

Watershed *Sentinel*

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Environmental News from BC and the World

Here Be Dragons



Also: 6 Sweet Secrets
Forest Industry Falldown
Who Wants LNG?

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There is a tide in the affairs of men, Which, taken at the flood, leads on to fortune; Omitted, all the voyage of their life, Is bound in shallows and in miseries,
On such a full sea are we now afloat; And we must take the current when it serves, Or lose our ventures. – Brutus, *Julius Caesar*, Shakespeare



Ocean Energy in British Columbia

by Arthur Caldicott

British Columbia is awash in ocean energy. A handful of companies stand on its shores eager to try out a quirky assortment of untested machines which they hope will exploit that energy for electricity generation.

At present, the BC government's only ocean energy policy is no policy. Staking of ocean rights has already begun. First Nations and communities have little idea what to expect or how to respond to it. The environmental risks are unknown. As for the economic opportunity for BC in this emerging industry, the policy vacuum tells us there will be no "leading on to fortune."

Here Be Dragons: The Monster of Maude Island

What we don't know, we fear: cartographers have for millennia drawn dragons and other fierce mythical creatures on those parts of their maps where their knowledge was non-existent. "Here be dragons" – actually, it was "*hc svnt dracones*" – was inscribed five hundred years ago on the Lenox Globe.

There be monsters close to home, as well. Chief Harry Assu, an elder from Cape Mudge on Quadra Island, spoke of a place in Seymour Narrows between Quadra and Vancouver Islands where dangerous sea monsters dwell. "One of these monsters always emerged around Maude Island. It must have been fifty feet across," said Chief Assu. "Every-

body stayed away for fear of being pulled in and dragged under the water." [*Spirit in the Stone*, Joy Inglis, 2000] Petroglyphs near the site depict what might be one of these monsters.

Perhaps it wasn't so much fear, as it was a cartographic and pictographic expression of the precautionary principle.

For the last sixty years, the tides haven't spilled between Maude and Quadra Islands. A causeway closed off the passage in 1942. Now Canoe Pass Tidal Energy Corp. wants to install turbines in the pass, remove the causeway, and let the 8-to-10 knot tides rip between the islands again.

Welcome back, tides, and welcome to a new breed of sea creature – generators that harness the energy in tides and waves.

Blind Vision: BC Energy Policy

For independent power producers (IPPs), British Columbia's 2002 Energy Plan was a dream. "The private sector will develop new electricity generation," the Plan said, and BC Hydro will buy it from them. The 2007 energy policy update added date and quantity targets to the directive – "self-sufficiency" by 2016.

What a gift to IPPs! Not only did government order BC Hydro to buy new energy only from private companies, but it dictated how much power BC Hydro has to acquire, told the public utility that it can't import power or build generation itself. With a captive market in BC Hydro, IPPs have been unleashed, bounty hunting for power projects. Monsters, indeed!

By these policies, analyst Marvin Shaffer calculates that BC ratepayers' pockets will be emptied of nearly 900 million dollars in 2016 alone. [Lost in Transmission, Marvin Shaffer & Associates Ltd., 2007]

The BC government actually did open the field for energy generation projects and technologies that were impossible within BC Hydro's culture of "big box generation" – big dams, reservoirs, and thermal plants. IPPs could run with the wind, so to speak.

But having unleashed the dogs, IPPs were guided by no public energy vision other than an ideological fixation on getting BC Hydro out of the generation business. Consequently, IPPs all ran to the safest thing – small hydro – and then to the bank, leading on to private fortune, at least.

Ocean Energy Potential in Waves and Tides

Waves and tides have attracted the interest of humans almost since we evolved onto land. Leonardo da Vinci studied them and sketched ingenious devices to harness their energy. The potential is obvious, predictable, and in many instances is found close to land, transmission systems and load centres. Ocean energy, aka hydrokinetic energy, is on the cusp of major exploitation for electricity generation.

A 2006 comprehensive study of Canada's ocean energy potential estimated that BC has a tidal stream capacity of 4015 MW at 89 sites which could produce 35,000 GWh of energy annually. BC's wave potential is 37,000 MW, which at only 10% energy conversion efficiency could produce 32,320 GWh. [Inventory of Canada's Marine Renewable Energy Resources, Andrew Cornett, 2006]

In reality, the wave energy present on BC's coast is an inconceivably large number. Also in reality, the practical usable energy is a mere fraction of what's there. (To put

these numbers in some context, BC's "heritage" hydroelectric capacity is 10,232 MW, which produces about 44,500 GWh annually.)

Unleashing Developers: Staking Frenzy

Since 2000, BC Hydro has indeed been in the cross-hairs of companies seeking electricity purchase agreements. Eight years later, it's evident that the policy has not actually resulted in any new thinking in energy generation. Nearly sixty small hydro projects, a handful of biomass, and still no grid-connected wind project. BC is the only Canadian province which can make that sad boast.

The sixty hydro projects are merely the tip of a staking frenzy on BC's streams which rivals the province's earlier gold rushes.

But small hydro is all conventional construction and established technology. It does not represent a breakthrough industry for BC; it's more of what we do as hewers of wood, drawers of water, and importers of manufactured turbines. [See "Rivers of Riches," *Watershed Sentinel*, January-February 2007.]

Now the bounty hunters are staking sites in the sea. Over thirty ocean energy applications have already been accepted by the province's Integrated Land Management Bureau. More than 5100 hectares (ha) of promising tide and wave energy sites have already been claimed.

No policy is guiding ocean energy in BC. What there is consists of four-pages: the "Ocean Energy Project Application Directive," issued in June 2007, lists little more than the three types of permits developers must acquire:

- A two year renewable Investigative Permit, the first step, costs \$500. 33 are on file. A tidal prospect is limited to 50 ha, a wave prospect is limited to 500 ha.
- A Licence of Occupation for installation of equipment, also costs \$500. Canoe Pass is the first.
- An actual Ocean Energy Project costs \$3300. There have been no applications yet.

Forty years ago, a tidal barrage was built in the Rance estuary on the Brittany coast; twenty years ago, another was constructed in the Bay of Fundy at Annapolis, NS. Both proved to be harmful to local ecology with heavy siltation, erosion, impeded water flows, and impacts on marine wildlife. Tidal barrages are mostly off the radar for future energy development because of the enormous capital cost and the enormous environmental impacts.

Continued on Page 18 ⇨

MW, GW and GWh

To illuminate a 10 watt compact fluorescent light (CFL), a generator must have the capacity to produce 10 watts. To keep this light on for an hour, the generator would need to run for an hour, producing 10 watt hours of energy.

That same 10 watt hours could keep a 1 watt light emitting diode (LED) illuminated for ten hours instead of one, and the generator would only need a capacity of 1 watt, instead of 10. But the generator could NOT light up a 100 watt bulb for even a millisecond, because it only has the capacity to generate 10 watts of energy.

The key words are capacity, and energy. Capacity is usually measured in watts, kilowatts, and megawatts. 1 kilowatt (kW) = 1000 watts. 1 megawatt (MW) = 1000 kW. Energy is the electricity generated or consumed over a period of time. It is measured in kilowatt hours (kWh), megawatt hours (MWh), and gigawatt hours (GWh).

1 MWh = 1000 kWh;

1 GWh = 1000 MWh.

↔ *Dragons continued*

The environmental impacts that come with exploitation of waves and tides for energy are in most respects untested and unknown. Concerns include impacts to shipping, fishing, visual impacts, habitat disruption, effects on marine life, and electromagnetic effects. We don't know the scope of all the impacts, or even what some of them are. We are the monsters on this map – and we must proceed with great caution.

Water Wings for a New Industry

Government must be involved at the earliest stages in the research required to understand the implications and consequences of ocean energy technologies, otherwise companies with limited resources will do as little as necessary to obtain permits. What they learn will be held as proprietary information. It's a non-policy which ensures that the knowledge inventory and technological advantage goes to other jurisdictions.

SyncWave Energy of Pemberton, BC, has underwritten research at the University of Victoria, and its site near Tofino will be used to gather wave data. Company founder, Nigel Protter, says in an email that the site is representative of the BC coast's wave energy resource. He believes that this is the kind of work that government should be paying for. It benefits everyone in the industry, and ultimately is a benefit to the people of BC.

A government has many ways to encourage an industry, but fiscal incentives beat all the advertising and trade shows, and are what bring the investment in.

Europe has the most ambitious renewable energy goals. Its simple "feed-in tariff" has been effective in drawing investment and moving EU countries toward the renewables targets. A feed-in tariff covers the difference between the cost of generation using renewable technologies and the market price of electricity. The extra cost is blended and passed through to electricity end-users.

In Portugal, power from ocean energy is paid \$363/MWh (€0.23/kWh.) In the UK, electricity from ocean energy and offshore wind fetches approximately \$222/MWh. It makes a difference: Edinburgh-based Pelamis is in Portugal with its first production deployment, not the UK – because of the tariff.

BC Hydro will pay a rate centred on \$88/MWh for any kind of power, whether it comes from rivers, wind, biomass, or fossil fuels. Changes to the Utilities Commission Act introduced in the spring 2008 legislative session may help with greenhouse gas reduction goals, but won't selectively encourage specific technologies.

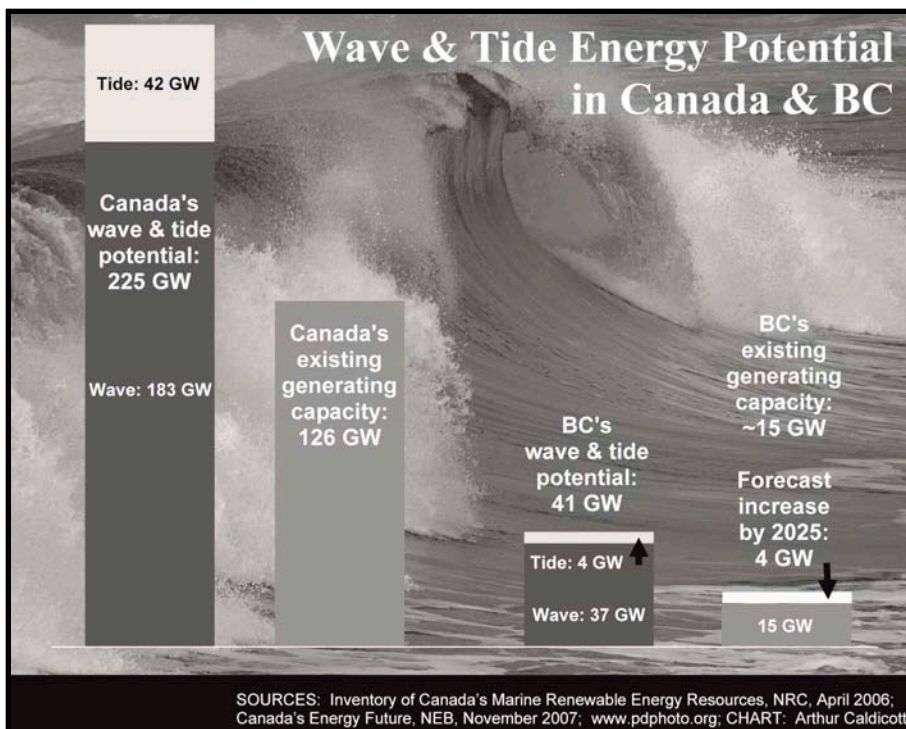
Unrealized Potential

Ocean energy is not like small hydro, or even wind. With those energy sources, the technology is mature or at least settling into commercial stability. BC has no opportunity to take leadership with design or manufacturing.

Ocean energy is an emerging technology, in some shops still not far advanced from guys sketching schemes in the pub. The only commercial production is from the two old tidal barrages in Nova Scotia and France. But near Aguçadoura in northern Portugal, three Pelamis units are awaiting deployment. This will be the first commercial wave energy installation in the world, capable of producing 2.25 MW.

While it still can, the UK wants to seize the opportunity to become to ocean energy what Denmark has become to wind – a global leader. As part of that strategy, the country sponsors two testing sites.

- The £15 million European Marine Energy Centre (EMEC), in operation since 2004.



EMEC has wave and tidal sites in the Orkney Islands. Developers can test their devices in the ocean without having to bear the costs of installing cables, connecting to the grid, build mounting berths, evaluating environmental impacts, etc. BC's Clean Current Technologies tested its tidal energy turbine at the facility. (www.emec.org.uk)

- In 2009, the £28 million Wave Hub off the coast of Cornwall will provide a site for full demonstration installations, where companies will obtain revenue from the grid connection. (www.wavehub.co.uk)

Canadian governments are aware of the opportunities. In 2006, Mossadiq Umedaly, who is now CEO of BC Hydro, wrote of ocean energy in his "Vision ... for Growing a Sustainable Energy Cluster," that "We can be leaders in Sustainable Energy – in approaches, components, systems, and integrated solutions. We can become a market jumping-off point to India, China and more.... To further grow clean and green production the government needs to provide clearer policy and more direction."

The federal government has formed the Federal Ocean Energy Working Group, developed a comprehensive resource assessment, and provided some funding for the Race Rocks Tidal Energy project near Victoria. It was co-sponsor with AXYS Environmental Systems of Sidney BC, of the TRIAXYS Directional Wave Sensor – the state-of-the-art in solar-powered, remote sensing, recording and transmitting of wave data.

The Nova Scotia government has underwritten \$4.7 million for the Fundy Institute for Tidal Energy facility, where three turbine developers, including BC's Clean Current Technologies, will be able to test full-scale versions in the world's largest tides. EnCana is the second funding partner, providing \$3 million.

EnCana has also provided \$3 million for the Race Rocks project which deployed a prototype generator from

Clean Current Technologies. The remaining \$1 million came mostly from the federal government. The BC government's contribution: \$187,000.

Glen Darou, CEO of Clean Current, says that nationally, and especially in BC, more can be done:

"The economic development angle has not been exploited, except in Nova Scotia. At this point if an industry is spawned it will be in the Maritimes. Nova Scotia is trying hard to displace coal fired electricity production. They are motivated.

"Ireland and Scotland are offering about 30 cents per kwh for ocean energy. As a result most of the development activity is happening in Europe."

Wise Monkeys

We are nearing breakthrough with ocean energy conversion technologies which are economic and will not ultimately destroy the environment that sustains us. BC's coast is one of the best places on earth to grow an ocean energy industry.

The energy potential is huge, but the economic potential for BC, were we to become a global leader with emerging ocean energy technology, is even greater.

We must also exercise caution – we humans have demonstrated repeatedly that our ingenuity and our greed can unleash the most dreadful monsters on nature. The oceans are already at risk. They too have a tipping point.

Yet the provincial government appears to be managing ocean energy with a uniquely British Columbian twist on the three wise monkeys theme. Hearing nothing, the government is issuing investigative tenures to every applicant. Speaking to no-one, no consultation or education is taking place, and no baseline data is being compiled to properly inform decisions on future applications. And seeing nothing,

blind to its economic potential, BC's ocean industry is left to fend for itself, ensuring that the global winners in ocean energy won't be from BC.



Stakes in BC continued on Page 20 ➡

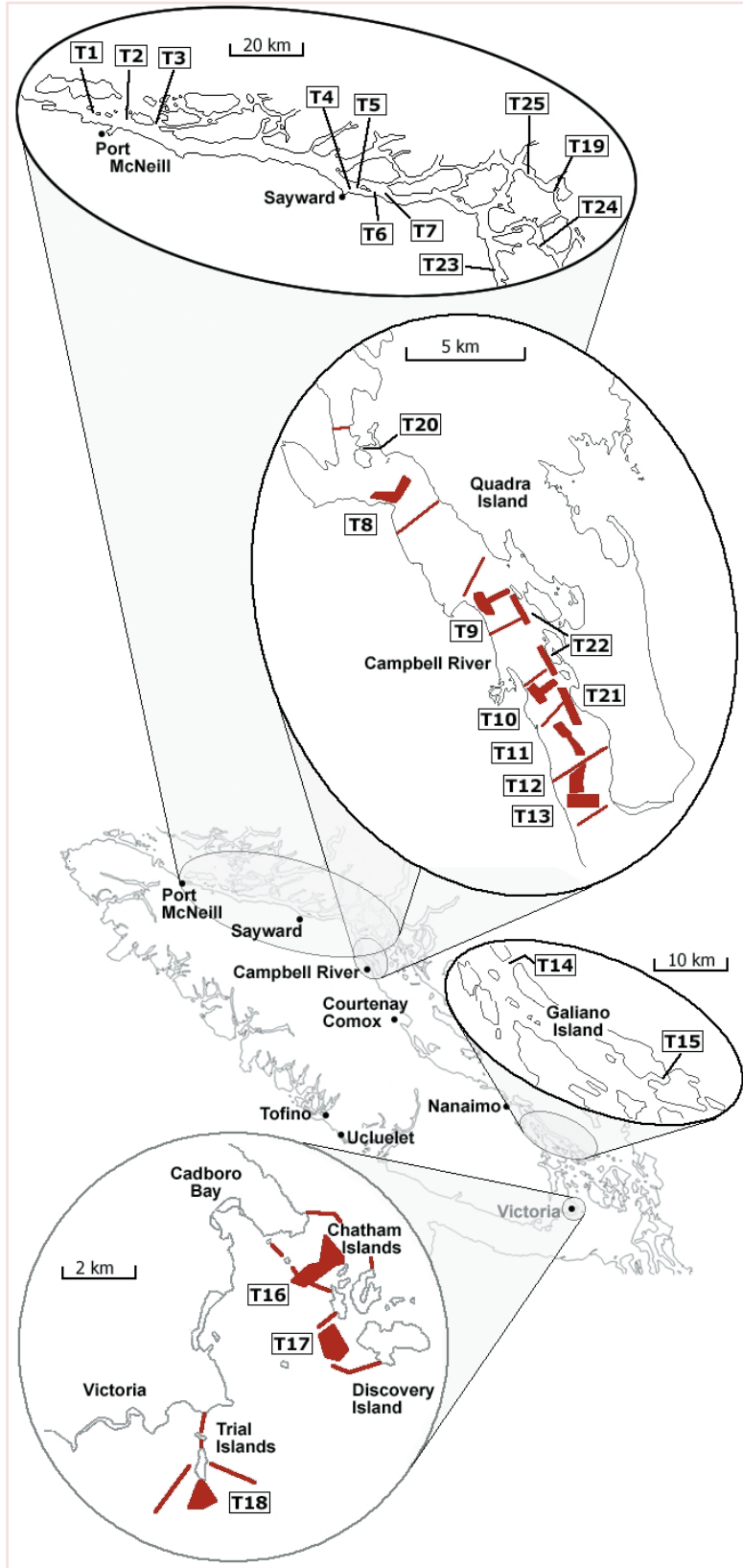
10,000 GWh or Bust

The challenge of matching supply with demand

By 2016, BC Hydro will need to purchase an additional 10,000 GWh of energy. A single plant capable of generating 1142 MW, if run continuously, would produce that amount of energy.

But that's not how electricity load or demand works in the real world. We use a lot more energy during the business day and early evening and in winter, than at night, and in the summer. That's not how the rivers, winds, and tides operate, either. Rivers flood in spring, dry up in summer, freeze in winter. Wind is sporadic. Tides go slack twice a day.

To get the required 10,000 GWh when it is needed, means that BC Hydro will have to contract for considerably more capacity than straight arithmetic would suggest. Instead of 1142 MW, BC Hydro may have to acquire 3000 to 6000 MW of capacity.



Tidal Energy Tenure Applications as of 20-April-2008

0778992 BC Ltd.

- T1 Pearse Passage, near Alert Bay, 48.93 ha
- T2 Weynton Passage, near Hanson Island, 49 ha
- T3 Blackney Passage, near Hanson Island, 49ha
- T4 Current Passage, near Helmcken Island 47ha
- T5 Current Passage, near Helmcken Island, 49ha
- T6 Johnstone Strait, near Helmcken Island, 50 ha
- T7 Johnstone Strait, near West Thurlow Isl., 50 ha
- T8 Discovery Passage, near Race Point, 49 ha
- T9 Discovery Passage, near Orange Point, 47ha
- T10 Discovery Passage, near Campbell River, 45 ha
- T11 Discovery Passage, near Yaculta Bank, 50 ha
- T12 Discovery Passage, near Yaculta Bank, 50 ha
- T13 Discovery Passage, near Cape Mudge, 46 ha
- T14 Trincomali Channel & Porlier Pass, 49 ha
- T15 Active Pass at Matthews Point, 49 ha
- T16 Baynes Channel, near Oak Bay, 48 ha
- T17 Plumper Passage, near Oak Bay, 49 ha
- T18 Enterprise Channel, near Trial Islands, 49 ha

BC Tidal Energy Corp.

- T19 Innes Passage, Sonora Island, 23 ha

Canoe Pass Tidal Energy Corp.

- T20 Canoe Pass, between Quadra & Maude Isl., 3 ha

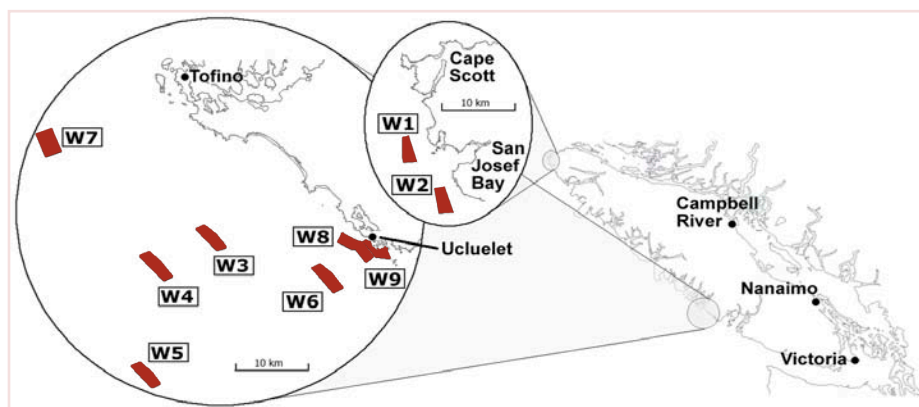
6420800 BC Ltd. (Lunar Energy)

- T21 Cape Mudge, Quadra Island, 50 ha
- T22 Discovery Passage, near Quadra Island, 50 ha

Orca Power Inc.

- T23 Discovery Passage, S of McMullen Pt, 4 ha
- T24 Okisollo Channel, W side Quadra Isl., 2 ha
- T25 Dent Rapids, Cordero Channel, Sonora Isl, 6 ha

Wave Energy Tenure Applications as of 24-April-2008



0778992 BC Ltd.	
W1	W San Josef Bay, 497 ha
W2	SW San Josef Bay, 497 ha
W3	20 km W Ucluelet, 500 ha
W4	26 km W Ucluelet, 500 ha
W5	36 km SW Ucluelet, 500 ha
W6	8 km SW Ucluelet, 500 ha
Syncwave Energy Inc.	
W7	21 km SW Tofino, 635 ha
Finavera Renewables Inc.	
W8	1 km offshore Ucluelet, 496 ha
Global Energy Horizons Corp.	
W9	adjacent Ucluelet, 425 ha

The Stakes in BC

As of mid-April, BC's Integrated Land Management Bureau lists applications for nine wave energy sites and twenty-five tidal energy sites. (tinyurl.com/2k4w4h)

Only one project is seeking a License of Occupation, at Canoe Pass (site T20) in Discovery Passage, all the others are Investigative Permits.

0778992 BC Ltd. for Fred. Olsen Group

Fred. Olsen Group is a Norwegian conglomerate with interests in just about everything to do with the oceans – shipping, fishing, offshore oil – and now 6 wave sites and 18 tidal sites in BC, including Active Pass, Porlier Pass, the Trial Islands, and most of Discovery Passage (which contains half of BC's practically usable tidal energy potential).



Fred Olsen's Buldra, now known as FO3

Technology: No tidal technology. FO3, the Fred. Olsen Group's wave energy device, exists only in scale model prototypes, though the FO3 is one of three technologies selected for Wave Hub. It looks like so many giant eggs bobbing under an offshore oil platform. The vertical motion of the eggs is converted to rotary motion which turns a generator.

Finavera Renewables Inc., Vancouver-based Finavera Renewables Inc., (TSX-V: FVR) has wind energy projects in Ireland, Alberta and BC. Five wave energy projects in the USA, Canada, South Africa and Portugal, including a power purchase agreement from PG&E, are all "under development," with no revenues.

Technology: The AquaBuOY wave energy converter consists of a floating buoy connected to the seabed by a long rubber tube. When the buoy rises with the wave, the tube stretches and contracts; when it descends, the tube expands. A neutrally buoyant piston floating at the top of the tube is connected to and turns a generator.

The only AquaBuOY in existence, a testing model built in 2007, was deployed in September off the coast of Newport, Oregon. It sunk a few weeks later, and now sits on the seabed. Finavera claims the device functioned as intended (apart from the sinking), and demonstrated that the company is betting on the right technology.

Finavera recently moved its wave energy operation to Oregon. Company spokesman Myke Clark says that Oregon has created a fiscal and regulatory framework to encourage ocean energy development, which does not exist in BC.

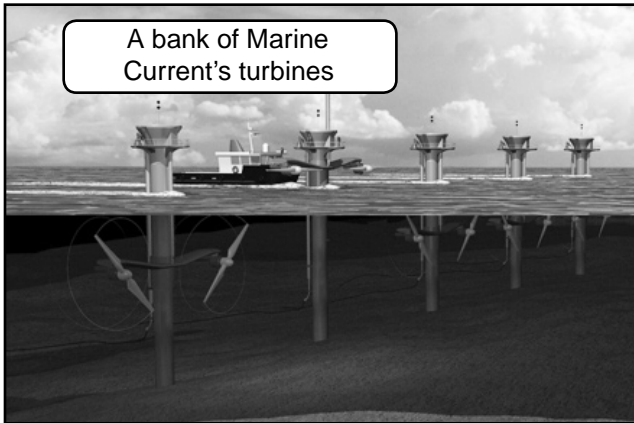
They intend to install a TRIAXYS wave testing device at the site off Ucluelet. If developed, the company envisions a farm of up to 400 AquaBuOYs, each generating 250 kW, capable of generating 50-100 MW or more.

www.finavera.com

SyncWave Energy Inc.

SyncWave Energy Inc., based in Pemberton, BC, has identified smaller off-grid oceanside communities and industries and off-shore applications as appropriate customers.

Continued on Page 22 ➔



⇐ *Dragons continued*

Technology: The Wave energy, “Power Resonator” consists of connected floating devices which, when tuned and operating together, optimize the energy conversion from wave action. Mounted in the centre of three outside “wave follower” devices is a resonator which “lags the signal” of the wave. The patented brains in the system is the tuner. It incorporates the company’s “SyncWave Energy Matching System” or “SWELS”. The tuner controls the resonator for optimum performance.

www.syncwaveenergy.com

6420800 BC Ltd.

Owned by UK-based Lunar Energy

Technology: “Rotech Tidal Turbine” is a horizontal axis turbine housed in a symmetrical Venturi duct. Water can flow either way through the device. It resembles the Clean Current Technologies turbine.

www.lunarenergy.co.uk

Canoe Pass Tidal Energy Corp.

Canoe Pass wants to build the first of six bridges, remove the sixty year-old causeway between Quadra and Maude Islands, and install a series of vertical axis turbines, each 6 m high by 6 m in diameter, produced by New Energy Corp. of Calgary.

The Canoe Pass Licence of Occupation application is the first of its kind in BC, all the others being Investigative Permits. The environmental impacts will be considerable, and disruptive, but they will largely restore the area to its condition prior to building the causeway in the 1940s.

BC Tidal Energy Corp.,

Sister company to Canoe Pass Tidal Energy Corp., BC Tidal Energy Corp. states it has an agreement with UK-based Marine Current Turbines, which makes a unique axial flow device, mounted with pairs of turbines.

www.marineturbines.com

Orca Power Corp.

This company name was once associated with Anthony Duggleby, who was once associated with Seabreeze Power

and Katabatic Power.

Global Energy Horizons

Global Energy Horizons of Victoria describes itself as a company created to attract capital to the energy industry.

Technology: the Australian CETO II wave device is an anchored sea-pump operated by the action of a slightly-submerged float. Seawater is pumped to a turbine and generator onshore – which is why this site is adjacent to land. A commercial scheme would involve hundreds of 18kW CETO units in a farm.

www.globalenergyhorizons.com, www.ceta.com.au

Other BC Companies

Clean Current Technologies

Glen Darou, company CEO, of North Vancouver’s Clean Current Technologies, which is clearly BC’s leading technology developer for tidal energy, says no time will be wasted obtaining site permits because the company is focused on technology. It provided the turbine which was installed at Race Rocks and is one of three turbine designs chosen for the Fundy Tidal Energy Facility. It has been tested at EMEC. The product is a ducted horizontal axis device, similar to the Lunar Energy Rotech turbine. The company plans on versions with different blade sizes and ratings, and sees them deployed in farms of dozens to hundreds of units.

www.cleancurrent.com

Blue Energy International

At eleven years, Blue Energy may be BC’s longest standing ocean energy company but has not been able to attract funding or a sponsor to build a demonstration project. Its vertical axis design, referred to as the Davis turbine, is named after Barry Davis, its early developer. The New Energy Corp. device is also derived from the Davis turbine.

www.blueenergy.com

Elsewhere in the World

Pelamis Wave Power Ltd.

Pelamis (“seaworm”) is a series of huge floating tubes, with smaller tubes between them containing the hydraulic generating machinery which is activated as the tubes rise and fall with the wave action. Its first commercial wave project is near Aguçadoura, Portugal and it is one of the technologies implemented at Wave Hub

www.pelamiswave.com

Ocean Power Technologies

The Powerbuoy is a floating tube which is submerged below the surface. As it rises and falls with the waves, it

causes motion in a piston-like structure, which is connected to a generator. The device is designed to be deployed in farms of multiple units, and will be installed at Wave Hub.

www.oceanpowertechnologies.com

SMD Hydrovision

TidEL is a buoyant tidal energy device with two 500 kW turbines, mounted together on a single crossbeam. It is tethered to the seabed by a series of mooring chains. The device floats in the tidal stream, oriented correctly toward the oncoming current.

www.smd.co.uk

Wavegen

No discussion of ocean energy devices should omit the LIMPET, the “Land Installed Marine Powered Energy Transformer.” It is mounted on land, and captures energy from the waves washing ashore.

Wavegen was purchased in 2005 by Voith Siemens, indicating the parent company believes the device has commercial promise.

www.wavegen.com



The only installed LIMPET was built in 2000 on the Isle of Islay



For more information about this and other ocean energy devices see www.bwea.com/marine/devices.html
Reading list available at www.watershedsentinel.ca

Recommended reading

Inventory of Canada's Marine Renewable Energy Resources, CHC-TR-041, Andrew Cornett, Canadian Hydraulics Centre, National Research Council Canada, April 2006, at www.oreg.ca

A Feasibility Study: Tidal Power Generation for a Remote, Off-Grid Community on the British Columbia Coast, Bob Davidson, February, 2007, at www.oreg.ca

The Path Forward: A Plan for Canada in the World of Renewable Ocean Energy, The Ocean Renewable Energy Group, March 2006, at www.oreg.ca

Environmental Impact Assessment: Guidance for Developers at the European Marine Energy Centre, The European Marine Energy Centre (EMEC), 2005, www.emec.org.uk/pdf/EMEC_EIA_Guidelines.pdf



Photo by E. Strijbos

Thornton Bank – Oostende, Belgium

Wind Power in Europe

The first of six wind turbine base towers has left the West Flemish coastal town of Oostende for the Thornton Bank. Thousands of spectators watched the attraction. The wind turbine base was transported 30 km to the North Sea sandbank off the Flemish coast.

Once completed, the largest off-shore wind turbines in the world will tower 184 metres above the North Sea. The wind farm at Thornton Bank will not be visible from the coast.

C-Power is the company behind the multi-million-euro project to provide enough wind energy to supply 600,000 homes.

A total of 60 wind turbines should be up and running by 2012.

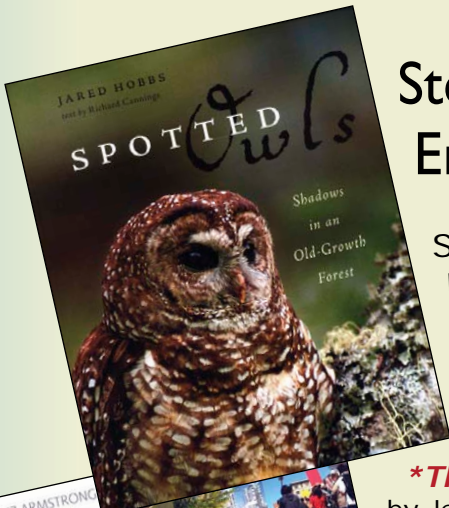
Also in April, the Scottish government formally rejected plans for one of Europe's largest onshore wind farms. Plans had been to build the £500 million wind-farm in the Outer Hebrides.

The Lewis windfarm, with 181 turbines, was projected to produce 650 MW of electricity, roughly 10% of Scotland's electricity needs, but its location on a significant peat moor would have released carbon dioxide and endangered rare birds.

It was opposed by 11,000 islanders, despite its support from local government and the community financial trust. Scotland is committed to developing renewable energy projects to supply all its electrical usage.

—*The Guardian*, April 21, 2008

www.7on7.eu



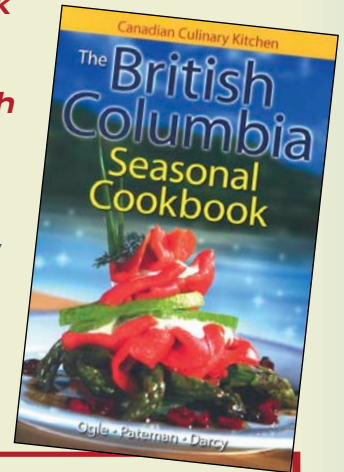
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***The British Columbia Seasonal Cookbook** by Jennifer Ogle, Eric Pateman and James Darcy. (Lone Pine Publishing, 2007)

***Spotted Owls: Shadows in an Old Growth Forest**, by Jared Hobbs and Richard Canning (Greystone Books, 2007) Draw held June 25th 2008



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