

## Photovoltaic Solar Array Operations on Lake Mead

by Rick Spilsbury

Instead of spending billions to get more water, the SNWA should be *earning* money to get more water. And instead of being the Watergrab super-villain, the SNWA could be the water conservation super-hero.

Here is an opportunity to absorb the solar energy that would have gone into evaporating water off of Lake Mead – and instead converting it into electricity. Here's an idea that's way better than California's [shade balls](#):

Presently, Southern Nevada gets 300,000 acre feet per year from the Colorado River. And an estimated **900,000 acre feet** a year of water *evaporate* off of Lake Mead! That's three times what Southern Nevada uses that just drifts away on the winds. If the SNWA could prevent just **1 percent** of that evaporation, Southern Nevada could get an extra 9,000 acre feet more per year from the Colorado River. That's about 3 percent more water for Southern Nevada. Not a huge amount of water, but definitely significant.

...What **would be huge** however; is that the SNWA could do it at no cost (in the long term) to ratepayers. In fact, with solar power arrays, there is money to be earned. Imagine that; more water and **lower** water bills. Moreover, solar power generation on Lake Mead means that Nevada's pristine desert valleys don't have to be bulldozed to install solar power.

Lake Mead covers an area of about 250 square miles. A solar array big enough to cover 1 percent of Lake Mead would be about 2.5 square miles. That's big enough to generate up to 700 MW.

But of course; Lake Mead is a National Recreation Area, and Agents of the Federal Government might initially be hesitant to build solar facilities on the water. However, Lake Mead is a man-made reservoir. And floating platforms do not have the environmental impact of land-based solar arrays on natural desert ecosystems. Since every acre of water with solar arrays on it would mean an acre of (usually) Federal land that won't have to be cleared of life for solar arrays, it seems very likely they will come around. And since this facility's water conservation (by evaporation reduction) could result in reduced water transfers from Federal lands (such as the SNWA Watergrab of Central Nevada), solar arrays on reservoirs should lead to much better environmental results overall.

In fact, Solar Island development could all happen very fast – much sooner than the expected growth of solar power generation on land – because the value of the water conserved can be factored into the cost/benefit equation.

Allow me to make a rough estimate. I'm assuming water at about \$2000 an acre foot. I'm using this figure from the cost of desalinated water from the [desal plant in San Diego](#). Sorry, as far as I know the SNWA has not published comparable figures for the cost of Watergrab water. And why? My guess is because the Watergrab figure is higher – which of course, would make **this** figure higher.

$$2000 \frac{\text{dollars}}{\text{acre foot}} \times 9000 \frac{\text{acre feet}}{\text{year}} \times 30 \text{ years} = 540 \text{ million dollars}$$

I think half a billion dollars should be more than enough to pay the difference for installing solar power on water.

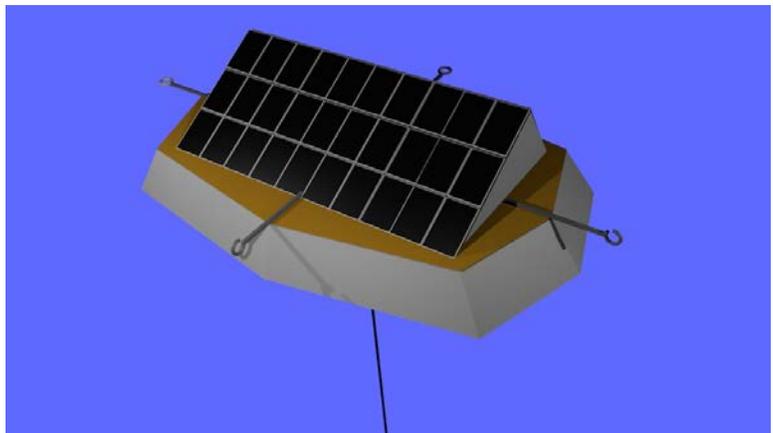
And need I remind you that this figure does *not* include how much money the solar power will make.

...Of course, only *one* Solar Island would mean only 9,000 acre feet of water per year gets conserved. It might take as many as 15 Solar Islands to conserve as much water as the Groundwater Development Project (pipe dreams of taking from the deserts of drought-stricken Central Nevada). Which means this Solar Island concept could end up becoming many big projects. But so what! If these Islands are earning money, are essentially pulling water from thin air, and are a decent place to visit; somebody will want to build more.

I would think that Pahrump or Phoenix would be very interested in a project like this. There are likely other States, Mexico, or even private companies who would willingly invest in water production and solar power combined.

And the reason I don't foresee much resistance is because everyone can benefit. Done right, this could be a way to keep lake elevations and river flows up. If participants banked some of the conserved water in the Lake to prepare for future droughts, that would mean more water for the Lake. Everyone wants that. Solar Islands could even be installed to keep Lake Mead levels up high enough for water to run the electric turbines in Hoover Dam – thus indirectly earning even more money.

...And it wouldn't be that expensive to do. The floating platforms to mount the solar arrays can be cheaply and *sustainably made*, with a buoyant bottom and a solid top for the floor of the platform. Each modular platform array can be tied to its neighbor platform to form a scalable reconfigurable platform network.

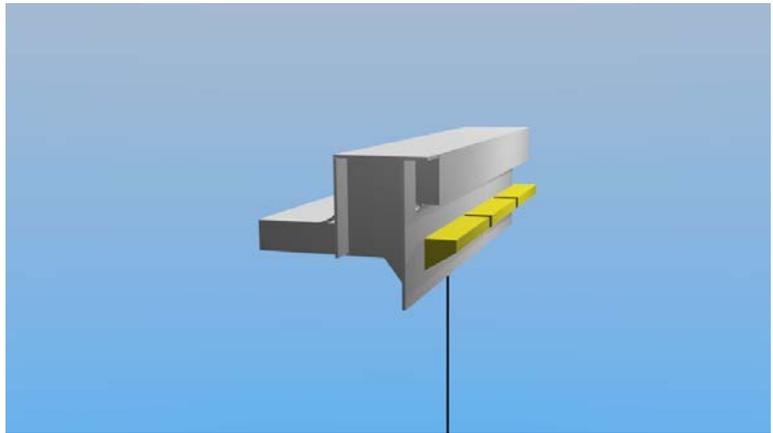


And since Lake water will be directly in contact with the platform bottom surfaces, there will be no air/water interface, which means essentially *no* evaporation under the platforms. Nonetheless, the spaces between the platforms will still be open to the sky, which means sunlight will still get through to the Lake, and evaporation will still happen near the solar platforms – cooling the solar cells, resulting in more efficient power production.

For protection from storms, it would be wise to build wave break platforms surrounding the solar power network. These wave breaks should be capable of eventually generating *wave power* to help pay

for themselves too. Moreover, the wave break facilities would shade some more of Lake Mead, thus further reducing evaporative losses.

The Wave Break Platforms could also be made inexpensive, portable, and modular – about the size of a semi trailer. Which means the overall shape and size of the wave brake facility would be determined by spacers between the wave break platforms. Again, scalable and reconfigurable. Which means the SNWA could start off small and improve their designs as they go. The technical challenges are achievable.



Whichever unique ideas I have here are all published **open source**. Which means the SNWA, or anyone for that matter, is welcome to use these ideas for free.

...I predict a Solar Island rush on the reservoirs of the Colorado River.

Thank you,

Rick Spilsbury

for more information on this Solar Island Arcology design:  
[NoShootFoot.blogspot.com](http://NoShootFoot.blogspot.com)

## Addendum

The floating PV solar array concept is not new. A number of installations have already been made around the world on smaller bodies of water.

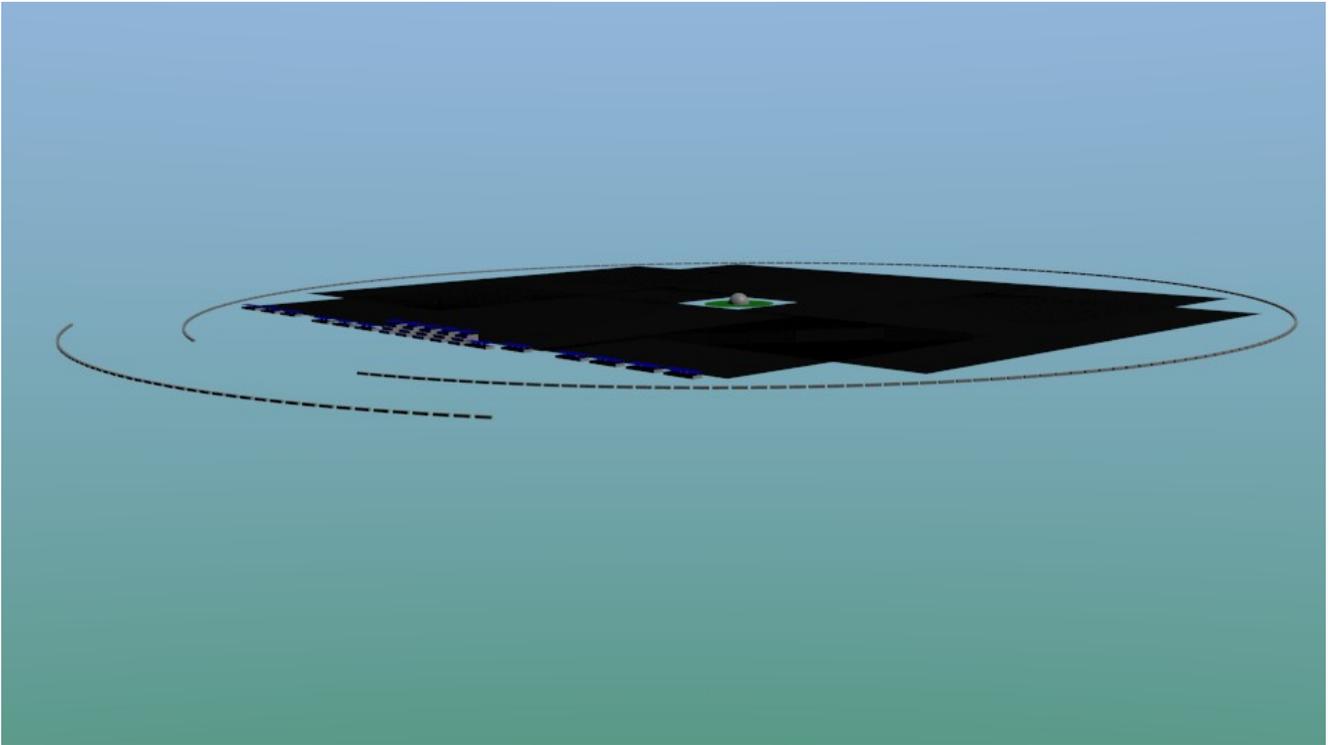
There are two large floating solar arrays in [Japan](#).

There are also a number of small floating solar arrays in [California](#) and one in [Australia](#).

There is even a 350 MW floating solar array planned in [Brazil](#).

And apparently, someone has already offered to put solar arrays on the [Colorado River](#).

What makes this floating solar array design different is that it is planned for more open water, it would have to be anchored to the bottom, it does a better job of reducing evaporation, and it could be developed into something more than just a solar array.



This image of a Solar Island shows the PV solar array in black, with the wave break as a ring surrounding the facility.

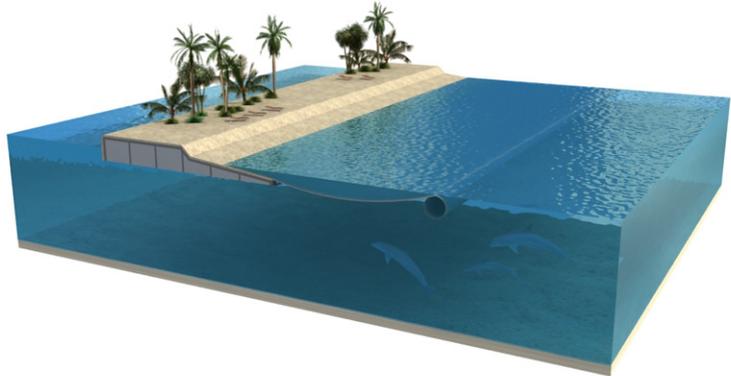
There are also additional structures pictured that may someday be added. The platforms on the left with the blue shade tops could eventually be maintenance housing, an on water Ranger Station, and possibly a marina – or even more. The dome in the middle could someday be a floating sewage treatment plant, surrounded by man-made wetlands.

Of course, these upgrades can be added later, but there are already companies poised to do the work.

A company called Floating Island International has developed what they call **BioHaven Floating Islands** – which “biomimic natural floating islands to create a “concentrated” wetlands effect.” ...In other words; they've figured out how to further clean Island sewage treatment effluent to the point it might end up cleaner than the water in Lake Mead.



Moreover; a company called **Dutch Docklands** has already been building homes on the water, and are poised to build islands – complete with sandy beaches and golf courses (of course, utilizing artificial turf).



It is important to consider aesthetics. Lake Mead is a National Recreation Area. But since it is a Recreational Area, it makes sense to add another beach or two. From the water, the Island wouldn't show up much. The wave break would look like a wall about a mile long. It could be painted white to look like Lake Mead shoreline. There could even be water parks located around the perimeter.

People tend to favor places they can go. And with the right image, this Island could become a tourist attraction – kind of like the SNWA's Springs Preserve – only cool. And what would make it cool is that it would be a step towards sustainability.

I envision a hidden resort, like some secret island in a James Bond movie. Once you enter through the passage, there could be a marina with a boardwalk that leads to a row of buildings that appear to be a combination of Santorini Greece and a fish tank. White! But with lots of passive solar windows – facing South, towards the Marina – which would be on the South side of the Island for that very reason.

I don't envision this Island to ever house more than a few dozen residents and guests. Too many people and the sewage treatment facilities would be overwhelmed. But eventually, a sustainable community the size of small village ought to be able to live somewhat self-sufficiently there. It could even be promoted as a proto-arcology. Now that's cool. I'd visit.

For more information:  
[NoShootFoot.blogspot.com](http://NoShootFoot.blogspot.com)