

OPT

OCEAN POWER TECHNOLOGIES

“Making Waves in Power”



Operation and Maintenance Lessons Learnt

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Ocean Power Technologies

- OPT Inc. based in NJ, USA, formed in 1994 with real-sea testing of the PowerBuoy® wave energy conversion technology since 1997.
- Floated on London Stock Exchange in Oct. '03 (£23m) and NASDAQ in April '07 (US\$90m).
- HQ in NJ, USA with OPT Ltd formed in UK in 2004. OPT currently 55 people (39 US office, 16 UK office) – recruiting heavily!
- Developing projects in Europe (primarily Spain, France and UK), USA and Australia.



NJ PowerBuoy

PB150 PowerBuoy System

PowerBuoy – Recent Deployments

2008

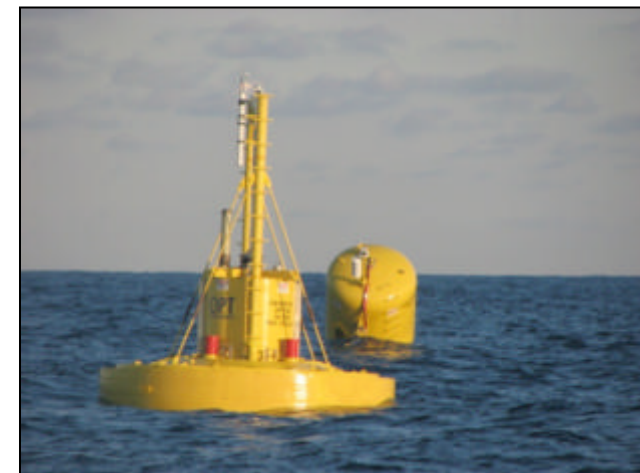
1. NJ PowerBuoy (PBNJ) – Deployed
2. Hawaii – Waiting for weather window
3. DWADS (Autonomous PB) – Deployed
4. Spain (PB40ES - 40kW) – Deployed

2009

5. Scotland, EMEC (PB150 - 150kW) – under construction
6. Oregon, Reedsport (PB150 -150kW) – under construction



Hawaii PowerBuoy ready for deployment – Sept. '08



DWADS Autonomous PowerBuoy deployed – Oct. '08

PB40ES PowerBuoy deployment – Santoña, Spain



Video

Key O&M Lessons Learnt, part 1 – Deployment/Retrieval

1. Think about location – ability to go to site and inspect quickly is a big advantage, as well as being able to see device from shore;
2. Port facilities – can look at 2 types, those for minor and major maintenance, thereby increasing your harbour options;
3. Vessel availability is a challenge even for minor activities – you may need your own small work boat for daily/monthly activities; and
4. Be innovative to reduce costs – note the PowerBuoy deployments now successfully use ballast tanks (i.e. horizontal tow-out) to avoid need for costly crane barges and expensive port facilities.

Key O&M Lessons Learnt, part 2 – Others

1. Non-grid connected testing power supply:
 - i) Ensure GPS and device monitoring is powered independently...but...
 - ii) Plan for SCADA power supply during periods of low wave energy...wind and wave?
2. Anti-foul thoroughly on modifications as well as first build to avoid growth; and
3. Finally...a lot of maintenance can be done offshore if designed in – PB150 float has an independent mechanical lock and man access capabilities at sea.

