



Wave Swell Energy Ltd: UniWave200 King Island Project

Lessons Learnt Report 3

Project Details

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KEY LEARNINGS

Lesson learnt 1: Technology cost effectiveness

Category: Commercial

Objective: To improve the collaboration with industry and show the future commercial feasibility of the technology.

Detail:

Like all forms of technology, cost competitiveness comes with scale and the knowledge achieved through this process. This fact is emphasised in an independent assessment of the future potential of the WSE technology by Australia's national science agency, the Commonwealth Scientific and Industrial Research Organisation (CSIRO). The CSIRO analysis concludes the WSE technology will:

- be immediately cost competitive with diesel generation
- reach cost parity with offshore wind at a global installed capacity of between 25MW and 45MW.
- attain an LCOE (levelised cost of energy) of AUD\$0.05 per kWh after 2,500 MW of global installed capacity, thereby reaching cost parity with the current lowest cost forms of generation, onshore wind and solar PV
- reach this cost parity with just 0.35% of the installed capacity of what was required by onshore wind and solar PV.

The CSIRO analysis also concludes that wave energy is predicted to provide 1.3% of all global electricity generation in 2050, amounting to 718 TWh annually and 170,000 MW of global installed capacity.

Implications for future projects: This analysis by CSIRO gives confidence of the potential cost reductions for future wave / marine projects and their associated LCOE.

Lesson learnt 2: Variable speed turbine control

Category: Technical

Objective: To continually improve and optimise the technology

Detail: A variable speed turbine control algorithm has been implemented on the UniWave200. The results to date have shown an improvement in overall efficiency and a reduction in the parasitic loads to run the Wave Energy Converter (WEC).

Implications for future projects: This control algorithm will continue to be optimised during this project and will then be used in future projects.

Lesson learnt 3: Scaling of results from model scale to full scale

Category: Technical

Objective: To continue the collaboration with the research community and build the capacity for

future projects.

Detail: The Australian Maritime College (AMC) recently undertook some model scale tests that replicate the installation of UniWave200 at King Island. The results of these tests combined with planned future tests give confidence in the results produced at small-scale.

Implications for future projects: This will enable WSE to model any future design and predict the performance with a high degree of confidence.

Lesson learnt 4: Increased height of structure

Category: Technical

Objective: To further develop the technology for implementation in future projects.

Detail: In larger seas water is being expelled through the rubber flap valves. This results in a reduction in the energy produced.

Implications for future projects: The location of the flap valves will be put at a higher elevation or alternatively the structure height will be increased proportionally.

Lesson learnt 5: Implications of the COVID-19 pandemic

Category: Logistical / Risk /financial

Objective: To improve collaboration with logistical, technical, services industries within Australia.

Detail: COVID 19 has restricted access to King Island for key personnel and made the logistics of running such a project remotely more challenging. This has resulted in both delays in getting appropriate personnel and supplies to the island plus increases in project expenditure. Many technical activities including commissioning and operation have been undertaken remotely.

Implications for future projects: While it's hard to predict future pandemics, the lessons learnt have put WSE in a good place to manage projects remotely.

Lesson learnt 6: The requirement for good remote visuals

Category: Logistical / Technical

Objective: To improve the technology for future projects.

Detail: We learnt good visuals have been very beneficial with the use of high-quality robust CCTV cameras with pan and tilt capabilities that have been upgraded to take advantage of remote operations and limited attendance of site personnel. Additionally, cameras provide security of Asset monitoring, weather and equipment, and also potential unwarranted personnel accessing the WEC.

Implications for future projects: Additional high quality CCTV cameras to be implemented.

Lesson learnt No. 7: Location of electrical infrastructure

Category: Logistical / Technical

Objective: To improve the technology for future projects.

Detail: Much of the electrical systems have been located on the WEC. For nearshore installations, the feasibility of relocating much of this equipment onshore will be further investigated. This would provide for easier access in a controlled environment at decreased cost.

Implications for future projects: Investigate the possibility of locating as much of the electrical system on shore as possible.