

Testing the waters

Martin McAdam, CEO of Aquamarine Power, says the wave sector must be realistic about the pace of development and should prioritise device reliability. Words by **Alistair Welch**

Aquamarine Power has been one of the most visible companies in the UK's nascent wave energy sector. The company's Oyster 800 device was installed at the European Marine Energy Centre (EMEC) in Orkney in 2011 and testing has continued since.

Furthermore, Aquamarine CEO Martin McAdam has become somewhat of a spokesman for the industry as a whole and in conversation with Energy Engineering he explained that whilst progress in the wave sector might have been slower than hoped he was still confident of a commercial future for Oyster and other wave energy technologies.

"Like everyone on the wave side of the industry we are still in the technology development programme," he says. "It's happening a little slower for the wave industry than it has for the tidal industry. We're several years

behind where the tidal guys are and that's because we don't have a technology that is sufficiently reliable to deploy on commercial projects."

Oyster 800 generation has been paused for the summer in order to undergo a comprehensive refit including the replacement of a 23 tonne cylinder module that incorporates a number of significant upgrades. "The challenge," adds McAdam, "is not in relation to the Oyster structure itself but some of the components on the structure – for example we have had some failures in data gathering, control and instrumentation, and the hydraulic systems."

Nevertheless, he is happy that the Oyster technology, essentially a large flap that sits on the seabed in shallow

water (15m) and is moved forward and backwards by wave activity to generate electricity, is on the right track. "The overall concept of Oyster will not change," he comments. "We have proven that the Oyster design itself has been very successful. It's the only wave machine that's been out operating through three full winters in Orkney – that's way ahead of anything else out there at the moment."

In addition to government support Aquamarine has benefitted from significant investment from the power and automation company ABB. ABB's involvement with Aquamarine has meant more than funding alone, it has enabled Aquamarine to access the technological expertise of the larger organization. "The future of the industry will be dependent on our ability to attract large, experienced engineering companies and OEMs who can bring a huge amount of expertise to the industry," explains McAdam. "Most of the wave technology developers are small businesses and

we need to be able to access the kind of expertise and technical muscle that you have in these larger organisations."

Even given the support of ABB, McAdam still estimates that it will be another three years to five before the Oyster technology is reliable enough to hand over to a customer with the necessary performance guarantees. He sounds a note of caution to would-be wave technology developers: "To anyone setting out on the journey it's going to take more time and cost a lot more money than you think. My advice would be to make sure that you do a lot more testing than you're planning. You need to test systems and equipment in as close to the real environment as possible. In other words put it into the sea."





Whilst the wave energy sector has been slower to develop than its marine cousin tidal, McAdam insists that the wave industry and its stakeholders must keep faith in its long-term viability. "The key here is that there is an enormous prize," he states. "No-one said it would be easy, but it has been harder than we thought it was going to be to crack the technology challenge. However, the amount of wave energy not just in Scotland but in the world is enormous; we could power the world's electricity need five times over if we were able to capture the energy of waves and convert it into electricity."

He continues: "The biggest challenge is stamina. We have to ensure that government support remains in place and we must attract additional private investment. As wave developers we also need to leave our egos outside the room – we are all trying to do the same thing; there will be no industry unless we succeed. At this early stage in the industry we are not

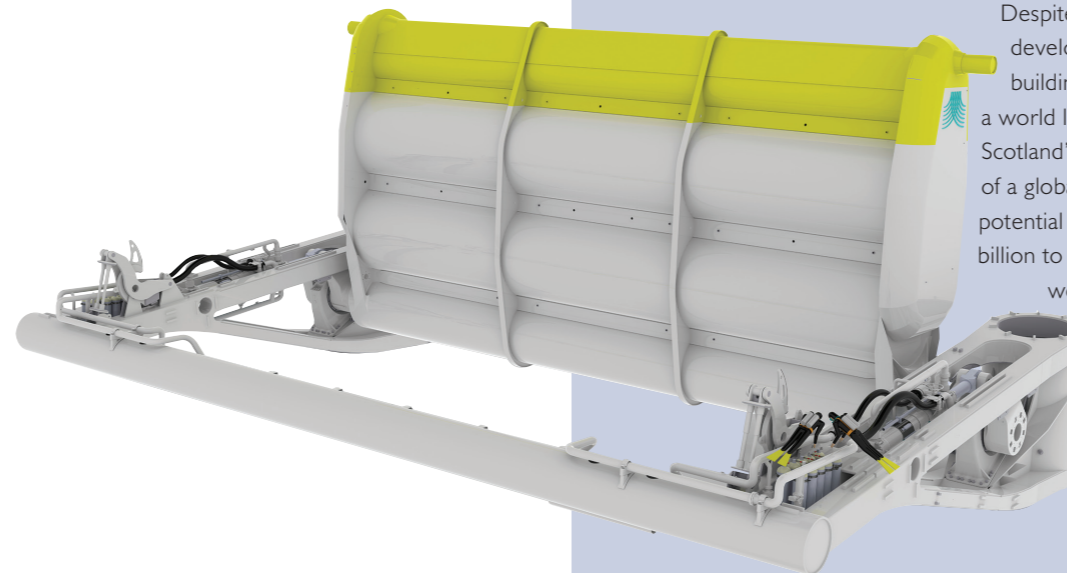
competing for customers, we should be working together more: cooperating, collaborating, and sharing our failures."

Aquamarine Power has certainly endeavoured to be transparent with regard to its successes and failures. McAdam is a regular speaker at energy conferences sharing the ongoing story of developing and commercializing a wave energy technology. In his view the sector as a whole must demonstrate that it has devices that are capable of generating reliably over extended periods of time. Whilst cost reduction is an important issue he argues that ensuring the reliability and efficiency of a device is a prerequisite. "Sometimes we have put cost reduction as the number one priority but having a low cost machine that doesn't work is of no value. We need to solve engineering problems first and then engineer cost out of the technology," he explains.

McAdam concludes: "My message is that we are getting a lot closer to having reliable technology but, looking

forward, this industry is talking about a five to eight year programme before we have truly commercial machines available in the marketplace."

www.aquamarinepower.com



Talking points

Winston Churchill once famously said that "of all the small nations of this earth, perhaps only the ancient Greeks surpass the Scots in their contribution to mankind".

Scotland has a long and proud history of innovation that has transformed the modern world. This small country has brought the world the steam engine, the bicycle, the telephone, the television, penicillin, radar and insulin – the list could go on.

Now, as the world searches for new, greener, more sustainable ways of producing energy, it once again turns to Scotland for the answers.

Scottish Renewables' Marine Conference, Exhibition & Dinner, to be held in Inverness on September 23 and 24, will showcase the cutting-edge wave and tidal energy technologies and expertise being developed here in Scotland, while tackling the tough issues facing the sector in 2014.

In the twelve months, since the industry last met in Inverness, we have seen some exciting developments within the sector.

The Crown Estate recently announced a host of new wave and tidal site leases around the UK, including four here in Scotland, indicating the appetite for new developments remains strong. Excitingly, two of these sites will be taken forward in partnership with community trusts, further enabling communities to take their energy future into their own hands.

Continuing on the community theme, the world's first community owned tidal turbine – in North Yell, Shetland – started exporting electricity. The turbine will power up to 30 homes and a locally-owned ice plant at Cullivoe Harbour Industrial Estate, and was described as "a tremendous moment for North Yell" by North Yell Development Council Chairman Robert Henderson.

We've also seen home-grown Scottish company Nautricity sign an agreement to develop a 500kW project in Nova Scotia – yet another example of the huge export opportunities open in Scotland if we continue to build on our world-leading position.

Despite the exciting developments outlined above, building on that position as a world leader and securing Scotland's place at the forefront of a global industry which has the potential to be worth over £70 billion to the UK economy by 2050 won't be easy.

How to do so, indeed, will be one of the many questions industry experts will address during Scottish Renewables' conference in Inverness. Scotland's marine energy

sector faces some really tough issues. Driven by a diverse set of challenges including electricity market reform and access to grid, the sector has had to readjust its pre-2020 deployment level expectations, posing serious questions about the pace and scale of future wave and tidal energy development in Scotland.

So just how far away from the commercialisation of wave and tidal energy are we? Do wave and tidal energy technologies now need distinct policy solutions? How can we create a market beyond 2020? Has the time come to radically overhaul the way the marine energy sector is funded?

The September event is an unparalleled opportunity to discuss these critical questions with Scotland's key industry players.

After an address by Scottish Energy Minister Fergus Ewing, sessions will be chaired by internationally-renowned figures including Dr Bernie Bulkin – formerly BP's Chief Scientist – and Stephen Gethins, Convenor of the Advisory Board at independent think-tank Scottish Global Forum and a former special advisor on energy and climate change to Scotland's First Minister.

Mary McAllan, Director of Energy and Climate Change at the Scottish Government, will debate the future of marine power with Lindsay McQuade, Policy and Innovation Director at ScottishPower Renewables – one of the country's largest renewables players – and Martin McAdam of wave power innovators Aquamarine Power in the final session of the two-day event, to be held at the Eden Court arts venue in the city.

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