

## ASX Announcement

13<sup>th</sup> December, 2016

### **Energy Made Clean Signs Strategic Memorandum of Understanding with Sumitomo Electric Industries and TNG Limited**

Please find attached ASX announcement released by TNG Limited announcing the signing of a strategic MoU between Carnegie Wave Energy Limited's 100% owned subsidiary Energy Made Clean, Sumitomo Electric Industries and TNG Limited (ASX: TNG).

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## **TNG signs key agreement with SUMITOMO ELECTRIC INDUSTRIES and ENERGY MADE CLEAN to develop vanadium-based renewable energy market in Australia**

*Strategic MoU with Japan's Sumitomo Electric Industries (SEI) and Perth-based Energy Made Clean (EMC) to jointly develop the Australian Vanadium Redox Flow Battery (VRF) market*

### Key Points

- **TNG, SEI and EMC have agreed to jointly work on the promotion of vanadium redox flow batteries in Australia and their integration with existing generating systems across the country.**
- **Under the MoU, each company will address key aspects of the venture, including but not limited to:**
  - **The supply of vanadium electrolyte from the Mount Peake Project – TNG;**
  - **The supply of VRF containerised systems – SEI; and**
  - **The supply of a compatible “balance of plant” – EMC**
- **A demonstration VRF supplied by SEI will be deployed in Australia**
- **The collaboration creates a platform for the three companies to drive the growth of one of the most exciting emerging renewable market segments in Australia’s energy sector.**

Emerging strategic metals company TNG Limited (ASX: TNG) is pleased to announce that it has signed a key Memorandum of Understanding with Sumitomo Electric Industries (“SEI”) and Energy Made Clean (“EMC”), a subsidiary of Carnegie Clean Energy (ASX: CCE), to collaborate on the promotion, development and growth of Australia’s Vanadium Redox Flow Battery (“VRF”) market.

The MoU follows TNG’s recent announcement that it had successfully produced high-purity, commercial grade vanadium electrolyte using vanadium pentoxide from its flagship 100%-owned Mount Peake Vanadium-Titanium-Iron Project in the NT (*see ASX Announcement – 10 October 2016*). The ability to produce commercial grade vanadium electrolyte opens up an exciting new growth area for TNG, positioning it to supply the fast-growing Vanadium Redox Flow Battery (VRF) industry.

Under the MoU, TNG will work together with SEI and EMC to review all of the potential applications of VRF in Australia with a view to subsequently co-operating on the marketing and sales of VRF. In addition, the parties have agreed to jointly establish a demonstration VRF of commercial size in Australia to showcase SEI’s technology.

TNG will also assess the feasibility and implementation of a Vanadium Electrolyte production facility in either Perth or Darwin.

Sumitomo Electric Industries is a global leader in the manufacture and sale of automotive, electronics, info-communications, industrial materials, and environment and energy products. Established in 1897 with over 240,000 employees worldwide and a turnover exceeding A\$32 billion in 2016, SEI has been leading the VRF market since 1996 and installed the world’s largest VRF with 60MWh power in Hokkaido, Japan; for more information: <http://global-sei.com/>

EMC is wholly-owned by ASX-listed company Carnegie Wave Energy (ASX: CWE); for more information: <https://carnegiwave.com/>. Energy Made Clean is a leading Perth-based renewable energy company providing off-grid power and utility scale solutions. TNG signed an MoU with EMC last year (see *ASX Announcement – 19 June 2015*) to establish the feasibility of Vanadium Redox batteries. EMC has a very broad experience with and extensive project portfolio of off-grid applications and is ideally placed to support the development of VRF in Australia; for more information: <http://www.energymadeclean.com/>.

TNG completed a Definitive Feasibility Study (DFS) for Mount Peake last year, confirming a potential world-class project capable of generating outstanding returns. Key findings of the DFS included life-of-mine net cash flow of \$11.6 billion, a pre-tax IRR of 41% and an NPV<sub>8</sub> of \$4.9 billion (see *ASX Announcement – 31 July 2015*). The DFS forecasts Mount Peake's nameplate capacity at 17,560tpa of high-purity vanadium pentoxide (V<sub>2</sub>O<sub>5</sub>), 236,000tpa of titanium dioxide (TiO<sub>2</sub>) and 637,000tpa of pig iron.

TNG subsequently agreed a Binding Life of Mine (LOM) off-take for 60% of its vanadium pentoxide production with Korean-based WOJIN Metals (see *ASX Announcement – 7 September 2015*). The remaining 40% of Mount Peake's V<sub>2</sub>O<sub>5</sub> output will be available for Vanadium Electrolyte supply following the Company's success in producing commercial grade vanadium electrolyte and other applications.

### **Management Comment**

TNG's Managing Director, Mr Paul Burton, said the Company was delighted to have joined forces with a leading global industrial conglomerate in Sumitomo and a rapidly growing renewable energy proponent in EMC to help facilitate the development of a major new market opportunity for alternative energy supply in Australia.

"The rapid development and growth of off-grid and mobile energy solutions using both vanadium redox and lithium-ion battery technologies has been sweeping the world and is now widely acknowledged as a transformational event in the global economy," Mr Burton said.

"TNG has the opportunity to participate as a key supplier of vital raw material for the vanadium redox battery sector, and by joining forces with two established market participants we can help to open up and drive the growth of the alternative energy market in Australia.

"This is in line with TNG's strategy for full vertical integration of our vanadium supply chain, and effectively means that we can be a key player in every vanadium market worldwide," he added. "We are very much looking forward to working with both companies as cooperative venture moves forward."

EMC's Managing Director, Mr John Davidson said the rapidly growing energy storage market was driving the need for companies like EMC to remain at the forefront of developing technologies.

"This strategic MoU represents a compelling three-way tie-up of an emerging miner, a manufacturer and an integrator to accelerate the development of a major new energy growth market," he said.

Paul E Burton  
**Managing Director**

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