



In wave power race, Sea Snake leads



JOAO ABREU MIRANDA/AFP/GETTY IMAGES

An off-shore electricity generator based on wave power off of Portugal's Atlantic coast. Portugal inaugurated a wave energy farm that uses floating tubes whose bobbing motion pumps hydraulic fluid to drive generators.

Nao Nakanishi

Reuters

A first attempt fell victim to the crisis – now in the docks of Scotland's ancient capital, a second-generation scarlet Sea Snake is being prepared to harness the waves of Britain's northern islands to generate electricity.

Dwarfed by 180 metres of tubing, scores of engineers clamber over the device, which is designed to dip and ride the swelling sea with each move being converted into power to be channelled through subsea cables.

Due to be installed next spring at the European Marine Energy Centre (EMEC) in Orkney, northern Scotland, the wave power generator was ordered by German power company E.ON, reflecting serious interest in an emerging technology that is much more expensive than

offshore wind.

Interest from the utility companies is driven by regulatory requirements to cut carbon emissions from electricity generation and it helps in a capital-intensive sector.

Venture capitalists interested in clean tech projects typically have shorter horizons for required returns than the 10-20 years such projects can take, so the utilities' deeper pockets and solid capital base are useful.

"Our view...is this is a 2020 market place," said Amaan Lafayette, E.ON's marine development manager. "We would like to see a small-scale plant of our own in water in 2015-2017, built on what we are doing here. It's a kind of generation we haven't done before."

The World Energy Council has estimated the market potential for wave energy at more than 2000 terawatt hours a year – or about 10

per cent of world electricity consumption – representing capital expenditure of more than 500 billion pounds (\$A912 billion).

Island nation Britain has a leading role in developing the technology for marine power, which government advisor the Carbon Trust says could in future account for 20 per cent of the country's electricity.

Developing like wind

"We are often compared to the wind industry 20 years ago," said Andrew Scott, project development manager at Pelamis Wave Power Ltd, which is developing the Sea Snake system, known as P2.

Standing beside the train-sized serpent, Pelamis's Mr Scott said wave power projects are taking a variety of forms, which he said was similar to the development of the wind turbine.

"You had vertical axis, horizontal

axis and every kind of shapes before the industry consolidated on what you know as acceptable average modern day turbines."

"It's easy to develop your prototypes and models in the lab, but as soon as you put them in water, it swallows capital," said John Liljelund, chief executive of Finnish wave energy firm AW-Energy, which just received \$US4.4 million (\$A5 million) from the European Union to develop its wave-roller concept in Portugal.

At present, industry executives say marine power costs about double that from offshore wind farms, which require investment of around 2-3 million euros per megawatt.

Utility action

Countries developing the technology besides Britain include Portugal, Ireland, Spain, South Korea and the United States – about 100 companies

are vying for a share of the market, but only a handful have tested their work in the ocean.

Privately owned Pelamis has focussed on wave energy since 1998, has its own full-scale factory in Leith dock and sees more orders for the second generation in prospect.

A single Sea Snake has capacity of 750 kilowatts. By around 2015, Pelamis hopes each unit will have capacity of 20 megawatts, or enough to power about 30,000 homes.

Neither Pelamis nor E.ON would elaborate on the cost of the Sea Snake, but they said the goal is to bring it down to the level of offshore wind farms.

"The challenge is more about getting to a place where we are comparable with other renewable technologies...We want to get somewhere around offshore wind," said Mr Lafayette.

"Modern slave" migrants toil in Italy's tomato fields

Silvia Aloisi

Reuters

After crossing half of Africa and surviving a perilous boat trip from Libya in search of a better life in Italy, Boubacar Bailo is now contemplating suicide.

One of an army of illegal immigrants hired to harvest tomatoes in the Puglia region, Mr Bailo squats in a fetid cardboard shack restlessly waiting for a call to the fields.

Every year, thousands of immigrants, many from Africa, flock to the fields and orchards of southern Italy to scrape a living as seasonal workers picking grapes, olives, tomatoes and oranges.

Broadly tolerated by authorities because of their role in the economy, they endure long hours of back-breaking work for as little as 15-20 euros (\$A25-33) a day and live in squalid makeshift camps without running water or electricity.

"I never thought it would be like this in Italy. Even dogs are better off than us," said Bailo, a 24-year-old from Guinea struggling to survive in an area of Puglia known as the "Red Gold Triangle", which produces 35 per cent



ABID KATIB/GETTY IMAGES

Migrants hoping for a new land of opportunity are experiencing tough conditions.

of Italy's tomatoes.

"It's better to die than to live like this, because at least when you die your problems are over."

Things have been particularly bad this year in Puglia, whose tomatoes end up in dishes around the world, from the upscale restaurants of London to the homes of the village of San Marco just a few miles away. The economic crisis

forced factories in Italy's rich north to shut down or lay off employees, so more migrants than usual – around 2000 people – have come here in search of work.

Rains – a tomato picker's best friend because the machinery an increasing number of farm owners use to replace manual labour does not work properly on muddy grounds – have been sparse.

And a crackdown by Italy's conservative government on illegal immigration has made farmers more reluctant to hire "clandestini" workers, particularly those easily identifiable as foreigners because of their skin colour.

This month, the Government launched an amnesty for immigrants illegally employed in cleaning or caring for the elderly by Italian families, but that does not apply to those bringing tomatoes in from the fields.

Mr Bailo, who was denied an asylum request and has no papers, says he has worked eight days in the past two months "and I didn't even put 100 euros in my pocket".

"Feudal system"

The going rate for illegal tomato pickers is 3.5 euros per "cassone" – a big plastic crate that, when full, weighs 350kg.

But in most cases, they will have to pay a cut to the so-called "caporali", middlemen who select the workforce for the farm owners and make sure the job gets done.

"It's a feudal system like in the Middle Ages. These modern slaves are handy for the economy – you can exploit them and then get rid of them

when you don't need them anymore," said Father Arcangelo Maira, a local priest trying to help the immigrants.

The shanty town where Mr Bailo lives in the countryside along with 600 fellow immigrants is known as "the Ghetto". From afar, it resembles a refugee camp in any war-ravaged African country, but the reality is possibly worse.

"The conditions in which they live and eat are extremely precarious. These are young, strong people who arrive in Italy in good health and fall sick here," said MSF doctor Alvise Benelli.

Spending hours kneeling or bending in the fields means that many suffer from back and muscle pain. The lack of hygiene causes skin and intestinal diseases. There are also an increasing number of people suffering from depression.

"They left their country and came here hoping to find an El Dorado, but they end up living in conditions that are often worse than what they had at home," said Mr Benelli.

"You see it most when they are forced to stay indoors. They sleep for much of the day and don't answer when we speak to them. Sometimes I have seen them cry."