

The Potomac Highland Steward

JANUARY 2016

ALTERNATE ENERGY ELECTRICITY FROM OCEAN WAVES

We can use the bountiful energy in ocean waves to power coastal cities and reduce greenhouse gases. Power companies do not need to crisscross inland regions like ours with electric lines from coal plants, and pipelines from fracking fields, to fuel coastal cities.

The wave industry needs faster reviews, more test sites, and more private investment.

Ocean waves are always there, powerful, out of sight, and near the customers. At night and in calm winds, ocean waves continue. The "technically recoverable wave energy resource is approximately 1,170 terawatt hours (TWh) per year" (DOE), enough electricity for 90% of the households in the US.

"More than 100 pilot and demonstration projects exist throughout the world" (2014, International Renewable Energy Agency).

Wave projects capture energy with floats, turbines, pumps, and generators. All use the motion of waves relative to seabed, calmer subsurface water, shore, or adjacent parts of the surface water. This article describes some of the designs.

DESIGN ISSUES FOR WAVE ENERGY

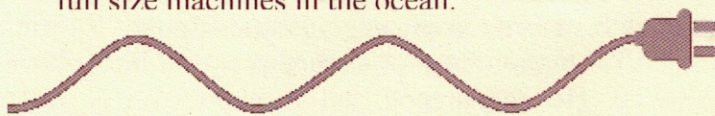
- ❖ Designs which capture wave motion relative to the **seabed or subsurface** waters can be used widely. These machines can be anchored far from shore, since long non-corroding cables are a well-developed technology (think ski lifts and weather buoys).
- ❖ Capturing wave motion at **shorelines** is less practical, since shorelines are scarce, expensive, visible and more turbulent than deep water.
- ❖ Waves can slightly **bend hinges** between two floats, to generate electricity. However moving hinges in salt water are not a well-developed technology. Pelamis used this approach in Scotland, but could not raise enough money to keep operating.
- ❖ Equipment at sea needs protection from water **leaks and corrosion**.
- ❖ Taking energy out of waves will **reduce**

movement of sand and sediment. So sites and density matter, to leave the shore alone. A row of wave generators can also be a breakwater, reducing wave damage.

- ❖ If the moving parts of wave machines move slowly enough, **swimming animals** can avoid them and benefit from new niches, as happens at shipwrecks.

US GOVERNMENT ACTIONS

- ❖ Applicants need years to get permits and licenses, and will often move faster by testing abroad. The US requires more onerous baseline studies for waves than for fracking.
- ❖ There is one ocean test site in Hawaii, which can test four designs per year, and one in Oregon. Each test needs permits from the state, Corps of Engineers, and Coast Guard. "A significant effort is required in face-to-face consultation with stakeholders."
- ❖ DOE started planning a Prize for wave energy in summer 2012, proposed it to Congress in April 2013, will choose winners in November 2016, and winners will still need more rounds of development.
- ❖ DOE's Prize is based on performance of 1:50 and 1:20 scale models in tanks. The miniaturized turbines and generators will not work the same as full size machines in the ocean.



EXAMPLES OF DESIGNS

All three examples on page four raise efficiency by having a high ratio between flotation force and the mass which changes direction on every passing wave. CETO and Drakoo already exist. Drakoo and Spindrift minimize leaks by keeping the generator above water level, with only a spinning shaft crossing from the water into the dry area for the generator, which can be sealed like any ship propeller shaft. CETO and Spindrift can be at any distance from shore.

See WAVE **ENERGY**
Page 4 ▶

An expanded version of this article with documentation links and more design descriptions is on our website at PotomacStewards.com/energy

President

Paul Burke
Jefferson County
304-876-2227

Vice President

Kirsten Weiblen
Hampshire County
304-856-1305

Treasurer

Eric Burleyson
Hampshire County
304-856-1305

Secretary

Donna Cook
Grant County
304-749-8424

Board Member

Bonni McKeown
Kanawha County
304-345-5383

Board Member

Andy Andryshak
Morgan County
304-947-5664

STEWARDS OF THE POTOMAC HIGHLANDS

We are a nonprofit 501(c)(4) citizens group addressing ways to live and work in respect and harmony with nature and people in the beautiful Potomac Highlands of West Virginia, Virginia and Maryland. We aim to strengthen citizens' efforts by sharing information and promoting networking among our neighbors. We lend our support to other groups who lobby for changes in laws and policies.

Among the leadership of Stewards we have personal experience in many of the issues that we cover. We invite you to use this newsletter and our website PotomacStewards.com to find information on the issues you care about.

We Depend Solely On Your Contributions

You can mail a check, or donate securely online at PotomacStewards.com

We are an advocacy group so your contribution is not tax-deductible, but whatever amount you can afford, no matter how small or large, is used 100% for our all-volunteer work to protect our Potomac Highlands.

Stewards of the Potomac Highlands

PO Box 455

Wardensville, WV 26851

info@PotomacStewards.com

Help us spread the word - when you are done with this newsletter please recycle it by sharing it with a friend or neighbor.

Together we can make a difference

SAD NEWS

Citizens of West Virginia lost a friend in 2015, Bill Howley. We came to know him through his efforts in organizing opposition to the PATH high-voltage powerline proposal in 2009/10. He encouraged and inspired over 100 people to intervene in the case before the WV PSC, and PATH was defeated in WV.

Bill Howley, 62, of Chloe died on April 23 in a car accident near Exit 79 on I-79. He was on his way to a meeting in his capacity as the recently-hired program director for WV SUN, an organization that promotes self-reliance through solar cooperatives in West Virginia. His last views were almost surely of the beautiful spring leaves and redbud blossoms.

Full obit at <http://calhounpowerline.com>. □

LEGISLATORS & CHEMICAL SPILL

In January 2014, legislators regulated above-ground chemical storage tanks, after a spill left 300,000 people without safe drinking water for months. Disgracefully, a year later, lawmakers in both parties gutted the law, again leaving citizens unprotected.

Thank you to Delegate Skinner and Senator Unger, the only legislators from our region who voted against gutting the law. *Links & maps available at PotomacStewards.com/cleanh2o.*

The 2015 law regulates only 0.2% of the tanks covered under the 2014 law—that is, 90 tanks statewide, and it cut inspections from annual to once in 5 years. The offending company's tank in the chemical spill would not even be regulated by the 2015 law.

The Potomac Highlands counties have 108 storage tanks in Jefferson, 22 in Morgan, 213 in Berkeley, 8 in Hampshire, 63 in Hardy, 67 in Mineral, 132 in Grant, and 44 in Pendleton.

Remember that 2016 is an election year. Time to make some changes?? You can even run for WV legislature yourself. Filing deadline is January 30. □

RURAL LIFE

LOCAL BUSINESS

Kate Pacelli and her husband Pete opened their store The Farmer's Daughter Market and Butcher in Capon Bridge, WV, in May 2015. They sell locally-sourced meats, dairy, produce, and dry goods. Their website is facebook.com/farmersdaughterwv. This email interview with Pete was done in December 2015.

What qualities made you choose the town of Capon Bridge as a good place to open your business?

Our family farm is located in Capon Bridge, and we noticed there was a great need for fresh food in the area. Outside of seasonal fruit stands, there are no fresh food options between Romney, WV and Winchester, VA. Judging from our local response, the community agreed!

I understand you try to source your meat and produce locally. About how many local farms are you helping to sustain with your business?

We are currently working with over a dozen local farms- from small family farms that supply us with eggs, to farms like Bigg Riggs and Mayfair farm who have other outlets like farmers markets. We calculated this month, that since opening May 30th, we have purchased over \$97,000 from West Virginia Farmers- something we're very proud of.

When and how did you first get interested in butchering?

I've always had an interest in food, particularly meat. My family comes from a long line of butchers from the Netherlands, my grandfather grew up in the family shop. His father was a butcher, his father's father was a butcher, and so on... I really got serious about it when I lived in Portland, OR. I frequented the neighborhood shops and read everything I could get my hands on, that is where I think it really clicked for me.

Are you self-trained, or have you had formal training and/or an internship somewhere?

I started working part time behind the counter at a whole animal butchery in Asheville, NC- the Chop Shop. I apprenticed and washed dishes for 6 months before ever holding a knife. I've also had a short internship at the Meat Hook in Brooklyn before working for JM Stock Provisions, a great whole animal

butcher with locations in Charlottesville and Richmond, Virginia.

I saw that you were offering a butchering internship. Any takers?

Yes, we recently brought on a gentleman interested in butchery, he has really taken to it and we now have him working a paid position.

Do you use more than one abattoir?

We leave that decision up to our farmers. They take the animals to the abattoir that they feel comfortable with, then bring us the whole carcass. Right now our beef and pork is slaughtered at two different facilities.

I've tasted quite a few of your sausages, and they comprise quite a delicious variety of flavors. About what percentage are from recipes vs. your own invention?

I have created about 50% of them, the other half I've picked up over the years from other butchers I've worked with.

Any chance that your bakery items will include bread in the future?

We have a baker who comes once a week and bakes mostly sweets. We would love to have bread, but aren't set up right now to have a baker here multiple days a week- which is what fresh bread would require. We're always looking for someone with a commercial kitchen who would like to supply the shop with fresh bread weekly- feel free to put the word out there!

I notice you have quite a few cookbooks in the shop. If you could keep only one, which would it be?

It would be the River Cottage Meat Book- in addition to some of my favorite recipes it allows some great insight into the farming and butchering side of meat.

Although it's still early days yet, your business seems to be thriving and building bit by bit. Do you have any advice for similar small businesses trying to succeed in rural areas?

I would suggest that they don't try to compete with Wal-Mart and other commercial groceries. Offer a higher quality product and encourage your patrons to ask questions they may have regarding price and sourcing of your product. Be present, put a face and some accountability to your business. And most importantly, hang in there. □



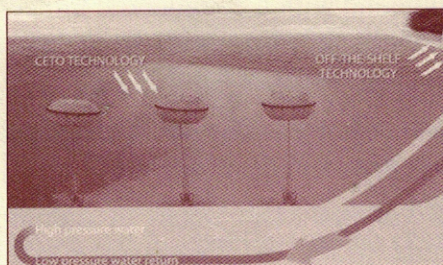
Stewards of the Potomac Highlands
PO Box 455
Wardensville WV 26851

PotomacStewards.com

PRSR STD
U.S. Postage
PAID
Martinsburg, WV
Permit 123

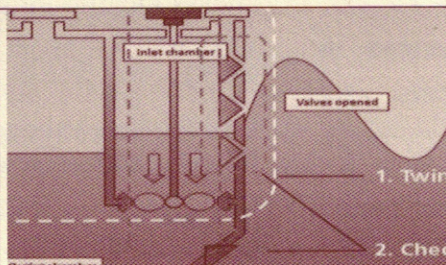
WAVE ENERGY

► FROM PAGE 1



CETO, CarnegieWave.com, 20¢ per kWh.

Buoyant chamber moves up and down just under the surface waves. The motion drives a pump, sending electricity or water (in a long pipe) to shore. Pumped water drives an electric generator and/or presses against an osmotic membrane for desalination.



Drakoo-B, Hann-Ocean.com.

It floats, attached to any floating platform. Valves let the top of each wave enter. This water drops and exits at the bottom of the next wave, spinning a turbine. A shaft goes up from the turbine to the generator which sits high and dry above water, capturing 55% of wave energy. Cables take electricity to shore.

SpindriftEnergy.com, 2¢ per kWh.

150' tube hangs from a float. Waves lift the tube through still water below, spinning a turbine in mid-tube. The tube narrows at the turbine (Venturi tube) to speed the water. Power is proportional to the cube of water speed, and a Venturi tube accelerates low speed waves to create high speed water flow, unlike other designs. A shaft goes up from the turbine to the generator which sits high and dry above water. Cables take electricity to shore.

