

*An Alternative Energy Company*

# TREMONT electric

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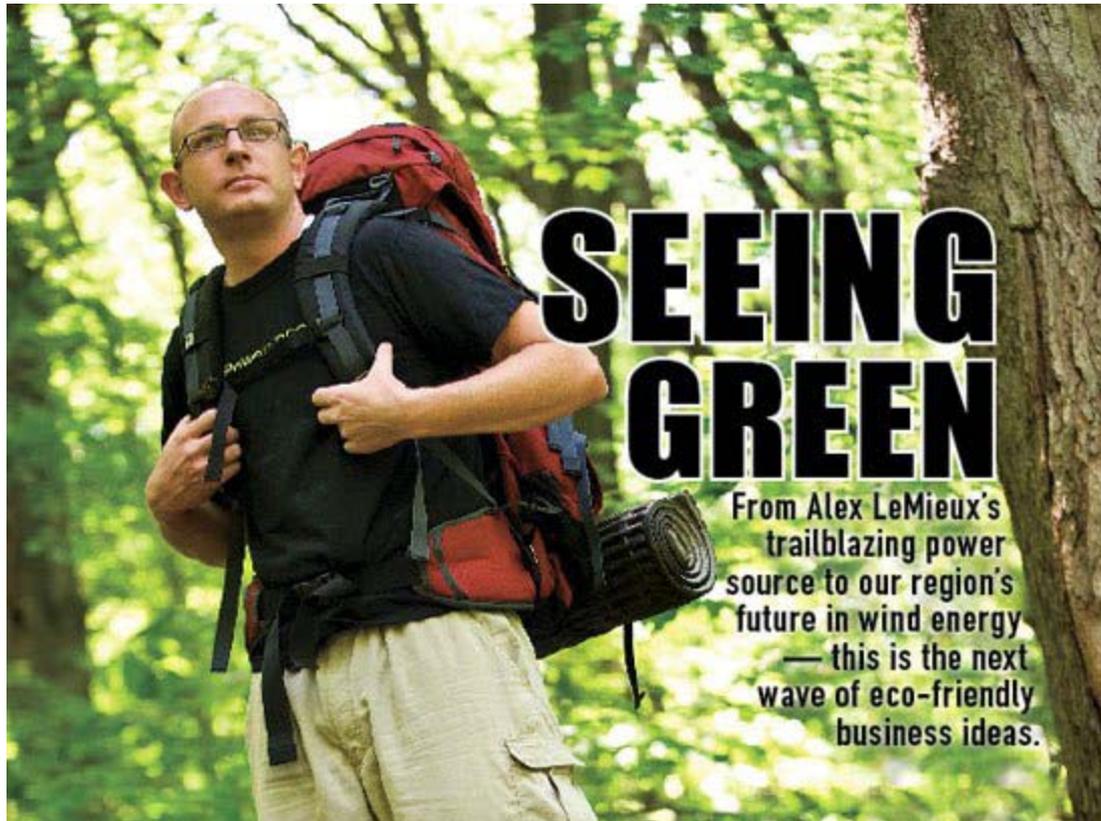
**nPower™ PEG**  
Personal Energy Generator

Market & Opportunity

*Green Energy*



# *Inside Business* cover-July 2009



## *Green Energy*

*"The idea for nPower® kinetic energy harvesting technology hit me while I was backpacking on the Appalachian Trail. I got tired of stopping all the time to buy batteries..."*

# nPower<sup>®</sup> PEG

## Never Lose Battery Power Again!

- Recharges handheld electronic devices
  - Generates energy as the user walks.
  - Carried in a bag, backpack, purse, or on your hip.
  - Charges any USB 2.0 handheld device.
- Green-Energy Lifestyle Product
  - Clean, reliable, simple power source.
  - Reduces your carbon footprint.
  - Zero emissions.
  - 100% recyclable.
    - \$149, Free green power for life!



*Green Energy*



# Patented Clean Energy Technology

(12) **United States Patent**  
**Lemieux**

(10) **Patent No.:** US 7,498,682 B2  
(45) **Date of Patent:** Mar. 3, 2009

(54) **ELECTRICAL ENERGY GENERATOR**

(76) **Inventor:** Aaron Patrick Lemieux, 2112 W. 7th St., Cleveland, OH (US) 44113

(\* ) **Notice:** Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 46 days.

(21) **Appl. No.:** 11/715,544

(22) **Filed:** Mar. 7, 2007

**Prior Publication Data**

US 2008/0217926 A1 Sep. 11, 2008

(51) **Int. Cl.**  
*F02B 63/04* (2006.01)  
*F03G 7/08* (2006.01)  
*H02K 7/18* (2006.01)  
*H02K 33/00* (2006.01)  
*H02K 35/00* (2006.01)

(52) **U.S. Cl.** ..... 290/1 R; 310/15

(58) **Field of Classification Search** ..... 290/1 R; 310/15

See application file for complete search history.

(56) **References Cited**

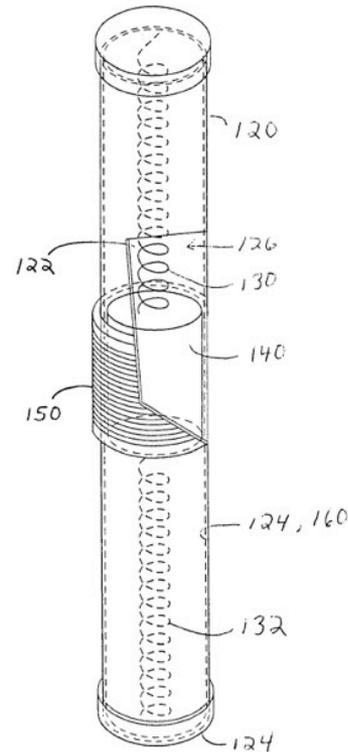
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**U.S. Patent** Mar. 3, 2009 Sheet 1 of 2 **US 7,498,682 B2**

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# The Alternative Energy Economy



**We know the country that harnesses the power of clean, renewable energy will lead the 21st century.” – President Obama, Address to Joint Session of Congress, 2/24/2009**



**CEO Aaron LeMieux with Ohio Governor Ted Strickland, joint Press Conference for Education and Green Job creation**

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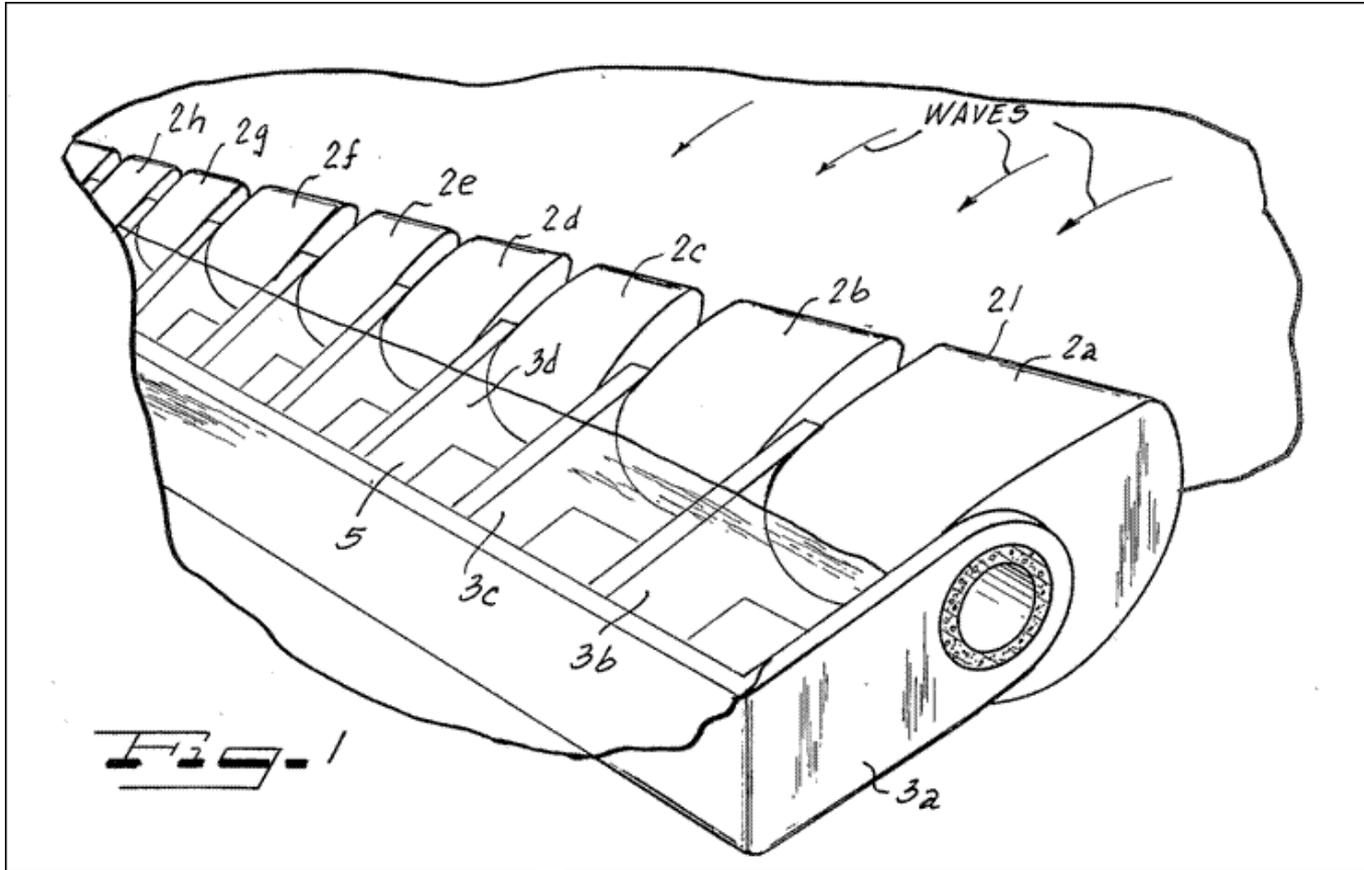


# Wave Energy Conversion

- Extracting the mechanical energy of waves for creating clean energy.
- Water waves are oscillatory in nature.
- Variables that must be considered:
  - Wave Height
  - Wave Frequency
- Water is 1,000 times more dense than air, therefore its energy content can be 1,000 times greater.
- Wave Energy is concentrated Wind Energy.
- There are many concepts that are being demonstrated.



# Salter's Duck-The Original WEC



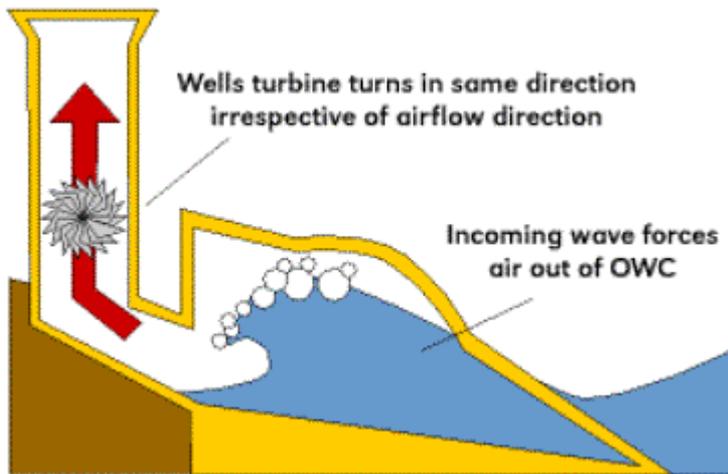
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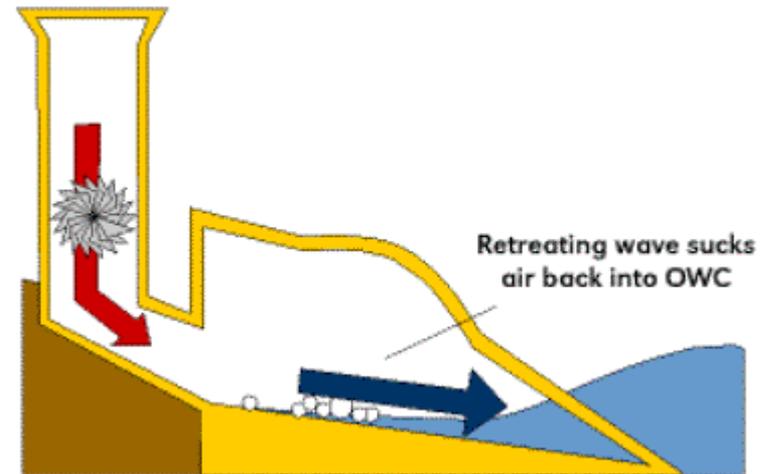
# Oscillating Water Column

Utilizes Wells Turbine for Electrical Power Generation

## Incoming Wave



## Outgoing Wave



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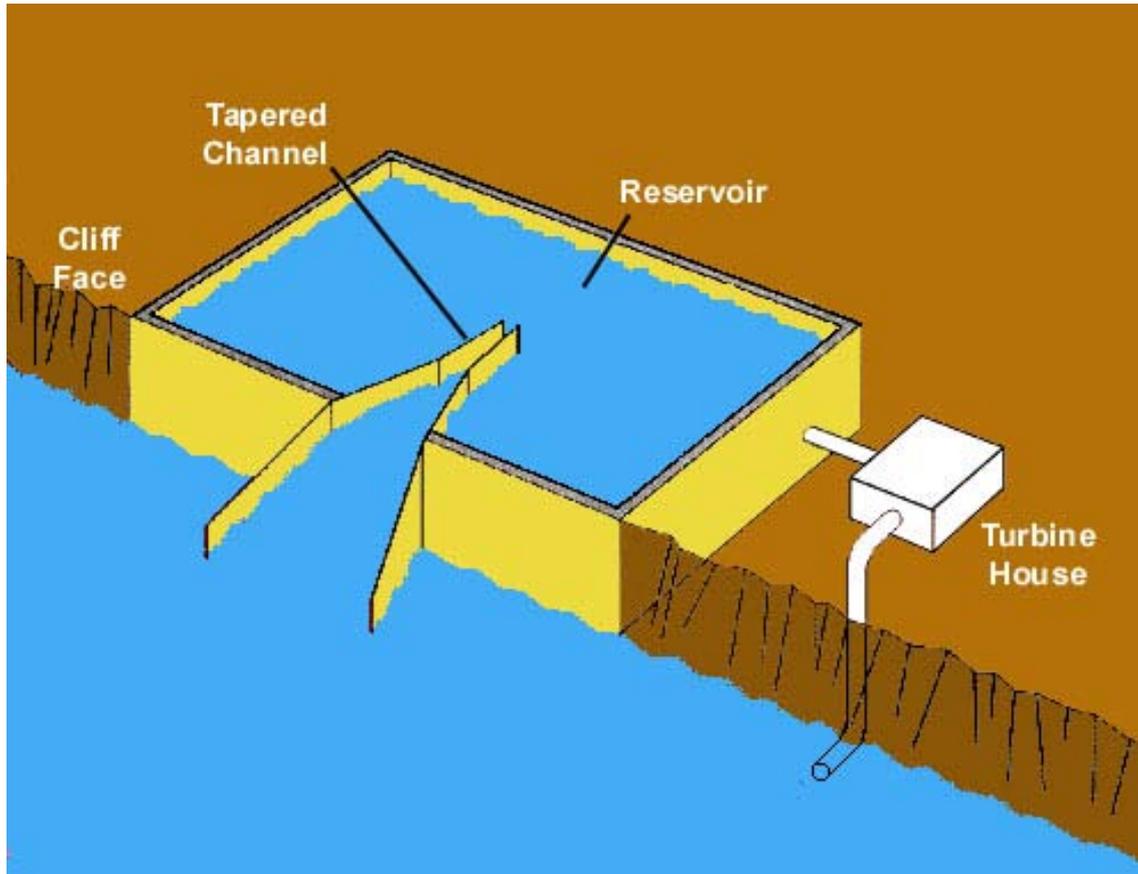
# Oscillating Water Column



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# Tapered Channel (TAPCHAN)



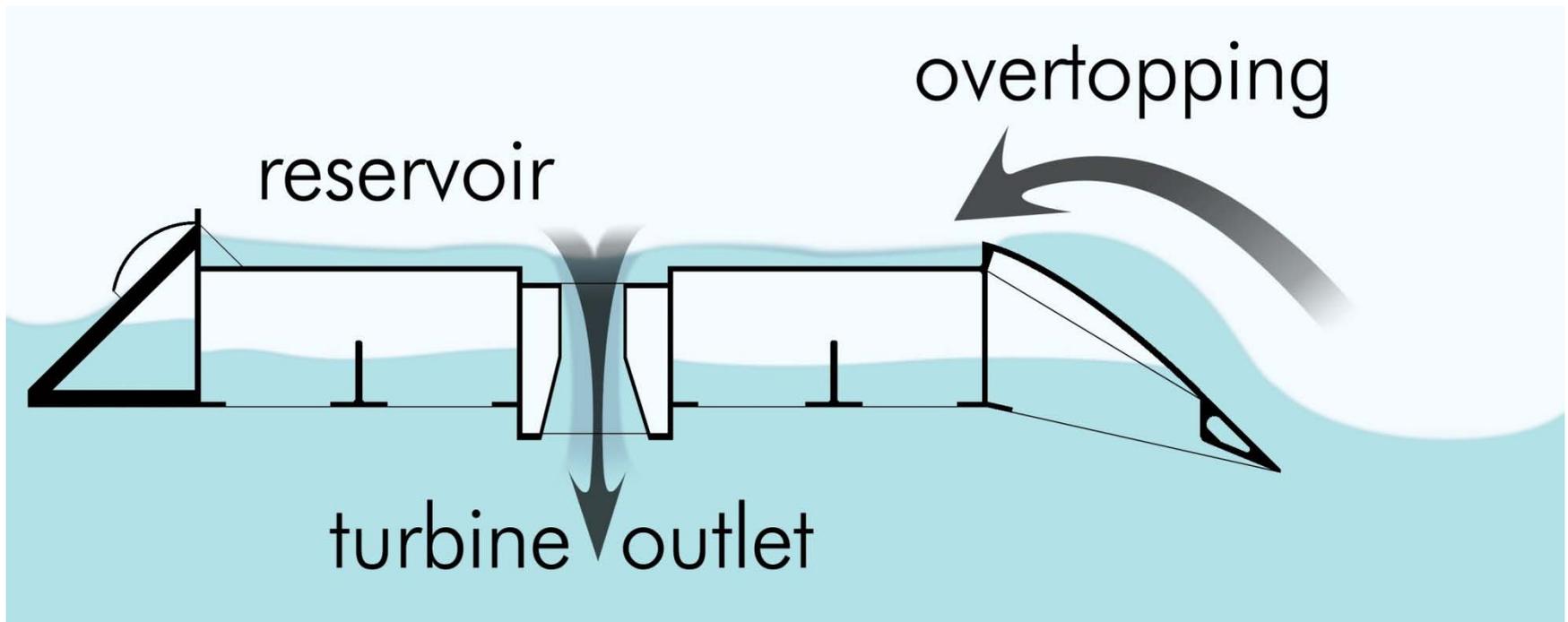
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© Boyle, 1996



# Wave Dragon

Extension of Tapered Channel Concept with Overtopping



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Graphic Courtesy of Wave Dragon



# Wave Dragon

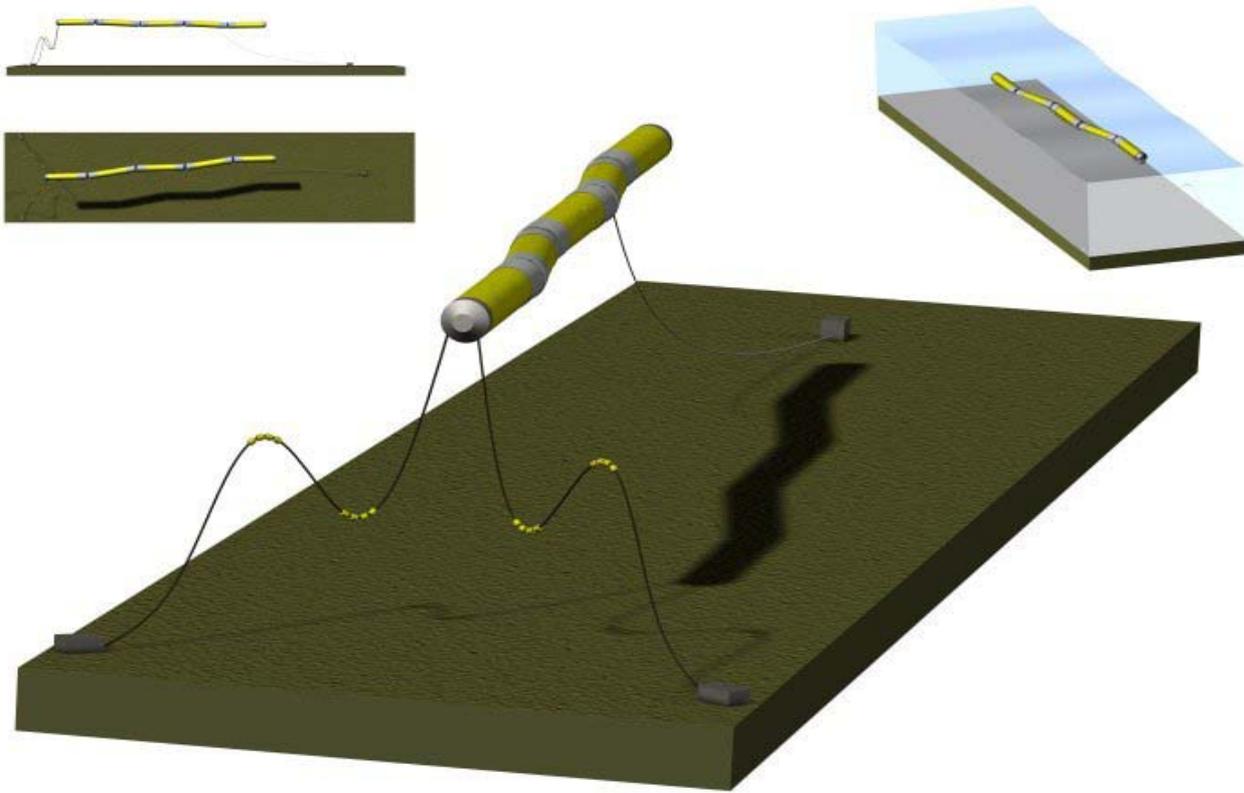


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Graphic Courtesy of Wave Dragon



# Pelamis



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# Pelamis



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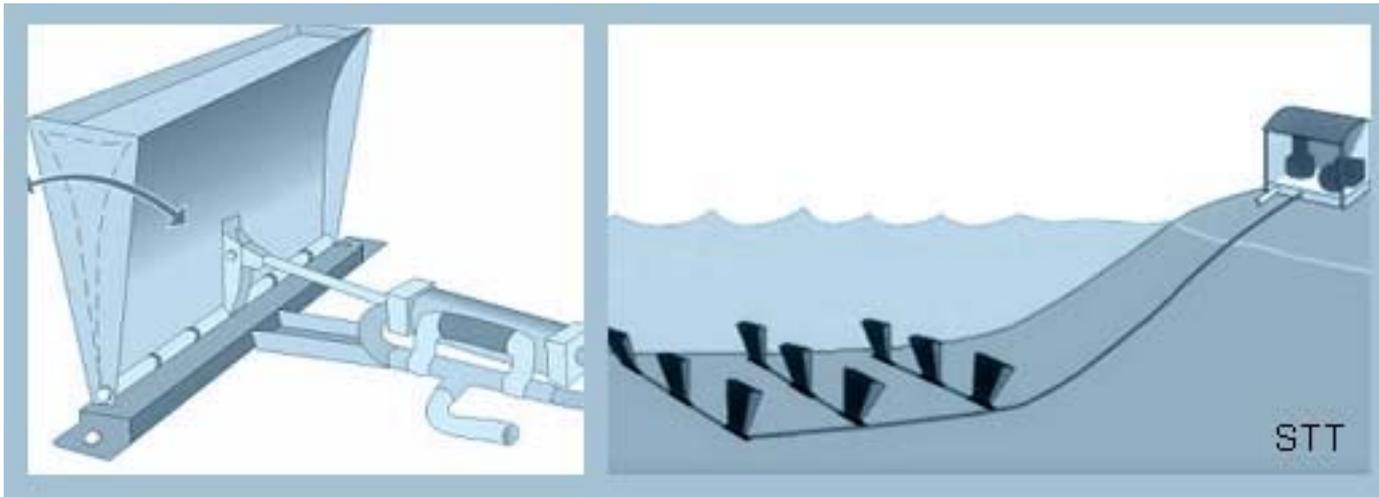
# Single Point Converter WEC

Typically 2 varieties

- Wave Rider Type
- Bottom Mount Type



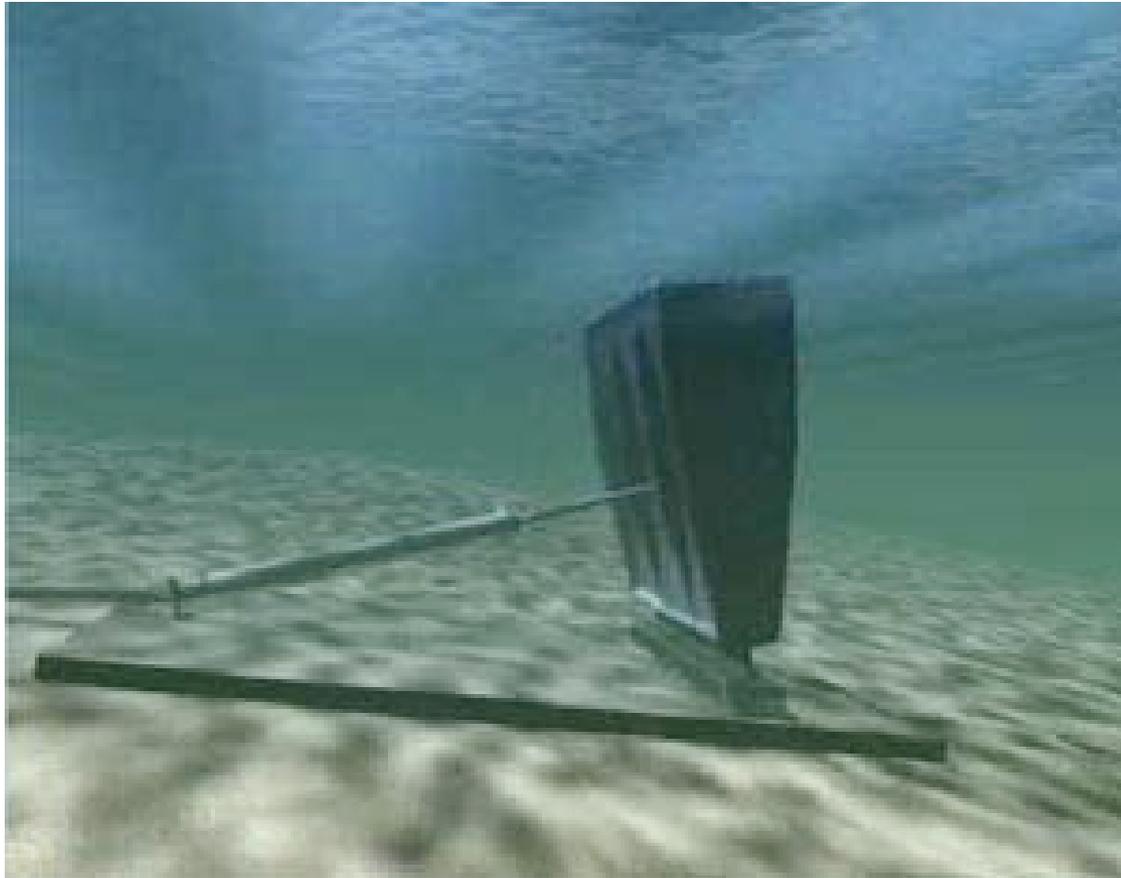
# Wave Roller



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# Wave Roller



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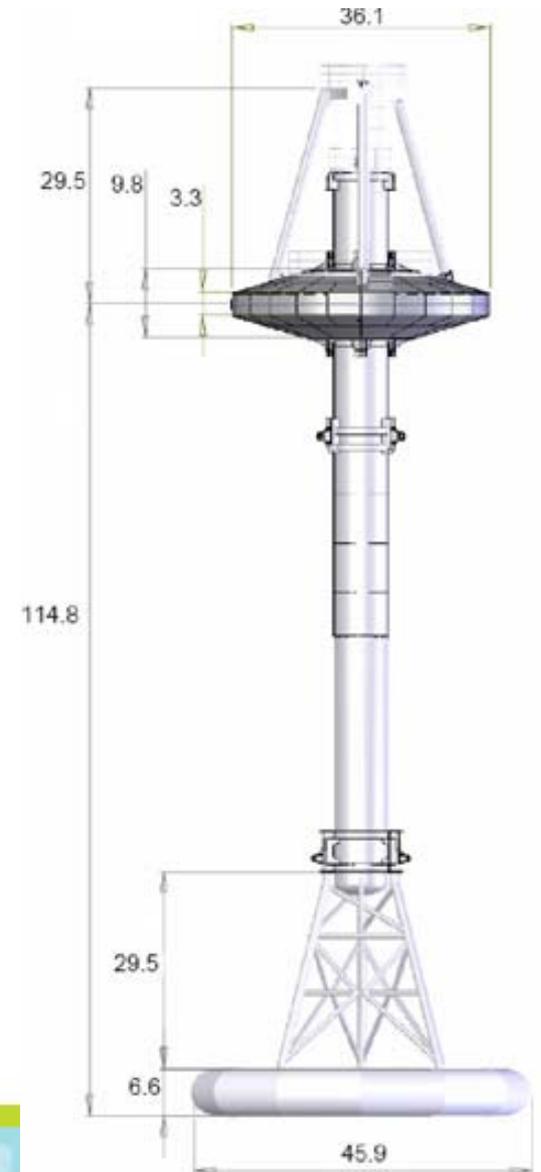
# Wave Swing



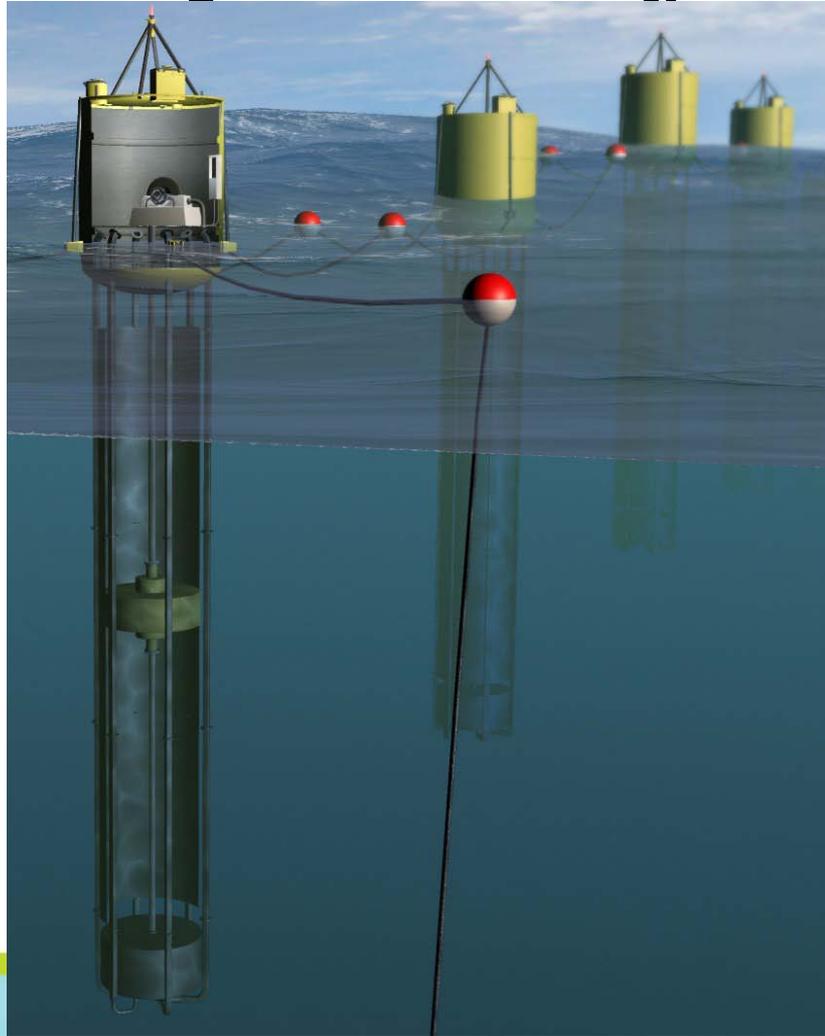
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# Power Buoy



# Aqua Buoy



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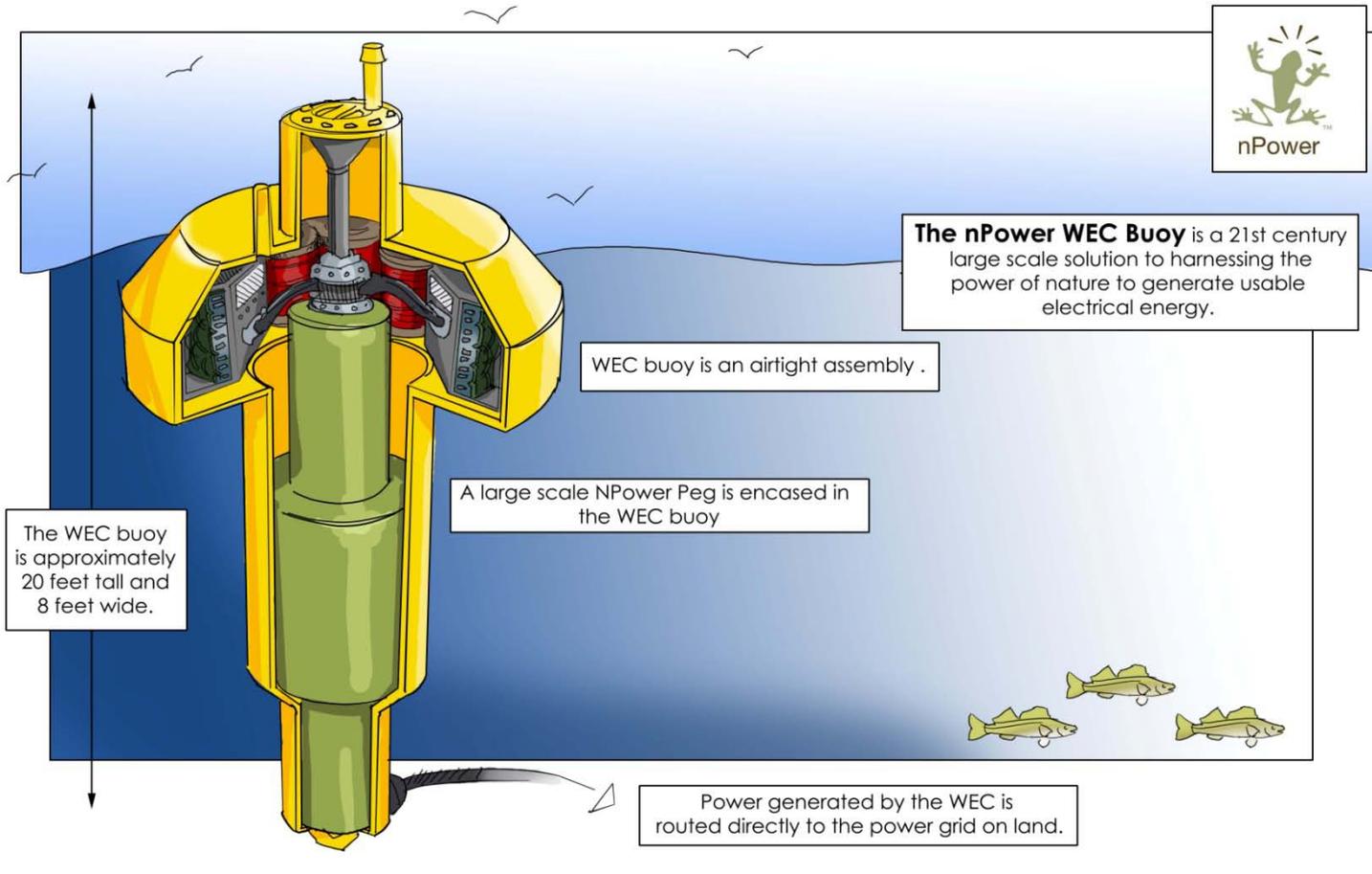
# Demonstrated Single Point Converters

## First Generation Technologies

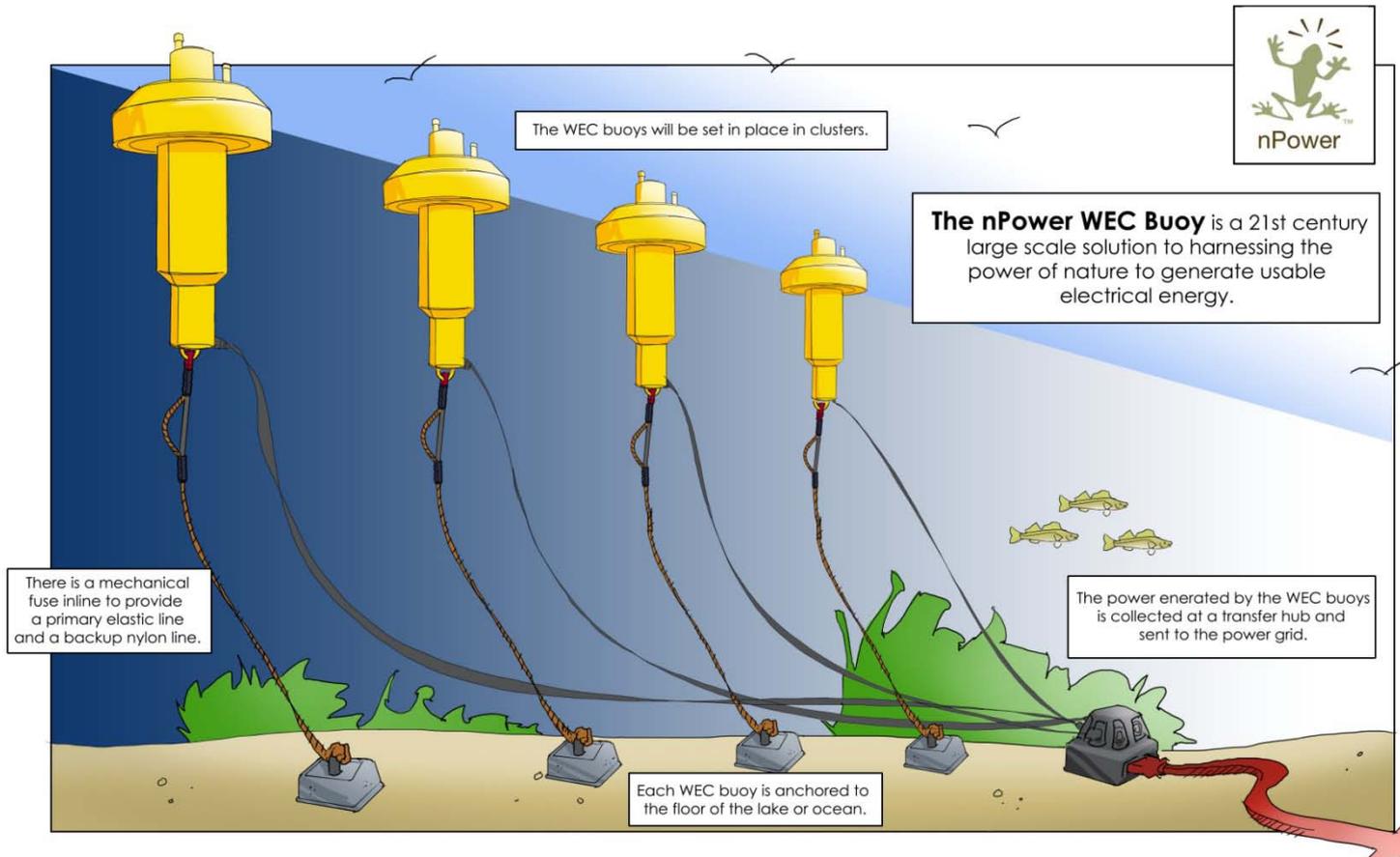
- Use a submerged datum and relative motion from a wave follower (submerged or on surface)
  1. Convert linear motion to rotary motion
  2. Use rotary motion to pump hydraulic fluid
  3. Use hydraulic fluid to turn rotary electrical generator



# Tremont Electric WEC



# Tremont Electric WEC Farm

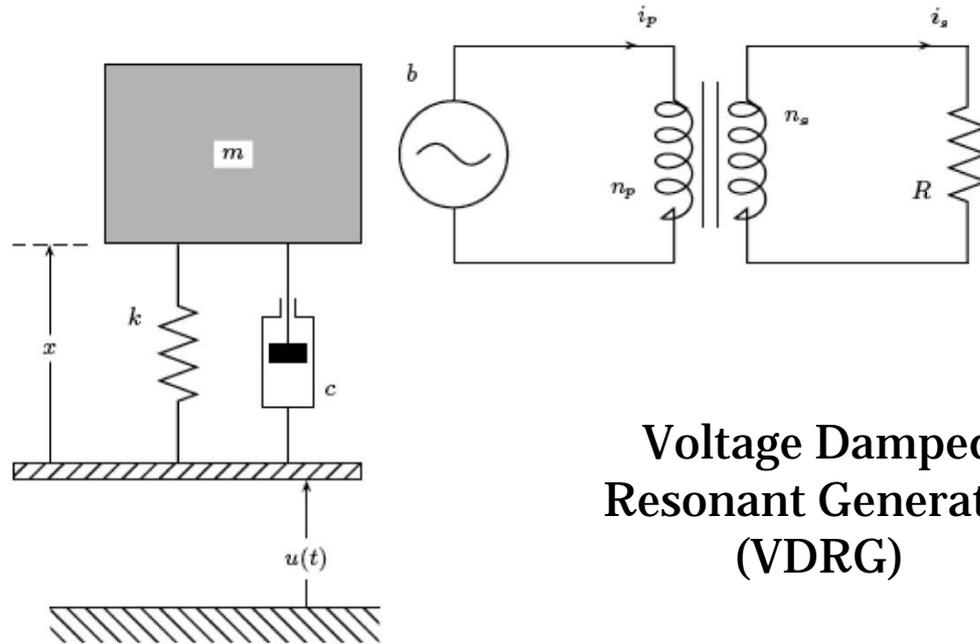


# nPower® is different

- Uses Direct Power Takeoff through a Linear Induction Generator (one moving part)
- All mechanical parts are completely sealed from the external environment
- Frequency Dependent (Double Edged Sword)



# General Model



Voltage Damped  
Resonant Generator  
(VDRG)

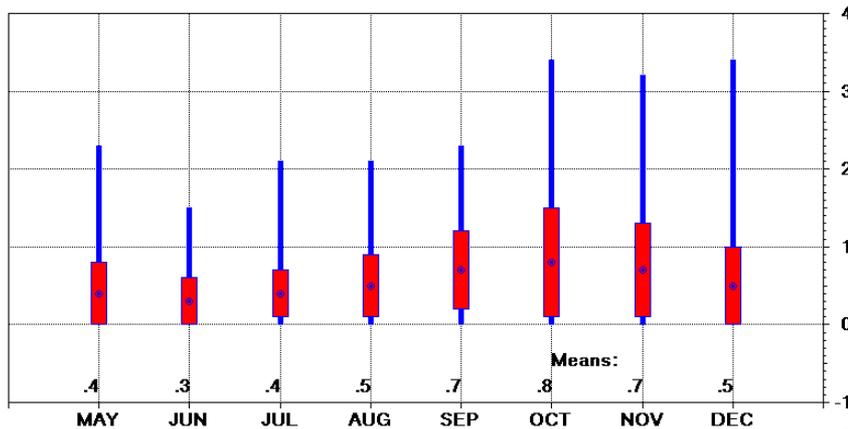
Figure 1: Energy Harvesting System.



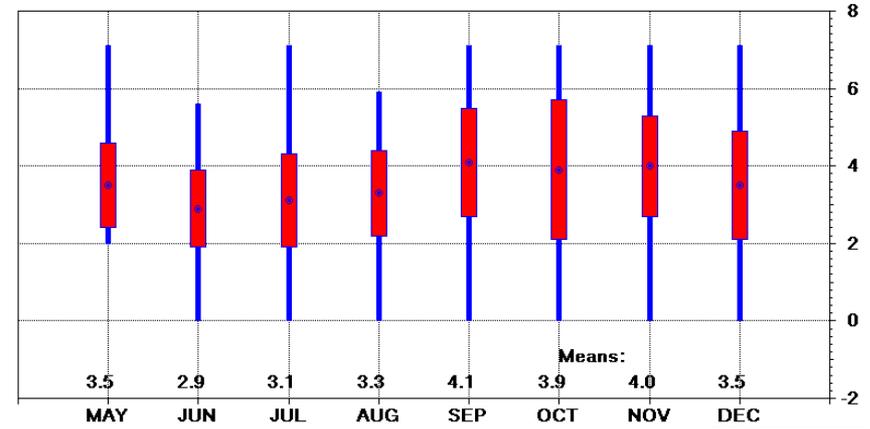
# NOAA Buoy Data Collection

Online data for first cut approximations, does not represent deployment in areas of increased wave energy density

45009 SIGNIFICANT WAVE HT. (METERS) 6/83-12/83

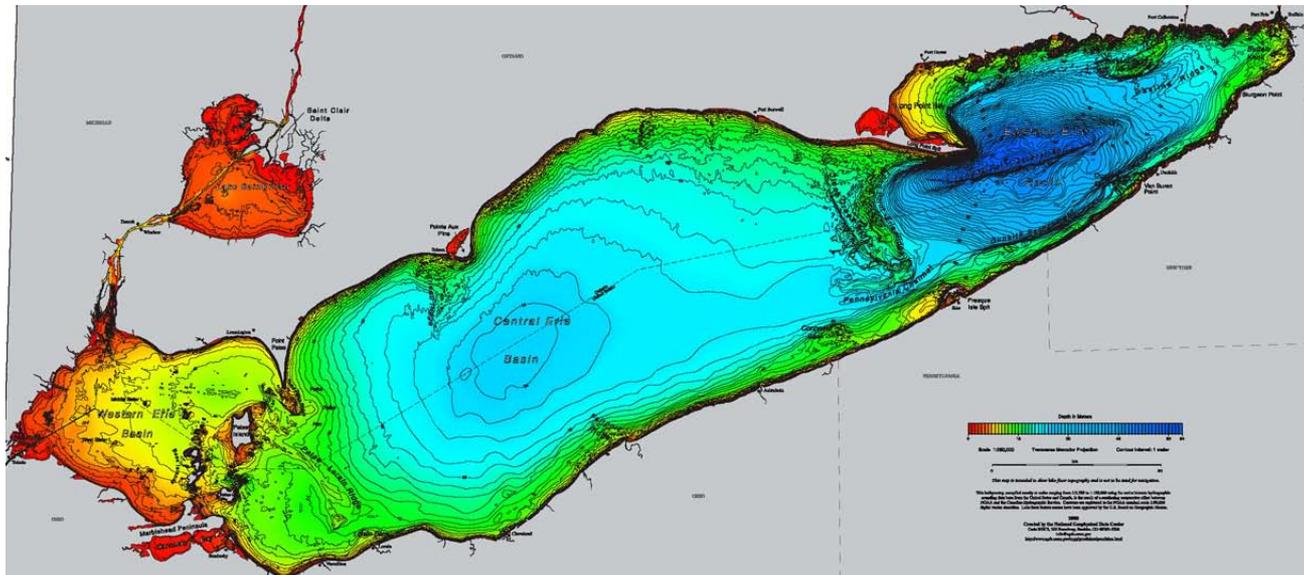


45009 DOMINANT WAVE PD. (SEC.) 6/83-12/83



# 72 Hour Power Output Forecasting

- We do not store energy, but we expect to predict output better than other Alternative Energy Sources.
  - Lake Erie could be considered a closed system
  - Its bathymetry is stable and well documented
  - Research is currently underway at The Ohio State University



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# Projected Power Output

Location	Buoy	Ave Wave Period (sec)	Ave Power Output (kilowatts)
Lake Erie	45009	3.5	50
Atlantic	44005	5	16
Pacific	46002	7	6

- Comparison to show frequency dependence and sensitivity on design criteria
- Assuming same WEC size, 8ft Dia x 20ft Long
- A new design would be employed in the Ocean to increase power output



# **The Development Road Forward**

- We will test and develop in Lake Erie because:
  - High frequency waves
  - Lower cost of testing vs. ocean
  - Ease of permitting
  - Friendly political climate
  - Lower environmental barriers, no large mammals
  - Ease of Grid interconnect



# **The Commercialization Road Forward**

- We will deploy smaller (50 kW) discrete units and deploy more of them than our competition.
- Allows for
  - Mass manufacturing model (economy of scale)
  - Hot swap for repair/maintenance
  - Device maintenance at shore facility



# The Technical Road Forward

- We are seeking additional collaborators for a demonstration project in Lake Erie in Summer 2010.

TREMONT  
electric



- There are many technical challenges ahead, but we are confident our strategy is sound.

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# Thank you very much!

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Aaron P. LeMieux, Founder & CEO

*Green Energy*

