

FIGHTING THE TIDE

Renewable energy and clean technology offer a wealth of opportunities for innovative Australian manufacturing companies. But are political uncertainty and government indecision holding the sector back? By Carole Goldsmith.

The future of Australia's renewable energy sector is in limbo as it awaits completion of a review of the Renewable Energy Target (RET). Mid-February marked one year since the Federal Government commenced its review. According to the Clean Energy Council (CEC), peak body for the industry, the ongoing delay has caused investment to dry up and led to widespread job losses.

CEC Chief Executive Kane Thornton has called on the Government to end the political impasse over the scheme and recommit to the RET. This will allow the industry to get on with the job of generating billions of dollars of investment and creating thousands of new jobs.

"Investment in large-scale renewable energy has been cut by almost 90% and many of the sector's 21,000 employees have already lost their jobs," says Thornton. "The renewable energy industry is calling on Prime Minister Tony Abbott to resolve the RET review. This uncertainty has damaged investments and spooked investors, with many of them losing confidence in Australia as a safe investment destination."



Clean Energy Council
Chief Executive
Kane Thornton.

The CEC is committed to accelerating the transformation of Australia's energy system to one that is smarter and cleaner. It represents and works with hundreds of leading businesses operating in solar, wind, energy efficiency, hydro, bio-energy, energy storage, geothermal and marine, along with more than 4000 solar installers.

Policy Manager Russell Marsh advises that the CEC's main task now is to get the Government to resolve the RET review: "There is pressure on the Government and the Labor opposition to get a resolution, so that uncertainty in the industry can be cleared, and investors again see the renewable energy sector as a safe investment zone."

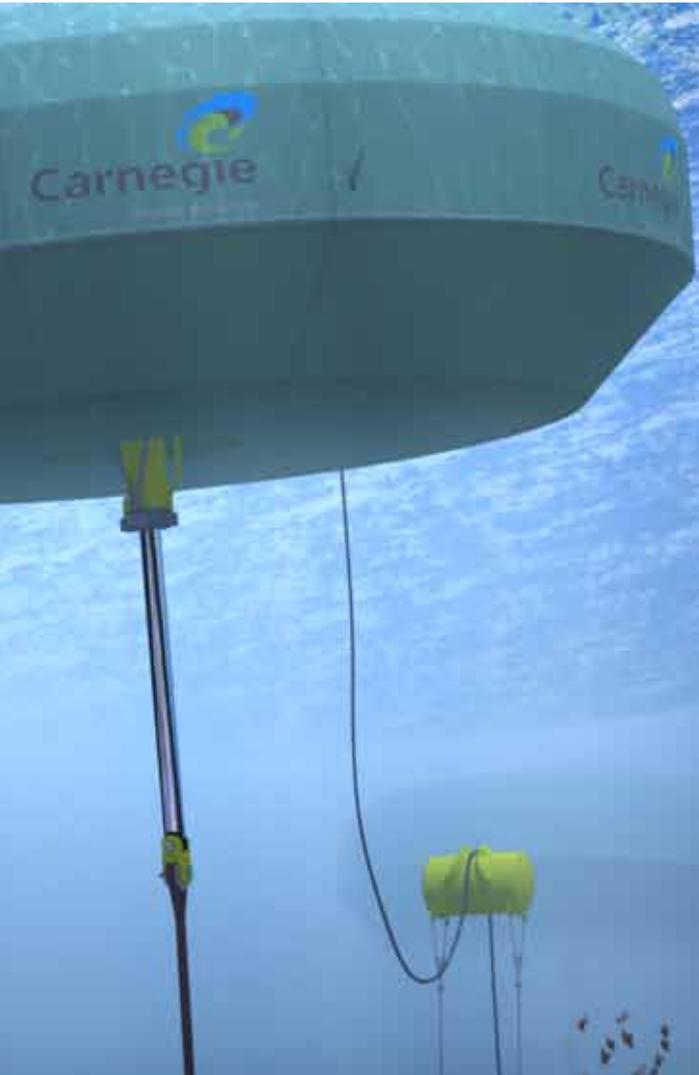
What does the CEC want the RET to be? According to Marsh, it should be left alone and not changed at all.

"The current target for large-scale renewable energy is 41,000GWh in Australia by 2020," he says. "This was set by the previous Labor Government in 2010. The RET Review Committee concluded that the current target won't push up power prices."



Clean Energy Council
Policy Manager
Russell Marsh.

Carnegie's CETO technology is different from other wave energy devices as it operates underwater, with giant metal buoys generating zero-emission electricity.



Marsh adds that there is still funding for the industry from the Clean Energy Finance Corporation (CEFC) and the Australian Renewable Energy Agency (ARENA). However, since the RET review started just over a year ago, any non-government investor looking to invest in renewable energy project will find it hard to get a clear idea of the potential return because the target still has not been set.

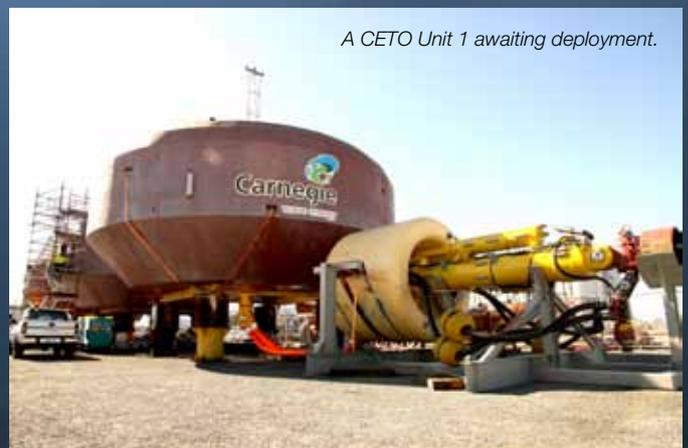
"As an example, there are a number of companies that develop wind farms and they need funding from banks or other financial institutions," Marsh explains. "However they can't tell their investors how the money will be paid back. The industry is facing an uncertain future and we need the Government to resolve the review and set the new RET as soon as possible."

AMT contacted the Federal Department of the Environment to ask when a decision would be made on the RET. A spokesperson responded: "We want to provide a sustainable future for the industry. There are challenges with the current structure and we are seeking to resolve these and provide certainty for the sector by achieving a bipartisan position."

Marsh highlighted two CEC member companies that have been actively involved in innovative renewable energy projects: Carnegie Wave Energy, and Keppel Prince Engineering.

Wave energy for Australia's largest naval base

The official launch of Carnegie Wave Energy's Perth Wave Energy Project in February was an important milestone for wave energy technology, and for the future of Australian energy generation. The Perth Project will provide wave-generated renewable energy to Australia's largest naval base, HMAS Stirling on Garden Island.



A CETO Unit 1 awaiting deployment.

"Wave energy is an emerging technology with huge potential, and Carnegie is one of the companies leading the way with this world-first project using CETO technology," says Thornton.

The Perth Project was officially 'switched-on' in mid-February by Industry Minister Ian Macfarlane and the commanding officer of HMAS Stirling, Captain Angela Bond. It is the only wave power plant in the world to operate multiple wave units. The Department of Defence is purchasing all of the Project's power for use by HMAS Stirling. The system will also desalinate ocean water to be supplied to HMAS Stirling.

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A CETO 5 unit during installation at the Perth Project site.



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Fremantle-based Carnegie's CETO technology has been under development for approximately 10 years and has had some \$100m invested in its commercialisation over this period. The CETO system is different from other wave energy devices as it operates under water, where it is safer from large storms and invisible from the shore. Carnegie's Chief Technology Officer Jonathan Fiévez explains about the CETO 5 technology used in the Perth Wave Energy Project.

"Three fully submerged giant metal buoys, each seven metres in diameter, drive seabed pump units to deliver high pressure fluid onshore," says Fiévez. "This moves along a subsea pipe to standard hydroelectric turbines, generating zero-emission electricity."

"The buoys rest about a metre below the ocean's surface and are connected to a polyester mooring rope which links to the system's pump, attached to a foundation on the sea bed. In a wave, the water molecules pass from one side of the buoy to the other, moving in a circular orbit."

Fiévez adds that seawater moves in and out of the buoy's six air components, providing air and buoyancy upwards and downwards. The water that comes out of the buoys goes through a hydraulic module and into a high-pressure pipeline. This is connected to a generator on the shore, creating renewable wave energy. The high-pressure water will also be used to supply a reverse osmosis desalination plant, replacing or reducing reliance on greenhouse gas-emitting, electrically-driven pumps usually required for such plants.

When asked how the system affects ocean life, Fiévez says: "We have some amazing videos that show the large amount of fish attracted to the buoys. Fish always flock to large objects in the ocean as this keeps them feeling safe."

All of Carnegie's manufacturing is outsourced via tender. Although the company tries to use local companies, Fiévez says that it is sometimes difficult to get components for the CETO system in Perth.

"It is more advantageous to have it built in Victoria and transported across," he explains. "As an example, Victorian firm Keppel Prince Engineering makes the piles used in our system. The piles are driven into the ocean bed, 25 metres under the ocean."

These piles are the foundation for the project, providing an anchor in the seabed to keep the units in place.



The Perth Wave Energy Project was switched on in February by Industry Minister Ian Macfarlane (second left), with ARENA CEO Ivor Frischknecht, and Carnegie Wave Energy's Dr Michael Ottaviano and Grant Mooney.

While the delay in the Government setting the new RET has not directly affected Carnegie, Fiévez adds: "It is certainly having an effect on future and existing manufacturers of our system. There has also been major reduction in investments in renewable energy companies. This lack of decision on the RET is a major problem for the industry."

The CETO technology has been independently verified by French company EDF-Energies Nouvelles, a leader in the production of electricity from renewable sources, and by the French naval contractor DCNS. Carnegie worked in partnership with EDF developing CETO 4 in 2009. EDF has the rights to develop CETO renewable energy projects in the northern hemisphere.

Carnegie currently employs 40 people, with the majority involved in the CETO project. According to Fiévez, 15 of these employees work in R&D, including a physicist, a hydrodynamics specialist, a mathematician, and oceanographer, plus mechanical and electrical engineers.

"We do all the design, engineering integration and specifications for the CETO system at our Fremantle head office," says Fiévez.

Grinding to prepare for an internal longitudinal weld in a Keppel wind tower.



Back grinding to prepare for internal submerged arc welding.



ARENA provided \$13m in funding support for the Perth Project. Planning and design work has begun on Carnegie's next-generation CETO 6 technology, supported by \$11m of ARENA funding. These larger units are aiming to deliver around four times the amount of power to HMAS Stirling that CETO 5 is currently providing.

"Our plans with CETO 6 are to build another wave energy generator around three kilometres out in the ocean from the present location and three times deeper," says Fiévez. "We are also setting up an office in the UK in the future to build the next CETO system."

Leading the field in wind tower fabrication

Keppel Prince Engineering (KPE) is Australia's largest wind tower manufacturer. KPE specialises in the construction, fabrication and maintenance of industrial structures and equipment from wind farms to bridges. Among KPE's recent large renewable energy projects are the construction of the Gullen Ranges Wind Farm, west of Goulburn, NSW. Completed in late 2014, KPE installed 14 wind turbines, and also manufactured and delivered 17 tower embeds and 17 towers.

In 2010 the company also fabricated 80 of the 140 wind towers at the Macarthur Wind Farm in south-west Victoria, the largest wind farm in the Southern Hemisphere. Each tower was approximately 80 metres high and weighed around 160 tons. Located south of Glenthompson in western Victoria, the 32-turbine Oaklands Wind Farm provides 63MW of renewable energy to its customers. In 2012, KPE manufactured the main body of the tower that supports the nacelle, hub and blades. Each tower stands at a height of 80 metres.

Based in Portland, Victoria, KPE is a major employer for this small regional town. Its head office, manufacturing plant and engineering operations are located across 120 acres of land. The company employs 265 people, comprising engineers, project managers, technicians, tradespeople, apprentices and support staff.

KPE Managing Director Steve Garner explains the process used in producing wind-towers that measure from 30 to 92 metres in length: "Australian high-grade steel plates are cut, rolled, welded and then painted in a horizontal position. During the painting process, they are rotated on large rollers and our employees paint them manually. This is labour-intensive work."

KPE also manufactured the underwater piles for the Carnegie Wave Perth project, and is active across a number of other sectors, including telecommunications, infrastructure, agriculture, marine, waste-water and electrical. Garner speaks proudly about some of the company's current projects: "We are handling the mechanical and electrical maintenance on-site for Alcoa's Portland Aluminium, and we're building communication towers for Telstra's network around Australia."

However, KPE's wind tower production and installation has come to a standstill amid prolonged uncertainty over the RET review. So has the company's planned large-scale expansion into solar, wave and hydro energy.

"Renewable energy companies like ours are in a state of limbo and this is not good for business," says Garner. "Due to the Federal Government's delay in letting us know the new RET, we have had to reduce our employee numbers from 380 to the current 265 employees. This is difficult for a small country town like Portland to lose so many local jobs.

"We don't have any major renewable energy projects at present, apart from a couple of regional commercial solar projects. Also we are supplying and installing some domestic solar systems in western Victoria."

Fortunately KPE's work in a wide range of other sectors helps keep the company afloat.

"These other larger parts of the company are going very well," says Garner. "Other smaller renewable energy companies, however, do not have other parts of their business to fall back on, so many are going broke."

KPE invested \$12m in plant and equipment in 2003 for its ongoing wind-tower manufacturing operations. When the RET is set and wind-tower production starts up again, Garner believes this has the potential to create another 200 jobs at its plant.

Garner's message to the CEC, the Government, the opposition and all involved: "Get this deal on the RET done and let us know what the new target will be, so we don't have more companies going broke.

"The renewable energy industry was going great before the GFC. This created a lot of incentives and money for investors. With the RET review happening every two years, investors are now hesitant to invest in the industry. There are many overseas investors wanting to come in and financially support Australian renewable energy projects. We need both sides of the Government to decide on the new RET to encourage investment in renewable energy and get the sector moving again." **AMT**

www.environment.gov.au www.cleanenergycouncil.org.au
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Installing an access door frame into the base section of a wind tower.