gTET Hot Wire

The Heat Transformers

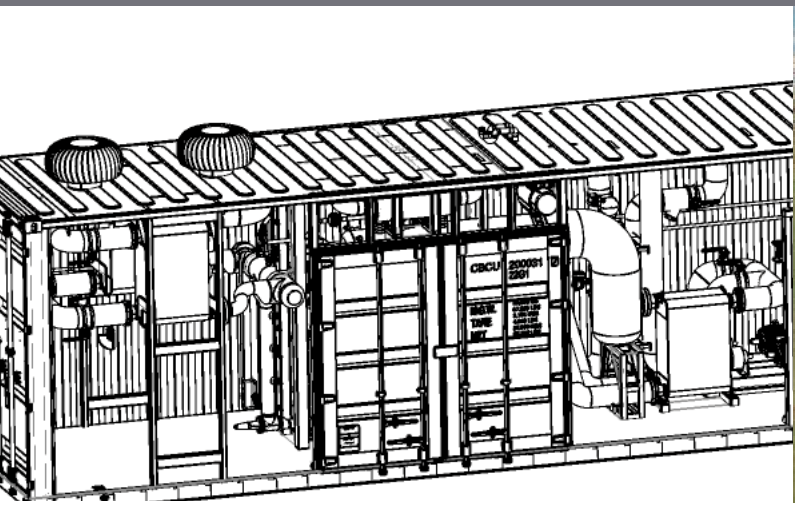
ISSUE 12 Q3 2023

News & Updates from green Thermal Energy Technologies

gTET is open for business as usual after COVID lockdowns

IN THIS ISSUE...

- Projects: Frucor Suntory ORC Generator
- Technical Brief: High Temperature Heat Pump (HTHP) Projects



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*"

www.g-tet.com

Refer to www.g-tet.com/news for previous editions of Hotwire

gTET
2/12 Mosrael Place Rowville Victoria 3178 Australia
Phone: +61 413 884 231 email: enquiries@g-tet.com

1. Projects:

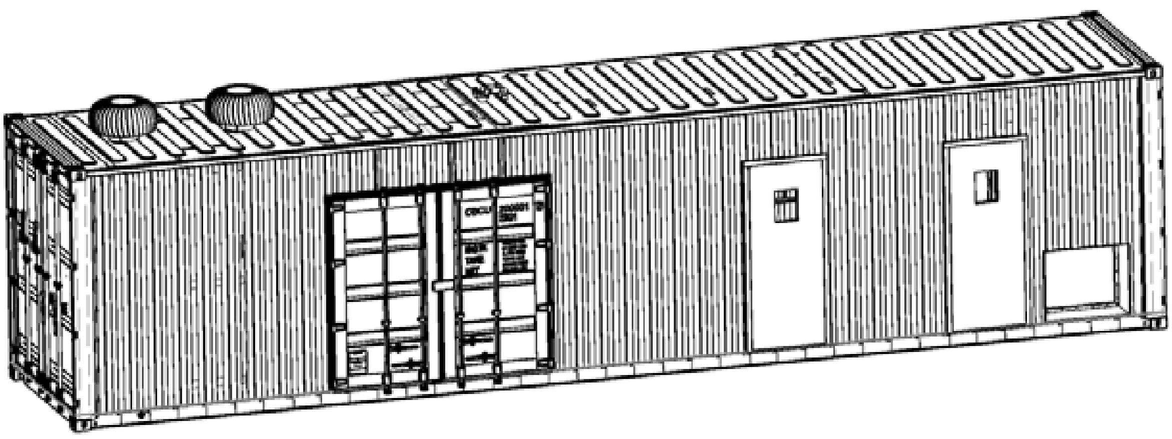
Frucor Suntory ORC Generator

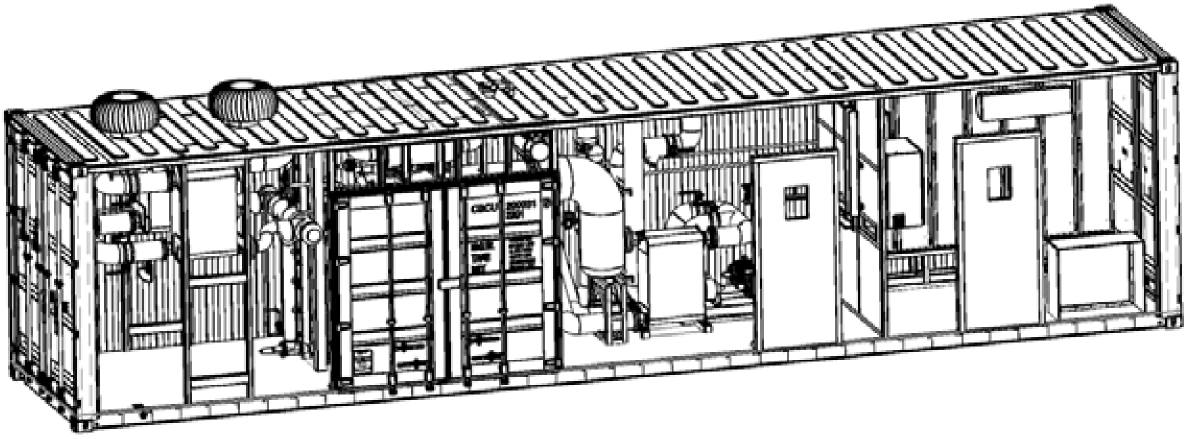
gTET Awarded Contract to Provide Innovative Load Management Solution for Frucor Suntory's Net Zero Facility

gTET has secured a contract for the integration of its Organic Rankine Cycle (ORC) generator in Frucor Suntory Oceania's new AU$400 million net zero facility in Ipswich, Queensland. This world-class facility will be powered by green energy and is the largest FMCG investment in Australia in the last 10 years.The ORC will synchronise with the facility's state of the art biomass boiler to balance heat loads across shifts and plant cycles to prolong the life of the boiler.

The facility will be the heart of Frucor Suntory Oceania's operations in Australia and will process and package various brands, including leading V Energy. The new site will be a game changer and have the immediate capability to produce up to 20 million cases of drinks each year when it comes online in mid-2024, with the opportunity to scale up in the future.

Hot water is generated by the biomass boiler to support the plant operational requirements and is also circulated in parallel through the gTET ORC power generation system. The thermal energy is used to expand a refrigerant through gTET's turbines allowing the conversion from heat to energy.The ORC inverter is AS4777:2020 certified for grid connection and is connected to the site grid via gTET's supplied distribution board which has been designed to meet the requirements of Energex STNW1174. The ORC system is housed in a forty foot, high cube shipping container, simplifying the onsite installation and allowing full system testing at gTET's Rowville facility prior to transporting it to site.





The system oversees parameters such as temperature, pressure, and flow rates. It dynamically fine-tunes the ORC's performance to optimize power generation in alignment with plant operations. The control system will be interconnected with Frucor Suntory's SCADA network, facilitating ongoing monitoring of the ORC system's functionality and real-time identification of potential faults and warnings.

gTET is committed to source locally where possible with container customisation and pipework fabrication both being sourced with Australian businesses along with many of the components.

Frucor Suntory Oceania's new facility is on track to be online by mid-2024. In August 2023, Frucor Suntory Oceania announced an exciting new partnership which will bring the best of Suntory to Oceania.

2. Technical Brief:

High Temperature Heat Pump (HTHP) Projects

High temperature heat pumps are a key technology in the endeavour to electrify a significant portion of commercial and industrial thermal energy delivering a COP (coefficient of performance) of at least 2 (>2kW(th) of heat produced for every 1kW(e) of electrical consumption). As traditional gas heating is phased out to achieve net zero carbon emissions HTHP's provide efficient replacement for many thermal applications which can be delivered with zero emissions when powered by zero emission electricity.

This said, implementing HTHP's in commercial and industrial applications requires a different approach in delivery of the thermal energy to traditional gas fired systems.

1. **HP's are best configured distributed.** Unlike a traditional steam or hot water boiler that is centralized providing a single temperature that is then reduced via heat exchange to the various process requirements, heat pumps are best configured to deliver the temperature and duty required by each process. This eliminates inefficiencies associated with producing a temperature higher than required by the process and the losses associated with equipment that regulates to the required temperature and pressure such as heat exchangers, pressure regulating valves, traps etc.

2. **HP's are best located close to the loads.** By collocating the HP with the process energy losses associated with transmission around the site are minimised. It is also much more efficient to route electrical cables to the HP alongside the process than insulated pressure pipes.

3. **HP's are best sized for averages, not peaks, with thermal storage.** The most efficient HP solution will levelise the thermal duties on both the cold side and hot side with the use of thermal storage so that the HP capacity can be minimized, the COP optimized and provide rapid response times for the process. Thermal storage can be implemented with water storage tanks and/or phase change materials.

4. **HP's should be configured to leverage other thermal waste streams.** Heat pumps enable low temperature thermal energy to be 'pumped up' to higher more useful temperatures. This allows for the energy in low temperature, otherwise wasted, thermal streams to be utilized by improving the COP of the heat pump.

5. **gTET promotes that HP implementation in existing sites is best approached progressively as opposed to deploying across the entire plant at once.** As with implementation of any new technology a small closely controlled project results in lower delivery and commercial risk and allows for the site technical team to learn the operation and maintenance. It also allows for the theoretical efficiencies and emission reductions to be aligned with real world operation which, on transient processes, may need to be calibrated. This approach also allows for redundancy and/or fallbacks to be provided where the new technology is process critical. For example, if a heat pump is being used to deliver hot water previously provided by a gas boiler, a changeover cut into the existing process supply enables the process to revert to the boiler should an issue be found with the heat pump implementation.

6. **The most efficient solution is not always the optimal solution for an existing plant.** gTET often finds that the most economically efficient heat pump solution for an existing site doesn't always result in the most energy efficient or most emissions reduction. Designs must consider existing processes and equipment which may have limitations in real estate, capacity, technology and access.

gTET can presently deliver heat pumps producing hot water, which can be flashed to steam, up to 120°C with technology in development that will exceed 150°C. This unique high temperature competitively competes with gas fired hot water generators, boiler and dryers, not only significantly reducing emissions, but also delivering significant operating cost savings compared to the surging cost of natural gas. The HTHP systems are designed to provide a very high turn-down and fast response to match process transients much closer than a gas boiler that consumes large amounts of fuel just to remain in standby.

Be sure to follow gTET on

LinkedIn

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

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