WindFloat Pacific
OSW Demonstration Project

June 18, 2014

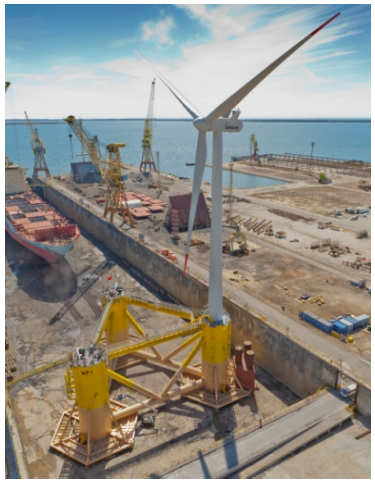
Update for Oregon Fishing Industry

Today….

- Update on status of project and modifications
- Siting of project
- Installation procedures: anchors, cables, WindFloats
- Operations and maintenance
- Permitting progress
- Environmental studies

WindFloat 1: Successfully Operating for Over 2.5 Years

- Installed off of Northern Portugal in October 2011; still producing today
- Generated and delivered over 8.8 GWh of energy to Portuguese Grid
- Technical availability over 93%
- Performed through extreme weather events, including waves over 15m
- Energy output consistent with onshore turbine under same wind conditions



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WFP - Alignment with DOE Objectives

Infrastructure and Supply Chain

- Validate and identification future West Coast infrastructure to support US offshore wind energy development
- In depth study and analysis of serial production benefits of the WindFloat technology

Deepwater Offshore Wind Resource Assessment

- Development and validation of a method suitable for deepwater locations
- Design basis development and energy generation predictions

Deployment of state of the art 6MW direct drive wind turbines offshore

Offshore Installation and O&M

- Multiple offshore wind turbines and transmission infrastructure without ANY offshore lifting or piling activities
- Design and analysis of offshore O&M methods and proceedures for a floating wind farm

WFP - BP1 Objectives and Accomplishments

50% FEED ✓

- ABS Approval in Principle in hand

Site Identification ✓

- Consultation with Local Fishing Fleets

Initiate Permitting Process ✓

- DNCI from BOEM establishes site control
- Aggressive Approval Schedule: Permits in Hand Q2 2016

Public Approval ✓

- Explicit Committed Support from NW Governors and stakeholders

Project Finance and Future Cost-share ✓

- Deepwater Wind's experience structuring off-takes and raising capital

Overview of Outreach Activities in Coos Bay

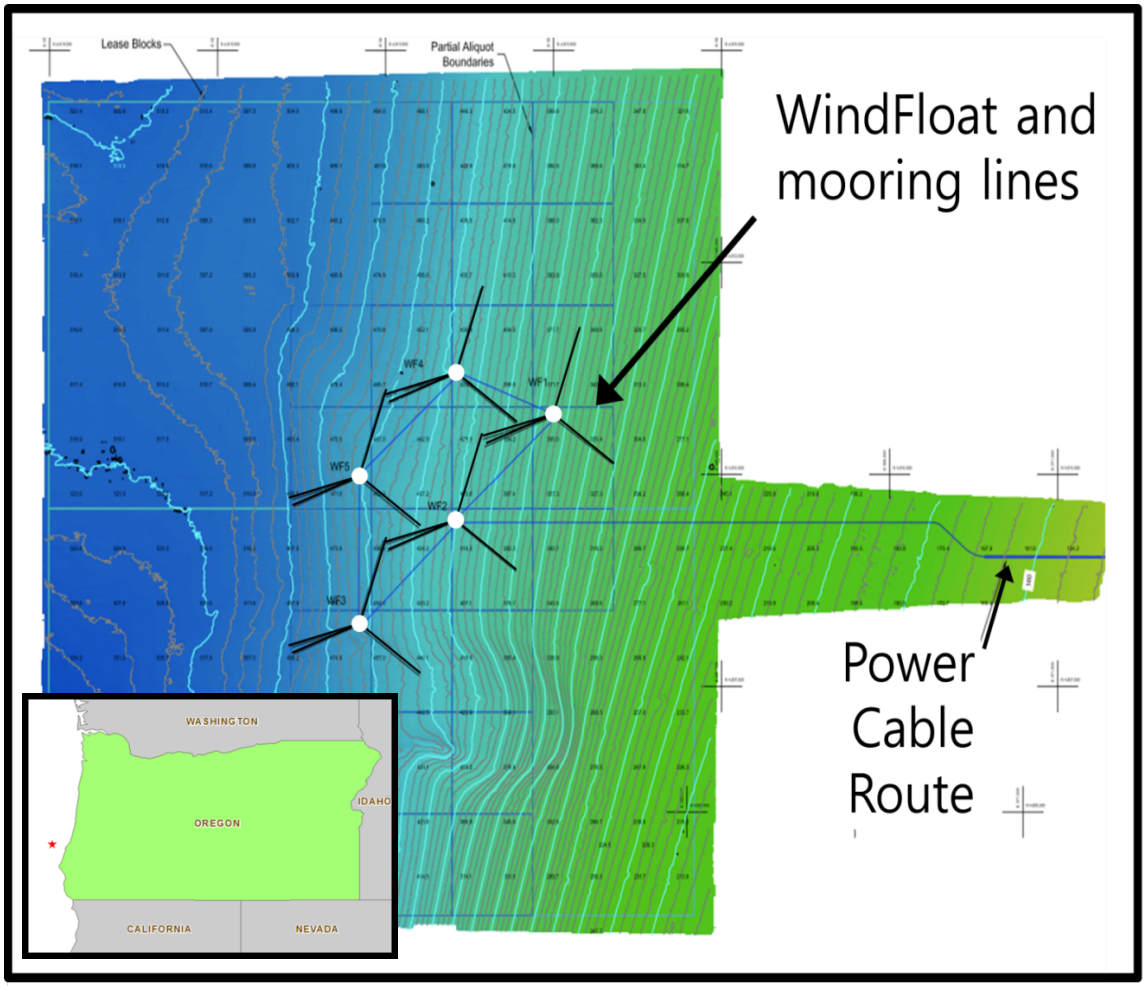
Date	Activity	Purpose
June 2011 and on	Meeting with Coos Bay Community	Project details, overall scope and intent of project
September 2012 and on	Meeting with Coos Bay and Charleston fishing communities; elected officials and port officials	Project details, overall scope and intent of project
May 2013	Public meetings (2) in Coos Bay	Public meeting to inform community and fisherman of project
August 2013	Meeting with SOORC members	Inform fisherman of project's progress
September 2013	Meeting with SOORC	Discuss potential effects of project on fishing efforts Coos Bay
September 2013	Public meeting (3) in Coos Bay	Public meeting to inform community and fisherman of project

Addressing Concerns and Modifications to the WFP Project

Concern	Modification
Interference with commercial fishing activities	Project site moved from ~10 miles offshore to approximately 18 miles offshore to reach 200 fathom depth.
Threats to migratory seabirds	Turbine blades will rotate at a minimum of 30 m above sea surface; no further changes needed.
Presence of Wind Floats potentially threaten marine mammals, sea turtles, and fish	Gather all available data on presence of marine animals. Determined that most migratory species are not present in large numbers; no changes needed.
Concerns about viewshed from culturally sensitive lands off Gregory Point	Additional visual effect studies will be conducted to demonstrate how small turbines will look 18 miles offshore.
Concerns about habitat destruction of rocky reefs on the WFP site and along cable route	Bathymetric surveys and sub-bottom profiling surveys used to identify sensitive areas; cable route modified to traverse around identified rocky reef.

Proposed Project Site

- Lease application filed with BOEM May 14th 2013
- Application area for OCS lease blocks (and aliquots) to BOEM
- ~18 miles offshore
- Project will be in about 350+ meters (~1200 feet) of water
- Generally sandy/silty bottom



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The WindFloat

Turbine Agnostic

- Conventional: 3-blade, upwind
- Partnership with manufacturers
- No major redesign
  - Control system – software
  - Tower – structural interface

Static Water Ballast – Stability

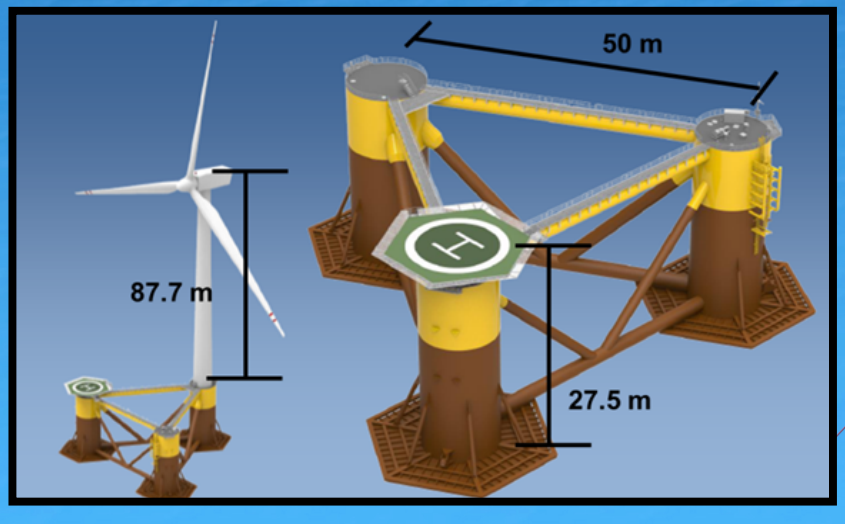
- Used to achieve operating draft

Heave Plates – Dynamic Stability

- Move platform natural response above the wave excitation (entrained water)
- Viscous damping reduces platform motions

Hull Trim System – Efficiency

- Tower is vertical – No mean pitch
- Closed-loop with redundant path

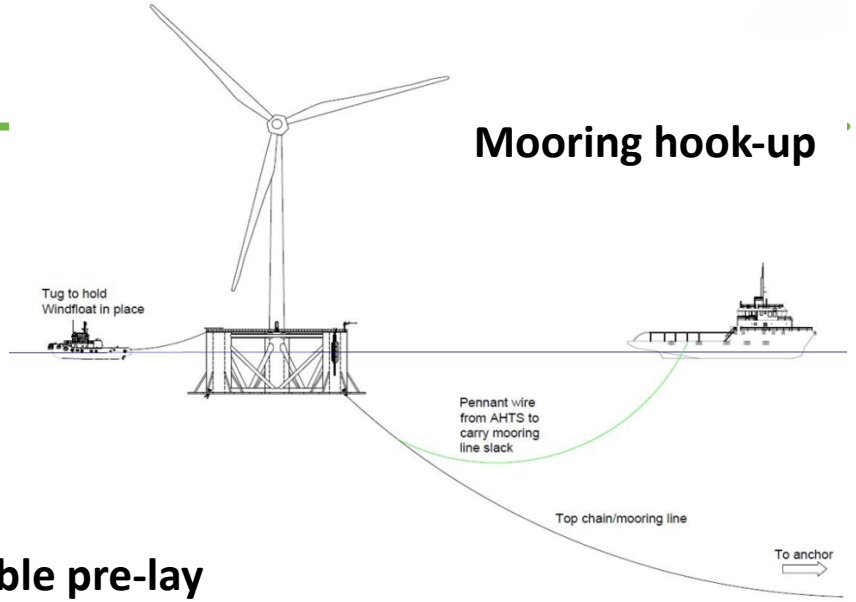


WFP – Installation: Overview

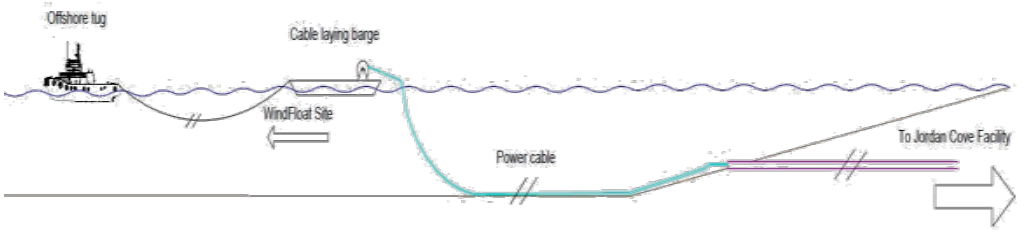
Preliminary Installation Plan

- Plan: 2 platforms 2016; 3 in 2017
- 120 ton Anchor Handling Tug Supply (AHTS)
  - Mooring pre-lay
  - Hull tow
  - Mooring hook-up
  - Inter-array cable connections all 5 platforms
- Additionally:
  - Coos Bay will be base for final assembly and offshore operations
  - Barge for cable pre-lay
  - Local tugs

Mooring hook-up



Export cable pre-lay



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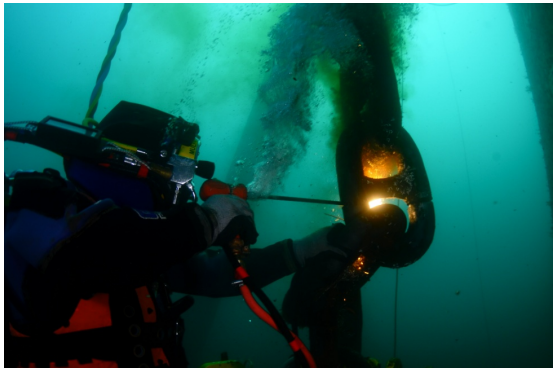
WFP - O&M: Overview

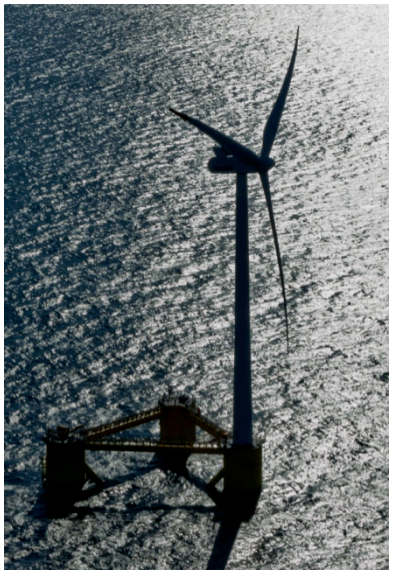
Normal Operations

- Power production
- Remote communication
- Platform monitoring through SCADA system
- Platform data collection and analysis
- Maintenance and Inspections
- Management of Downtime
- Systems reliability
- Systems longevity

Offshore vs. Onshore Operations

- Logistics
- Safety at sea
- Shore base





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WFP – Permitting

Location

- Sited 18 miles offshore, off continental shelf
- Lower risk:
  - Fewer biological resources at risk
  - No pile driving noise, no excessive vessel traffic for installation
  - Mostly out of sight from shore
  - Distant from congested shipping lanes
  - Interaction with very few ocean users
- Landfall of cable on industrial Port of Coos Bay land

Communication

- Acknowledged experience and data from WindFloat 1
- Contact early and often with key stakeholders, esp. fishing community
- In communication with OR state and federal agencies
- Public meetings, media contacts, lots individual stakeholder meetings, discussions

Support

- Interest from groups in Coos Bay area, Oregon coast, up and down Pacific coast
- Strong support for potential economic development from underserved area
- Excellent cooperation of west coast agencies

WFP – Permitting: Monitoring Strategy

Determine Environmental Priorities and Baseline Data Needs

- Intersection of WindFloats and export cable with marine animals, habitats, ecosystem processes
- Researched scientific literature, databases and previous studies
- Ongoing consultation with resource agencies and stakeholders
- Discussions with agencies and stakeholders
- Ongoing meetings with stakeholders early and often
  - receive feedback to determine the efficient path forward for lease, permitting, deployment

Address gaps in baseline data:

- NEPA analysis
- Pre-installation

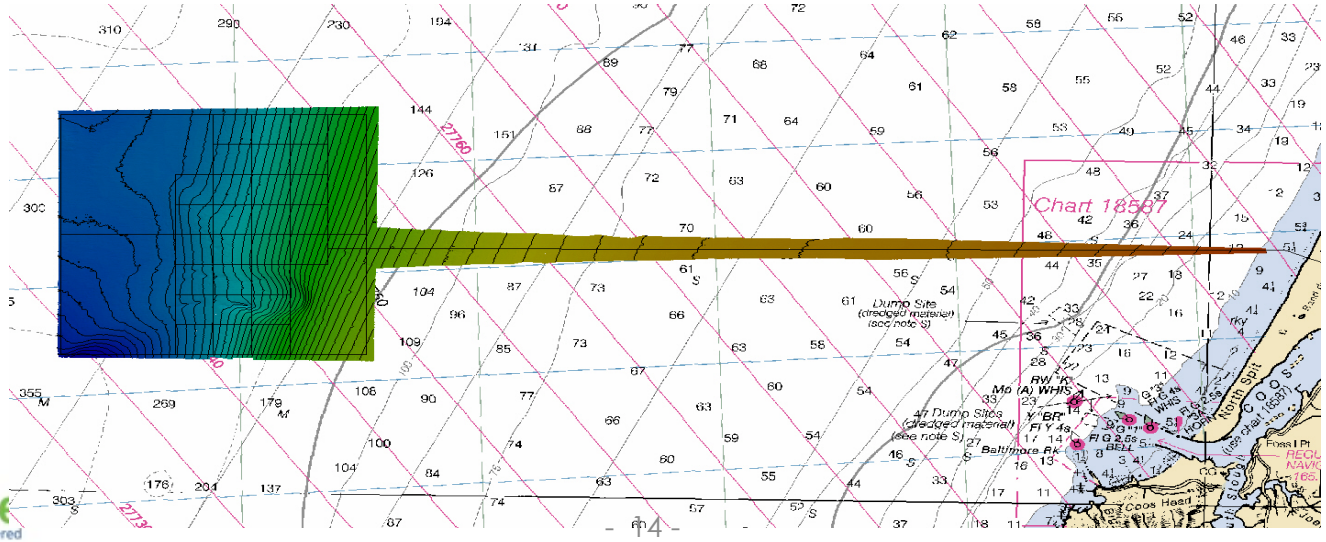
Delineate full permitting process including:

- Seabed lease
- Consultations on ESA, MMPA, MBTA, FAA, DOD interactions, ACOE permits, USCG
- OR state land lease, permits
- NEPA analysis and approval process
- Determine post-installation monitoring needs, design monitoring studies

WFP – Permitting: Site Assessment Underway

Six surveys and analyses took place during 2013 as defined by BOEM/NEPA:

1. Measuring water movement
2. Acoustic monitoring for marine mammals
3. Surface sediment sampling
4. Seabird surveys
5. Bathymetric survey
6. Analysis of visual effects of WFP



WFP – Visual Effects: Turbines off coast of Coos Bay

View from cable landing

Zoomed approximately 4 times

Views from other shore locations will be very similar (for example Gregory Point)

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WFP – Permitting: Pre-Install and Post-Install Monitoring

Planning in cooperation with BOEM, NOAA Fisheries, USFWS, OR state agencies:

Seabirds

- Continuous line surveys
- Radar and infrared video

Marine Mammals

- Passive acoustic detection system
- Aerial surveys

Sea Turtles

- Continuous line surveys

Bats

- Anabat Deployment (PMEC or WindFloat)

Fish

- ROV
- Fish Tag Receivers on WindFloat

Benthic Habitat

- ROV surveys w/ inspections

WFP – Environmental Monitoring: Pre-Installation

Study	S-R Interactions	Area of Concern	Authority or Agency
Sub-bottom profile and magnetometer survey	Benthic Habitat Cultural resources	Geotechnical, geophysical/ benthic habitat	USCG; NOAA Fisheries; SHPO
Current data acquisition	NA	Physical Oceanography	USCG
Hydrophone for ambient noise	Attraction or avoidance from WFP project	Marine mammals; fish	NOAA Fisheries; USFWS
Observers on vessels	Collision with WF structure; attraction or avoidance	Seabirds, marine mammal, sea turtles	USFWS; NOAA Fisheries

WFP – Environmental Monitoring: Post-Installation

Study	S-R Interactions	Area of Concern	Authority or Agency
Seabird observation data	Collision with WF structure/blades; attraction or avoidance	Seabirds	USFWS
Marine Mammal observation data / Passive acoustic hydrophones on WFs	Collision with WF structure; attraction or avoidance	Marine mammal	NOAA Fisheries
Sea turtle observation data	Collision with WF structure; attraction or avoidance	Sea turtles	NOAA Fisheries
Observation data/ Vemco received data	attraction or avoidance	Fish	NOAA Fisheries
Observation data	WFP anchors/ benthic habitat	Benthic habitat	NOAA Fisheries

Environmental Studies and Permitting Team

Principle Power

Kevin Banister
kbanister@principlepowerinc.com

PNNL:

Andrea Copping
andrea.copping@pnnl.gov

Luke Hanna
luke.hanna@pnnl.gov

University of Washington:

Brian Polagye
bpolagye@uw.edu

Herrera Environmental:

Phil Coughlan
pcoughlan@herrerainc.com

Kristina Gifford
kgifford@herrerainc.com

Oregon State University:

Sarah Henkel
sarah.henkel@oregonstate.edu

Rob Suryan
rob.suryan@oregonstate.edu

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