



Water - Energy Nexus and Sustainable Water Source through Ocean Energy (Booth 7) (/initiative/4Wcx/water---energy-nexus-and-sustainable-water-source-through-ocean-energy-booth-7)

I propose sustainable clean water through a reliable clean energy source--ocean energy.

Submitted by Candace Brown

Comments

Candace Brown 3w, 4d ago

NEUTRAL

The 1 MW CETO 6 energy generation solution is estimated at \$4 million according to the Project Development Officer at Carnegie Wave Energy last week. The prices have come down from the \$25 million (pre-commercialization cost) published in their literature from 2012 which is the cost for the largest Australian military base and its unique requirements and Carnegie original development costs that were recaptured in that project. The commercialization of this technology drives down the cost of the solution.

Candace Brown 1m, 1w ago

NEUTRAL

Note the Perth (PWEF) project example (military installation) \$25 million cost cited in the submission example includes 3 CETO 5 (240 kW) sustainable Wave energy infrastructure and a Direct Reverse Osmosis Desalination "pilot". It is primarily an

energy utility.

Candace Brown 1m ago

NEUTRAL

This proposal is a sustainable (zero-emission) wave energy solution that can operate with any high-energy water sourcing need or offset the existing fossil fuel energy sources of the existing City of Santa Cruz Water System.

Jean Brocklebank 3w, 6d ago

CON

I want to know the energy cost of manufacturing, installing and maintaining this infrastructure

Candace Brown 3w, 4d ago

PRO

In conversation and email exchange, Jean indicated she was against anything that was about desalination and note this solution is to provide a zero-emission energy source once installed for any water pumping needs (including the 4,200 MW/year existing energy needs of the Santa Cruz Water District of which 2,600 MW/year is used to pump groundwater) which is not purposely for desalination. My personal feeling is that there is a combination of capture/storage/conservation and only in very worst case scenario...(more than 5 years of severe drought) should one consider alternatives..and if so only to meet existing needs of the population and not as an excuse to allow excessive growth)...and I know that the Water Advisory Committee is considering the economic burden of ANY solution considering the economics/demographics of the existing citizens... Any water sourcing beyond our present surface/gravity fed sources will take more energy than now unfortunately and we need to move to carbon-neutral energy sourcing. I have dialogued with Jean privately that the Carnegie Wave Energy System comes in (multiple sizes - 7 meter (80 kW), 10 meter (150 kW), 11 meter (240 kW) and 16 meter (1 MW) across sizes (3.28 feet to a meter) depending on the energy needs and location. Note that this energy is CONTINUOUS (unlike wind and solar) so multiply by 24 hours and 365 days to get the full impact of the energy source created by waves. To consider how much energy is expending shipping and/or trucking it, I need the weight of each unit and am exploring documents for these details and it depending on the type of transportation--ship, train or truck. These details are yet to be considered. Contrast these 23-

33-36-52 feet solutions with wind with 140 foot turbine and 250 tower (and only about 40% as reliable). Comparing wave energy to solar of similar energy size--10 meter wave blanket to a soccer field of solar panels (according to UC Berkeley) and only half as reliable as wave energy. SO THE NET IS THAT THE OVERALL ENERGY EXPENDED TO SHIP AND INSTALL THE WAVE ENERGY SYSTEM IS FAR LESS THAN WIND AND SOLAR SOLUTIONS WITH A NET MUCH MORE RELIABLE CARBON-NEUTRAL / ZERO-EMISSION ENERGY SOURCE. The units are made of material (including iron that also makes them have a very long-lifespan) to displace the water volume and to create a kinetic force when moved by the wave that can be captured. The manufacturing for the Australian Perth location is done in Southern Asia. Systems of similar nature in the United States have been made in Oregon for another company and the manufacturing location has not been determined for this solution. They can be either shipped by ship, train or truck to their location and then a vessel carries them to their final destination 2-3 miles offshore typically depending on the sea bottom depth. After which, the maintenance cycle is every three years. They are built to last at least 25 years.

Candace Brown 3w, 4d ago

NEUTRAL

I am personally still processing all the great suggestions from the Civic Engagement and know there is a portfolio of wonderful options for conserving, redirecting, capturing, storing (including groundwater aquifers) that will then be transported to locations across the county. All of this takes energy. And also note that the City already uses 4,200 MWh/year (including 2,600 MWh/hr to pump groundwater) and that the energy is not carbon-neutral right now. I am proposing a zero-emission energy sourcing solution that is needed for any water sourcing including the existing Water Department needs.

Candace Brown 3w, 1d ago

Please see in the Resource section the PDF - "Perth Wave Energy Project Update - Onshore power generation installation and offshore preparations."

David Faulkner 3d, 9h ago

PRO

Although I am against desalination, harnessing wave energy is a great idea.

Candace Brown 2d, 18h ago

Thanks Dave!

Candace Brown 3w, 6d ago

NEUTRAL

Note that the \$25 million cost estimate was based on a military installation. Further inquiry indicated the cost would be \$4 million per MW capital cost and then you have continuous power x 24 hour x 365 days per year.

Fred Martinez 2w, 6d ago

CON

Missing the point.

Candace Brown 2w, 3d ago

Please elaborate your point Fred. Thanks.

jeanine lovet 2d, 20h ago

CON

won't come close to generating enough energy to power a desal plant

Candace Brown 2d, 19h ago

NEUTRAL

Jeanine, Perhaps it was not clear that the ratings are continuous per hour (x24 hour x 365 days per year) The 240 kW (CETO 5) and 1 MW (CETO 6) per buoy are scalable as needed for existing or future energy needs of the City. Typically wave energy is considered "available" for at least 80-90% of the time so taking

1 MW x 24 x 365 x 80% = 7,008 MW/year per buoy....or using the CETO 5 (smaller version and scaling as needed) = 1,682 MW/year per buoy. I personally feel that there has been a strong case for alternatives to desal in this forum that capture/store, transfer/distribute and pump/distribute at lower energy costs..(however the existing Water District energy requirements are still 4,220 MW per year also excluding expansion)Water is very dense and for the same reason that it takes a great deal of energy to pump and move it, wave energy offers a great energy source.

jeanine lovett 2d, 19h ago

the point is that that won't even come close to being enough energy to run a desal plant. If you look at the math you could put solar panels on every roof of Santa Cruz and still not be able to power a full size desal plant

Candace Brown 2d, 19h ago

NEUTRAL

UC Berkeley found in their study that a 10 meter Wave Energy capturing blanket could capture as much energy as a soccer field of solar panels....AND wave energy is CONTINUOUS (2-3 time that of wind and solar) and Yes it is amazing. It is taking some education to realize what an opportunity Wave Energy is for this community Jeanine and I appreciate you providing your comments so I can provide these important points about Wave Energy vs. Solar....The reason why it has not been established yet has to do with multiple reasons...our focus on fossil fuels and other countries choosing to invest in R&D in the last decade (rather than the U.S. in its lost decade) on this important source of energy which has now progressed to the point where it is commercially viable and in the case of the CWE CETO 5 and 6 better suited for this environment with marine and whale migration concerns..... 60% of the global population lives within 60 km of the coast...

jeanine lovett 2d, 19h ago

CON

This is a very misleading Proposal. Your taking a good for the environment and putting it with something extremely bad.

Candace Brown 2d, 19h ago

NEUTRAL

You associated it with desalination Jeanine and I'm trying to clarify that in the comments you are providing....I personally believe that there are alternatives to Desalination that are viable. You cannot say that they don't require significant energy also --granted not like desal!!!!....and also the existing Water District which has an exist energy footprint that is not being addressed. I am simply saying that water sourcing and energy are interlinked including the existing Water District and that Santa Cruz has the opportunity to switch not only to a comprehensive water sourcing solution (with the alternatives offered in this forum) and with an energy source that is emission-free....This is all good Jeanine.