ACCIO ENERGY

A NEW DIRECTION IN WIND ENERGY

Wind Power. Redefined.™

A New Category of Renewable Energy:

ELECTROHYDRODYNAMIC (EHD) WIND POWER

arpa·e awardee

Award	$4.9M over 2 years
Goals	Achieve 10x scale-up and complete first-ever sub-commercial scale validation of offshore power production using EHD technology and validate disruptive LCOE cost
Testing Partner	University of Maine Advanced Structures & Composites Center

ARPA-E and Accio Energy share the goal of demonstrating and commercializing a transformative energy technology

NEW CATEGORY OF RENEWABLE ENERGY:
ELECTROHYDRODYNAMIC (EHD) WIND POWER

LOWER COST offshore wind farms

HIGHER CAPACITY FACTOR

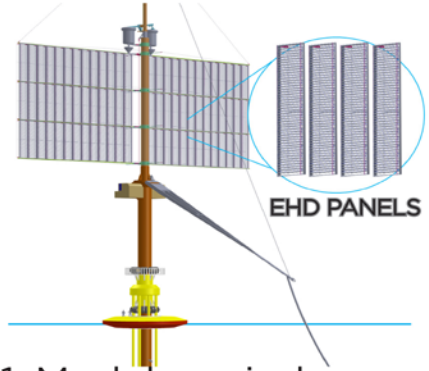
LOGISTICS, INSTALLATION, O&M advantages

SITING advantages

ENVIRONMENTAL benefits

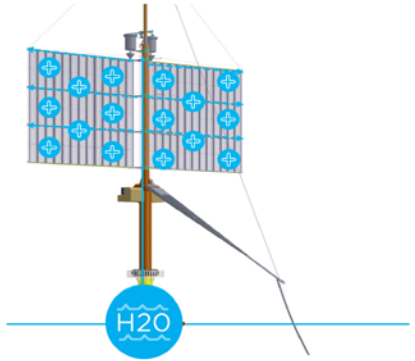
EHD WIND: GENERATION PROCESS

Panel-based



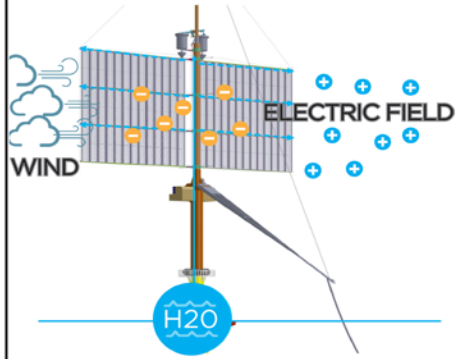
1. Modular, wind-permeable panels assembled into generator systems

Charge Formation



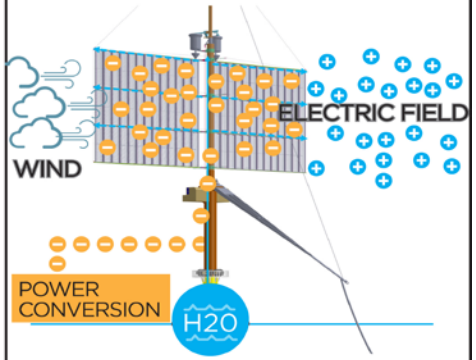
2. Emit a modest amount of sea water as positively charged droplets

Charge Separation



3. The wind separates the charges, building up a ~200,000 volt electric potential

Power Harvesting



4. The system harvests the accumulated electrons as a high-voltage direct current

Robust Design

- Lower non-recurring engineering design costs
- Panel count defines total power generated

Manufacturing

- High volume, trusted processes for low cost and reliability
- Common, inexpensive materials

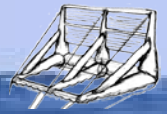
Logistics & Installation

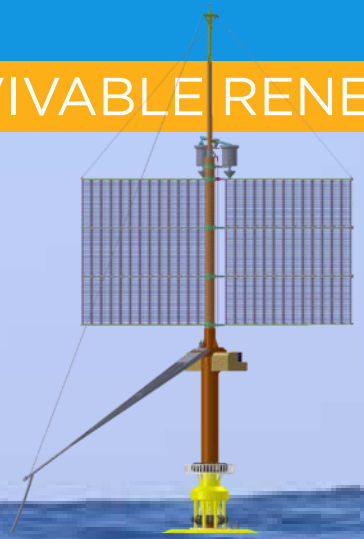
- Standard containers shipping
- Panelized for easier installation
- 20kW to many MW

Survivable

- Remaining panels operate if one or more is damaged
- Power conversion is ground based

EHD WIND: SCALABLE FLEXIBLE SURVIVABLE RENEWABLE





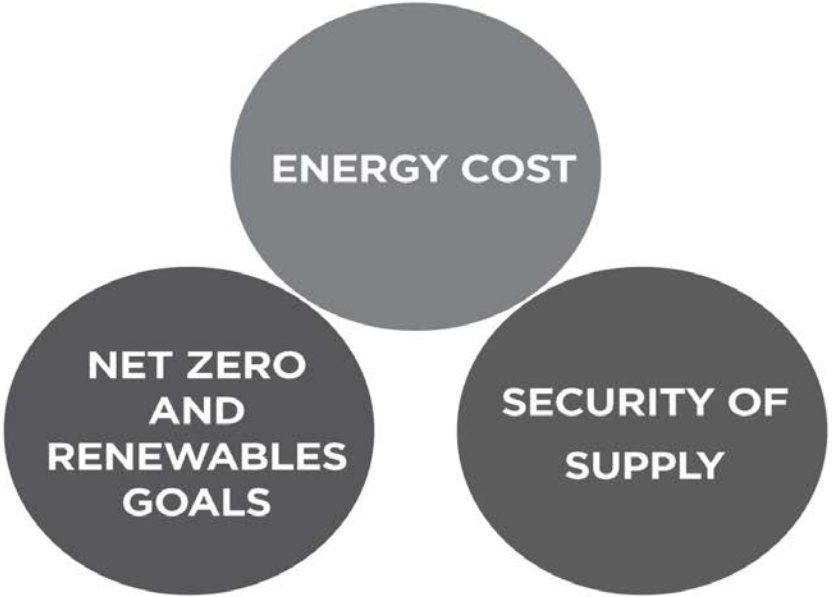
- "Pop-up" transportable, floating EHD wind system that operates "near shore"
- Power for expeditionary or relief operations

- 450kW concept design deployable from the deck of a cargo ship
- Estimate 2 containers to deploy 25kW

EHD WIND: REDEFINES MILITARY WIND ENERGY

PROBLEM:
Wind turbines are expensive and pose issues for radar.

SOLUTION: EHD Wind Energy



COMPARISON: 100MW OFFSHORE WIND FARM

$611M	**45% lower** Total CapEx	$353M
35–40%	**40% higher** Capacity Factor	50-55%
$22/MWHr	O&M	$16/MWHr
$221/MWHr	LCOE	$99/MWHr

$260M savings on installation.
$20M more revenue/year.

Source: U.S. Energy Information Agency, Annual Energy Outlook 2018

Source: Comprehensive LCOE Model

COMPARISON: **100MW OFFSHORE WIND FARM**

Massive size challenges distribution & logistics	Standard container-based distribution & logistics
Complex batch processes limit opportunities for manufacturing economies of scale	Low cost raw materials & manufacturing processes
Limited dynamic range of operation (requires braking)	Wider dynamic range of operation
Downwind turbulence limits density	Opportunity for higher density siting
Tower-based power conditioning & offshore substation required	Central, ground-based power conditioning & onshore substation
Fast-moving blade tips lead to wildlife & radar impacts	Modular panels are stationary & quiet

ACCIO ENERGY

Transformative technology can support a wide range of missions

TODAY

- ✓ Proven concept
- ✓ Great value proposition
- ✓ Capital efficient
- ✓ $4.9M ARPA-E funding for in-water testing

ACCIO ENERGY **OPPORTUNITY**

- **Transformational technology** with step change impact on cost
- **25kW to 25GW + on same platform**
- **Scalable, Survivable and Logistics and Maintenance Friendly**