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GAS-TESS Pilot Project Update

- GAS-TESS up and running after scheduled shutdown to assess O&M requirements
- O&M a key factor in business case for wastewater treatment utilities
- Improvements to be fast-tracked to provide SA Water with key data for evaluating business case
- Proposed review of revenue settlement due to delays in export approval to NEM

Operational status

The GAS-TESS was recently shut-down to install additional instrumentation and inspect it internally. This demonstrated that the unit was in good condition. An estimate for operation and maintenance (O&M) costs can now be prepared, these being a key factor for utilities evaluating biogas burning equipment over their lifetime.

The GAS-TESS is now back online supplying electricity and heat to the wastewater treatment plant (WWTP). Our engineers will continue test runs to refine operating characteristics and anticipate working with the Glenelg WWTP operators to evaluate the benefits of the TESS integrated with the plant systems from late September.

Commercial arrangements under the settlement agreement are underway but SA Water has advised there may be a long delay to obtain approval to export electricity to the grid. The addition of solar generation at the same time as the GAS-TESS and the current, interim network restrictions have imposed operational constraints on the site and hence GAS-TESS, so the company proposes to review the settlement agreement with SA Water.

Current performance status

A wide range of tests have been conducted to characterise the actual GAS-TESS performance compared to original design calculations and predictions. Analysis of the GAS-TESS performance is most readily obtained from simultaneous operations of the burners using biogas at the same time as energy is produced by the turbine, as this provides steady state conditions for simpler comparison with mass and energy balance calculations.

Under this regime, the combustion system burning the biogas is operating at 82.7% efficiency, almost at design specification, and some modifications to operational procedures are expected to improve performance. As expected, in this first testing phase of configuration the device is delivering only 39.8% CHP efficiency because the turbine is operating at half its potential efficiency. This is due to a number of factors but primarily caused by low heat transfer through the heat store to the energy recovery system (ERS). This results in a lower ERS gas outlet temperature and energy content, ultimately resulting in a turbine inlet temperature well below optimum.

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Next Steps
As planned, the Company will upgrade the storage to increase heat transfer once the overall systems are validated. The project agreement provides for two years of operational tests, and we intend to upgrade the GAS-TESS performance in several stages.

However, the business case for the GAS-TESS is not driven just by return trip efficiency because the biogas is a by-product of a WWTP operation that must be burnt on a continuous basis whereas the heat and electricity loads of a plant and electricity export value are variable. This is one reason that SA Water proposed a GAS-TESS device - to time shift the energy supply to maximise the value of the biogas, something that the engines cannot provide. The second reason is to minimise O&M costs.

Following the positive internal inspection, some enhancements will now be fast-tracked, where possible, to provide SA Water with key performance and O&M data for evaluating the performance of the TESS compared to engines. Other performance enhancements will be rescheduled for inclusion in the design of the next version of the technology.

FOR FURTHER INFORMATION PLEASE CONTACT:
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ABOUT 1414 DEGREES LIMITED
1414 Degrees believes in a sustainable energy future, where energy is available to all, at all times. Its clean energy storage is set to reduce energy costs by increasing the efficiency of renewable generation and stabilising grid supply. The 1414 Degrees thermal energy storage system (TESS) is unlike any other energy storage system in the world.

1414 Degrees' technology stores energy generated from electricity or gas and supplies both heat and electricity in the proportions required by consumers. It is unique in its combination of low cost, flexibility of location, scalability, and sustainability. Following the successful development of its commercial demonstrator, the Company is now in an early stage of product development and commercialisation.

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