A Big Step Toward Energy Independence

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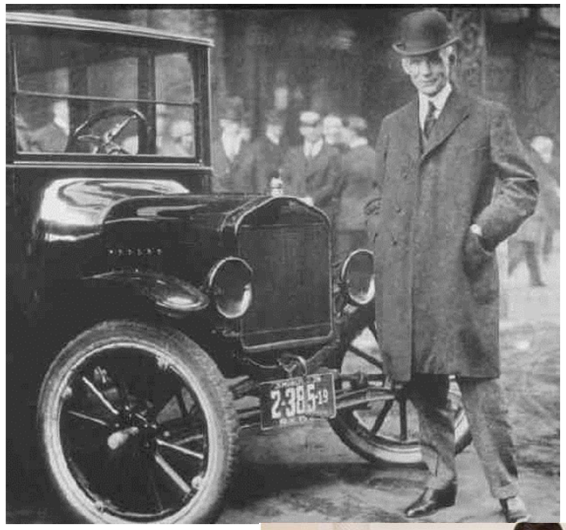
Markian Melnyk

Can we afford offshore wind?

- We can build an offshore wind industry by using our regional energy purchasing power – by choosing to "buy local".
- The challenge is to reach an industry scale that is big enough to drive down costs.
- The transition should start now and be gradual to avoid rate shock - the cost impact on ratepayers must be reasonable.
- Working as a region we can afford offshore wind. We need to fairly share the benefits and the responsibilities of building this important new industry.



Henry Ford lived by the maxim: "Everything can always be done better than it is being done." The Model T was introduced at a price of $825 in 1908. Over 15 million units later the last Model T rolled off the assembly line priced at $380. Like other manufactured goods, land-based wind energy has also experienced dramatic cost reductions over time.

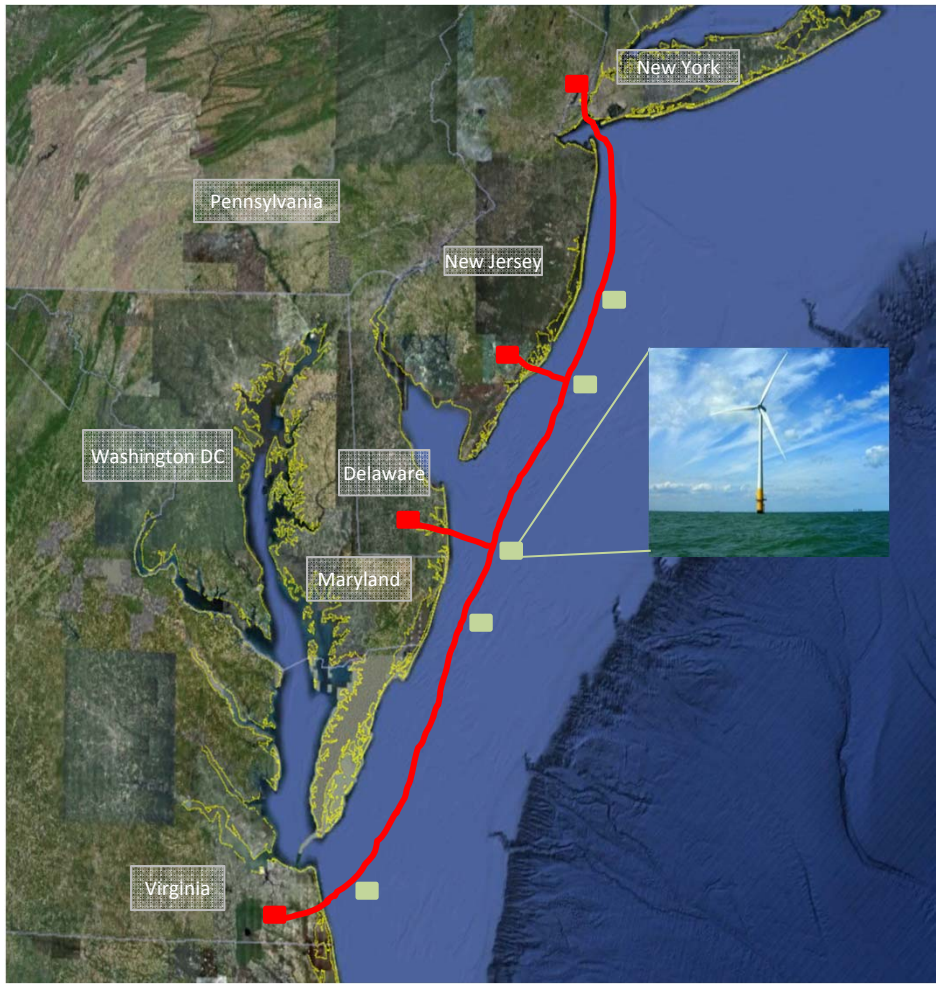
The U.K. proved that with a steady demand signal, the offshore wind industry would locate in the U.K. and create jobs and innovations.

Siemens CEO Peter Loscher and UK Prime Minister sign turbine plant agreement in London.

Andreas Goss, chief executive of Siemens UK says that the new plant will create more than 700 new jobs. "There will also be more new jobs in the area of logistics and at suppliers," He adds that Siemens is intending to make investments "in the high double-digit million range." Siemens later said that it would be investing in excess of £80m in the plant. Recharge News, Mar. 29, 2010

"Local roads or an interstate highway network?"

Planning ahead to avoid obstacles will save ratepayers money in the long run



Lessons from the UK Offshore Wind Experience

Do it once

Do it big

Don't come back!

- *Adequate infrastructure makes progress efficient by helping to avoid uncertainty, expensive delays and suboptimal solutions.*
- *The smart approach is to plan ahead for an integrated network that can accommodate the required scale and build the network gradually over time in coordination with the offshore wind projects.*

"Unless we get coordination between offshore and onshore right, the investment overall will be much higher than it needs to be"

"An uncoordinated approach may cost 25 percent more overall."

- Steve Holliday, CEO, National Grid

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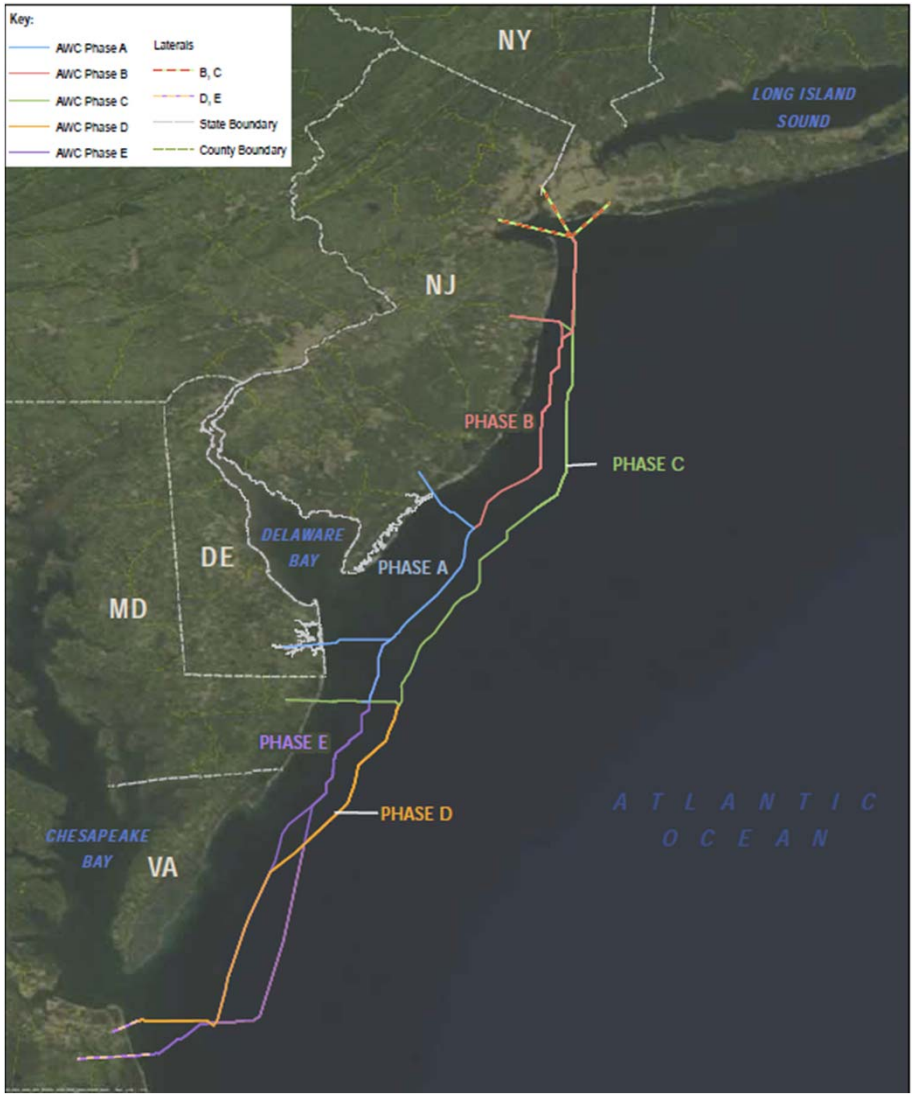
AWC project overview



- AWC addresses the basic challenge of juggling variable load and variable production of a product that cannot be stored.
- Mid-Atlantic critically congested area
  - Deliver wind energy efficiently
  - Strengthen the regional grid
- 5 project phases
- Two independent circuits
- Up to 7,000 MW of capacity

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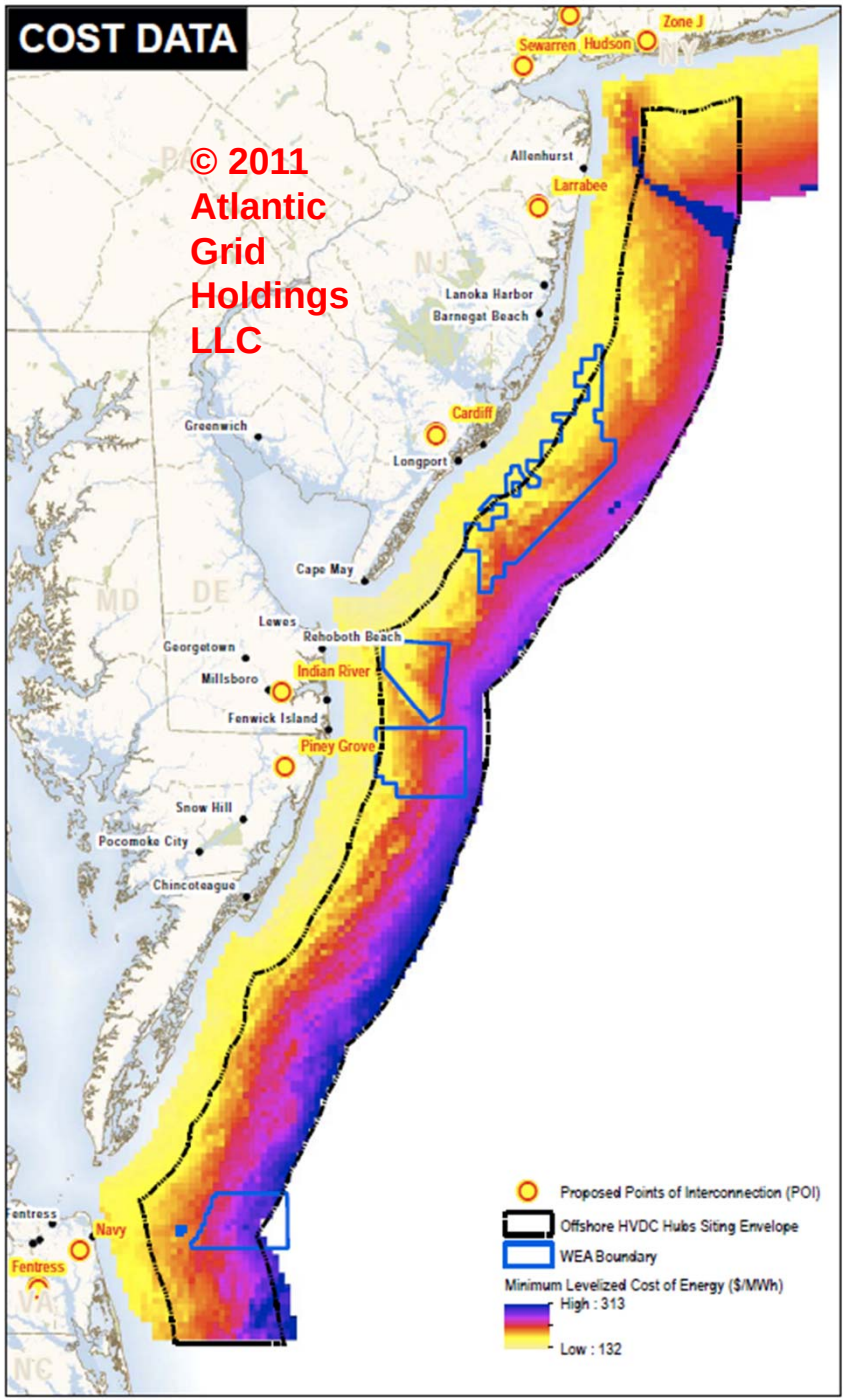
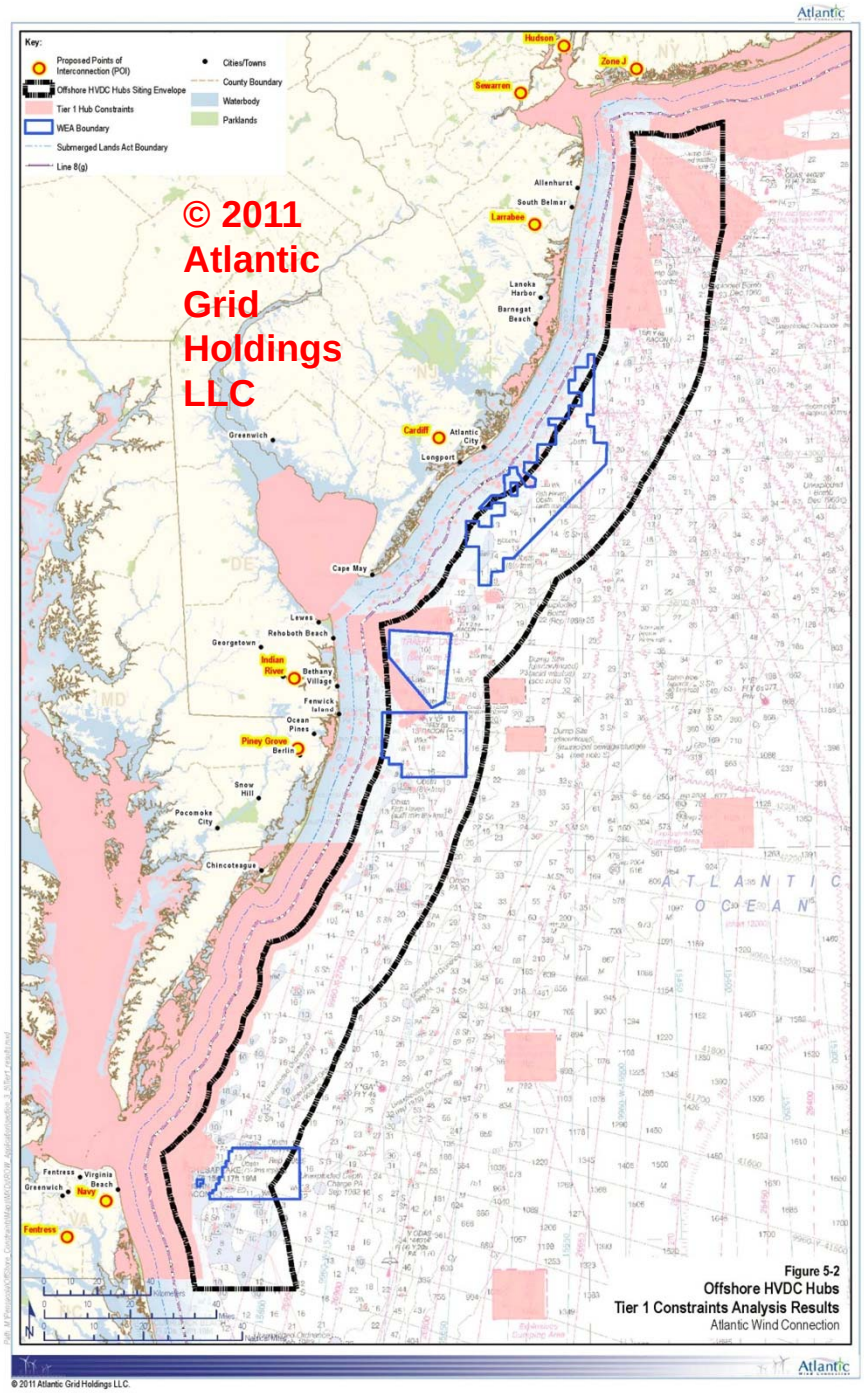
AWC modeled offshore wind energy production costs



- AWC hubs should be close to where wind farms will likely be built.
- The yellow areas are lower cost.
- Given current turbine sizes and cost, water depth drives projects towards the coast.

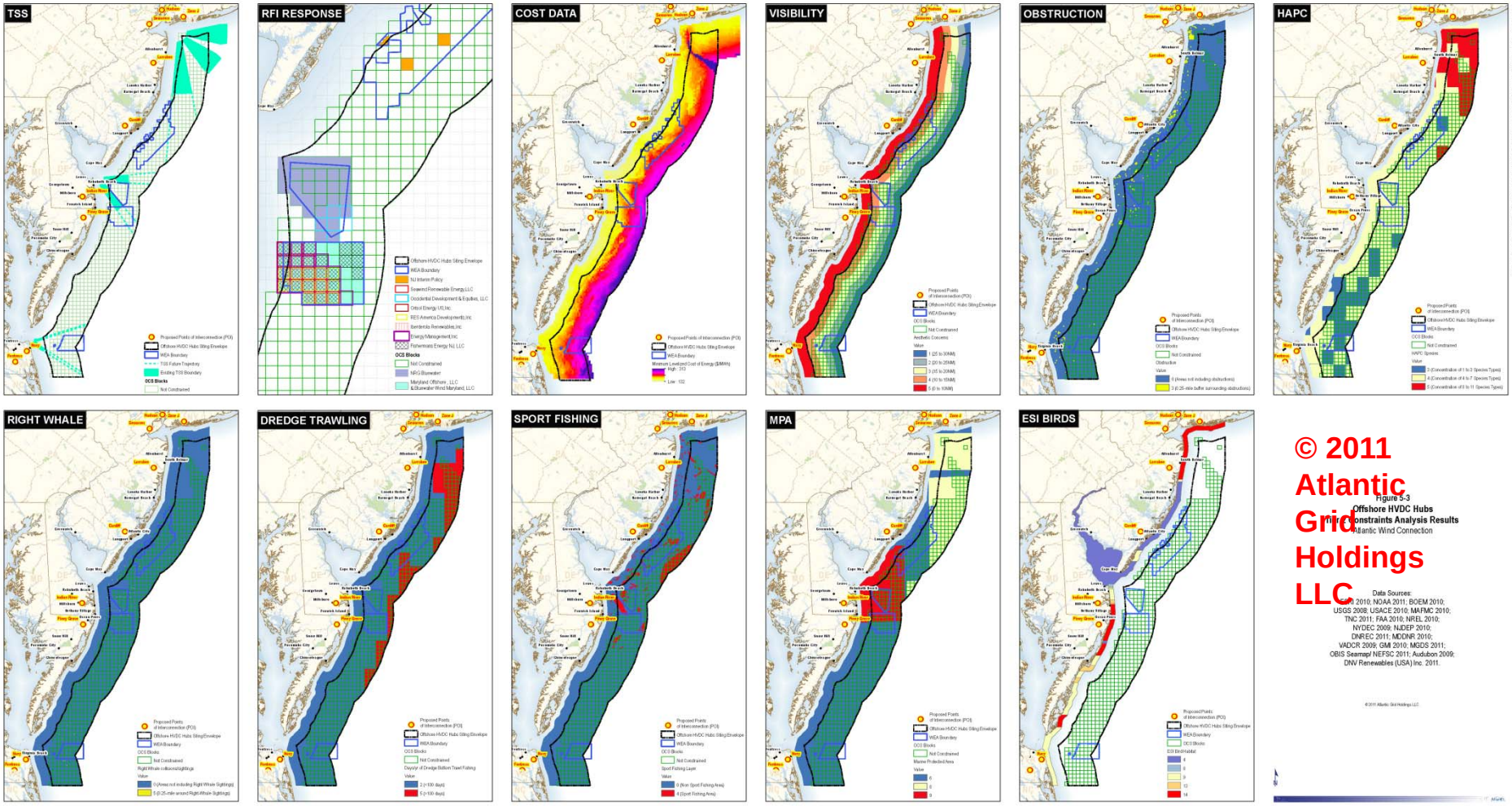
TIER I: uses and conditions that preclude wind development



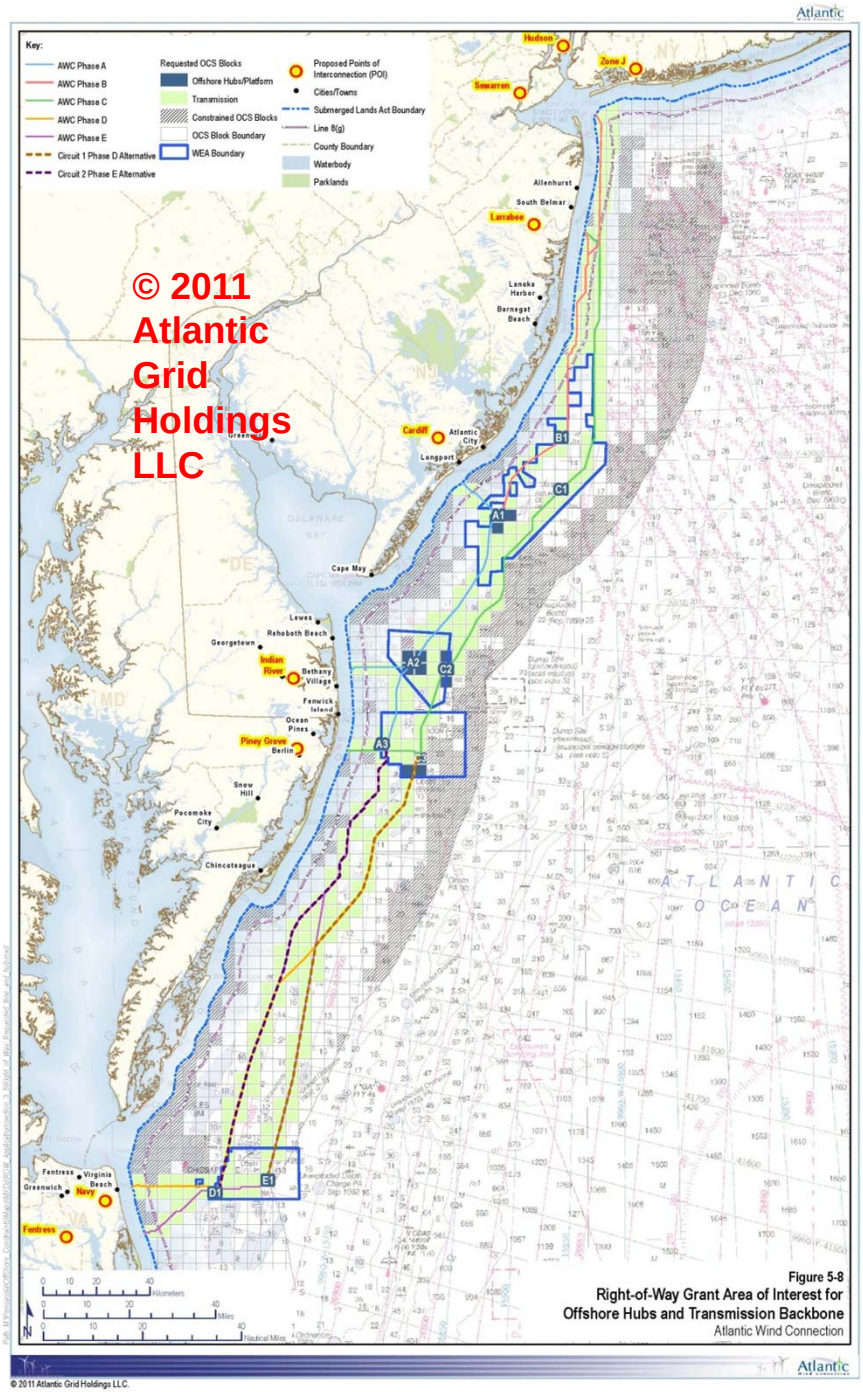
- Use Conflict
  a. Shipping Lanes / Navigational Channels
  b. TSS
  c. Submarine Cables
  d. Dumping Grounds
  e. Fish Havens / Shellfish Harvest & Management Areas
  f. Dump Sites

- Air Space Designation
  a. VA Capes Operating Area
  b. Other Space Designated by FAA & NOAA & NAVY as prohibited, restricted and warning

TIER II: uses and conditions that influence, but do not preclude, wind farm development



AWC has filed with BOEM to obtain cable ROW and hub sites

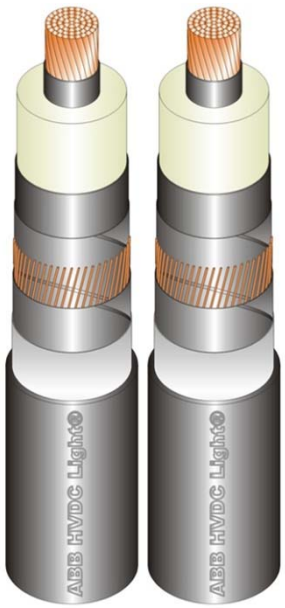


AWC is an integrated system that can be built out in pieces over time.

AWC consists of hubs and cable segments built in phases in concert with offshore wind expansion.
This approach results in efficient development of a regional offshore backbone network and predictable interconnection costs for offshore wind projects.

AWC transmission system components

- Buried transmission cable
- Terrestrial converter stations
- Offshore converter hub platforms



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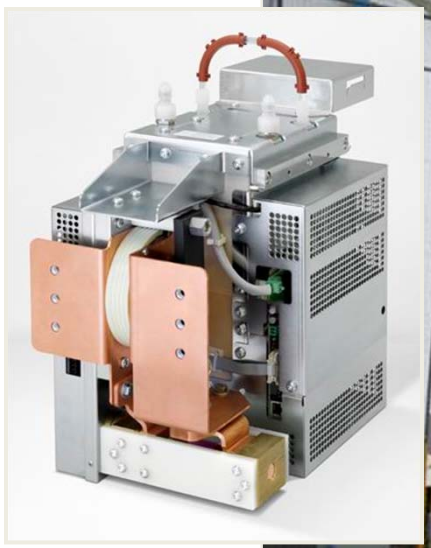
High voltage direct current (HVDC) technology

- HVDC technology provides controllability of power flows – meaning that we can direct power to grid connection points where it is most valuable or most needed to support reliability
- Interconnected wind farms and converter electronics allow us to balance the variability of offshore wind with conventional power resources
- HVDC systems are preferred for high-power, long-distance transmission
- Over distance, high voltage alternating current (HVAC) systems have high losses and generate reactive current that requires compensation
- Lower sensitivity to distance means that HVDC provides greater siting flexibility for wind farms
- Improvements in converter electronics are expected to reduce converter costs over time

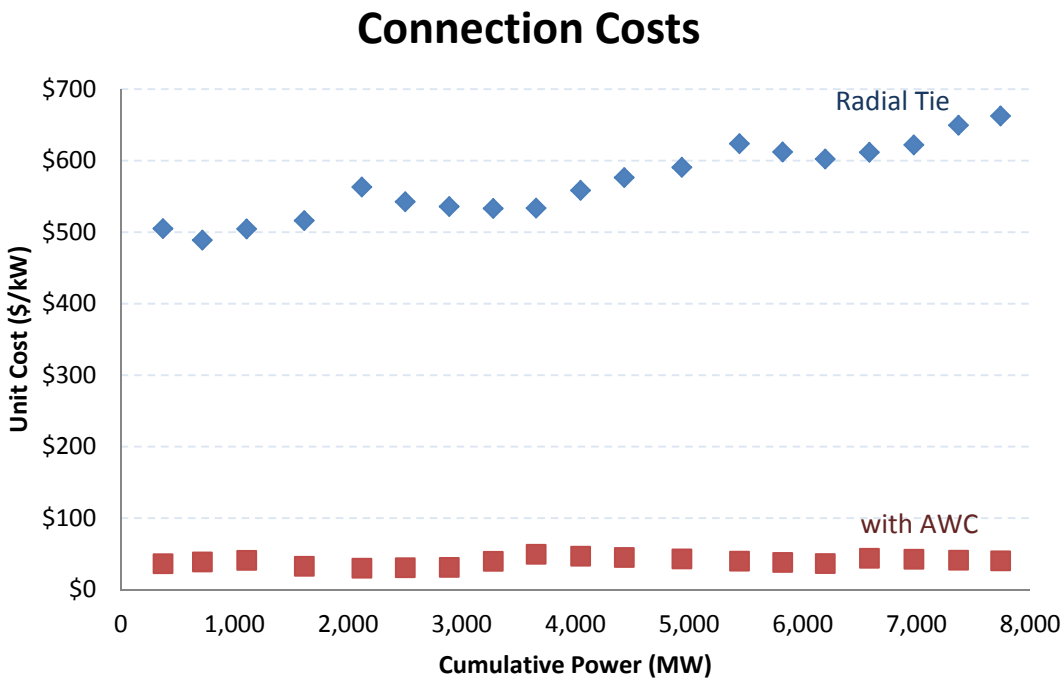


Converter electronics

Part of a converter arm

Courtesy of Siemens

Cost to connect (from wind developer's perspective)



- The cost to connect a wind farm to a terrestrial interconnection point is difficult to predict
  - Depends on queue position and other factors
  - Expected to increase over time
  - Concentrated injections of wind energy close to the WEAs will depress wind farm revenues and require greater support payments

The Brattle Group study findings

"By reducing siting, permitting, and interconnection barriers to wind development, the Project [AWC] will expedite the installation of offshore wind on a scale that very likely spurs the development of local industry to provide equipment and services, which will substantially lower the cost of offshore wind development." - The Brattle Group

Compared to the radial interconnection of individual wind plants, the AWC Project offers total benefits of $9-$15 billion, including the avoided costs of radial transmission lines.

- streamlined permitting, greater scale, and lower costs
- maintains and improves the reliability and operation of the transmission grid
- provides congestion relief and other economic benefits

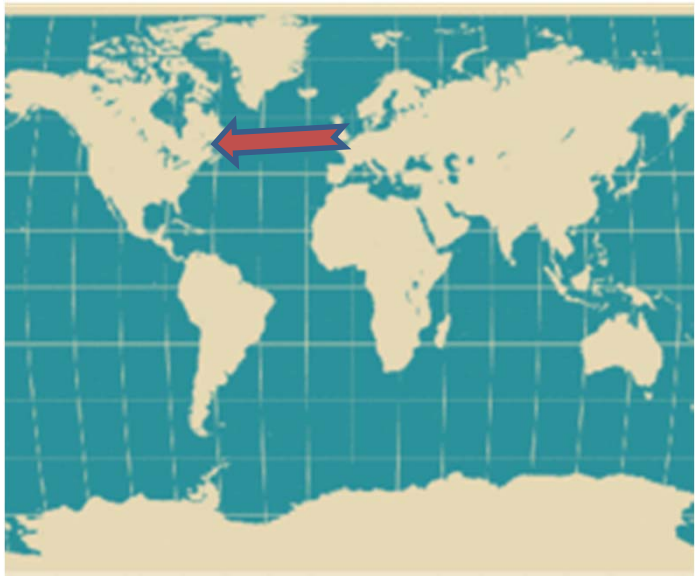
The “secret” of joint purchasing power

- By aggregating and coordinating the region’s offshore wind energy purchases we can send a steady demand signal to industry.
- Industry will respond competitively to serve the demand and, to save logistics and labor expenses, will move some production from Europe to the mid-Atlantic region.

“The greatest upside opportunity for reducing the cost of offshore wind energy... is to attract major elements of a Mid-Atlantic offshore wind supply chain to the state.”

“If the turbine and tower package were manufactured in Virginia, we estimate the project capital cost would decrease by $480 per kilowatt.”

- Virginia Coastal Energy Research Consortium (VCERC)



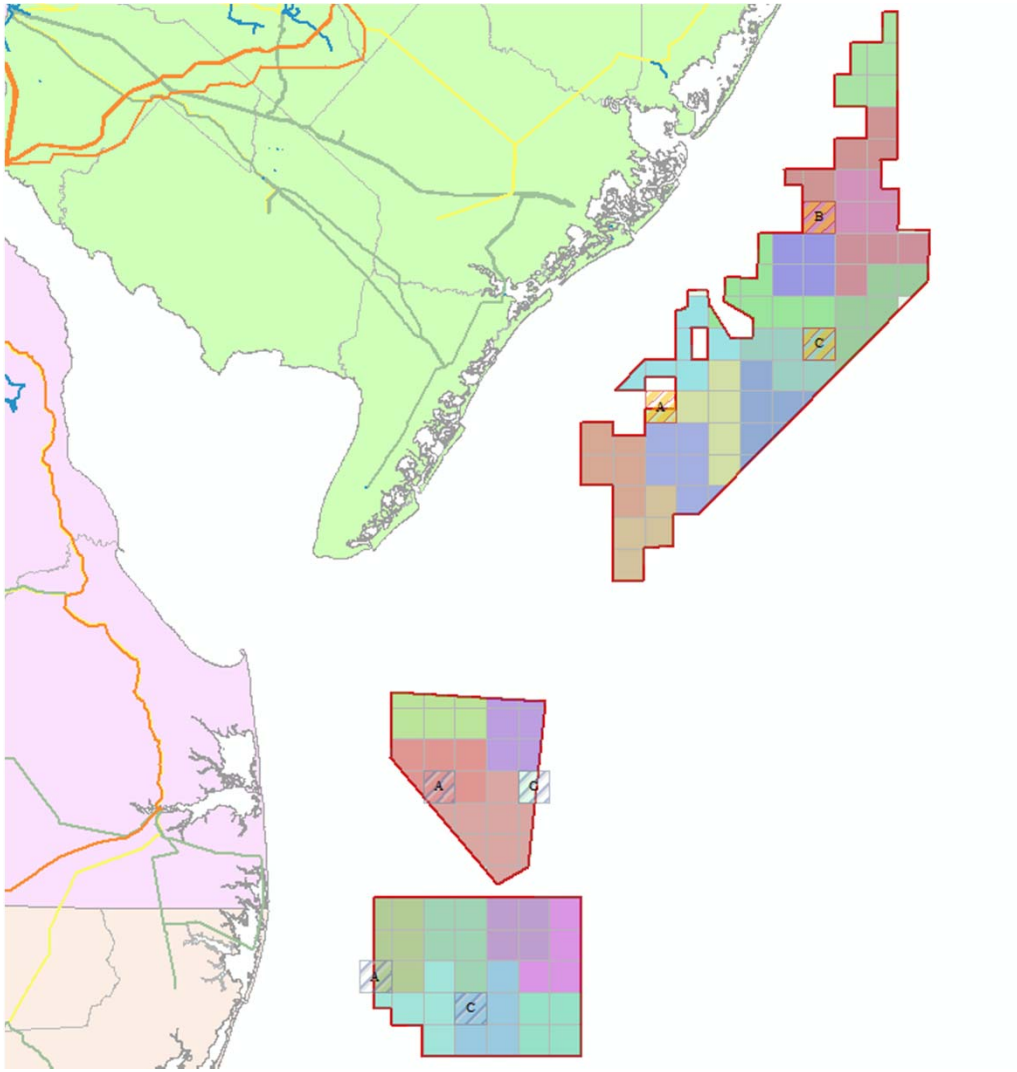
VCERC and The Brattle Group separately found that offshore wind logistics and labor costs would be reduced by moving production from Europe to the U.S. – producing a 20% capital cost savings for offshore wind energy projects.

Scale and long-term demand will drive local jobs and development

The Brattle Group study findings: Economic stimulus benefit of 6,600 MW of offshore wind generation and related offshore transmission, especially significant with AWC system

Economic activity	Jobs (FTE-years)	Earnings ($ billions)	Economic activity ($ billions)
Construction and *low* in-region manufacturing	130,000 to 184,000	$7.6 - 11.4	$16.4 – 30.3
Construction and *high* in-region manufacturing	184,000 to 263,000	$11.4 - 17.4	$30.3 – 51.5

Efficient project staging produces lowest cost



Staged offshore wind and transmission development

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Predictability

=

Greatest regional benefits and lowest cost

Markian Melnyk

Atlantic Wind Connection

(240) 396-0344

MMelnyk@AtlanticWindConnection.com