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Ocean Energy Opportunity in the Pacific Northwest

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PNWER Action Points 2005

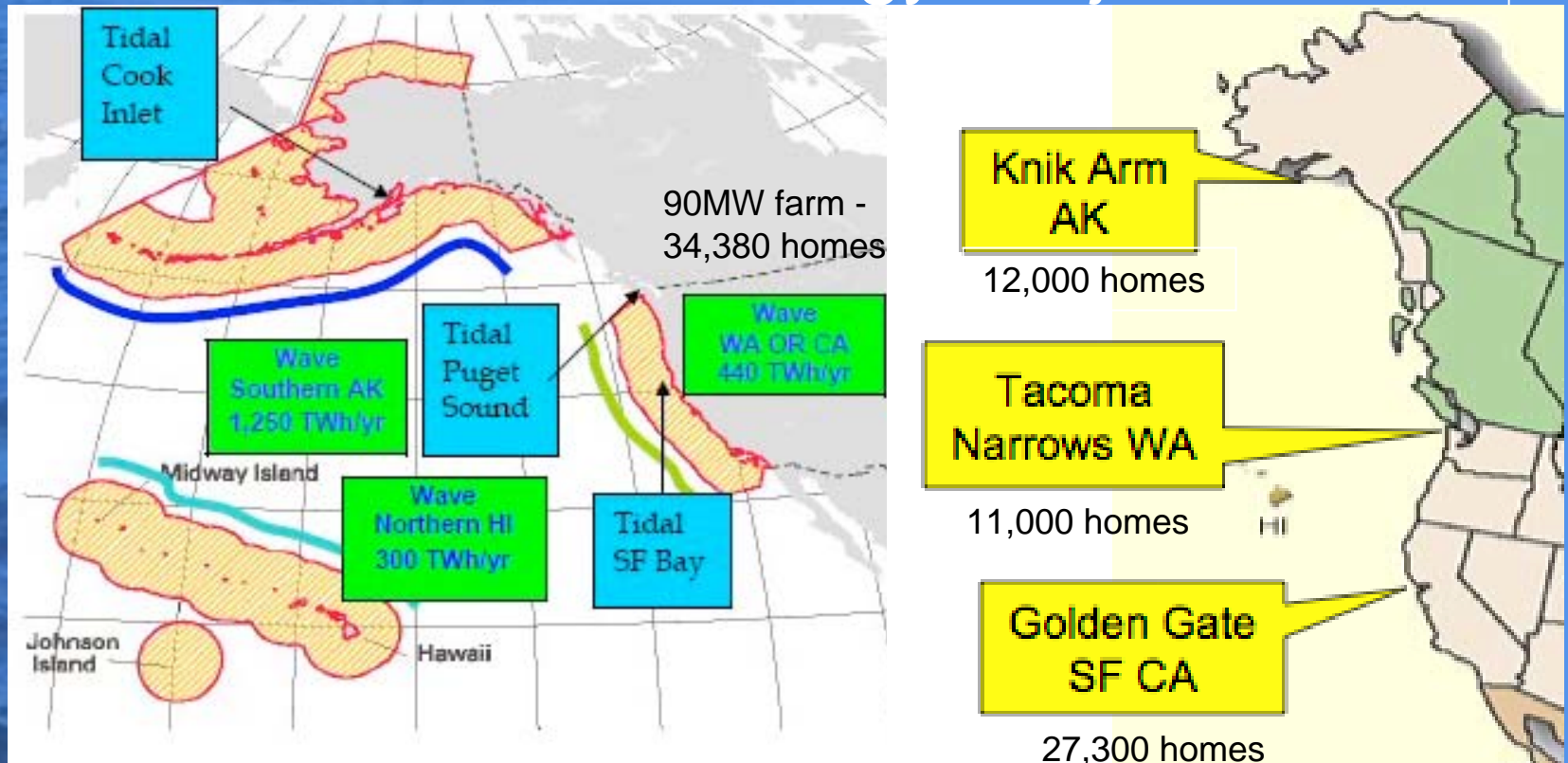
– *PNWER 15 proposed actions on ocean energy*

Retain focus that ocean energy is an important energy option for the region

- Determine the available ocean resources and economic opportunities
- Understand the regulatory, siting and permitting hurdles facing ocean energy so they can be streamlined

Resource - 1

EPRI Ocean Energy Projects



Resource - 2

Canada's Ocean Energy Resource Prospects

- Inventory of Canada's wave energy resources
 - Analysis of buoy measurements
 - Analysis of results from wind-wave hindcasts
- Inventory of Canada's tidal current resources
 - Analysis of results from tide models
 - Site-by-site inventory

Andrew Cornett - CHC NRC Ottawa

Michael Tarbotton - Triton Consultants VCR

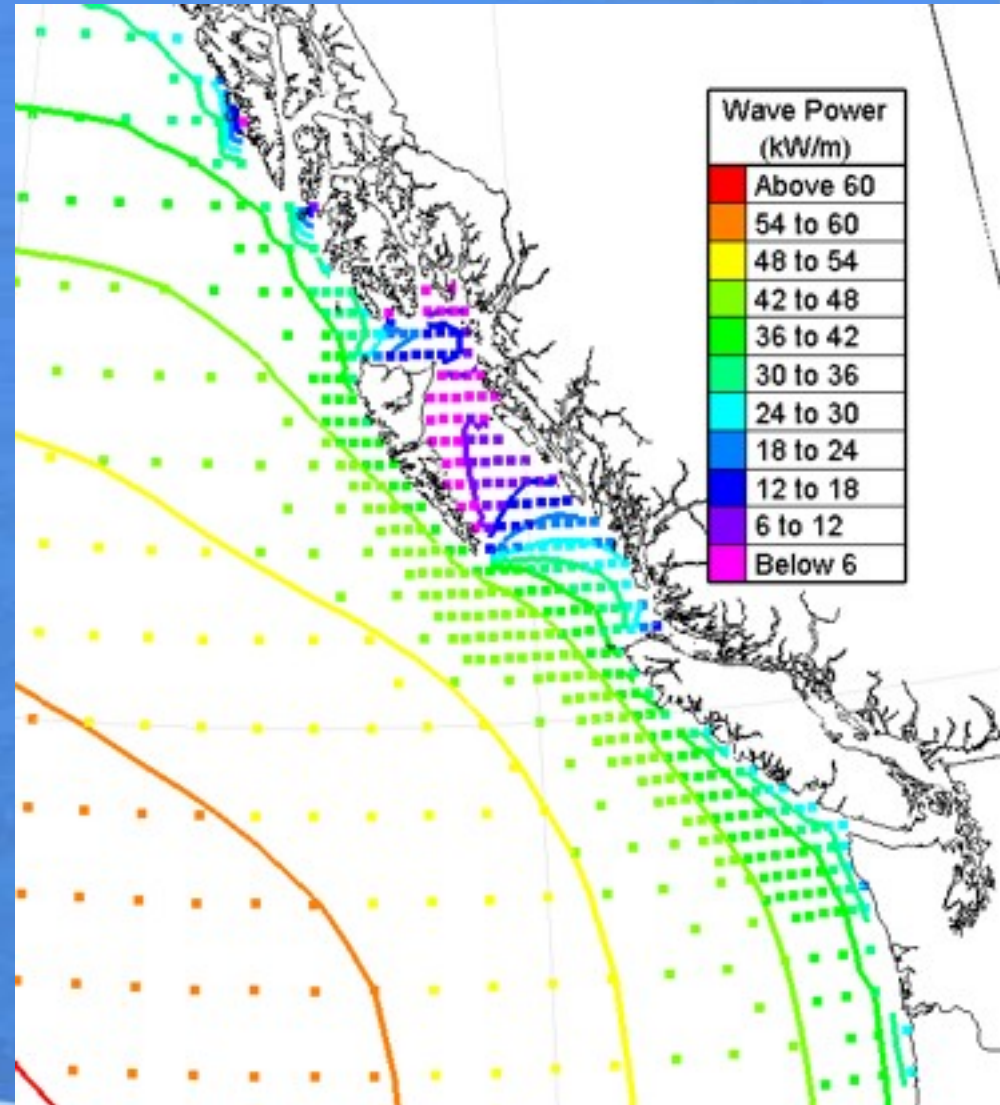


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Annual mean wave power (kW/m) from WW3-ENP hindcast

- 0.25° by 0.25° resolution
- 81,000 grid points
- NE Pacific
- 3+ year simulation
- 3 hour time interval
- Considers ice cover
- Approximation of shallow water effects
- Extensive validation
- Data courtesy NOAA-MMAB



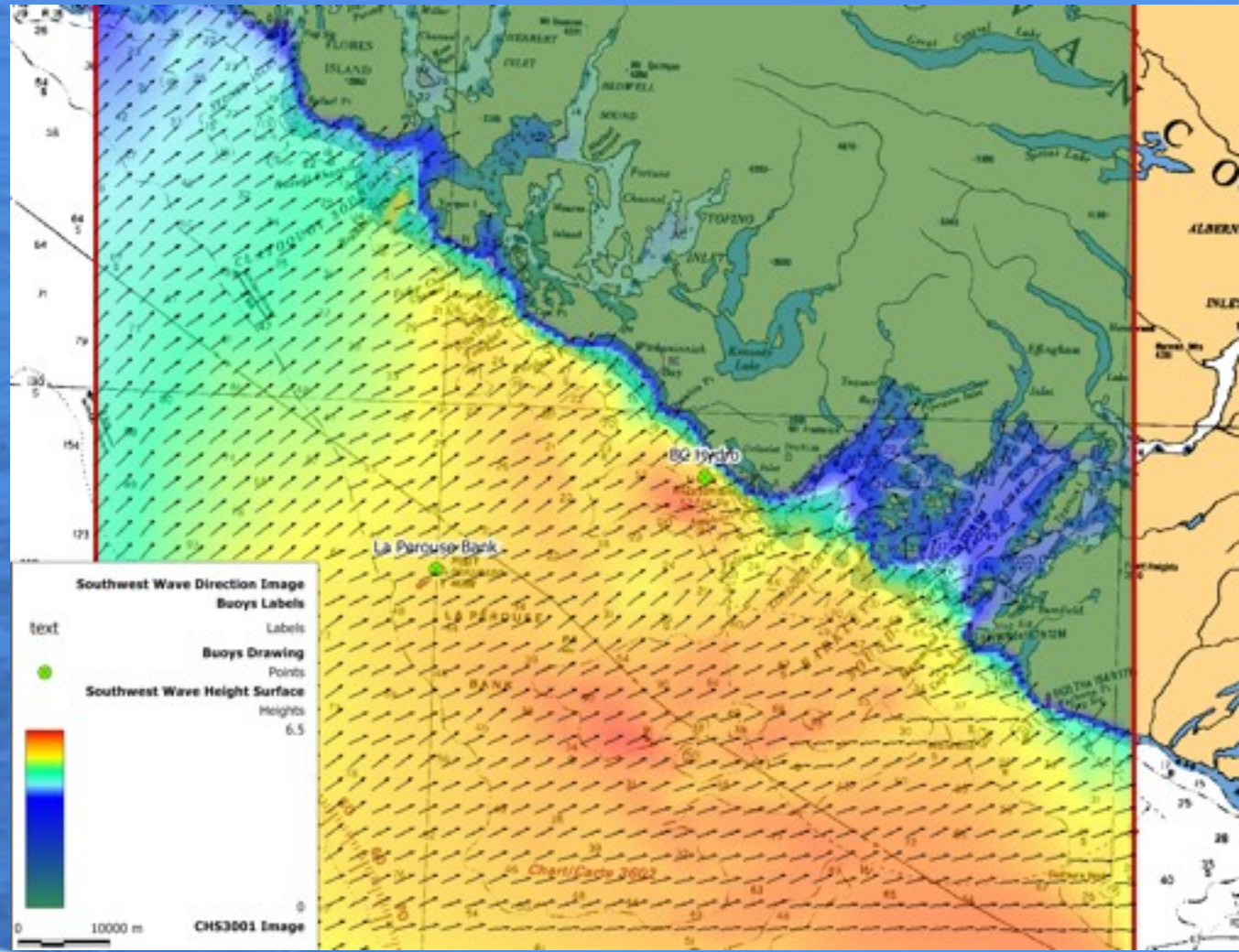


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Modeling
of the
nearshore
will
identify
hotspots

*e.g. from Triton
Consultants*





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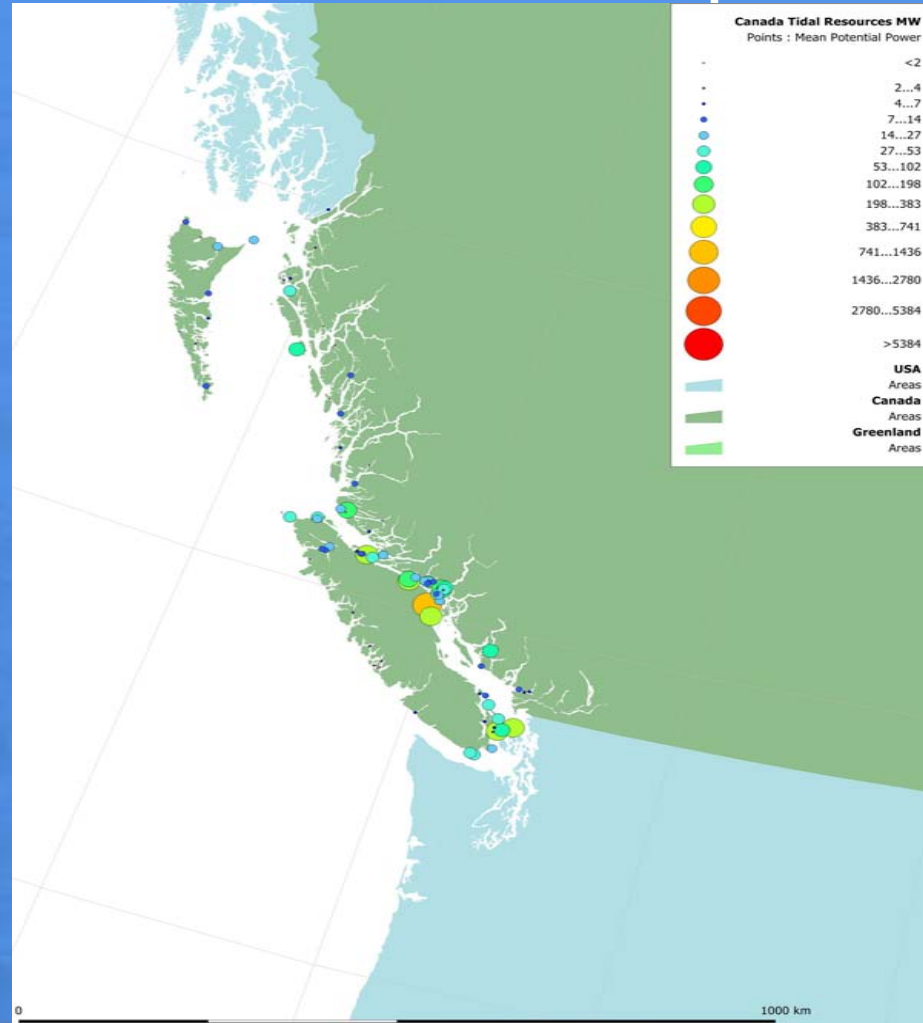
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Wave Resource Summary

- Wave energy resources are spatially and temporally variable (greatest in deep water during winter)
- Potential Offshore resource(annual mean values):
 - 37,000 MW in the Pacific
- Potential Nearshore resource (annual mean values):
 - 35 kW/m near the Queen Charlotte Islands
 - **~9,600 MW**
 - 25 kW/m near Vancouver Island
 - **~9,400 MW**

British Columbia Tidal Hotspots

- 89 sites
- 4,000 MW potential
- 45 MW average
- 40,000 homes

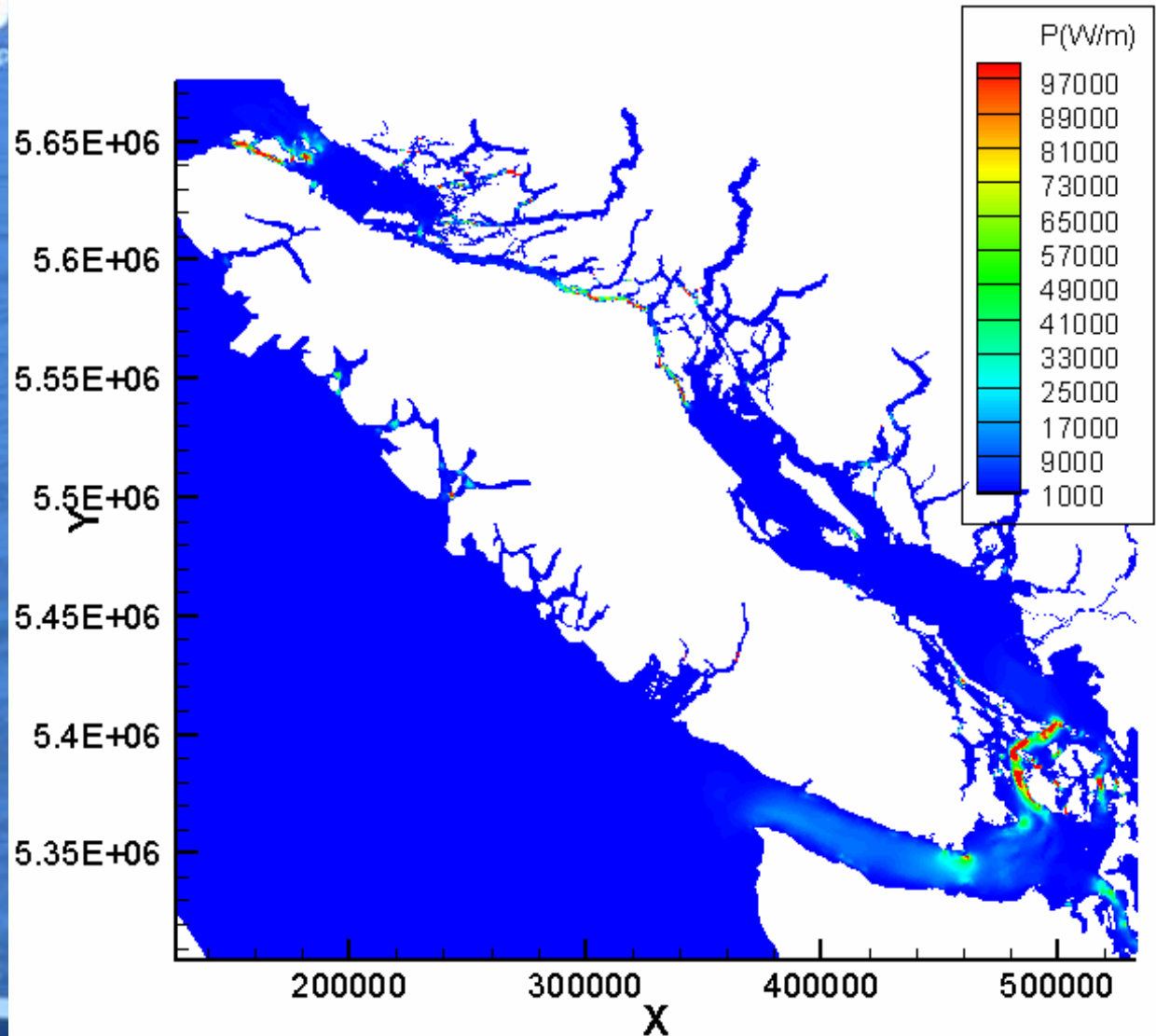




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Around Vancouver Island





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Economic Opportunities

- Canadian Multi-Dimensional Analysis
 - Good fit with existing marine and power industry
- Scottish Enterprise - more than \$250m investment by 2008
- EPRI projects - capital and operating expenses for model tidal and wave projects
- **P**eople **O**regon **W**ave **E**nergy **R**esources
 - Create a large number of high paying jobs
 - Meet Western Oregon's electrical power deficit
 - Become national leader in wave energy – both in industry and academia
 - Diversify coastal economy



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Addressing Hurdles

- OREG workshop - Feds, BC, New Brunswick and Nova Scotia
- EPRI regulatory reviews
- BC using existing process for exploration
- BC using wind policy as template for OE development
- AquaEnergy project (Makah Bay) in FERC Review
- Oregon partnership- involving Ocean Policy Advisory Council

Emerging BC Imperative?

- Demo in operation this summer; SDTC funding announced for a second; another development site permitted
- Emerging resource/energy economy imperative
 - Premier's Technology Council
 - BC Progress Board
 - Alternate Energy and Power Technology Task Force
 - Hosted IEA Committee - Implementing Agreement on Ocean Energy
- Energy Plan 2006 - expect focus on
 - Self-sufficiency, energy export, resource diversity
 - Renewable portfolio standard, development tools?

Oregon - Wave energy Imperative

Mechanism to:

- Be first to market in US
- Quickly streamline permitting process
- Continue to support Oregon as lead position, through POWER group and renewable energy cluster
- Increase political support and awareness to accelerate this process

Local Supplier Support

- Have existing manufacturing and sustainable industry clusters
- Have established marine industry
- Can meet all production requirements
- Strong academic support on emerging technologies to industry

Oregon - Strategic Imperative

- Ocean Renewable Energy Conference - Harnessing The Power Of Waves - *July 14th, 2006 - The Embarcadero Resort, Newport –*
- 12:00 - 1:00 LUNCHEON - Economic Development Potential of Wave Energy - *Governor Ted Kulongoski of Oregon*
- "I want Oregon to be the national leader in renewable energy production. Generating electricity from the motion of ocean waves is a critical aspect of that goal. This progress creates long-term prosperity and great new jobs for Oregonians, while reducing dependence on fossil fuels from overseas."

A Continuing Role for PNWER?

- Sharing knowledge and enthusiasm
- Continue call for strategic imperative from member governments
 - Renewable portfolio standards/standing offer - advanced renewable tariffs
 - Flexibility by energy/utility regulators to enable emerging energy opportunities
- Support case for federal funding (Can & US)
- Include ocean energy in discussions of regional energy planning and interconnection issues
- Initiate an energy diversification/regional sustainability working group