

Hot Wire

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News & Updates from green Thermal Energy Technologies

gTET remains open for business during COVID19

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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. CEO Message:

10 Years of gTET

December 2020 is gTET's 10 year anniversary.

From the humble beginning when gTET's founders, Simon and myself, sought to commercialise its technology in Organic Rankine Cycle generators with virtually no start-up capital, to today's business with a proven product range delivered to many clients across a wide range of industries, it has been quite a journey.

Commencing a tech based start-up business in Australia, particularly with a product that requires significant product development investment, causes those involved to regularly question the technology, strategy and market opportunity. However it was necessary to remain true to the belief that our technology was solid and the market significant. We soon came to realise that with insufficient capital to sustain a focused commercialisation path with the ORC generators alone that gTET needed to diversify into other commercial technologies and products that aligned with gTET's strategy of thermal energy recovery and efficiency and could provide immediate sales. Product lines including heat pumps, drying systems, heat transfer systems and chillers were included in the portfolio. gTET also quickly came to realise that many of its clients required turn-key solutions, as opposed to just providing a product, and so gTET developed its capabilities in areas including power grid connections, civil works, energy audits and site management. gTET now even holds an open builders licence in Queensland.

Today gTET delivers solutions to clients ranging from Fortune 500 companies, with mature systems and processes, to small businesses fully reliant on us and has recently established our joint venture, TORC pl, for the purpose of building, operating and maintaining clean energy power stations.

I'd like to take the opportunity to offer my sincere appreciation to all of our clients and all those that have supported us and our business along our 10year journey and commit that we'll continue to go above and beyond in delivering innovation, quality and commercially competitive solutions for the next decade.



PAUL KEEFER

2. Projects:

1. gTET VSD Chiller System

gTET team delivers a bespoke Australian made chiller system to a New South Wales gold miner on time despite Covid-19 restrictions. gTET designed and constructed the chiller system at its headquarters located in Melbourne. A majority of the material used in the construction was sourced through gTET's local Australian supplier base.



When a large gold mine in New South Wales launched an expansion of its underground mine, Howden Australia was contracted to design and commission a new three fan (2.5MW) ventilation system. The ventilation system is required to operate continuously to support underground mining operations. Each of the fans is driven by a VSD housed in the Howden switch room and the VSD's require external cooling to support continuous operation. Late in 2019 Howden approached gTET to provide a turnkey cooling system for these fan drives that complied with all the specifications of the mine. On previous cooling installations the mine had experienced reliability issues due to dust contamination, driving an additional requirement that the cooling system operate dust free.

gTET's design team engineered the cooling system to package inside a custom built 40ft container. The container houses three chillers each with 67kW cooling capacity, capable of continuous supply of cooling water to the VSD's in the switch room.



Access doors down the side of the container provide maintenance access to each chiller. The containerised cooling system draws air in through a bank of nine filters located at one end of the container and maintains positive pressure to ensure dust free operation. Personnel access is primarily through a double door airlock to ensure maintained positive pressure of the system. An insulated tank and pumps circulate chilled water through pipework connecting the cooling system with the VSD drives in the Howden switch room. gTET also designed and supplied the connecting pipe line and supports, providing an end to end solution for the client.

The electrical and controls teams at gTET designed, developed and constructed a control panel and electrical infrastructure to manage the systems operation. gTETs system monitors



temperatures, flow and pressures and adjusts the response accordingly to maintain continuous supply of chilled water and maintain positive pressure operating environment within the enclosure. The control system can be manually operated within the VSD chiller enclosure via the HMI but is primarily linked back to the Howden switch room via ethernet.

The entire sourcing and construction phase of the project was managed through the global pandemic, creating a range of challenges for the team to ensure on time completion of work.

Local lockdown and workplace restrictions driven by the pandemic meant that only a small portion of the required workforce was able to be onsite at any time and needed to operate under a strict Covid-19 work safe plan.



3. Technical Brief:

Advantages of gTET Power Purchase Agreements

gTET partnered with Australian energy company Energy Storage this year to establish TORC pl for the purpose of financing and operating clean energy power stations with clients who have a thermal waste stream or combustibile solid waste stream. TORC's mantra being to utilise the plethora of waste across commercial and industry for alternative useful forms of energy, in particular electrical power.

TORC's initial focus is Australia and New Zealand but has aspirations across other international locations. TORC will be equipped with a range of thermal energy technologies not least being gTET's ORC generators for converting heat to power. Client support commences by conducting an energy audit of the clients site with the outcome being identification of suitable waste streams and identifying optimal use of the energy.

Example technologies include:

1. ORC generators to generate electrical power from waste heat
2. Biomass boilers or water heaters to combust solid waste streams into heat
3. Pyrolysis to convert combustibile solids into heat and biochar
4. Absorption chillers for producing chilled water from waste heat
5. Heat transfer to utilise waste heat for other heating/drying applications
6. Preheating gas burners from waste heat streams to reduce gas consumption
7. Heat pumps to increase low grade heat into useful higher temperatures.
8. Electric heat pumps to produce steam or high pressure hot water as more efficient replacement for gas boilers.

TORC pl provides clients an opportunity to implement waste to energy projects at zero capital, operating and maintenance cost under a Power Purchase Agreement (PPA) where the client only pays for the useful energy delivered. The PPA arrangement is not just limited to power sales and may include metered sales of heat; as such it may more aptly be called an 'Energy Purchase Agreement'.

Generally the solutions provide the client a reduction on equivalent energy from the grid or mains gas and typically provide reduced or zero carbon emissions. The client also obtains the tax benefits from off-balance sheet capital.

The PPA's must be over at least 12-15yr duration in order to provide an adequate return on the capital and they are subject to the client being of adequate credit worthiness.

The client provides the input energy, whether that's heat or combustible fuel, to the power station free of charge and receives useful energy at a discounted rate to grid power or mains gas. They receive the benefit without the expense or need to develop the capability to operate or maintain the equipment. The power station is characterised as renewable or clean depending upon the fuel source and therefore the energy produced also counts towards a reduction in nett carbon emissions. The PPA may require that TORC provides a guarantee on the power delivery, for example if the project disconnects the site from grid power in order to maximise the financial returns. This can be provided with consideration of the back-up generating requirements and financial risk.

Heat recovery projects are often discretionary and not process critical to industry and as such it is often challenging to meet internal investment metrics. The PPA business model is set over 12-15yrs with zero capital investment by the client and therefore may overcome their investment metrics.

The security required by TORC is in the form of:

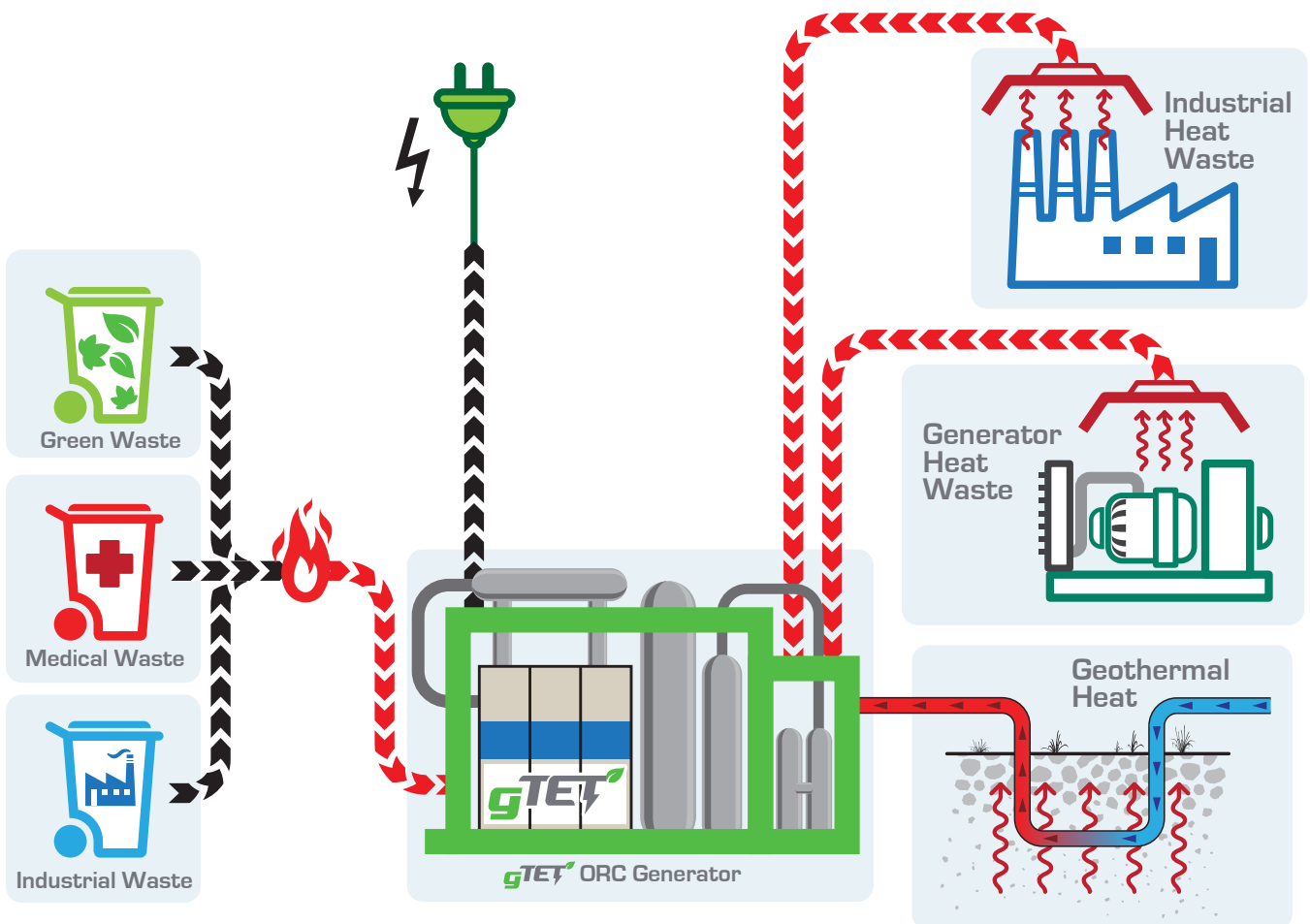
1. Retained ownership of the capital equipment which can be relocated if needed.
2. Penalties for early cancellation of the PPA
3. Minimum threshold of 'take or buy' from the power station or energy recovery equipment.

Ideal projects are those where the waste energy source can be fully repurposed into useful energy. For example power generation with a drying system or power generation and absorption chiller.

Power Purchase Agreements are not appropriate to all businesses but in many cases they provide businesses a strategy to reduce operating costs and GHG emissions without financing the capital and without the need to implement the capability to maintain and operate the equipment

gTET provides Waste to Energy (W2E) solutions with **ZERO** capital investment

Electricity Generation



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