Wave energy building

Composites at the heart of renewable wave energy power generation.

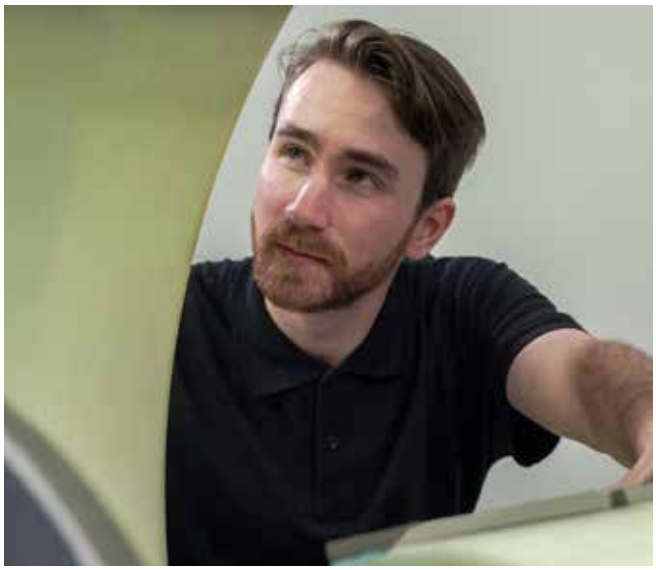
Advanced Composite Structures Australia (ACS Australia) has partnered with Carnegie Clean Energy together as participants of the Blue Economy Cooperative Research Centre (Blue Economy CRC) to develop the future of renewable energy power generation using the untapped wave energy source of the world's oceans. Wave energy is consistent, predictable and globally distributed, and can be converted into clean, renewable electricity. For offshore aquaculture, the use of wave energy means less reliance on conventional fuels and a chance to decarbonise operations in remote locations, like barges. Ocean Energy Europe (OEE) forecasts significant growth for wave energy with a $1.09Tn market potential by 2050.

Carnegie Clean Energy, based in North Fremantle, Western Australia, develops ocean energy technologies including their wave energy converter (WEC), the CETO® targeting utility scale power, and artificial intelligence wave predictor technology to capture the most energy out of every wave. Together with Blue Economy CRC partners, they are developing the next generation of wave energy converters, and key to this development is the Mooring Tensioner Wave Energy Converter (MoTWEC). The ACS Australia team members are composites specialists responsible for the engineering design, analysis and manufacture of the key tensioning unit that enables the WEC power unit to generate electricity efficiently from the cyclical motion of the ocean waves.

The tensioning mechanism is made up of four glass fibre composite spring elements, which were designed and manufactured by ACS Australia in their Port Melbourne facility. The composite construction is ideally suited for the compact application in harsh seawater environments, where corrosion resistance is paramount, but more importantly, the combination of stiffness and strength requirements effectively make a traditional metallic spring solution unfeasible. The composite spring design is ideal for the WEC system to maintain tension in each of the mooring lines connecting the WEC to the seabed, which experience high in-service cyclic loads.

Interestingly, the unique geometry and elegant form of the spring elements, resemble that of a modern artwork piece!

The project team is now performing fatigue testing of the MoTWECs at the Carnegie Clean Energy onshore testing facility in North Fremantle. Recently, the project reached a testing milestone with over 250,000 representative fatigue cycles completed. This represents a significant achievement for the team, with testing to continue through the coming months.



"ACS-A's experience in composite components has been invaluable in the success of the MoTWEC project. The mooring tensioner developed is a key component of our wave energy technologies enabling game changing performance improvement," said Alex Pichard, Chief Technology Officer - Carnegie Clean Energy

Use of the technology developed in MoTWEC to power aquaculture feed barges is being investigated in the Blue Economy CRC project MoorPower®. The next phase of the project aims to demonstrate the replacement of diesel generators with clean wave energy during the offshore deployment of a scaled demonstrator unit later in 2023.

The Blue Economy Cooperative Research Centre (CRC) is established and supported under the Australian Government's CRC Program, grant number CRC-20180101. The CRC Program supports industry-led collaborations between industry, researchers and the community.

acs-aus.com carnegiece.com
blueeconomycrc.com.au business.gov.au