

Wave Energy Technology (WET) List: Overview of Devices

Sonoma Coast Hydrokinetic Energy Project (SCHEP)

Device Name	Type of Technology	Company Name	Website(s)	Notes in Worksheet	Phone	Fax	Email	Address	Country
Aegir Dynamo	Point Absorber	Ocean Navitas Ltd.	www.oceannavitas.com	1	01427 788 344	0845 094 3862	enquiries@oceannavitas.com	Nursery House, Marton, Lincolnshire UK, DN21 5BQ	UK
Anaconda	Attenuator	Checkmate Seaenergy	www.checkmateuk.com/seaenergy/	2	+441225 705 465	+441225 705 497		Unit 6, Pegasus Way, Bowerhill, Melksham, Wiltshire SN12 6TR, UK	UK
Archimedes Waveswing	Point Absorber	AWS Ocean Energy Ltd.	www.awsocan.com	3	+44 (0) 1349 88 44 22	+44 (0) 1349 88 44 66	info@awsocan.com	Redshank House, Alness Point Business Park, Alness Ross-shire IV17 0UP, Scotland	Scotland
BioWAVE & BioBASE	Pitching/ Surging/ Heaving/ Swaying (PSHS)	BioPower Systems Pty. Ltd.	www.biopowersystems.com	4	+61 2 9209 4237	+61 2 9209 4232	info@biopowersystems.com	Suite 145 National Innovation Centre, Australian Technology Park, Eveleigh NSW 1430, Australia	Australia
CETO	Point Absorber	Carnegie Corporation	www.carnegiecorp.com.au	5	+61 8 9486 4466	+61 8 9486 4266	enquiries@carnegiecorp.com.au	Office: 1/16 Ord Street, West Perth, Western Australia 6005; Mailing: PO Box 1902, West Perth, Western Australia 6872	Australia
Ocean Treader	Attenuator	Green Ocean Energy Ltd.	www.greenoceanenergy.com	6	+44 (0)1224 651051	+44 (0)1224 636970	info@greenoceanenergy.com	Osborne House, 28 Carden Place, Aberdeen AB10 1UP, UK	UK
Oyster	Oscillator	Aquamarine Power	www.aquamarinepower.com	7	+44 131 718 6011	+44 131 718 6100	info@aquamarinepower.com	10 Saint Andrew Square, Edinburgh EH2 2AF, Scotland	Scotland
Pelamis	Point Absorber	Pelamis Wave Power Ltd.	www.pelamiswave.com	8	+44 (0) 131 554 8444	+44 (0) 131 554 8544	enquiries@pelamiswave.com	31 Bath Rd, Leith, Edinburgh EH6 7AH Scotland, UK	Scotland
PowerBuoy	Point Absorber	Ocean Power Technologies, Inc.	http://oceanpowertech.com	9	+1 609 730 0400	+1 609 730 0404	info@oceanpowertech.com	1590 Reed Road, Pennington, New Jersey 08534, USA	USA
SEADOG Pump	Point Absorber	Independent Natural Resources, Inc. (INRI)	www.inri.us	10	1-877-INRIUSA	952-697-3058	seadog@inri.us	7466 Washington Avenue South Eden Prairie, MN 55344, USA	USA
Wave Treader	Attenuator	Green Ocean Energy Ltd.	www.greenoceanenergy.com	11	+44 (0)1224 651051	+44 (0)1224 636970	info@greenoceanenergy.com	Osborne House, 28 Carden Place, Aberdeen AB10 1UP, UK	UK
Wavebob	Point Absorber	Wavebob LLC	www.wavebob.com	12	+1 443 951 1050			420 Chinquapin Round Rd, Suite I, Annapolis, MD 21401, USA	USA
Wavebob	Point Absorber	Wavebob Ltd.	www.wavebob.com	12	+353 (0)1 651 0177	+353 (0)1 651 0175		H3, Maynooth Business Campus, Maynooth, Co. Kildare, Ireland.	Ireland
Wave Hub		South West of England Regional Development Agency	http://www.wavehub.co.uk/	13	+44 (0) 1752 251071	+44 (0) 1752 234840	nick.harrington@southwestrda.org.uk	North Quay House, Sutton Harbour, Plymouth, PL4 0RA	UK

Wave Energy Technology List: Device Details

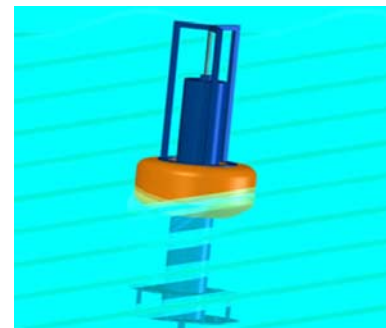
Sonoma Coast Hydrokinetic Energy Project (SCHEP)

Company Name: Ocean Navitas Ltd.

Device Name: Aegir Dynamo

Weblink: www.oceannavitas.com

Pictures



General Description

The buoy design operates as the buoyancy chamber tries to surface creating an upward force against the anchor, which in turn gives a stable consistent platform for the float to move up and down on. The float moves as a direct result of waves and swells acting upon it, and the energy created by this movement is transferred to the Aegir Dynamo™, which is housed in a sealed chamber within the Central Column. The Aegir Dynamo™ converts this linear energy in to electrical energy.

200kW Buoy: In this format the buoy would be installed with 2 100kW Aegir Dynamo's in the same central column and would generate enough power for around 250 homes, it is primarily designed to service isolated coastal communities that either do not have a structure to attach a shorebased device to, or require more power.

1.4 MW Buoy: In this format the buoy would be installed with 8 200kW Aegir Dynamo's and produce enough energy for around 2,000 homes, it will only be approx 9-12 meters in diameter (depending on the prevailing wave conditions) and have a manufactured mass of approx 65 tonnes. Importantly it would also produce its maximum rated output (1.4MW or 1400kW) in the average sea state in UK coastal waters of 2.5 meters. The manufacture of the 1.4MW buoy is the long term goal of Ocean Navitas.

Technical Details

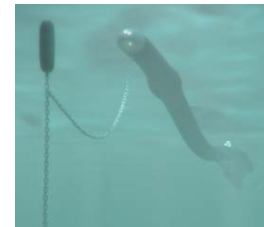
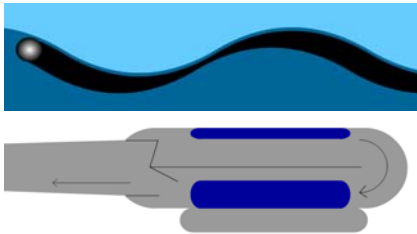
- Uses a linked dynamic mooring system
- Buoys will be fitted with sensors that will relay any problem to shore via fibre optic cable
- Require inspection every six months, minimum life in excess of 20 years
- Minor maintenance at six monthly intervals (seals, cathodic protection, etc.)
- Visual impact: max. 5 meters above the surface at full 1.4MW scale
- Not visible to the naked eye from shore when placed 1 km or more
- Navigational regulations require devices to be fitted with flashing lights visible for 2 km at night

Wave Energy Technology List: Device Details

Sonoma Coast Hydrokinetic Energy Project (SCHEP)

Company Name: Checkmate Seaenergy
Device Name: Anaconda
Weblink: www.checkmateuk.com/seaenergy/

Pictures



General Description

The inventors (Professors Rod Rainey and Francis Farley FRS) have developed the concept of a distensible rubber tube, floating head to sea, in which bulge waves are excited by passing sea waves. The bulge waves are then used to drive a turbine generator. It is the long ocean swells which have most energy; developed by winds over hundreds or thousands of miles; these are the ones Anaconda uses.

Water from each bulge wave flows under pressure into the upper reservoir of the Power Take Off through a one way valve. Energy storage is due to potential energy against gravity because the reservoirs are at different heights. The space above the free surface in each reservoir is occupied by a variable volume air bag. These are interconnected and used to maintain a positive pressure in the system. Pressure compensation due to the system pressure being higher than the surrounding sea allows the water to flow under gravity through the turbine and into the lower chamber. As water leaves the upper chamber, air from the lower chamber's air bag goes in the opposite direction to fill the upper chamber's so the total volume of the two reservoirs remains the same. The water is then drawn back into the bulge tube through the other one way valve during the low pressure phase of the bulge wave.

Since they are inter-connected, pre-pressurisation of the bulge tube is achieved by the compensation system used in the PTO. This allows the bulge tube to contract beyond its resting state without becoming flaccid. Another benefit of the pre-pressurisation is that it keeps the distensible portion of the bulge tube in tension, greatly increasing its fatigue life. Pressurisation also affects tuning to the sea wave length. Reactor mass is provided by the water in the PTO and there is an additional keel weight which is also used for stability.

Technical Details

- Uses long ocean swells
- Bulge waves used to drive turbine generators
- "Power Take Off" system

Wave Energy Technology List: Device Details

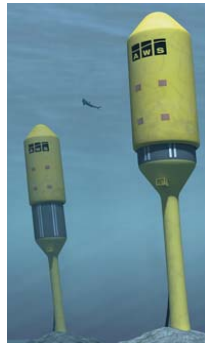
Sonoma Coast Hydrokinetic Energy Project (SCHEP)

Company Name: AWS Ocean Energy Ltd

Device Name: Archimedes Waveswing

Weblink: www.awsoccean.com

Pictures



General Description

This is a cylinder shaped buoy, moored to the seabed. Passing waves move an air-filled upper casing against a lower fixed cylinder, with up and down movement converted into electricity. As a wave crest approaches, the water pressure on the top of the cylinder increases and the upper part or 'floater' compresses the gas within the cylinder to balance the pressures. The reverse happens as the wave trough passes and the cylinder expands. The relative movement between the floater and the lower part or silo is converted to electricity by means of a hydraulic system and motor-generator set. The device is intrinsically simple with only one main moving part - the floater.

Technical Details

- Submerged at least 6m below the sea surface
- Avoids the high storm loadings, reduces mooring costs and the risk of damage
- Future outputs up to 1.0MW and load factors in the range 25-30%
- One main moving part and limited auxiliaries, reduces failure risk/maintenance requirements
- Designed so all maintainable parts are accessible by ROV
- Submergence removes visual impact, no noisy high-speed rotational equipment
- Location exposed to ocean swells
- 40 - 100m of water depth outwith main commercial shipping lanes
- Secure electricity power grid ashore
- Industrial port within 12 hours sailing time
- Sea-bed suitable for laying power cables to shore
- Expected arrays = several tens of units
- A 50MW farm will occupy an area around 3 nautical miles long by 2 cables wide
- In 2004, a full-scale pilot plant installed off the coast of Portugal
- Engineering for 250kW optimised pre-commercial demonstrator is ongoing

Wave Energy Technology List: Device Details

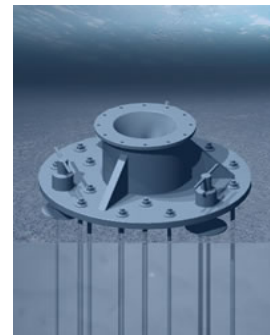
Sonoma Coast Hydrokinetic Energy Project (SCHEP)

Company Name: BioPower Systems Pty. Ltd.

Device Name: BioWAVE & BioBASE

Weblink: www.biopowersystems.com

Pictures



General Description: BioWAVE

The wave power system, bioWAVE™, is based on the swaying motion of sea plants in the presence of ocean waves. The hydrodynamic interaction of the buoyant blades with the oscillating flow field is designed for maximum energy absorption. In extreme wave conditions the bioWAVE™ automatically ceases operating and assumes a safe position lying flat against the seabed. This eliminates exposure to extreme forces, allowing for lighter designs and substantial cost savings. Systems are being developed for 250kW, 500kW, 1000kW capacities to match conditions in various locations.

General Description: BioBASE

BioPower Systems has developed a novel singular mounting system called bioBASE™. This system is modeled on the seabed holdfast mechanism used by large sea plants, such as the giant kelp. In such systems, the vertical and lateral loads that are translated to the seabed by the main shaft are re-distributed into many smaller elements that engage with the bottom strata. This mechanism serves to distribute the forces and alleviate excess loads. The bioBASE™ utilises rockbolting technology for the multiple 'roots' of the system, and does not require large specialised vessels or drill rigs due to the small gauge of each bolt. Once the bioBASE™ has been installed, the surmounting device (either the bioWAVE™ or the bioSTREAM™) is easily attached and secured with the assistance of a single surface vessel. Other applications of the bioBASE™ technology are offshore wind turbines and deepwater foundations.

Wave Energy Technology List: Device Details

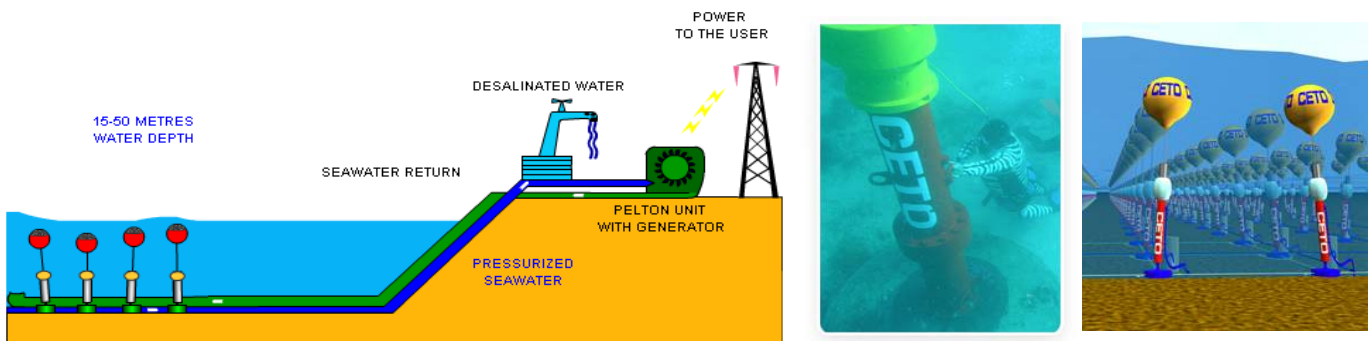
Sonoma Coast Hydrokinetic Energy Project (SCHEP)

Company Name: Carnegie Corporation

Device Name: CETO

Weblink: www.carnegiecorp.com.au

Pictures



General Description

CETO units are fully submerged and permanently anchored to the sea floor meaning that there is no visual impact as the units are out of sight. This also assists in making them safe from the extreme forces that can be present during storms. They are self-tuning to tide, sea state and wave pattern, making them able to perform in a wide variety of wave heights and in any direction.

Technical Details

- Manufactured from steel, rubber and hypalon materials
- 20 years in marine environment
- Can operate efficiently in swell in the 1 to 2 metre wave height range
- Sits underwater, moored to the sea floor, resulting in no aesthetic impact
- Designed to operate in harmony with the waves rather than attempting to resist them
- Farms will have no impact on popular surfing sites
- Farms will operate in water >15 metres in areas where there are no breaking waves
- Units attract marine life
- Produces fresh water directly from seawater (magnifying pressure variations in waves)
- Contains no oils, lubricants, or offshore electrical components
- Built from components with a known subsea life of over 30 years.
- Wave energy can be harnessed for permanent base load power & for fresh water desalination

Wave Energy Technology List: Device Details

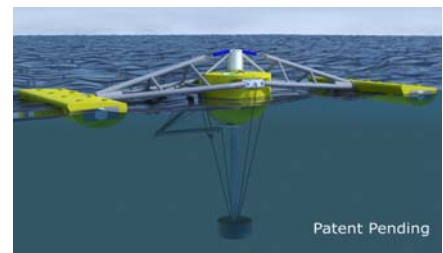
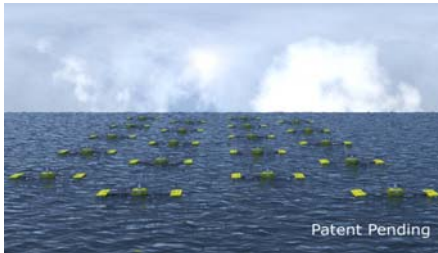
Sonoma Coast Hydrokinetic Energy Project (SCHEP)

Company Name: Green Ocean Energy Ltd (1 of 2 Devices)

Device Name: Ocean Treader

Weblink: www.greenoceanenergy.com

Pictures



General Description

Ocean Treader comprises a Sponson at the front, a Spar Buoy in the center and a second Sponson at the aft end. As the wave passes along the device first the forward Sponson lifts and falls, then the Spar Buoy lifts and falls slightly less and finally the aft Sponson lifts and falls. The relative motion between these three floating bodies is harvested by hydraulic cylinders mounted between the tops of the arms and the Spar Buoy. The cylinders pressurise hydraulic fluid which, after smoothing by accumulators, spins hydraulic motors and then electric generators. The electricity is exported via a cable piggy-backed to the anchor cable. Ocean Treader is directional and has been proven to passively weather-vane to face the wave train, and it also has active onboard adjustment to allow for offset due to the effects of current.

Technical Details

- Steel load bearing members w/buoyant bodies molded from GRP (Glass Reinforced Plastic)
- Deployed in farms of 10 – 20 machines
- Water Depth 50m – 100m
- Less than 3NM (5km) from the shore line to minimise cable lay costs and for ease of accessibility
- Exposed location ensuring high wave energy levels
- Clear of major shipping channels
- Over 500 KW rating for a relatively small ocean footprint
- 50m long, 20m beam, 20m draft
- 20 Machine Wave Farm giving 10MW typically takes up 0.70km x 0.33km giving 43MW/km²
- Modular design means ease of component change-out
- Very few Single Point Failure modes will lead to a high level of reliability
- Low levels of intrusion to the marine environment
- Currently fund raising to allow a full size prototype to start offshore testing in 2011

Wave Energy Technology List: Device Details

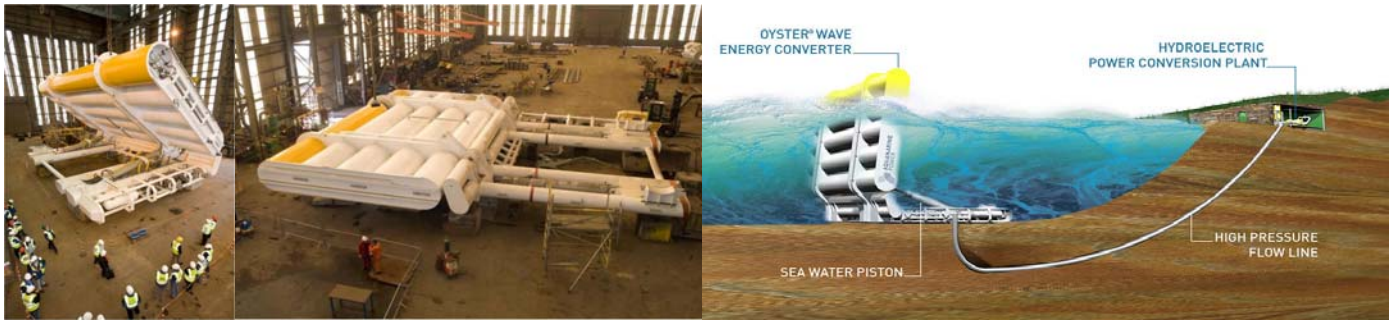
Sonoma Coast Hydrokinetic Energy Project (SCHEP)

Company Name: Aquamarine Power

Device Name: Oyster

Weblink: www.aquamarinepower.com

Pictures



General Description

Oyster® is a hydro-electric Wave Energy Converter, designed to convert renewable energy harnessed from ocean waves into usable electricity. Oyster® consists of an Oscillator fitted with pistons and fixed to the nearshore sea bed. Each passing wave activates the Oscillator, pumping high pressure water through a sub-sea pipeline to the shore. Onshore, conventional hydro-electric generators convert this high-pressure water into electrical power. Oyster® is designed to be deployed in multi-MW arrays. With a peak power of 300-600kW per Oyster®, a commercial farm of just ten devices could provide clean renewable energy to a town of 3,000 homes.

Technical Details

- Mechanical flap with minimal submerged moving parts
- No underwater generator, power electronics or gearbox
- Power generation equipment remains onshore
- Deployed at depths of 10-12m
- Benefits from more consistent seas and narrower directional spread of nearshore waves
- Reduced wave height and load enhance natural survivability
- Excess energy is spilled over the top of flap; allowing it to duck under the waves
- Uses water as its hydraulic fluid (eliminates envir. risks assoc. w/ oil & submerged electrical)
- Measuring just 18m x 12m x 2m
- Silent in operation and contains no toxic substances
- Based Carbon Trust figures, each Oyster®'s annual carbon saving could be ≤ 500 tons
- Lightweight structure gives an excellent power-to-weight ratio with an annual average output
- An annual average output competitive with devices weighing up to five times more

Wave Energy Technology List: Device Details

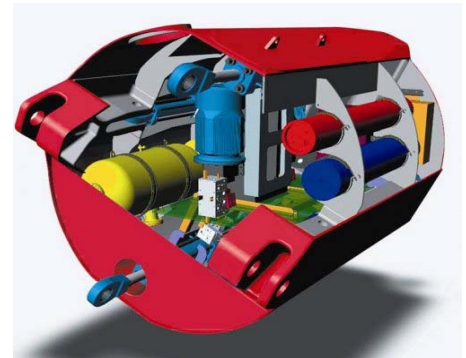
Sonoma Coast Hydrokinetic Energy Project (SCHEP)

Company Name: Pelamis Wave Power Ltd.

Device Name: Pelamis

Weblink: www.pelamiswave.com

Pictures



General Description

The Pelamis Wave Energy Converter is a semi-submerged, articulated structure composed of cylindrical sections linked by hinged joints. The wave-induced motion of these joints is resisted by hydraulic rams, which pump high-pressure fluid through hydraulic motors via smoothing accumulators. The hydraulic motors drive electrical generators to produce electricity. Power from all the joints is fed down a single umbilical cable to a junction on the sea bed. Several devices can be connected together and linked to shore through a single seabed cable

Technical Details

- Each machine can provide sufficient power to meet annual electricity demand of ~ 500 homes
- Under 40kW/m annual avg wave energy levels, machine offset ~ 2,000 tons of CO₂
- Offshore application in water depths of 50-70m
- 140m long and 3.5m in diameter with 3 power conversion modules per machine
- Each machine is rated at 750kW
- Avg. production 25-40% of the full rated output over the course of a year
- Within the power take-off systems are volumes of biodegradable hydraulic fluid
- 2 levels of egress/ingress protection on all leak points (also uses biodegradable transformer fluid)
- Fault tolerant generating system with the incorporation of multiple levels of redundancy
- Rapid attachment-detachment system
- Installation can be completed in 1-2m wave height on site
- Disconnection completed in over 2m significant wave height
- Machines removed from site & returned to a safe quayside facility for maintenance

Wave Energy Technology List: Device Details

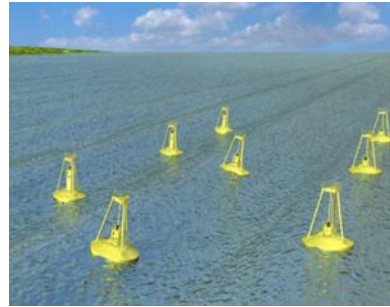
Sonoma Coast Hydrokinetic Energy Project (SCHEP)

Company Name: Ocean Power Technologies, Inc.

Device Name: PowerBuoy

Weblink: <http://oceanpowertechnologies.com>

Pictures



General Description

The rising and falling of the waves off shore causes the buoy to move freely up and down. The resultant mechanical stroking is converted via a sophisticated power take-off to drive an electrical generator. The generated power is transmitted ashore via an underwater power cable. A 10-Megawatt OPT power station would occupy only approximately 30 acres (0.125 square kilometers) of ocean space. Sensors on the PowerBuoy® continuously monitor the performance of the various subsystems and surrounding ocean environment. Data is transmitted to shore in real time. In the event of very large oncoming waves, the system automatically locks-up and ceases power production. When the wave heights return to normal, the system unlocks and recommences energy conversion and transmission of the electrical power ashore.

Technical Details

- Environmentally benign and non-polluting: no fuel, no exhaust gases, no noise
- Scalable up to large power stations (100+ MW)
- 10-Megawatt station would occupy only approx. 30 acres (0.125 square kilometers)
- Remote and Mini-Grid Installations with overall capacity of up to 3 MW
- Offers high load factors and availability, rugged, simple steel construction
- Utilizes conventional mooring systems, minimal visual impact
- Add'l Applications: Desalination Plants, Hydrogen Production, Remote Sensing & More

Wave Energy Technology List: Device Details

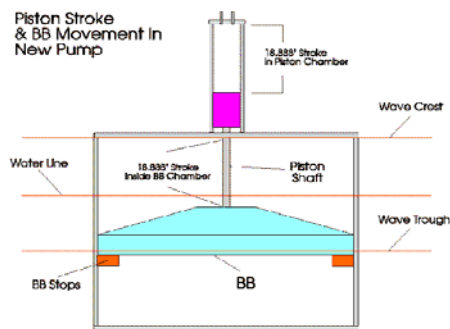
Sonoma Coast Hydrokinetic Energy Project (SCHEP)

Company Name: Independent Natural Resources, Inc. (INRI)

Device Name: SEADOG Pump

Weblink: www.inri.us

Pictures



General Description

The SEADOG® Pump captures ocean-wave energy to pump large volumes of seawater, consuming no fuel or electricity and creates no polluting by-products in the process. The pump uses buoyancy to convert wave energy to mechanical energy. The main components of the SEADOG® Pump include a buoyancy chamber, buoyancy block, piston assembly, piston shaft, piston cylinder, and intake and exhaust valves. When positioned in the water the buoyancy block (filled with air) floats within the buoyancy chamber, moving up and down in relation to the ocean waves and swells. The buoyancy block is connected to the piston shaft which in-turn moves the piston assembly through the piston cylinder.

As the buoyancy block moves down in the trough of a wave it draws the piston downward through the piston cylinder. The downward movement draws water into the piston cylinder through the intake valve filling the piston cylinder chamber. As the next wave lifts the buoyancy block the water within the piston cylinder is under pressure and is expelled through the exhaust valve. Each cycle of the buoyancy block rising and falling, drawing in and expelling water, is called a stroke. Each stroke of the piston causes the water to be pumped from the piston cylinder in a regular manner.

Technical Details

- Applications: seawater desalination systems and hydroelectric energy generation
- Pump operation requires no fuel or electricity, introduces zero carbon dioxide
- Adaptable device that can be scaled and configured for most of the world's shorelines
- Contains no electrical or hydraulic components
- Array will continue to function if one or more pumps are shut down for maintenance
- July of 2007, launched a 3-month ocean demonstration in Gulf of Mexico
- Deployment in Humboldt County is planned for late 2008-early 2009

Wave Energy Technology List: Device Details

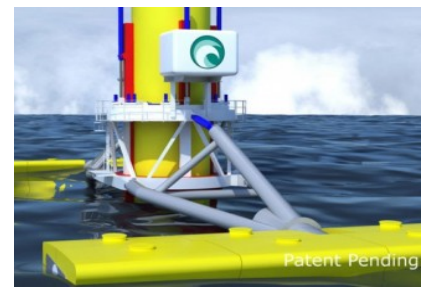
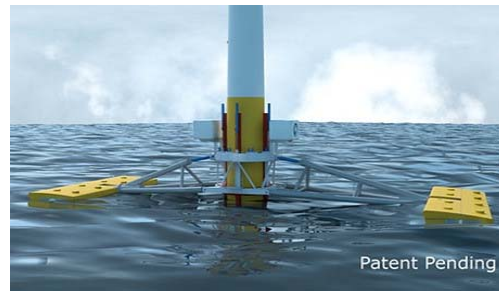
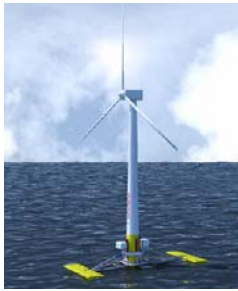
Sonoma Coast Hydrokinetic Energy Project (SCHEP)

Company Name: Green Ocean Energy Ltd (2 of 2 Devices)

Device Name: Wave Treader

Weblink: www.greenoceanenergy.com

Pictures



General Description

The Wave Treader concept utilises the arms and sponsons from Ocean Treader and instead of reacting against a floating Spar Buoy, will react through an Interface Structure onto the Foundation of an Offshore Wind Turbine. Between the Arms and the Interface Structure hydraulic cylinders are mounted and as the wave passes the machine first the forward Sponson will lift and fall and then the aft Sponson will lift and fall each stroking their hydraulic cylinder in turn. This pressurises hydraulic fluid which is then smoothed by hydraulic accumulators before driving a hydraulic motor which in turn drives an electricity generator. The electricity is then exported through the cable shared with the Wind Turbine. Periodically the Interface Structure moves vertically to allow for the effects of tidal range, and it also can rotate to ensure that the Sponsons are optimally aligned with the wave direction. An initial study commissioned by us, indicates that the additional loads placed on the foundation of an Offshore Wind Turbine from Wave Treader are relatively small, and therefore Wave Treader will not adversely affect the stability of the Wind Turbine.

Technical Details

- Projected over 500 KW rating
- Infrastructure overheads shared with Wind Turbine giving higher profitability
- Primarily for Round 3 Offshore Wind Turbines (further offshore, more vigorous wave environ.)
- 50m long, 20m beam
- 25 year design life, 5 years between major refits
- Refits comprise of replacing arm & sponson bearings, generator skids, & cylinders
- Standard, Proven Marine Construction – Steel & GRP
- Modular design means ease of component change-out
- Very few Single Point Failure modes will lead to a high level of reliability
- Low levels of intrusion to the marine environment
- Expect full size prototype in 2009 with commercialisation in 2011

Wave Energy Technology List: Device Details

Sonoma Coast Hydrokinetic Energy Project (SCHEP)

Company Name: Wavebob LLC (USA) / Wavebob Ltd. (Ireland)

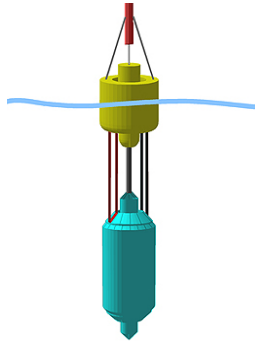
Device Name: Wavebob

Weblink: www.wavebob.com

Pictures



WAVEBOB



General Description

The Wavebob is an axi-symmetric, self-reacting point absorber, primarily operating in the heave mode. It is specifically designed to recover useful power from ocean wave energy, and to be deployed in large arrays offshore. It is an axi-symmetric buoy structure on slack moorings which makes it inherently sea-worthy. Its ability to de-tune in seconds is vitally important in a resonating energy absorber. Unlike all other self-reacting heaving buoys, the Wavebob's natural frequency may be set to match the typical ocean swell (Atlantic 10", or Pacific 15"), facilitating good energy absorption. It can ride very large waves and still recover useful power. It has exceptional facilities for almost instantaneous tuning and longer period adjustment of natural frequencies and bandwidth. On-board autonomous control is a feature, and there is considerable scope for intelligent systems, for example individual units co-operating in arrays. These are highly significant attributes in changing wave climates, so typical of the North Atlantic.

Technical Details

- Uses mooring system
- The outer torus has a diameter of the order of 20metres, overall height of 8 metres
- Relatively stable in all but the most severe storms
- Typically carries three or four motor-alternator sets
- Built-in redundancy facilitates remote switching and high availability
- Main device remains on site (for up to 25 years)
- Individual components replaced & taken to ashore for servicing as necessary
- No requirement for deep water facilities or dry docks
- Average electrical power 500kW and greater is expected from North Atlantic sites

Wave Energy Technology List: Device Details

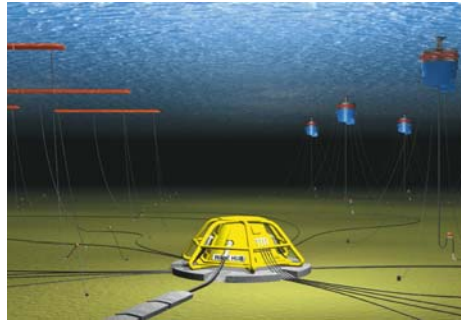
Sonoma Coast Hydrokinetic Energy Project (SCHEP)

Company Name: South West of England Regional Development Agency

Device Name: Wave Hub

Weblink: <http://www.wavehub.co.uk/>

Pictures



General Description

Wave Hub is a groundbreaking £42m renewable energy project being developed by the South West RDA (Regional Development Agency) to create the UK's first offshore facility to demonstrate the operation of arrays of wave energy generation devices. Wave Hub provides a consented, grid connected area of sea located off the coast of Cornwall. It holds a 25-year lease from The Crown Estate for an area of 8 sq km with a cable route back to shore. The infrastructure involves a sub-station building at Hayle on the coast, adjacent to a Western Power Distribution sub-station; a sub-sea cable, a sub-sea hub unit to allow connection to the cable of four arrays of wave energy conversion devices and navigational markers. The system will operate initially at 11kv, but can be upgraded to 33kv, allowing 50MW to be brought back to shore. The change over will be considered when the necessary connectors, penetrators and other components for 33kv operation have been developed and proven and will involve a further consent application.

The project will work with up to four different technologies at any one time. A 1km x 2km sea area will be leased to each developer for installation from 2010 onwards. Leases will run for five years, or maybe longer, and will allow each developer to generate a maximum of 4-5MW of power. The Wave Hub will record the strength of the incoming waves and will enter into a power purchase agreement on behalf of all developers using the project. The Wave Hub is currently inviting approaches from wave technology developers wishing to install devices from 2010 onwards.

Technical Details

- Offshore facility
- Infrastructure involves a sub-station; a sub-sea cable, a sub-sea hub unit to allow connection to the cable of four arrays of hydrokinetic devices
- Can work with up to 4 different technologies at any one time
- Each type of technology can generate a maximum of 4-5 MW of power
- Initially operates at 11 kV but can be upgraded to 33 kV to allow for 50 MW