

Justification Report – Solar Desalination and Tourism

Combination: Desalination, Solar and Tourism

Basin selected: Caribbean and Mediterranean

Description

Offshore facilities often have issues relating to the provision of fuel and freshwater due to the distance from shore and the challenges of marine construction. Therefore, a combination between an offshore marina and solar power is proposed. Offshore marinas serve as a location that provides a temporary berth for passing sailing ships, and often supply the boats with supplies such as water.

Solar thermal technology has been demonstrated as an effective means to desalinate water, and with a plentiful supply of seawater surrounding the floating marina, there will be a minimum amount of energy required for pumping. In addition to the solar desalination facility, a section of the floating solar platform will be dedicated to PV panels that will generate electricity to drive the pumps and electrical systems necessary to operate the solar desalination facilities, as well as powering amenities within the marina such as lighting etc. This will also require energy storage facilities so that such amenities can be powered at night.

This combination can be considered as single, as no current prototypes or concepts exist. However, there are several cases where solar desalination has been effectively demonstrated onshore, including Element Water Makers, Airlight Energy and WaterFX. Offshore marinas have been successfully developed by KG MedMarinas, MDL Marinas and IGY Marinas.

Technical

Marina technology is a proven method of providing a berth for speedboats and sailing boats. By connecting a series of floating pontoons using ropes and cables, a floating, flexible structure is assembled that can be arranged as required to provide the maximum amount of protection to boats. Depending on the exposure of the location, a series of floating break waters can also be used to provide additional protection.

Solar Photovoltaic technology will provide energy autonomy for the marina services while Solar Thermal will drive a solar desalination system supported by one of these pontoons, and would be anchored by mooring lines in such a way that the solar panels would face in the direction of the sun's path. PV panels located on an adjacent pontoon would generate electricity that would in turn drive the pumps that would collect seawater from the ocean and drive in through the solar desalination system. This arrangement has been established successfully onshore, most notably with WaterFX.

While this combination has not yet been tested offshore, several floating solar desalination concepts have been proposed, most notably with SUNdy from DNV GL, and the technology could be developed within the next few years.

Socio-economic

By creating a tourism hub in an area that previously had none, or minimal, shore access will encourage a greater number of tourists to visit that region. This will serve to boost the local economy and create jobs within the tourism sector that previously did not exist. Skilled jobs will also be created relating to the maintenance and service of the marina, and the transport of visitors to shore.

By creating a new source of income to the local economy, this would potentially contribute heavily in terms of GVA. It is estimated that the coastal marinas industry contributes more than £500 million in Gross Value Added to the UK and Channel Islands economy and may be as high as £700 millionⁱ.

Environmental

By utilising the power of the sun to operate the marina and solar desalination units, the concept will avoid the burning of fossil fuels to serve these needs. Furthermore, by providing desalinated water on site, fuel will be saved that would otherwise have been used to transport freshwater out to the marina.

The storage of electricity will need to be carefully designed, as the chemicals used to store energy could be potentially devastating to the local environment. Additionally, precautions would have to be made to reduce the risk of fuel spills from ships through error or collision.

Financial

The platform's income would come from charging boat owners a rate for the berth, with an additional cost for water resupply. In the Caribbean and Mediterranean sea basins, sailing trips are a popular form of holiday, and the industry has a reliable and predictable distribution based around particular destinations. If this marina was located in such a way that made travel to a popular destination more accessible and effectively less expensive, then a steady profit will be likely.

There is also the potential to expand the marina so that it can also resupply fuel to the docked boats, which could also potentially provide another revenue stream.

Further Information

1. Does the opportunity qualify as multi-use of space or multi-use offshore platform:
Yes. This combination could be used as a multi-purpose platform, that is similar in appearance to existing floating marinas.
2. Scale of concept/project:
This concept would be in the form of a single, small autonomous platform that would be located close to a nearby, previously difficult to access, tourist destination.
3. Identify the key threat/challenge that can be addresses through combining the chosen sectors:
By reducing demand on water supplies of local communities and also providing a source of income at the nearest location onshore, this platform has the potential to economically invigorate coastal towns and provide a new source of income to many locals.
4. What is the customer/societal problem that can be solved by combining the sectors:
By providing clean freshwater at an offshore location, this marina has the potential to supply sailing boats and, in the case of emergencies, even ships with a sustainable, carbon-free source of water.

ⁱ http://www.tyha.co.uk/NewsDetail.asp?N_ID=34