

# Cobscook Bay Resource Center

## *Tidal Energy Conference*

August 4, 2007

Eastport, ME

*Emission-Free Electricity from the  
Boundless Energy of the Quoddy Tides*

## Status Report



ORPC Maine, LLC

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## ORPC Background

### Our Mission

Ocean Renewable Power Company, LLC (ORPC) was founded in 2004 for the purpose of generating reliable, competitive, emission-free electricity from the virtually unlimited energy resources of the oceans. ORPC will accomplish its mission by developing proprietary modular ocean current generation (OCGen™) technology and incorporating it into environmentally superior, financially successful tidal and ocean current generation projects.

- ❖ ORPC's professional management team has extensive experience in the development and financing of cogeneration, independent power and renewable energy projects
- ❖ ORPC utilized the extensive technical resources of the U.S. Navy to assist in technology evaluation and selection and in the development of designs that are robust enough for underwater deployment in the ocean
- ❖ ORPC has retained a core team of highly respected individuals and professional firms in the fields of turbines, generators, power electronics and controls, submersible structures, mooring systems, oceanography, regulatory process, environmental studies and permits, and legal/business counsel
- ❖ ORPC formed ORPC Maine, LLC in 2006 to develop, permit, install and operate tidal energy projects in northern New England and eastern Canada



## ORPC Maine Team

ORPC Maine has retained a highly competent team of Maine-based professionals and firms to lead our efforts in Maine. ORPC has also developed key affiliations with leading Maine organizations.

- ◆ Bob Lewis, ORPC Maine Site Manager – provides project management and coordination of Eastport project activities
- ◆ Devine Tarbell & Associates (Mary McCann, Project Manager) – provides experience and expertise in environmental studies and permitting as well as FERC licensing (Portland)
- ◆ Pierce Atwood (Elizabeth Butler, Lead Attorney) – provides essential legal, intellectual property and business advice (Portland)
- ◆ Jim Sysko, P.E. – a Maine Professional Engineer with 30 years experience in design and construction of Maine projects, including prior demonstration projects utilizing the Gorlov Helical Turbine (Bethel)
- ◆ University of Maine, School of Oceanography - Dr. Huijie Xue (Orono)
- ◆ Maine Technology Institute (Gardiner)
- ◆ Maine's Marine Technology Center (Eastport)

ORPC Maine won a Development Award from the Maine Technology Institute, which in addition to funding, provided an MTI “seal of approval” for the OCGen™ technology and the ORPC Maine business plan.

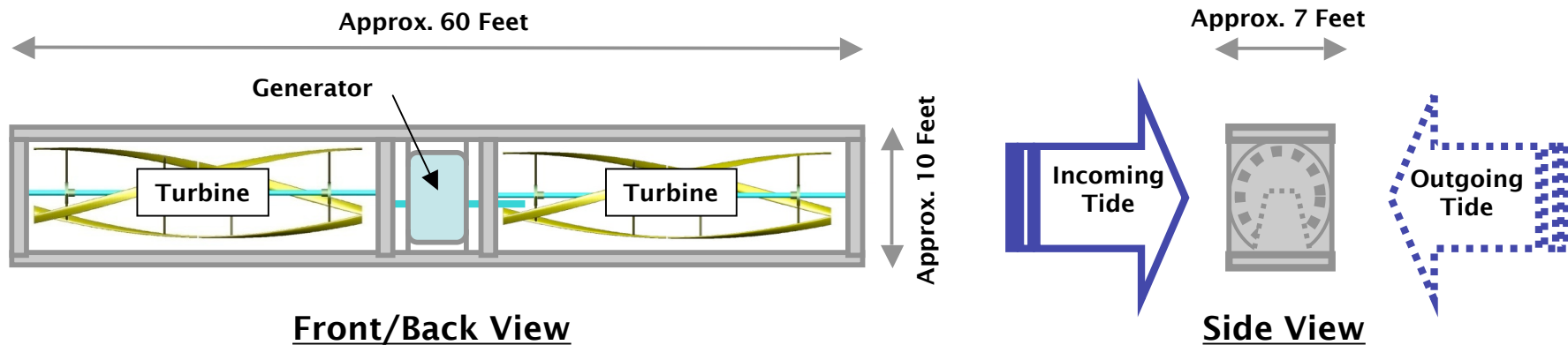
ORPC Maine continues to look for mutually beneficial relationships with Maine organizations and individuals to help fulfill the ORPC mission.



## Turbine-Generator Unit

*Patent applications in process*

**The core component of ORPC's Ocean Current Generation (OCGen™) technology is the Turbine-Generator Unit (TGU)**



### A simple and rugged underwater workhorse

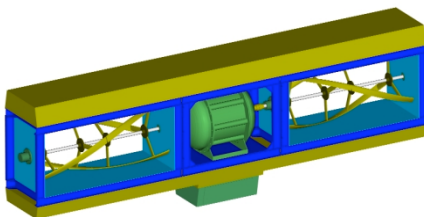
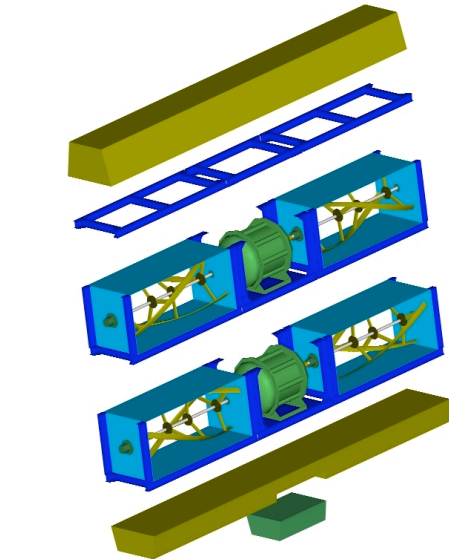
- ◆ One moving part (turbines & generator on single shaft) – No gears
- ◆ Rotates in same direction for incoming & outgoing tides
- ◆ Generates 180 kilowatts in a 6 knot current (30 to 35 homes)



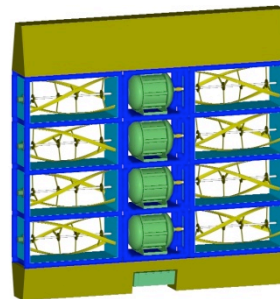
## OCGen™ Module

### Turbine-Generator Units “stacked” to create OCGen™ modules

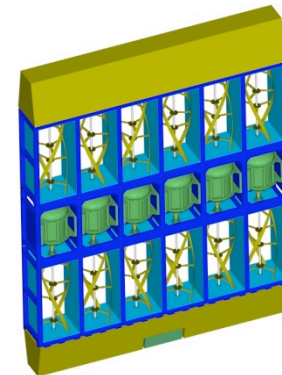
- Plug & play turbine-generator units
- Modular ballast/buoyancy & electronics
- Easy assembly – economies of scale
- Multiple configurations



Prototype Configuration



Horizontal Configuration



Vertical Configuration

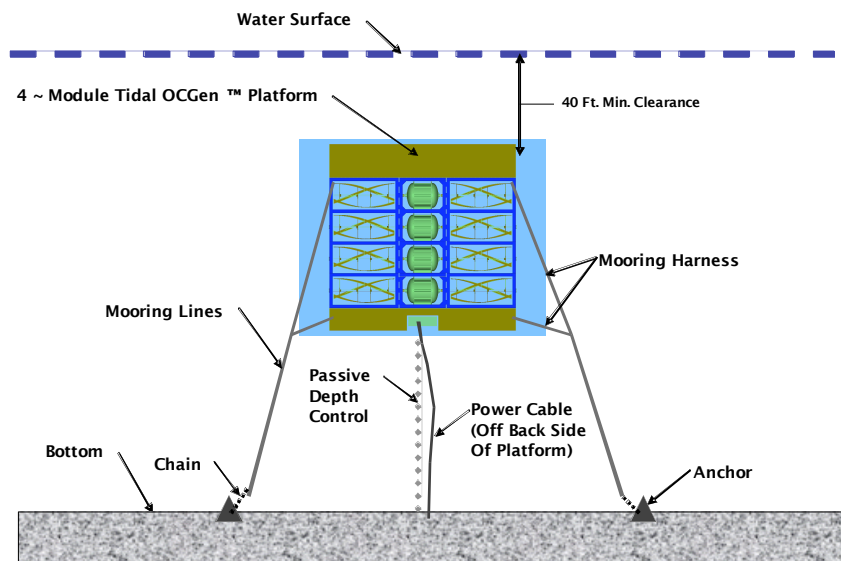


## Deployment Plan

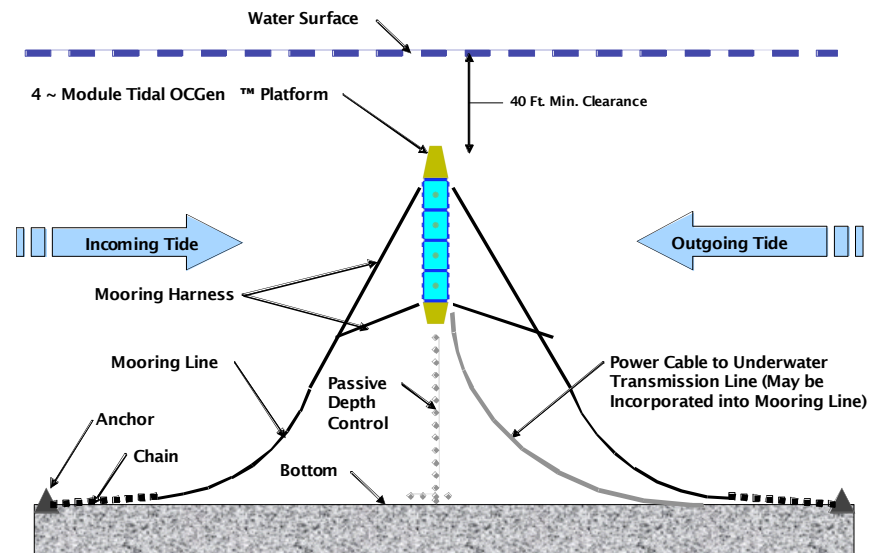
### Ease of Installation and Maintenance

1. Towed (in the horizontal position) to the site
2. Attached to mooring lines and power cable
3. Submerged into operating position (de-ballast)

Brought to the surface for inspection and maintenance



Front Elevation





Side Elevation



## ORPC Development Plan

### ORPC's 3-Phase Development and Commercialization Plan

1. 1/3 Scale Turbine-Generator Unit (TGU) Demonstration Project (Nov-07)
  - ✓ “Proof of Concept” for core component of the OCGen™ technology
  - ✓ Collect data for final design and detailed engineering
-  Full-Scale OCGen™ Module Prototype Project (Mid 2009)
  - ✓ Full-Size Single TGU OCGen™ Prototype Module, including ballast/buoyancy equipment, submersed power electronics and control system package and mooring system
  - ✓ Power generated will be transmitted to a buoy where it will be metered and dissipated (no FERC license needed)
  - ✓ All important environmental and operating parameters will be monitored and data will be collected and analyzed
  - ✓ Deployed for a minimum period of 12 months
  - ✓ FERC licensing process will be initiated
-  1st Phase of Commercial OCGen™ Project (Mid 2011)
  - ✓ Complete FERC licensing, finance, build and operate the 1<sup>st</sup> phase of the 1<sup>st</sup> commercial OCGen™ project (likely in Western Passage)
  - ✓ Includes underwater transmission line and connection to the grid



## ORPC Maine Progress Report

### **Funding**

- ⦿ TGU Demonstration Project is 90% funded using funding from Maine Technology Institute (MTI), Massachusetts Collaborative (MTC) and private equity
- ⦿ Awarded \$300,000 SEED funding from MTC to match the \$300,000 received from MTI

### **FERC Permits**

- ⦿ Obtained Preliminary Permits from FERC for Western Passage and Cobscook Bay sites (A special thanks to the Passamaquoddy Tribe for their cooperation)

### **Eastport Presence**

- ⦿ Opened our Eastport office at 22 Washington Street (the “ORPC Maine” building)
- ⦿ Hired an Eastport native, Bob Lewis, as ORPC Maine Site Manager





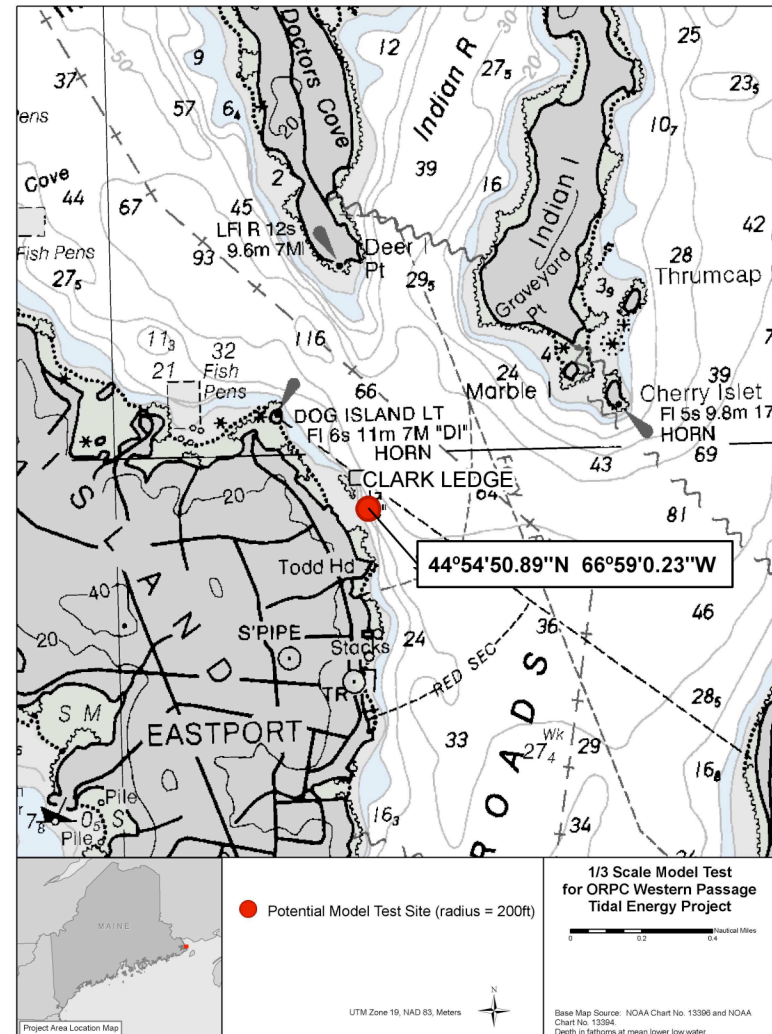
## ORPC Maine Progress Report (Cont'd)

### **1/3-Scale TGU Demonstration Project (TGU Demo Project)**

- ⦿ Started TGU Demo Project in mid-May
- ⦿ Met with Cobscook Bay Fisherman's Association, Cobscook Bay Resource Center and other key stakeholder to discuss and select specific site for TGU Demo Project – Site is just off Clark's Ledge in Western Passage (offshore from the end of Clark Street)
- ⦿ Planned deployment is from mid-November to mid-December
- ⦿ Met with Maine DEP (ME DEP) and Army Corps of Engineers (ACOE) and reached agreement on permitting requirements:
  - Received confirmation that no ME DEP permits will be required
  - Finalized and submitted ACOE Section 10 permit application (should receive permit by mid-October) with stipulation that 1 day (tidal cycle) of underwater noise monitoring be conducted)
- ⦿ ORPC proprietary Advanced Cross Flow (ACF) turbine and permanent magnet generator have been ordered and are being manufactured
- ⦿ Lease of space at the boat school facility (to be used for material receipt, storage, fabrication, assembly and pre-deployment testing) being finalized with the City
- ⦿ Reached conceptual agreement with Port of Eastport to provide deployment barge, installation of moorings, installation of deployment barge and other services (waiting for final proposal from the Port)
- ⦿ Working with Cobscook Bay Resource Center and Passamaquoddy Tribe to try to get current study (ADCP) done for ORPC Maine and Tribe sites in Western Passage (need funding)

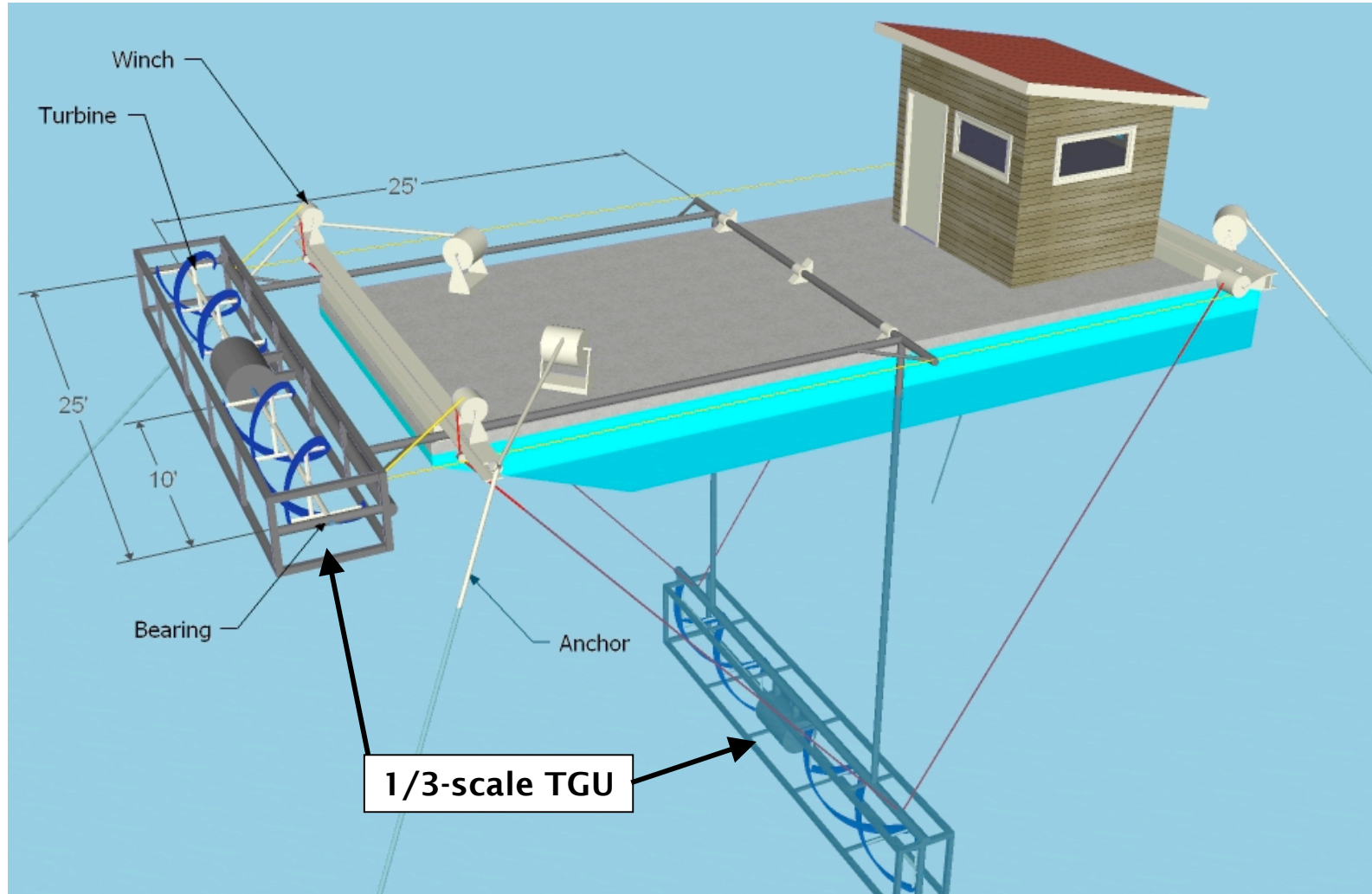


## Clark's Ledge Site





## Deployment Diagram





## Summary

- ★ ORPC was successful in raising the funding needed for the TGU Demo Project
- ★ The project is currently on schedule and within budget
- ★ The 1/3-scale TGU will be deployed from mid-November to mid-December
- ★ The TGU Demo Project has generated a lot of interest and enthusiasm so be prepared for some visitors “from away” during the deployment period!



### Warning

It will take a lot of hard work, cooperation, money and luck to get us through the demo and prototype projects and we can't make any assurances that we will be successful.

*ORPC Maine would like to publicly thank all of the officials, organizations and citizens who have given us such tremendous support and cooperation. We pledge continued cooperation and full public disclosure of our plans and progress in our efforts to make tidal energy a reality in Eastport.*