



18 April 2019

ASX:14D

QUARTERLY SHAREHOLDER UPDATE

HIGHLIGHTS

- **GAS-TESS commissioning underway**
- **Early cash flow potential for TESS-IND connected to National Electricity Market**
- **Focus on research discipline for large scale storage development**
- **Strong cash position, \$12m**

1414 Degrees Limited (ASX:14D) is pleased to provide its March 2019 quarterly update.

This quarter has seen solid progress with the GAS-TESS fully installed and integrated into our first commercial site and commissioning underway. Assembly of the next TESS-IND is planned for third quarter of 2019, with all long lead time items such as turbine and heat exchanger now ordered. Our business development team have been analysing energy requirements and modelling cash flows at large industrial customer sites. They have identified opportunities to generate early cash flows in a staged approach by connecting our electrically charged devices to the National Electricity Market (NEM). Cash flow discipline maintains a strong cash position of \$11.97m with significant deposits paid on long lead time components for the next TESS build. First operating revenues are expected with GAS-TESS commissioning.

Commercialisation strategies

There is scope for separate business models for the gas and electric charged TESS devices based on customer profiles and energy sources. The latter can both charge and discharge to the NEM to generate revenue from grid stability services and trading, whereas the GAS-TESS stores and time shifts energy generated from biogas. However, many customers are seeking lower-cost, reliable energy supply and prefer to avoid the upfront capital and management cost of owning technology. This is advantageous for the TESS technology at this commercialisation stage because its low capital cost can be financed and amortised within a supply and maintenance contract with a reliable counterparty.

This model can be applied to previously announced smaller industrial customers (Pepes Ducks or Abbe Corrugated), but also to retailers like Enova Energy and large manufacturing or refining companies who are intensive heat users. Locating a TESS next to an industrial heat user provides 1414 Degrees with multiple potential revenue streams including long term contracts for heat and electricity supply to industry, firming renewable generation on the NEM, and providing grid stability services.

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To further this opportunity, your Company is preparing to implement the energy services and solutions model outlined in the prospectus. This involves creating special purpose vehicles (SPV) for each customer site, in partnership with finance and engineering services entities. Since many sites proposed by industrial customers require gigawatt hours (GWh) of energy storage to replace their gas or coal fuel, we are proposing to stage the first installations so that the site can progressively reduce its current heating equipment and supply contracts while 1414 Degrees scales up its technology. The 1414 Degrees TESS is relatively easy to integrate into many factories and refineries because the TESS heat output can be matched to connect into the existing infrastructure.

Opportunities for TESS in the agriculture sector have been enhanced in a report by global engineering company, ARUP. ARUP compared 1414 Degrees TESS with concentrated solar power (CSP) and concluded that the TESS would be more economical than CSP as a replacement for fossil fuelled greenhouse farms. This is good news for Smartfarm developers and other industries looking to decrease costs and increase renewable energy use.

GAS-TESS business plan

Smaller industrial sites of GAS-TESS and TESS-IND customers are also expected to prefer energy supply contracts over the purchase of technology, however larger water utilities could prefer to purchase GAS-TESS with performance and maintenance contracts.

Given the keen interest in the GAS-TESS, your Company is very focused on commissioning and demonstrating successful operation at the Glenelg site. The demonstration period will be conducted on a semi commercial basis, whereby SA Water will sell biogas to 1414 Degrees for its value at the National Electricity Market price at the time of supply, and 1414 Degrees will provide hot water and sell electricity to SA Water at the NEM price. The GAS-TESS can time shift the biogas energy to generate and sell electricity at the most advantageous price. This will generate revenue and input cost from the point of commissioning, however it should be understood that the revenue will be indicative of energy efficiency and time shifting value only, whereas the primary value proposition of the GAS-TESS for waste water utilities derives from increased asset utilisation with reduction of high operating costs from eliminating pre-treatment of the biogas and fully combusting toxic corrosive and abrasive compounds. 1414 Degrees' revenue potential from operations and maintenance will be assessed during the operational stage.

TESS-IND/ TESS-GRID business plan

The positive revenue potential of connecting our electrically charged devices to the NEM has been internally analysed, with further modelling by CQ Partners and Flow Power, and reviewed by KPMG. Accordingly, your Company is conducting a feasibility study to connect a TESS-IND to the NEM at our Southlink workshop, where it can buy, store, and discharge electricity as engineers optimise its operating parameters to maximise revenue. Following this, the device would be relocated to a NEM connected site that could also sell heat and realise its full efficiency. For example, energy retailer Enova Energy Ltd has introduced 1414 Degrees to a heat user where a TESS-IND would assist Enova Energy in providing security of supply at a competitive cost.

All long lead time items such as a turbine and heat exchanger for the next TESS-IND have now been ordered, and assembly will start in the third quarter of 2019. The device will utilise the existing infrastructure and control systems used for the successful TESS-IND commissioning in 2018. As would be expected, our engineers have modified the design to reduce cost and increase efficiency.

Large scale energy storage

My recent participation in the Global Energy Solutions Summit for the National Governors Association in Washington DC, and meetings with a venture capital company in Los Angeles and with the British Government Department for Business, Energy and Industrial Strategy (BHEIS) in London all confirm interest in very large industrial scale energy storage. I have previously reported that Australian corporates were seeking to reduce costs and decarbonise their energy supplies, however it is clear that these objectives are not confined to Australia.

Unfortunately, there is still low awareness of the potential benefits to the electricity market as a flow on benefit from reducing carbon-based heat supply to industry. The overwhelming focus is on the electricity market because the increasing renewable supply is creating many new problems that bias policy towards the electrical efficiency of energy storage, favouring pumped hydro and batteries. The Washington conference alerted participants to significant environmental issues with large scale adoption of batteries and pumped hydro. Few have considered the potential of technologies like to 1414 Degrees TESS to simultaneously stabilise the grid and electrify industry by reducing its dependency on gas and diesel. It is therefore clear that 1414 Degrees must demonstrate the efficacy of its technology in the NEM and be ready for demand from utilities and industries to scale up to the gigawatt hour size.

Technology readiness

There is clearly demand from industry and governments for large scale energy storage. The cost per kWh of TESS storage diminishes with scale because more silicon can be held within a smaller surface area as the vessel size increases, and your Company has already advanced the design of a device aimed at storing four fold the energy in the same space as the current models.

In contrast with the 1414 Degrees TESS or pumped hydro storage whose cost per unit of storage can decrease with scale, the cost per unit of cellular battery storage is fixed. Lithium batteries have a limited capacity life and will introduce many environmental challenges if used in large numbers, with the result that only pumped hydro is a sustainable contender for a very large power storage, but neither batteries nor hydro power can supply the heat needed by industry. However, TESS is a contender at this scale of storage because it is compact, can be located at industrial sites and can operate at a low unit cost of energy. These factors mean it is an attractive solution for big industry needing large storage capacity in order to switch from gas to renewable heat for processing.

The size of the market for thermal energy storage is much greater than that for electricity alone, so the capability of the TESS to provide grid stability services as well as industrial heat presents a compelling commercial opportunity for the TESS technology at very large scale.

Our engineering team proved their innovative skills by demonstrating effective heat transfer to and from silicon phase change storage. However, it has become clear that scaling the storage technology requires a high level of research discipline to ensure the most productive use of our resources. To accomplish this your Company has recently employed two more staff with PhD research qualifications, and I am working with them to ensure focus and rigor in our innovations to service this very large market.

While we maintain close focus on commercial operation of the current projects, we're also preparing for a big future. I am grateful to our supporters, shareholders and especially our very hard-working 1414 Degrees team. I look forward to reporting continuing solid progress in my next review.

Dr Kevin Moriarty
Executive Chairman

FOR FURTHER INFORMATION PLEASE CONTACT:

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ABOUT 1414 DEGREES LIMITED

1414 Degrees is working to create 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 years of effort by the Company's engineering team and the successful development of its commercial demonstrator, the Company is commercialising its scaled up products.

For more information please visit www.1414degrees.com.au