



Mid-Atlantic Coastal Bays and Sounds -- an Overlooked Opportunity?

Princeton Energy Resources International PERI
Daniel F. Ancona III , Bruce Buckheit , Dr. Lynn Sparling

Daniel F. Ancona III

Vice President for Renewable Energy
Princeton Energy Resources International
1700 Rockville Pike, Suite 550
Rockville, Maryland 20852 USA
Direct +1 301-468-8414
dancona@perihq.com

Bruce C. Buckheit

Energy and Environment
Regulatory Consultant
Direct +1 703-280-1383
b_buckheit@msn.com

Dr. Lynn Sparling

University of Maryland Baltimore County
Atmospheric Physics Department
Direct +1 410-455-6231
sparling@umbc.edu

Mid-Atlantic Coastal Wind Myths

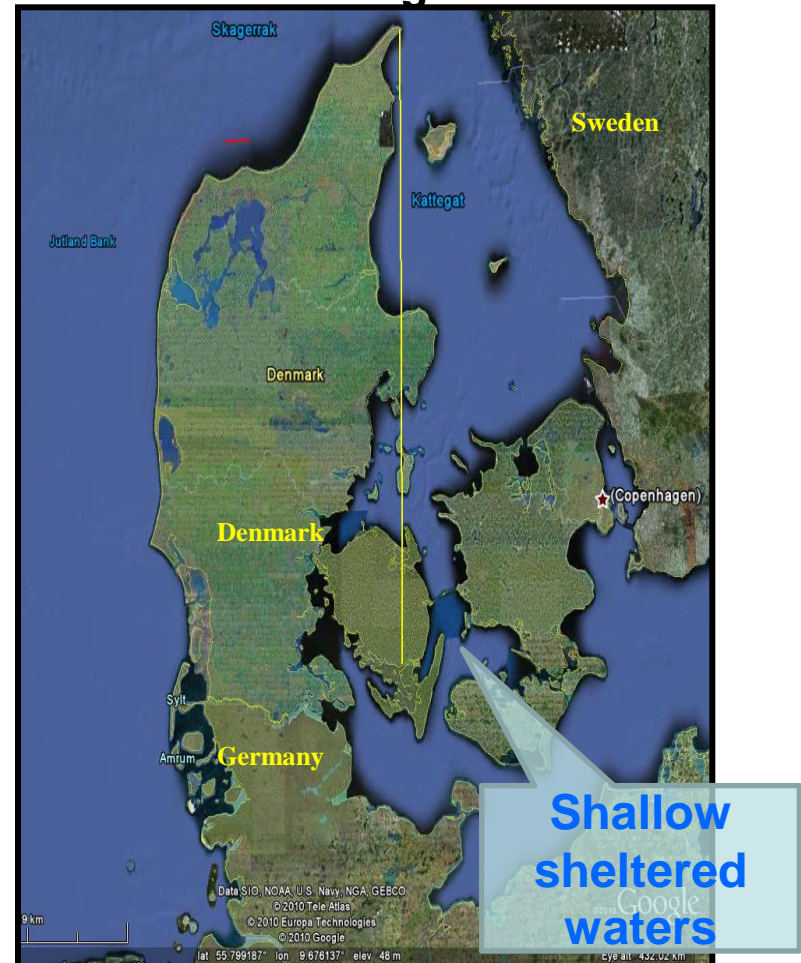
1. “Wind resource is not sufficient in coastal plains, bay(s) and sounds.”
2. “Coastal wind power cannot compete with stronger offshore wind strengths”
3. “Competing uses rule out most of the otherwise available bottomland.”

To date these issues have not been sufficiently addressed.

DELMARVA – Jutland Comparison

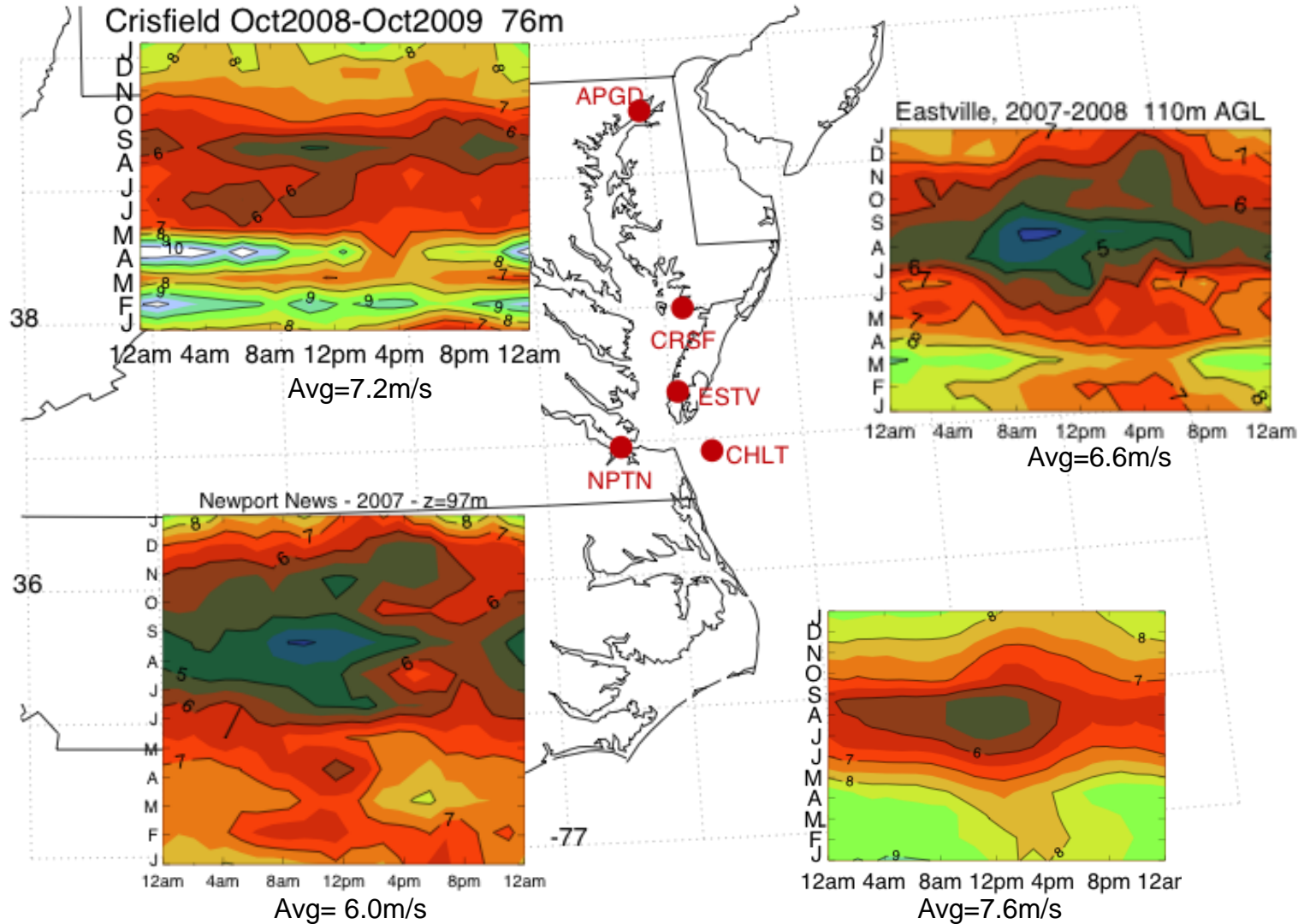
Jutland Peninsula, Denmark - w/300 km line – 2,400 of land-based wind plants and initially >200 MW in sheltered shallow waters. Now building in North Sea.

DELMARVA w/ 300 km line



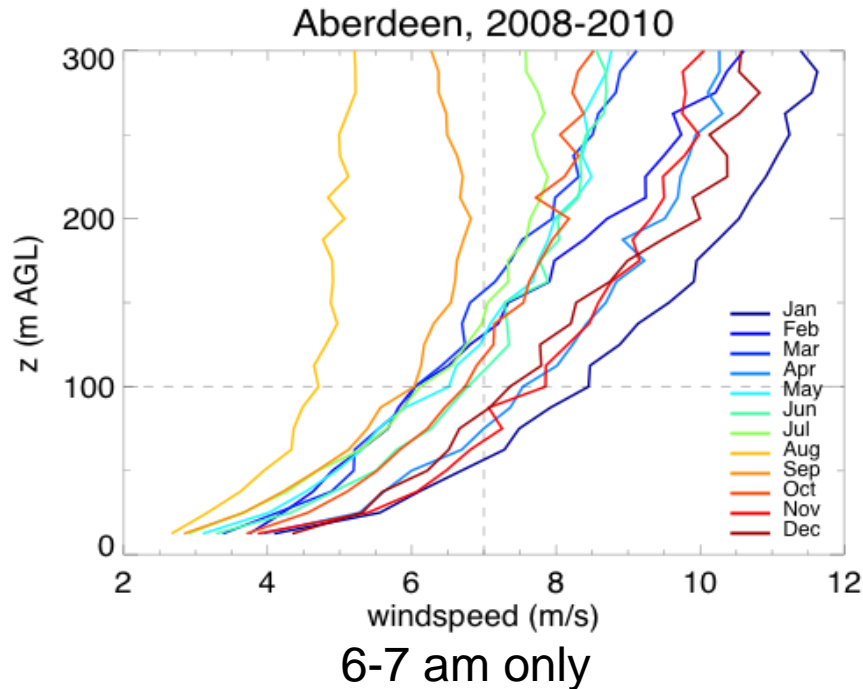
Coastal Winds are Potentially Viable

There is little data above 50 meters. Some available from tall towers.

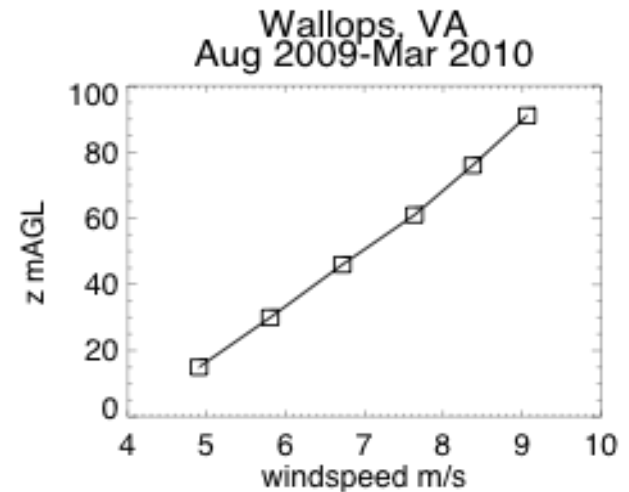
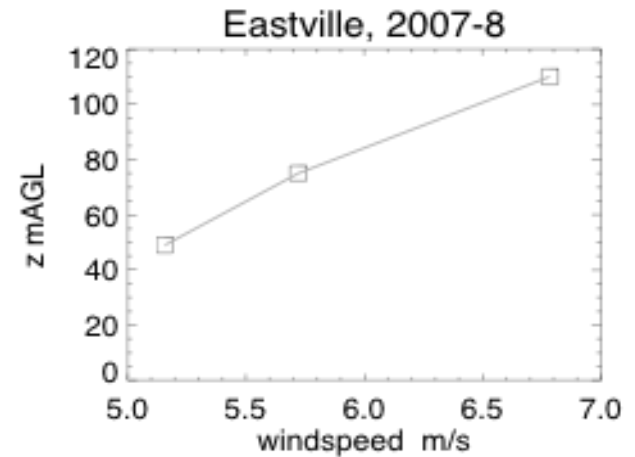


Coastal Wind Strength Increases Significantly with Height

High vertical resolution balloon



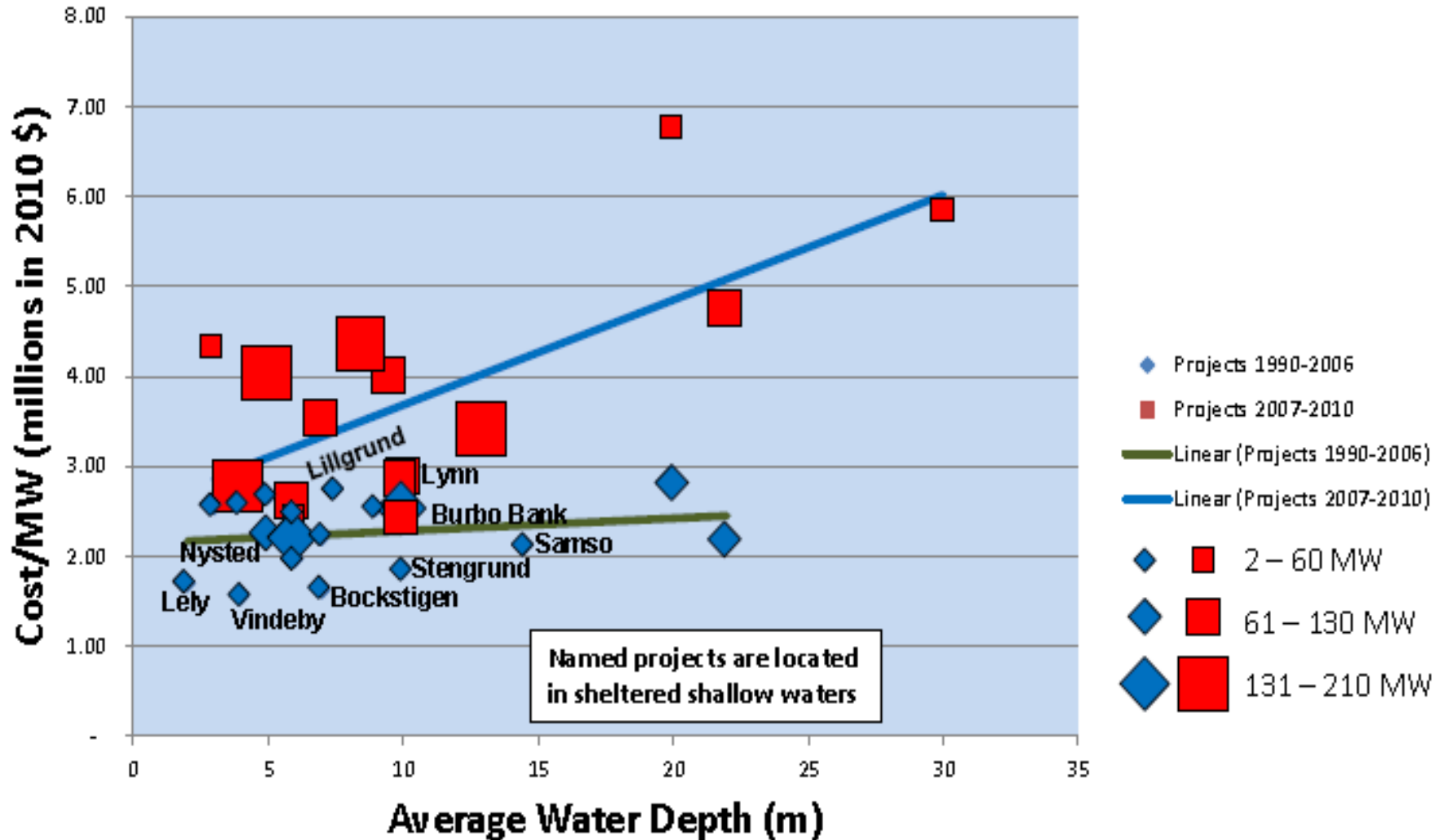
Tall Towers



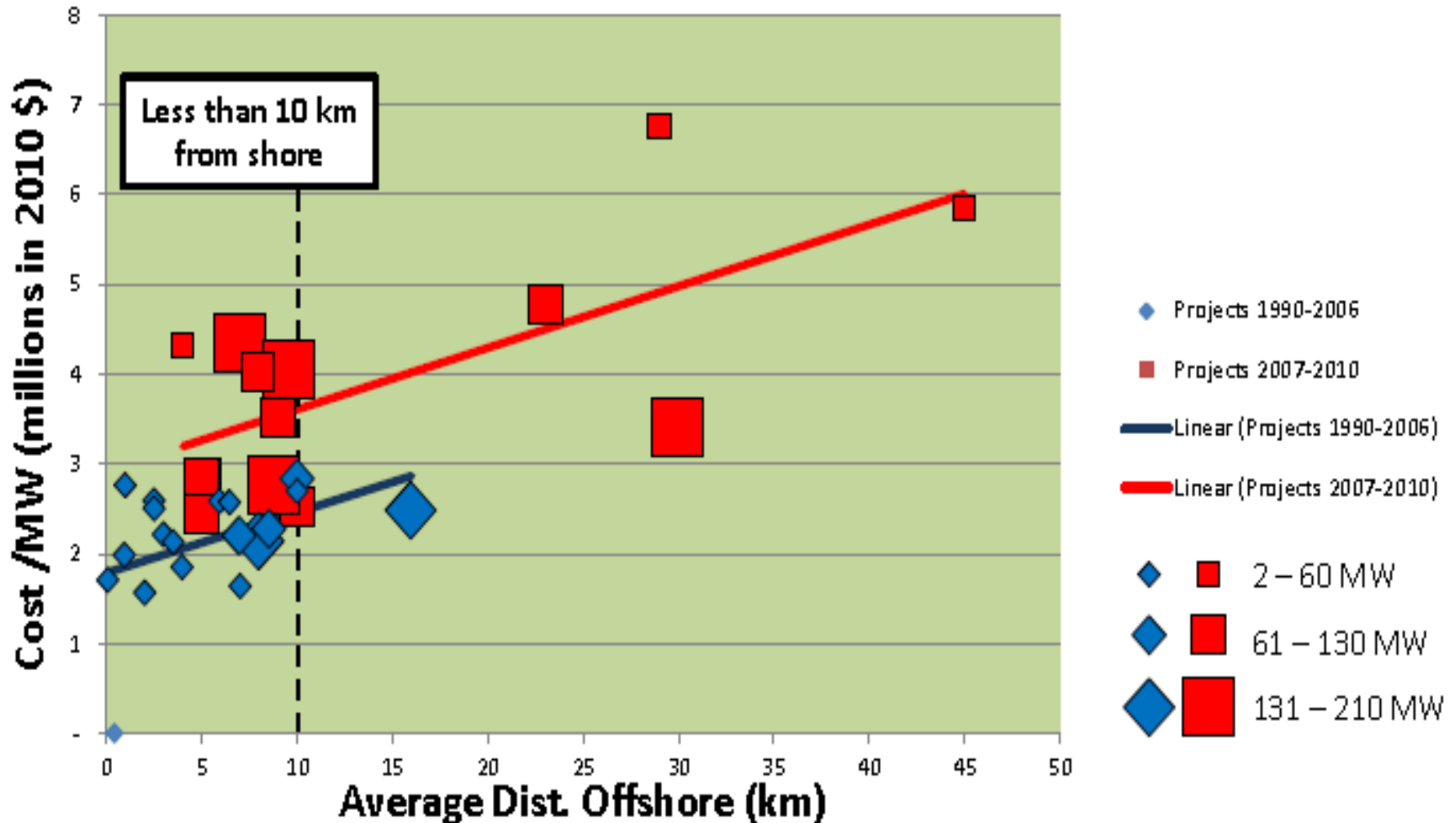
Coastal Winds are Less Than Offshore But Sufficient for Development

- Wind resource is difficult to predict due to large spatiotemporal variability and insufficient observations, especially above 50 m
- Winds are weaker than offshore, but measurements show that some coastal locations may have annual mean wind $> 7\text{m/s}$ at 100 m height
- Wind strength increases rapidly with height at measured coastal locations
- Moderate wind strength at coastal sites, but much lower construction costs in bays and sounds may offset the higher winds at ocean sites
- Limited data suggests the existence of intermittent, but powerful, large-scale nocturnal low level wind jets
- Bay and Sound areas in mid-Atlantic have large areas with potential shallow sheltered water sites

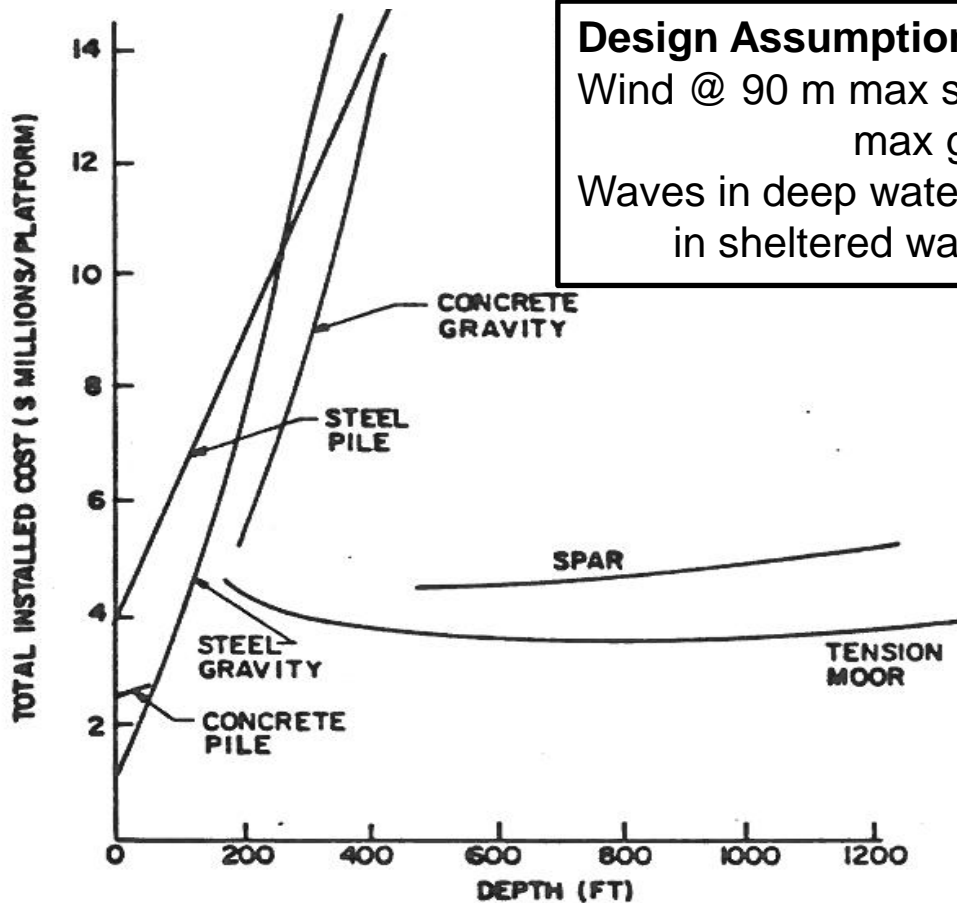
Offshore EU Wind Plant Cost vs. Water Depth in Sheltered vs. Open Water



Offshore EU Wind Plant Cost vs. Distance from Shore



Offshore Platform Costs for US



Design Assumptions:

Wind @ 90 m max sustained 108 m/s (210 knots)
max gust 140 m/s (275 knots)
Waves in deep water max 30 m (trough to crest)
in sheltered waters max 3 m

Westinghouse Electric designs in 1979 dollars by Global Marine Development and Oceanographic Services
Source: ERDA Contract: E(49-18)-2330, WASH-2330-78/4 Vol. 2 Apparatus Designs and Costs

- Severe wind and wave design drivers for ocean applications favor shallow sheltered water using gravity and driven pile platform designs
- Point designs for **bay applications could be lower cost than land-based units due to easier transport and assembly**

POLICY DRIVERS FOR COASTAL WIND POWER

- REVENUE TO THE STATE FROM LEASE OF STATE BOTTOMLANDS –THIS REVENUE COULD BE DEDICATED TO RESTORING THE BAYS
- STATE, RATHER THAN FEDERAL, CONTROL OF TIMING, LOCATION AND DESIGN OF COASTAL WIND POWER PLANTS
- STATE CAN ENSURE THAT DEVELOPMENT OF COASTAL WIND POWER IS CONSISTENT WITH LOCAL LAND USE PATTERNS AND PLANS
- PREMIUMS PAID FOR RENEWABLE ELECTRICITY STAYS WITHIN THE REGION AND GENERATES CONSTRUCTION, ENGINEERING AND MAINTENANCE JOBS IN THE STATE
- COMPLEMENT VARIABLE WIND RESOURCE WITH LOW COST NATURAL GAS FIRED ELECTRIC GENERATING UNITS
- GLOBAL CLIMATE RESPONSE TO MITIGATE REGIONAL IMPACT FROM RISING WATER LEVELS, EXCESSIVELY HOT SUMMERS AND EXTREME WEATHER EVENTS
- AVOID WASTED ENERGY AND COST ASSOCIATED WITH LENGTHY TRANSMISSION TO EAST COAST LOAD CENTERS AND SUPPORT UPGRADE OF LOCAL GRID SYSTEMS

STATE/FEDERAL POLICIES OVERLOOK COASTAL WIND POWER

- EXECUTIVE AND LEGISLATIVE EFFORTS TO MANDATE PURCHASE OF WINDPOWER ARE FOCUSED ON OFFSHORE WINDPOWER (MD, DE, NJ)
- MULTIPLE REC ALLOTMENTS LIMITED TO OFFSHORE WIND POWER (MD,DE). ALLOWING A 3X MULTIPLIER EFFECTIVELY REDUCES A 20 PERCENT RPS TO 7 PERCENT
- SPECIFIC REC REQUIREMENT (“CARVE OUTS”) LIMITED TO SOLAR POWER (MD, OTHERS)
- RENEWABLE PORTFOLIO STANDARDS AND GOALS ALLOW COMPLIANCE BY PURCHASE OF RECS FROM DISTANT STATES AND BY THE PURCHASE OF TIER II RECS
- FEDERAL AND STATE SPONSORING ENVIRONMENTAL STUDIES FOCUS ON OFFSHORE APPLICATIONS; NEW JERSEY HAS COMPLETED BASELINE ENVIRONMENTAL STUDIES AND MARYLAND HAS DATA BASE. NO SIMILAR STUDIES HAVE BEEN PROPOSED OR CONDUCTED FOR COASTAL WIND POWER IN THE REGION
- FEDERAL SPONSORED WIND RESOURCE ASSESSMENTS AND ECONOMIC STUDIES HAVE FOCUSED ON MID-WEST AND ON SMALL SCALE WIND PLANTS. NO SIMILAR STUDIES HAVE BEEN CONDUCTED FOR COASTAL WIND POWER

STATE/FEDERAL POLICIES OVERLOOK COASTAL WIND POWER (CONTINUED)

- VIRGINIA LEGISLATURE TASKED THE VIRGINIA MARINE RESOURCE COMMISSION (COMPRISED OF REPRESENTATIVES OF COMPETING USES OF THE BAY) TO DETERMINE WHETHER THERE WAS A VIABLE COASTAL WIND RESOURCE IN VIRGINIA. NOT SURPRISINGLY, THE COMMISSION DETERMINED THAT THOSE COMPETING USES PRECLUDED DEVELOPMENT OF COASTAL WIND POWER IN VIRGINIA. (SEE CHART)
- VIRGINIA STATE CORPORATION COMMISSION REJECTED A WIND POWER PURCHASE AGREEMENT POWER THAT IT DEEMED “REASONABLE FOR WIND” BECAUSE THE COST WAS GREATER THAN THE COST OF EXISTING COAL GENERATION AND THE PROJECT WAS NOT NEEDED TO MEET VIRGINIA’S RPG.
- AT THE SAME TIME THE VIRGINIA LEGISLATURE AUTHORIZED A SUBSIDY FOR COAL PRODUCTION OF \$17,000 PER COAL FIELD WORKER. VIRGINIA HAS NOT REQUIRED COAL MINE OPERATORS TO CLEAN UP ABANDONED COAL MINES, HAS NOT LEVIED REMOVAL TARIFFS SUFFICIENT TO ACCOMPLISH THIS ACTIVITY AND HAS NOT DIRECTED MINE OPERATORS TO PROPERLY REMEDIATE THE IMPACTS OF “MOUNTAIN TOP REMOVAL” MINING.
- CURRENT POLICIES REQUIRE COASTAL WIND DEVELOPER TO UPGRADE EXISTING TRANSMISSION CAPACITY IN THE AREA FEDERAL GOVERNMENT HAS PROPOSED TO REVISE THESE POLICIES AND SOME STATES HAVE IMPLIMENTED SOLUTIONS

VMRC Excludes All Virginia Bottomlands without Serious Examination of Compatible Uses

