

# Pelagic Power

by Anders Tørud - 2008

## **The company**

Pelagic Power AS is one of several Norwegian companies currently developing wave and tidal devices. This is the situation in spite of a rather unstrained energy supply situation, comparatively low energy prices and weak governmental incentives for implementing new renewable energy production in Norway.

Pelagic Power is a start-up company based outside Trondheim in Mid-Norway. The company was incorporated in late 2005 and has since worked on developing a wave power device. The company is working in close cooperation with the Norwegian University of Science and Technology in Trondheim. The University has strong traditions within marine engineering and renewable energy.

Like many of the other wave and tidal companies in Norway, Pelagic Power has an international market focus already from an early stage, as the company does not rely on the development of a strong home market.

The company is still in an early technology development phase but has already tested large scale (1:3) models in sea trials.

## **The technology**

Pelagic Power's concept is based on the point absorber principle like many other wave power devices. But there are several features that separate this concept from other concepts. A power plant based on Pelagic Power's technology will consist of several pumping units and one central turbine/generator unit. The pumping unit has a point absorber bouy and a piston pump that converts the kinetic energy from the waves to pressurized water that is fed to the central turbine. A complete power plant will have a large number of pumping units feeding one central turbine. The pumping units gats the water from the surrounding sea.

Pelagic Power's concept can be installed as an offshore wave power plant or a near-shore plant. In the near-shore version it is possible to install the turbine and generator on land, saving maintenance cost. A near shore version can also be used for pumping water to for instance desalination plants.

One of the concepts main advantages is that it has a central unit for conversion from pressurized water to electric energy. This means that several point absorbers can feed one turbine/generator unit. The point absorber/pumping unit has no electrical components or oil hydraulic components and can therefore be manufactured at a relatively low cost.

Another cost saving feature is the fact that the pumping units/point absorbers are not anchored on the sea bed but are floating freely in the water masses. Heavy installations on the sea bed are major cost drivers for any offshore construction. Being "free floating" and not tied to the sea bed, the Pelagic Power wave power concept is also less dependent on the seabed conditions, tidal

variations and water depth. That said, the wave power plants will of course be anchored and moored to the sea bed, but each single unit will not.

### **Combination with offshore wind**

As mentioned earlier Pelagic Powers is a free floating point absorber concept with several pumps/point absorbers feeding a central turbine/generator unit. This central turbine/generator can be placed in the shaft of a floating offshore wind turbine. Offshore floating wind turbines are suited for areas with large depths. Pelagic Powers concept is also independent of the depth as long as it is larger than about 60 meters. In Pelagic Power's opinion the combination of offshore floating wind turbines and wave power plants is an interesting concept.

### **Plans**

The sea trials done by Pelagic Power revealed several points for improvement on the wave power concept. The company is now planning a "re-design phase" where all weak features of the concept will be improved. Further on, small scale tests will be conducted to verify the concept.

A major challenge for Pelagic Power will be to design an installation procedure that is suited for installations without the use of divers or ROVs. In our opinion low cost installation and maintenance is key to a good overall economy for a wave power plant.

Pelagic Power is still a small company with a rather small organization. The company is actively looking for strategic investors that can help the company in the further development of the technology and the organization.

Pelagic Power sees a strong future for wave power technology and plans to be a part of this future.

# Floating free

**Anders Torud**, project manager of Pelagic Power, discusses a small Trondheim company's aspirations to be part of the future of wave power technology

**P**elagic Power, a startup company based outside Trondheim, is one of several Norwegian companies currently developing wave and tidal devices. This is the situation in spite of a rather unstrained energy supply situation, comparatively low energy prices and weak governmental incentives for implementing new renewable energy production in Norway.

The company was founded in late 2005 and has since worked on developing a wave power device in close cooperation with the Norwegian University of Science and Technology in Trondheim. Like many of the other wave and tidal companies in Norway, Pelagic Power has an international market focus and does not rely on the development of a strong home market. Although still in an early technology development phase, the company has already tested large scale (1:3) concept models in sea trials.

## Different

Pelagic Power's concept is based on the point absorber principle, similar to many other wave power devices. There are several features that make it different though. For example, a power plant based on Pelagic Power's technology will consist of several pumping units and one central turbine/generator unit. The pumping unit has a point absorber buoy and a piston pump that converts the kinetic

energy from the waves to pressurised water that is fed to the central turbine. A complete power plant will have a large number of pumping units feeding one central turbine. The pumping units gets its water from the surrounding sea.

The concept can be installed both as an offshore wave power plant as well as a near-shore plant. In the near-shore version it is possible to install the turbine and generator on land, saving maintenance costs. A near shore version can also be used for pumping water to desalination plants, for instance.

One of the concepts main advantages is that it has a central unit for conversion from pressurised water to electric energy. This means that several point absorbers can feed one turbine/generator unit. The point absorber/pumping unit has no electrical components or oil hydraulic components and can therefore be manufactured at a relatively low cost.

Another cost saving feature is the fact that the pumping units/point absorbers are not anchored to the sea bed but float freely in the water. Heavy installations on the sea bed are major cost drivers for any offshore construction. As its 'free floating' and not tied to the sea bed, the Pelagic Power wave power concept is also less dependent on the seabed conditions, tidal variations and water depth. That said, the wave power plants will of course be anchored and moored to the sea

bed, but each single unit will not.

The central turbine/generator unit, which the pumps/point absorbers feed in to, can be placed in the shaft of a floating offshore wind turbine. Offshore floating wind turbines are suited for areas with large depths. Pelagic Power's concept is also independent of the depth as long as it is larger than about 60m. In our opinion, the combination of offshore floating wind turbines and wave power plants is an interesting concept.

## Challenge

The sea trials that have already been done by Pelagic Power revealed several points for improvement on the wave power concept. So, the company is now planning a 're-design phase' where all weak features of the concept will be improved. Further on, small scale tests will be conducted to verify the concept. A major challenge for Pelagic Power will be to design an installation procedure that is suitable for installations without the use of divers or ROVs. In our view, low cost installation and maintenance is key to a good overall economy for a wave power plant.

It is actively looking for strategic investors that can help the company in the further development of the technology and the organisation. Pelagic Power sees a strong future for wave power technology and plans to be a part of this future. □

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