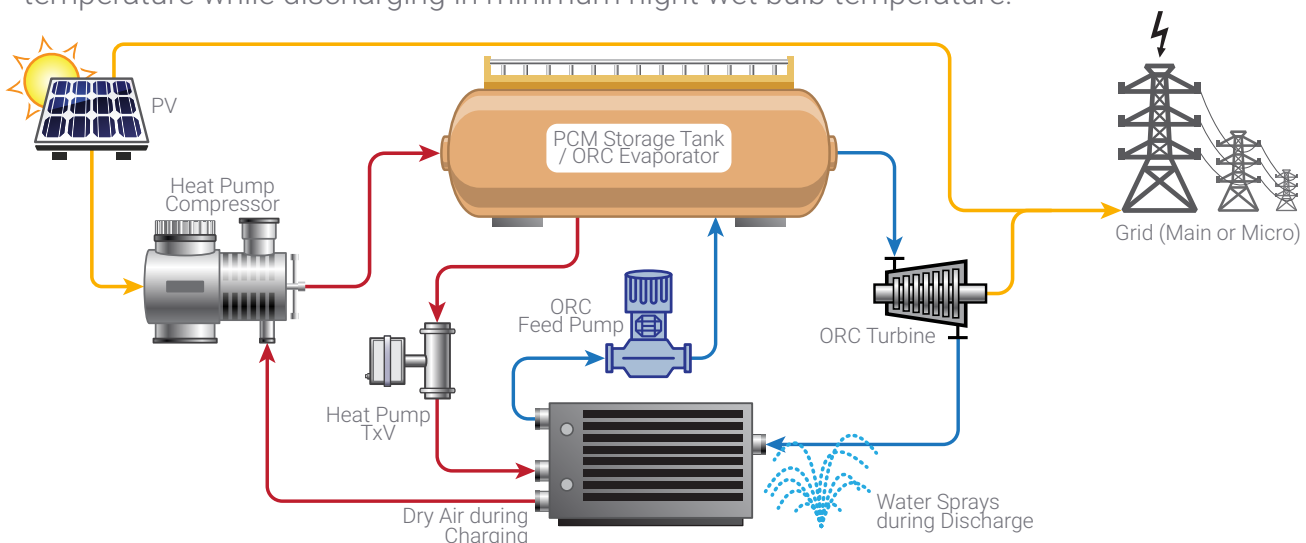
Thermal energy contributes more than 50% of all global energy and so VRE storage that can leverage the thermal energy supply and/or delivery significantly increases the applications and effectiveness of solution.

The relatively low 130°C storage temperature of our Thermal Battery is ideally suited to many industrial processes and is also ideally suited to significantly leverage the heat pump COP of numerous very low-grade waste or renewable heat sources in the range of 50°C-80°C such as data centres and shallow depth geothermal.

The following is a none exhaustive list of configurations for the Thermal Battery that TORC has already initiated communication in the market. All of these examples enable the installation to achieve 100% renewable on-site power consumption from the sites variable renewable generation e.g PV solar with each configuration optimising the system efficiency, and therefore the LCOS (levelized cost of storage), for the site CHP (combined heat & power) requirements.

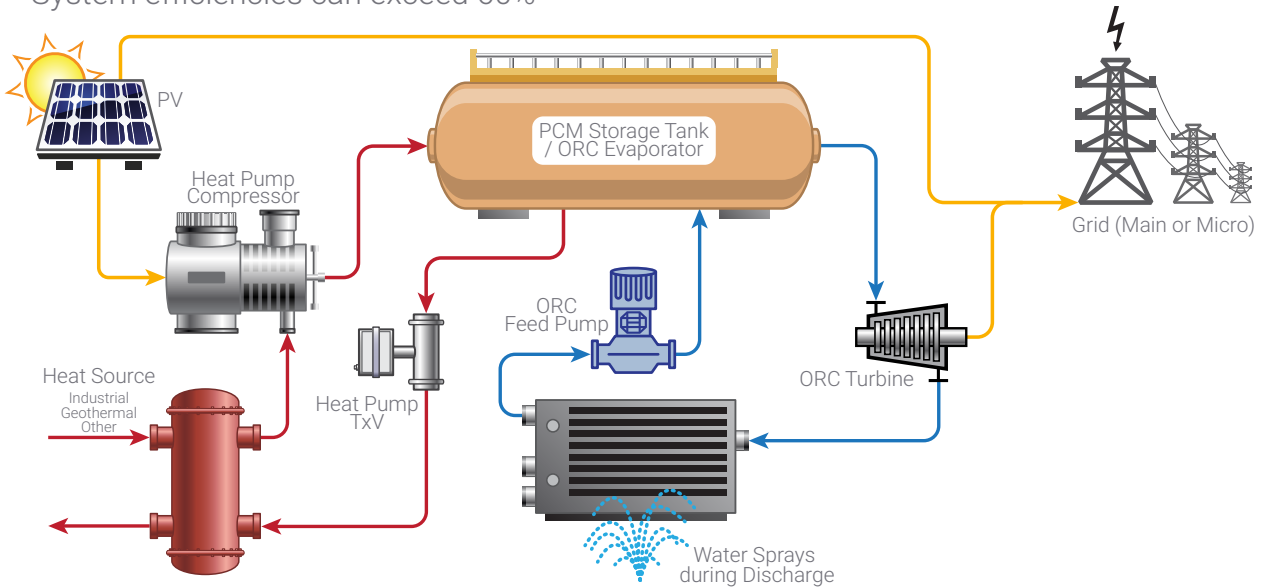
1. *Electrical Only Configuration*

- Heat pump charging with dry air evaporator. Leverage the dry bulb advantage (hotter).
- ORC discharging with adiabatic (water spray) condenser. Leverage the wet bulb advantage (colder).
- Leverage the diurnal advantage of charging during the maximum day time dry bulb temperature while discharging in minimum night wet bulb temperature.



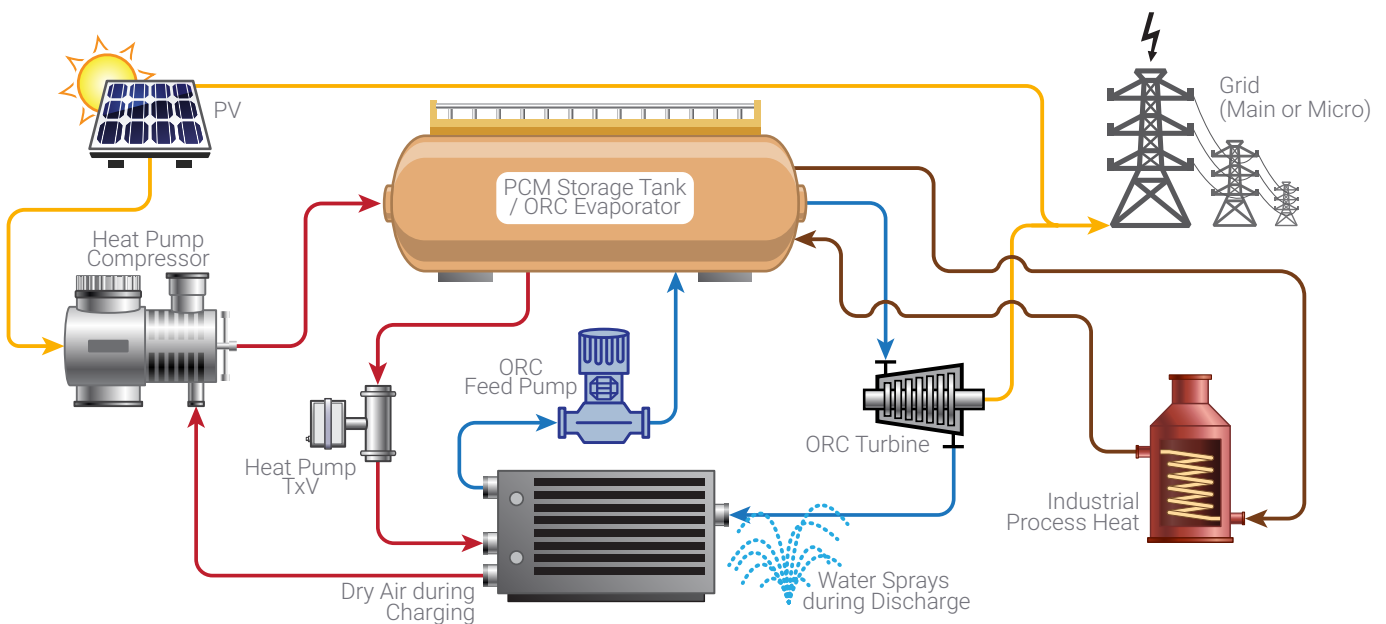
2. Electrical with Heat Generation

- Heat pump charging 'pushing off' the waste heat source thereby leveraging the advantage in increasing the COP
- ORC discharging with adiabatic (water spray) condenser leveraging wet bulb advantage and diurnal advantage
- System efficiencies can exceed 60%



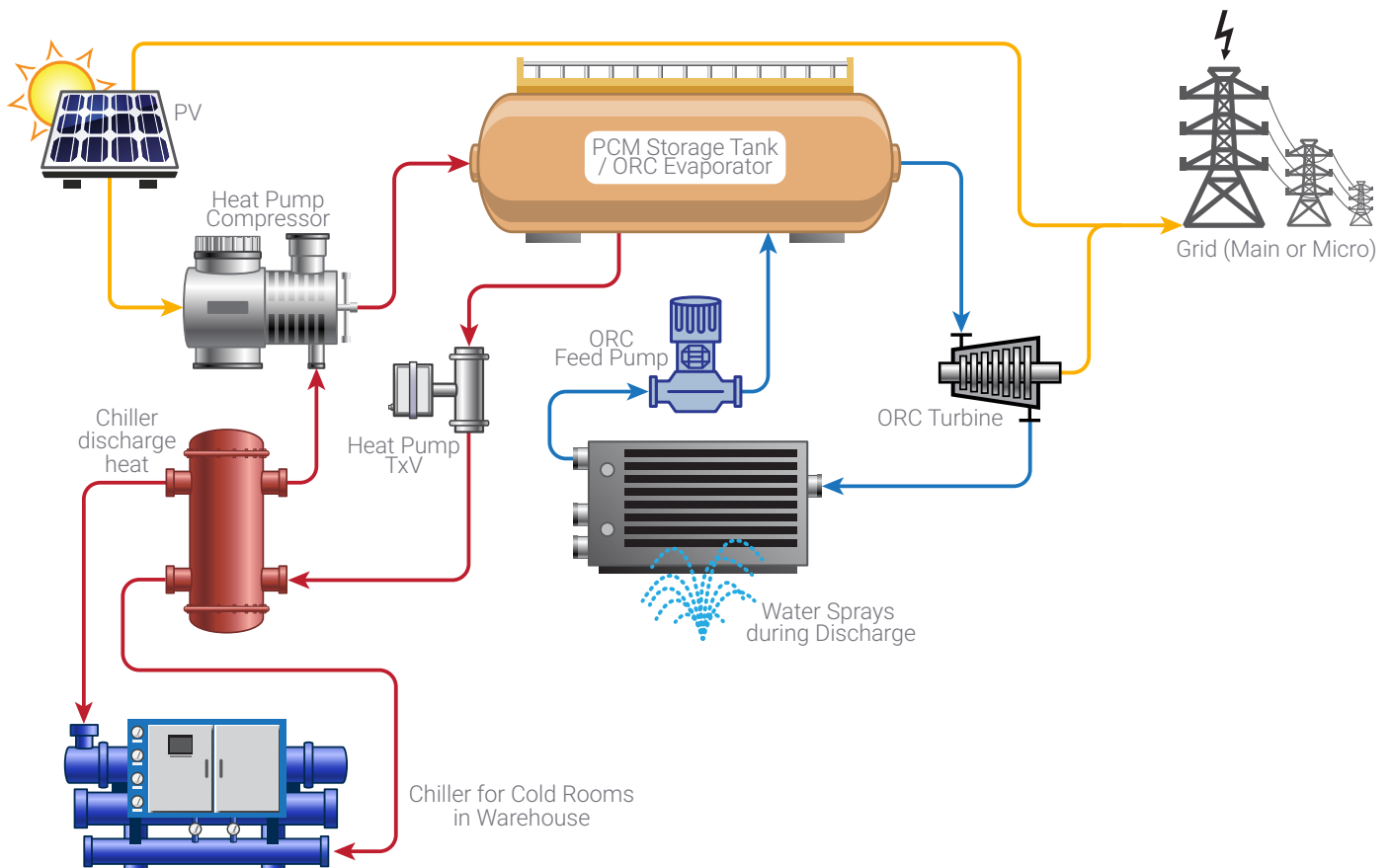
3. Electrical with Stored Heat Consumer

- Heat pump charging from dry bulb evaporator and ORC discharge via wet bulb condenser with diurnal temperature advantage
- Stored heat provided as very efficient zero emission process heat up to 130°C
- Energy stored and delivered with over 70% efficiency.



4. Electrical with Cold Consumer

- Heat pump charging pushing from the chillers condenser heat in order to increase the Thermal Battery charging COP
- ORC discharging with adiabatic (water spray) condenser
- Cold storage in PCM (phase change material) aligned to periods of VRE generation eg period of PV sunlight which also aligns with the Thermal Battery charging period.
- System efficiencies can exceed 60%



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to stay up-to-date on news, updates, past and present project info

www.linkedin.com/company/gtet-green-thermal-energy-technologies/