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TOMORROW'S FUTURE

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Utility Scale Ocean-going mobile synchronous power generation

Geoff Rogers¹

¹ Enlighten Power Systems, Melbourne, Australia; geoff.rogers@EnlightenPowerSystems.com

With the sweeping changes impacting Australia and many parts of the world's energy systems there is unprecedented demand for additional synchronous support to the electricity grid. A Powership is a new mobile ocean-going method of delivering synchronous, safe, secure and reliable power in Australia and other developed and developing economies. A Powership has key operational benefits which play to its advantage in the harsh mid-latitude weather which Melbourne, Adelaide and the rest of the south eastern sea-board face. This includes: Dearth of investors prepared to invest in long life capital plant with fossil fuel, 5-minute trading advantageous to renewable energy providers makes it very difficult for steam or gas turbine plant to compete with fast response battery or other inverter connected generation, whereas hydro-resources will take 5-10 years to be significantly increased.

A new generation of Smart generators based on turbo-charged medium speed reciprocating engines from Europe have become the preference for grids where high concentrations of renewable unscheduled and intermittent generation are on the increase. These engines can ramp from stationary to full output in under 5 minutes, and when synchronized can change their output by 100% in one minute. **Fuels can be Natural Gas derived from pipeline or LNG, or alternatively, Oil. Renewable fuels like hydrogen are also possible.**

This makes them valuable for both fast frequency control and provision of inertia, while being able to stabilize grid when wind lulls and surges or cloud cover affects wind and solar sources respectively.

Investors are reluctant to commit to fixed synchronous plant which has an economic life of over 30 years to recoup the initial investment, but a relatively novel concept, proven in developing countries where other constraints apply, has now emerged in developed markets. Powerships are utility scale ocean-going power plant, available for lease on an operated-basis contrasted with traditional approaches to constructing synchronous plant.

The market is dominated by one operator, with shipyards in Mediterranean, who recently started constructing smaller sized ships in Indonesia. 2700 MW of Powerships have been built and are in operation. Another 5000MW is committed and under construction.

Powership has been successfully deployed in our region Asia and Africa. They can deliver power within 120 days of a commitment. The mobility of the technology means a system can be re-deployed elsewhere with short notice.

This paper seeks to gain feedback from the reader and audience on their reactions to the Powership solution, so that the authors can influence the technical and commercial specifications and services made available.

