Economic Benefits of Offshore Wind Development in Virginia

City of Virginia Beach
Energy Alternatives Open House

Virginia Beach, VA

04 December 2008

Neil Rondorf

VCERC Industry Partner
Science Applications International Corporation
Virginia Beach, VA

Tim Wilkins

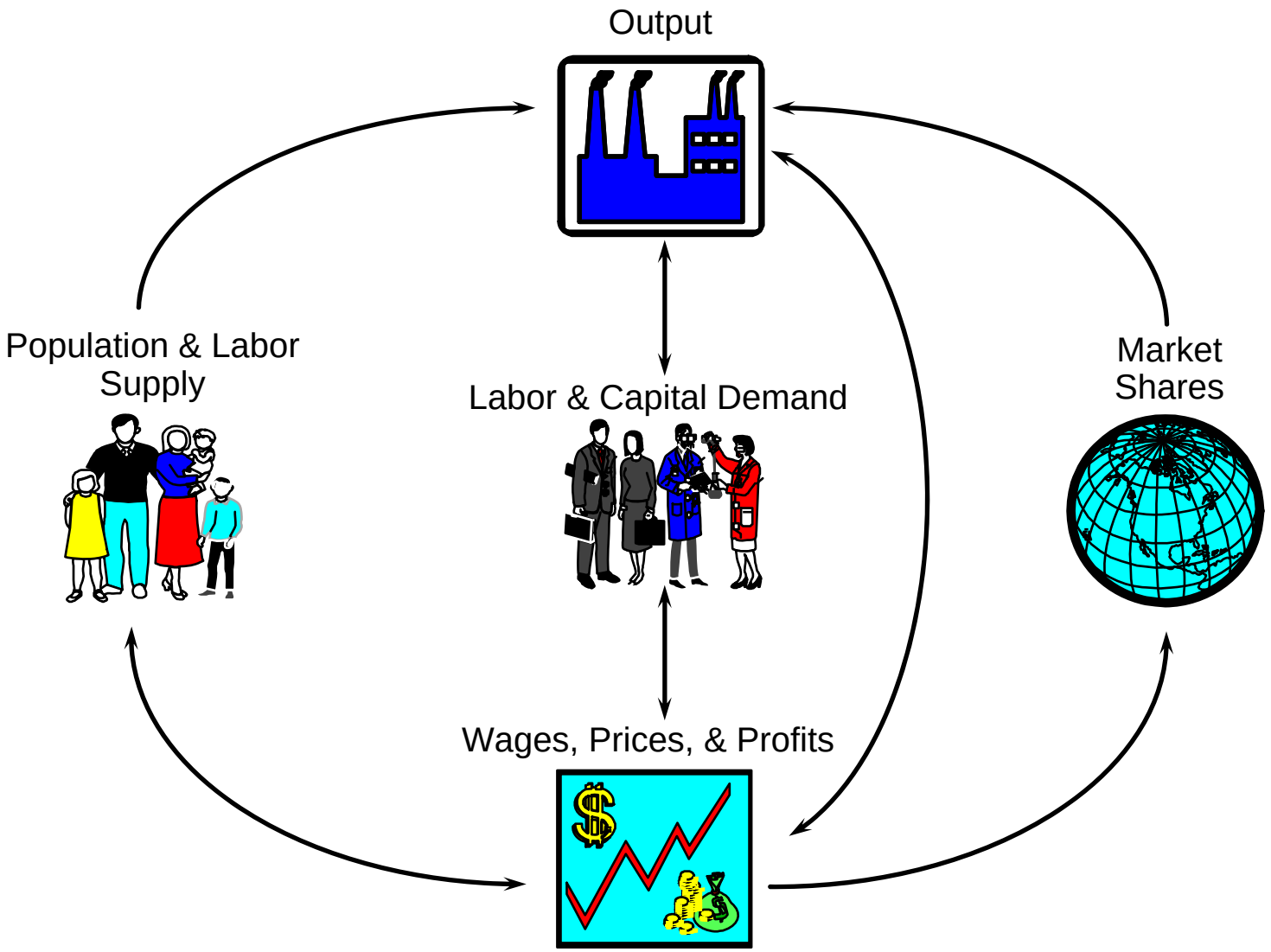
VCERC Subcontractor to SAIC
Paliria Energy, Inc.
Chesapeake, VA

Economic Development Studies

Norfolk State University and Industry Partner (SAIC) responsible for overall direction and preparation of final report

- *What are realistic timetables and magnitudes of economic development impact to build out offshore wind potential?*
- *What are workforce training needs and small business opportunities associated with this build-out?*
- *What are supply chain constraints and opportunities?*
- *Develop budget and plan to seek federal funding for ocean test bed to host offshore wind or wind/wave hybrid systems*

Regional Economic Models, Inc. (REMI) Basic Model Structure



REMI Labor Inputs Derived from Scroby Sands Supply Chain Analysis

Table 4-1: Scroby Sands – Project Data

Scroby Sands			
Location	3 km off Caister, Norfolk	**Developer**	EROWL
Construction	2003	**Owner/Operator**	EROWL
Online	2004	**EPC**	Vestas
Capacity (MW)	60	**Turbine Installation**	A2Sea & Seacore
Number of Turbines	30	**Foundation Installation**	Mammoet Van Oord
Turbine Manufacturer	Vestas	**Total Cost (£m)**	80 (inc. 5 yrs O&M)
Turbine Rating (MW)	2	**Planning Status**	Complete
Foundation Type	Monopiles	**Contracting Status**	Complete
Water Depth (m)	2-10		

Final Report

A Report to Renewables East by Douglas-Westwood Limited and ODE Limited

Commissioned by the DTI

DWL Report Number 334-04

July 2005

RENEWABLES EAST

ode OPERATIONS

DOUGLAS-WESTWOOD

Table 7-1: Typical Project Characteristics

Factor	Details
Project Capacity	500 MW
Number of Turbines	100 +
Turbine capacity	4-5 MW
Water Depth	20 metres +
Distance from Shore	10 miles +
Cable Type	HVDC
Substation	Yes, offshore
Year Online	2010
Project Cost	£550 million

REMI Results for 588 MW Project
(Base Case)

Offshore Wind Project Construction - Base Case *

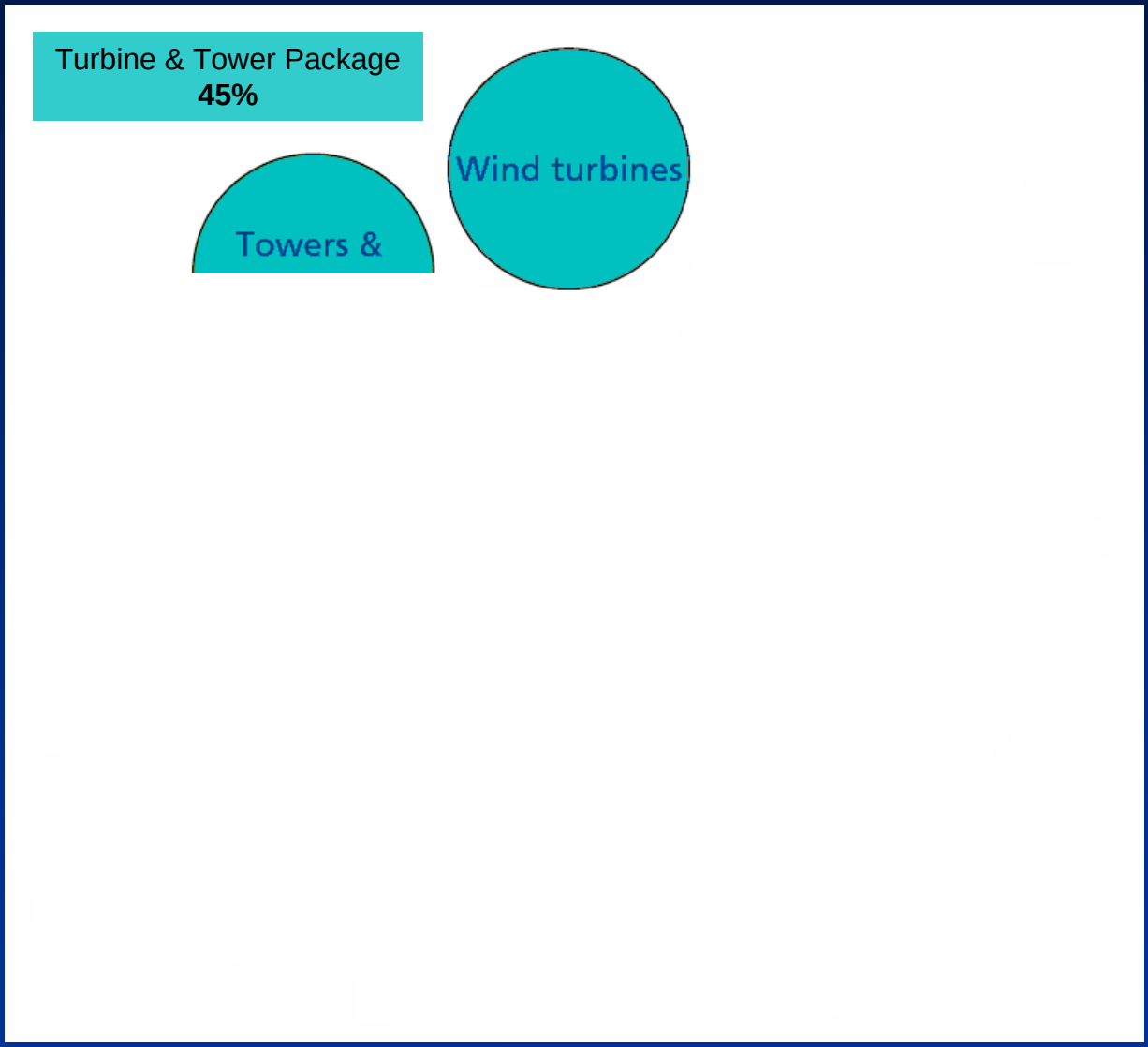
Build-Out	GRP (Mil $)**	Total Personal Income (Mil $)***	Employment (No. jobs)
Year 1	$17.5	$14.0	300
Year 2	$57.8	$46.69	868
Year 3	$74.4	$65.4	1,146

* REMI impacts include direct, indirect, and induced effects

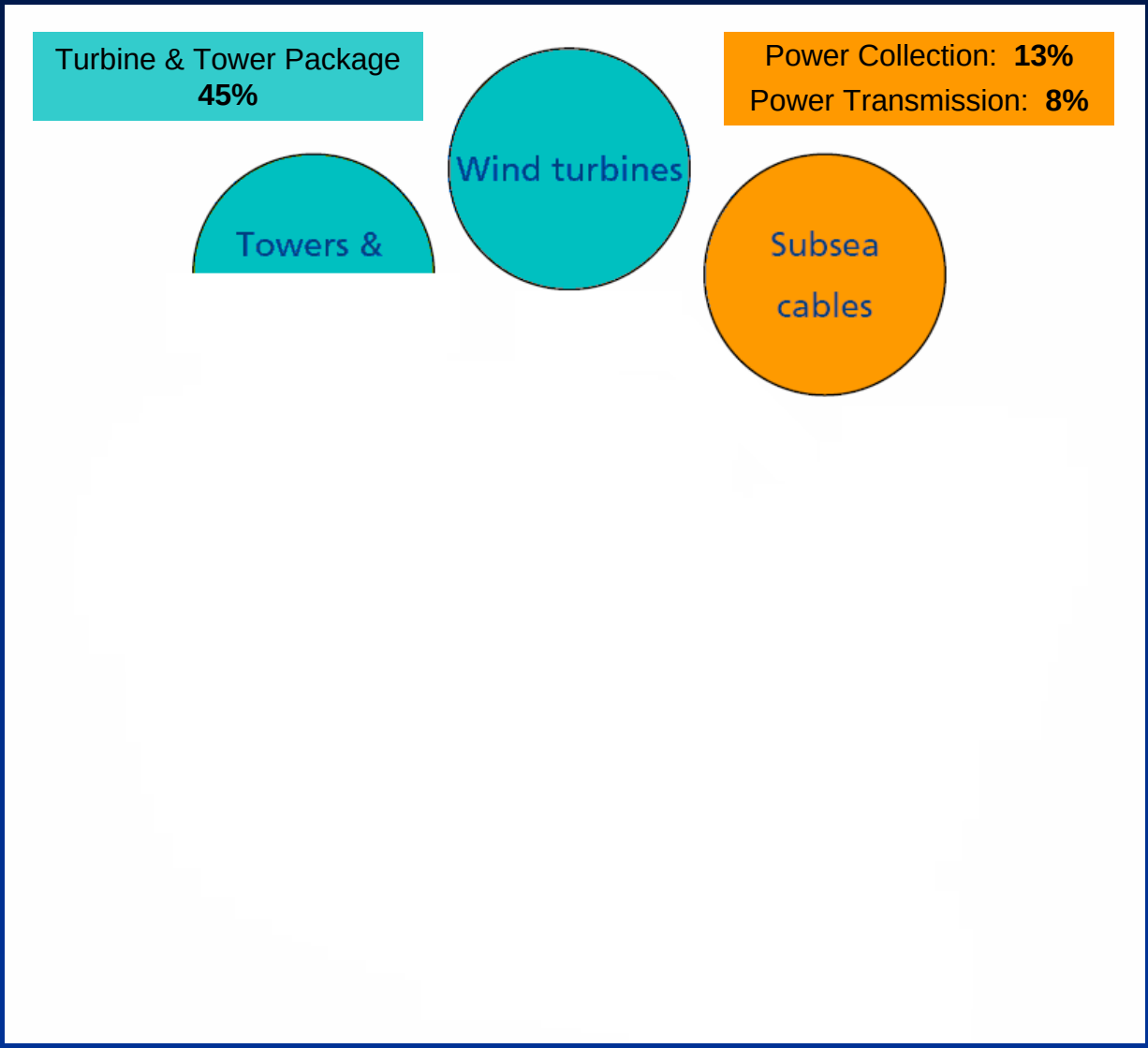
** Real dollars (2000)

*** Nominal dollars

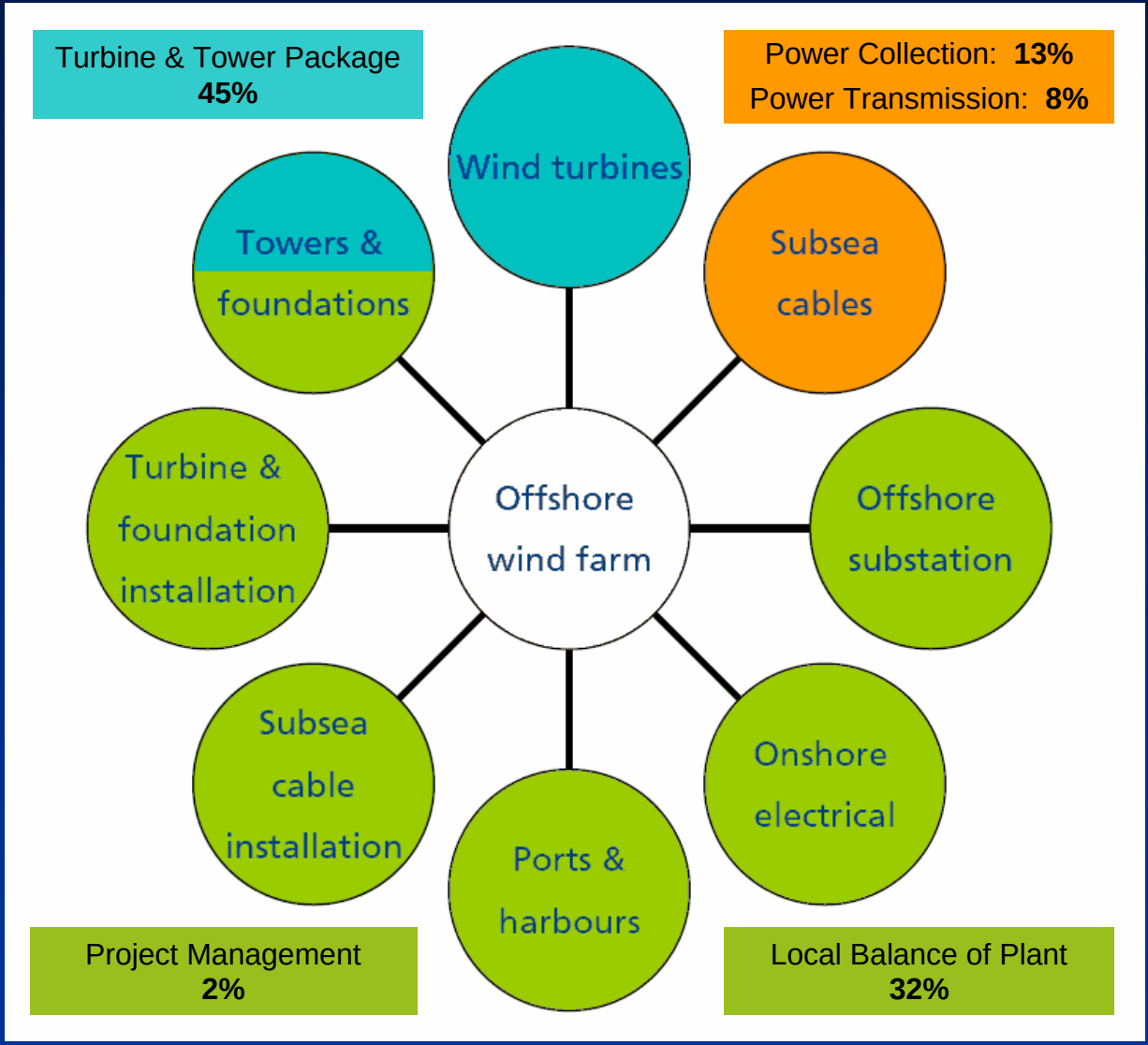
Nearly Half the Capital Cost of an Offshore Wind Project is in the Turbine & Tower Package



Another Fifth of the Capital Cost is in Submarine Power Cable Fabrication

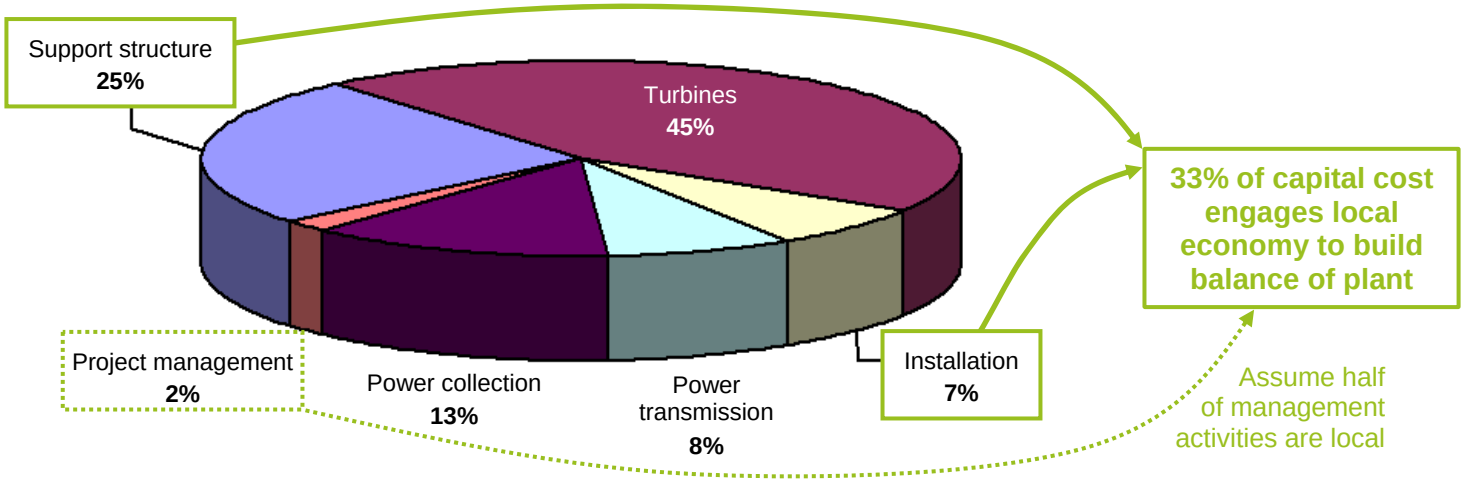


The Remaining Third of the Total Project Capital Investment Engages the Local Economy



New Sustainable Business Value of $150-200 Million per Year in Maritime Sector Alone

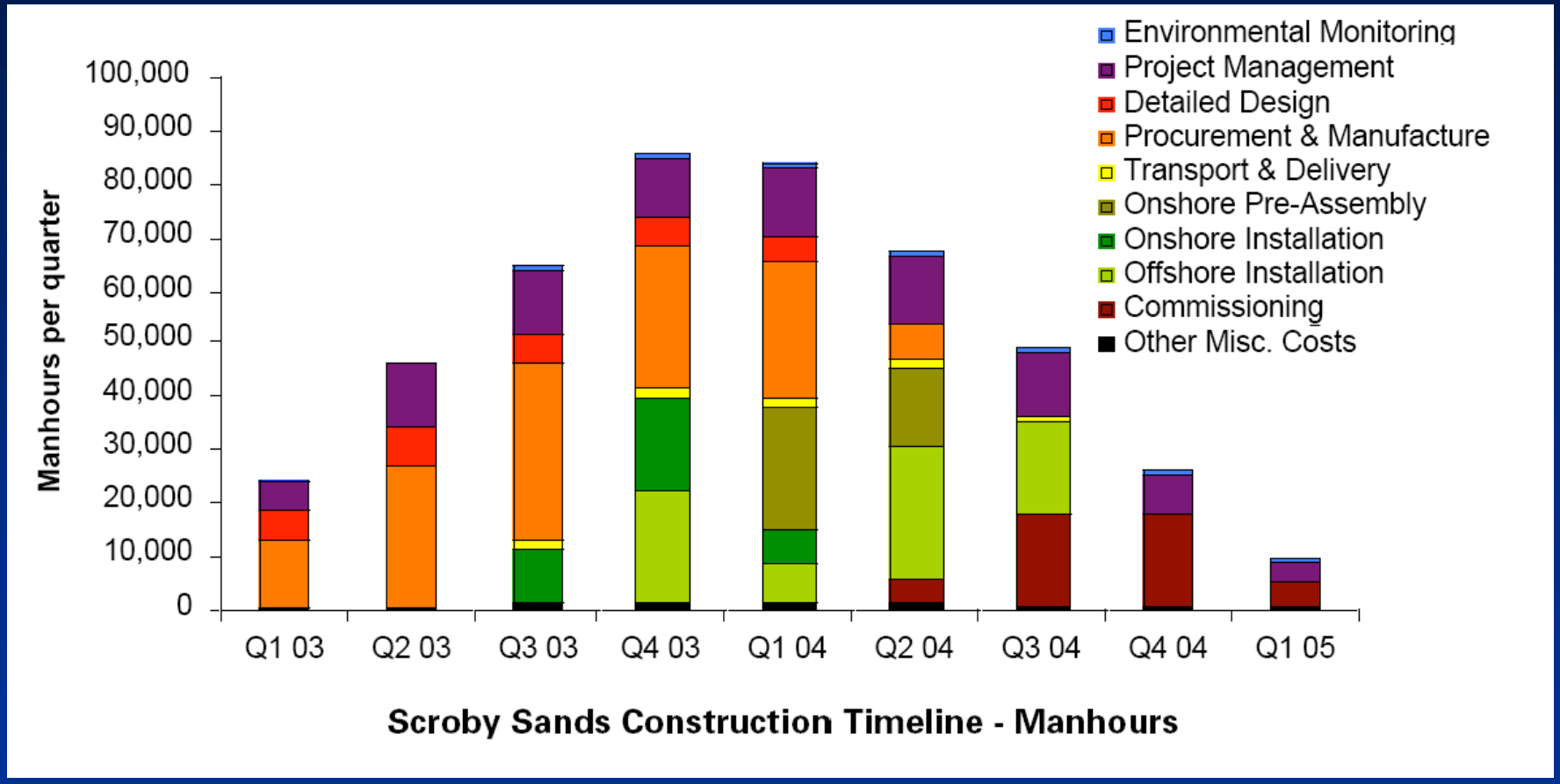
Typical capital cost breakdown for monopile-based offshore wind project



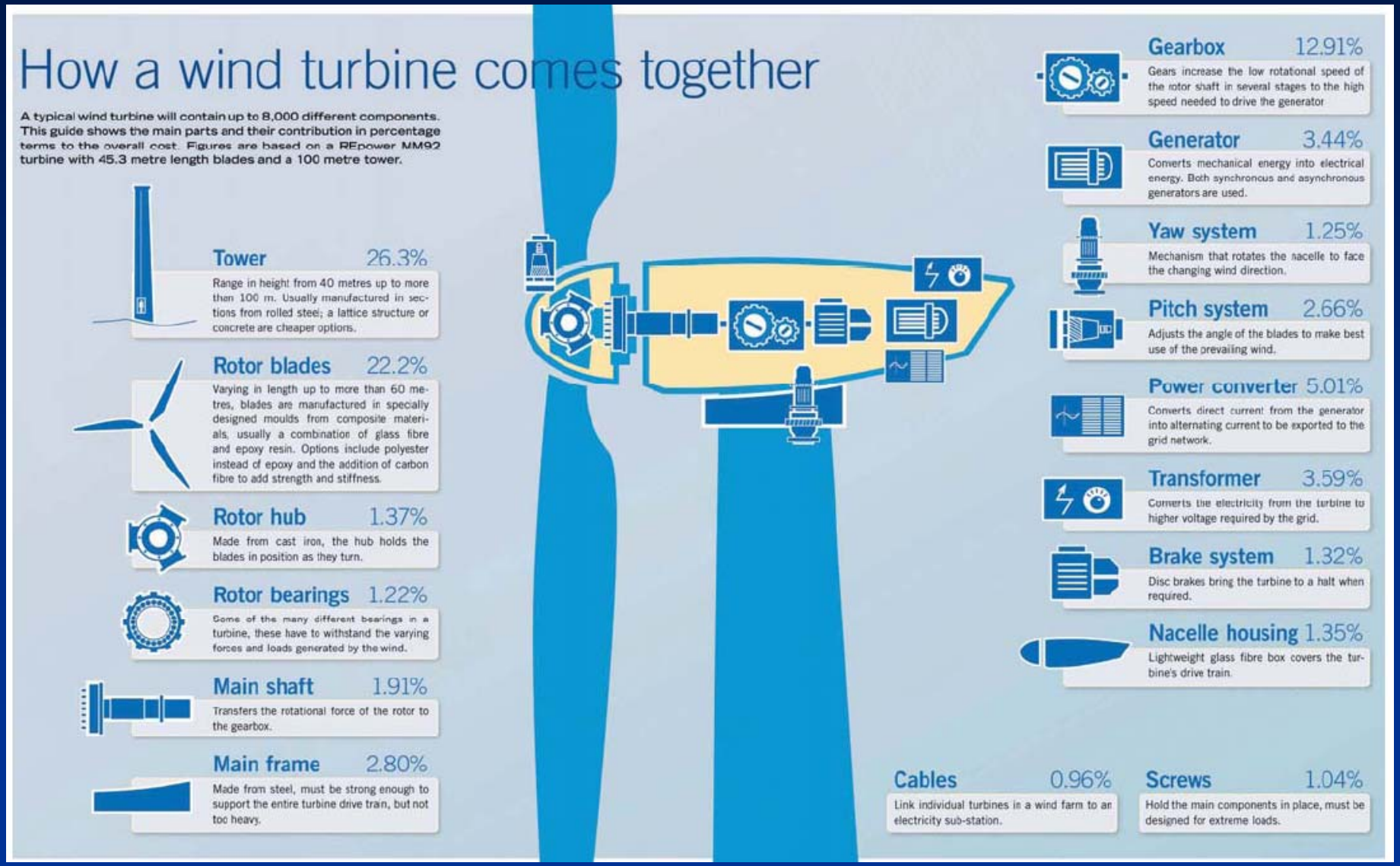
Estimated maritime industry value of fabrication, installation, and service contracts for notional 2,000 MW of installed offshore wind capacity:

- Assume capital cost is double that of Horns Rev project
- At $3,100 per installed kW, total capital investment (CI) = $6.2 billion
- Assuming an installation rate of 200 MW per year= $620 million per year over 10-year build-out
- Value of local fabrication and installation contracts = $200 million per year until fully built out
- Value of local offshore service contracts (2.5% of CI) = $155 million per year after fully built out

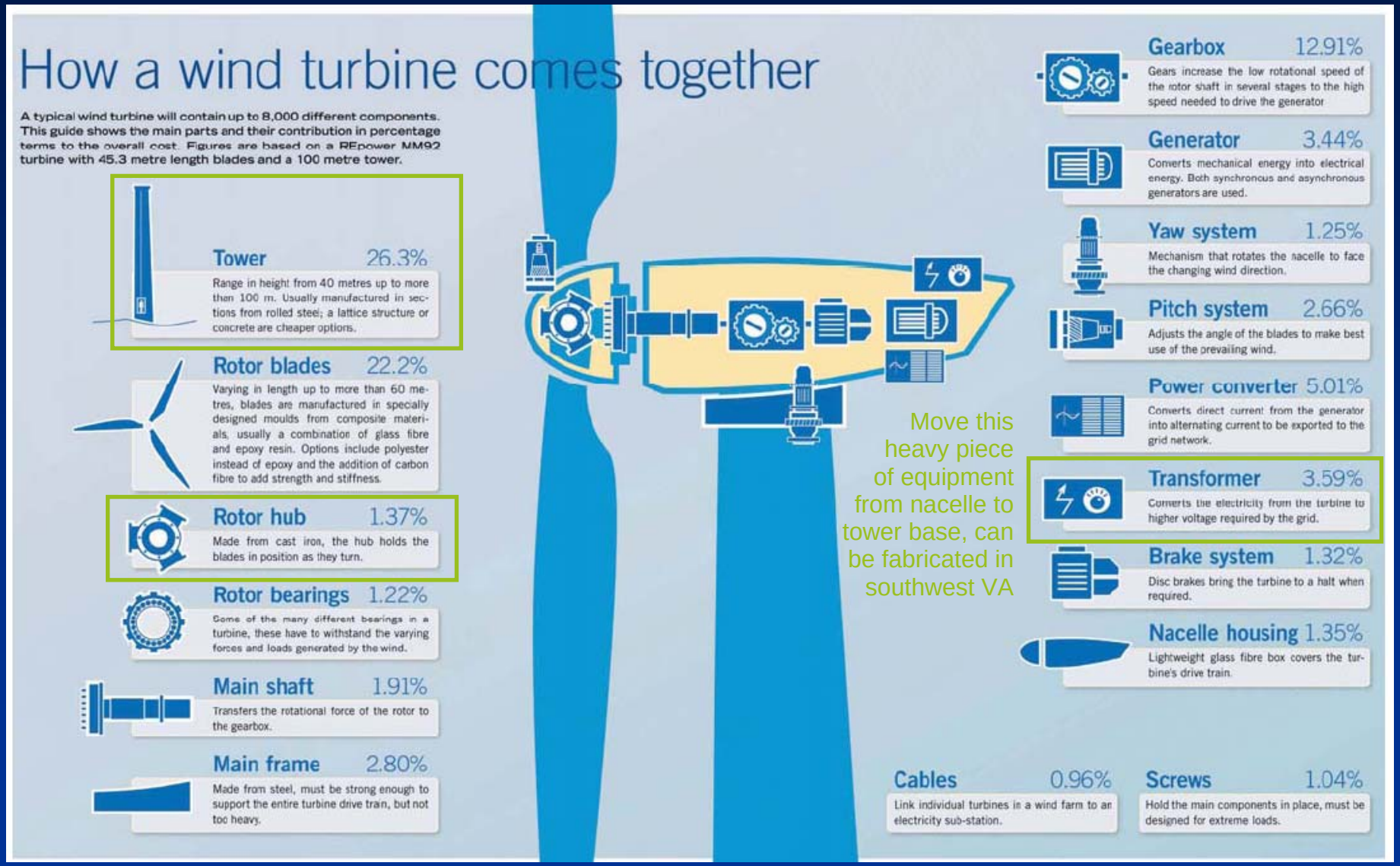
Scroby Sands 60 MW Construction Timeline



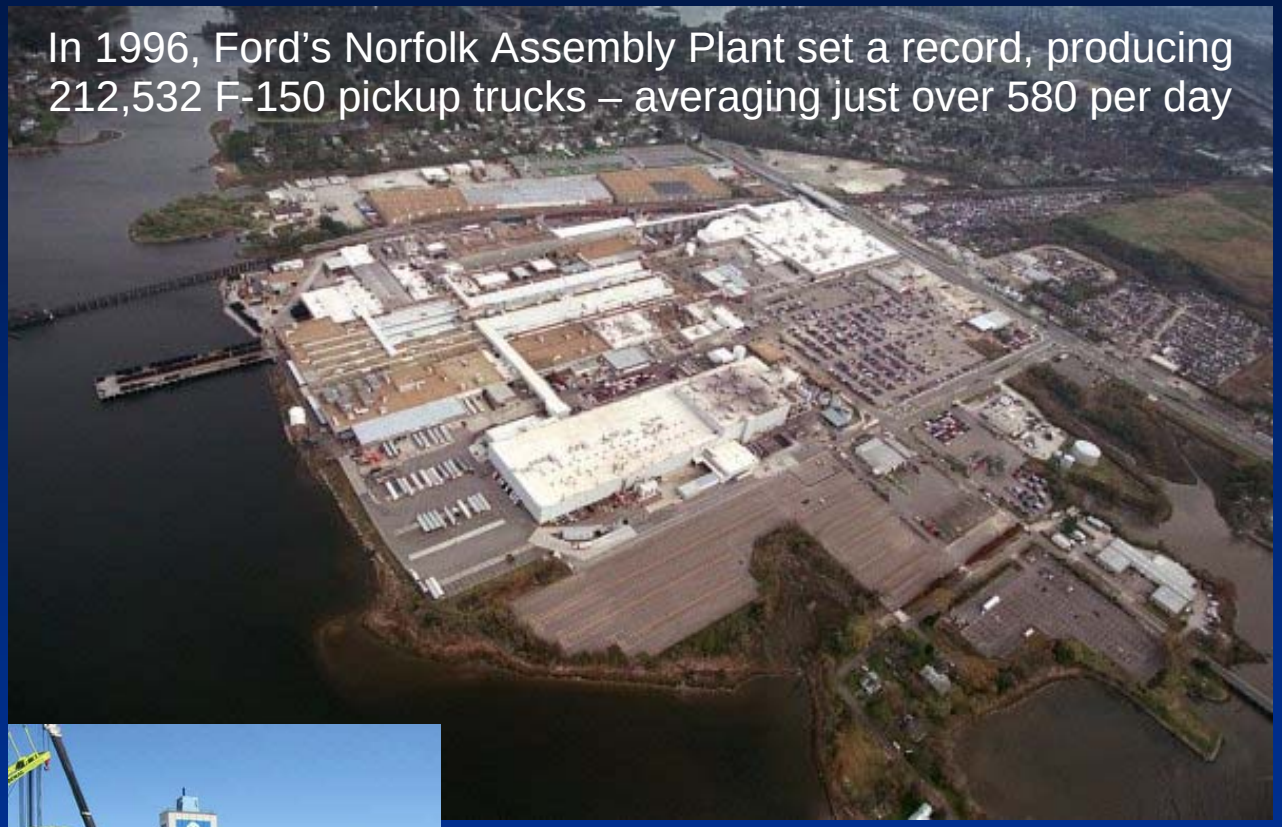
Turbine & Tower Package Cost Breakdown



Of the Turbine & Tower Package Cost, About 30% Might be Readily Sourced in Virginia



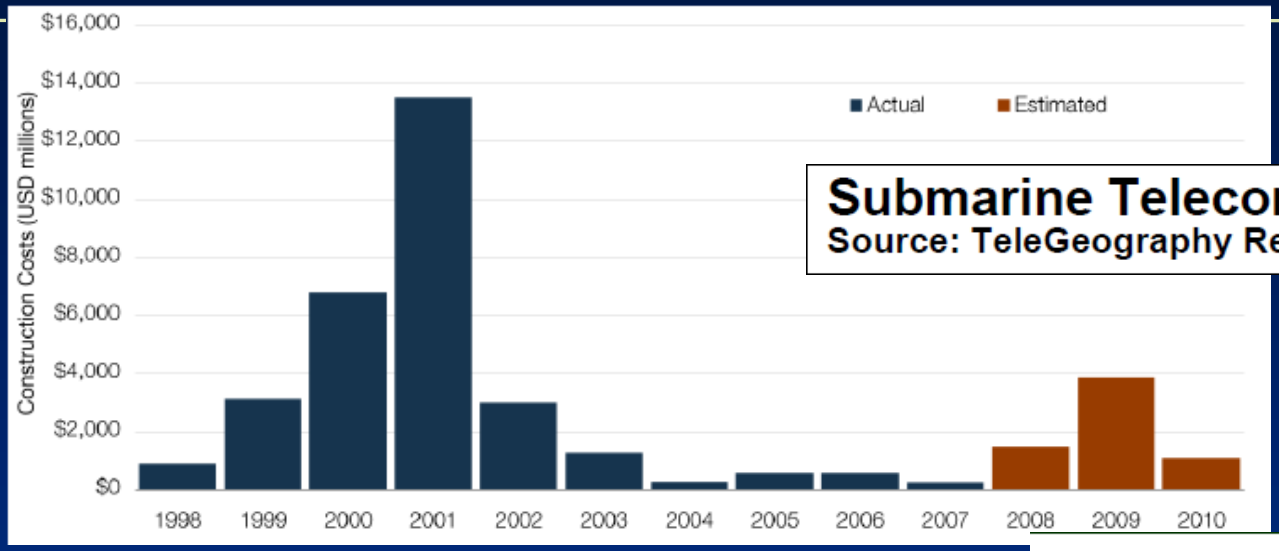
The Remaining 70% Represents a Potential Manufacturing Possibility in Tidewater



During World War II, this plant temporarily retooled from automobile manufacture to the production of landing craft. With road, rail, and deep-water access, this site is well positioned to be retooled yet again, for offshore wind turbine assembly.

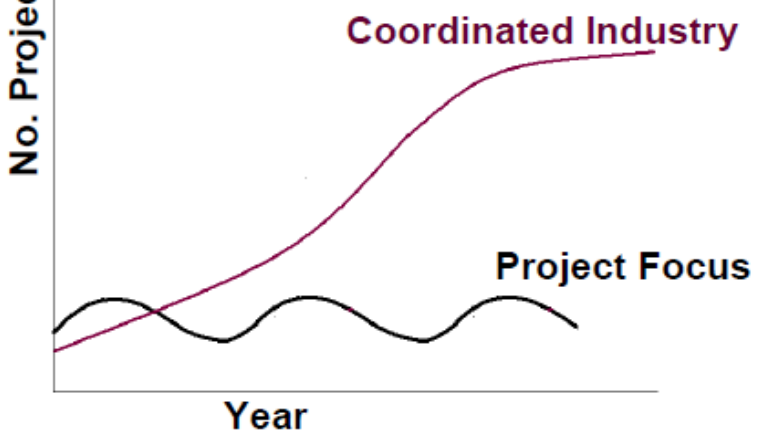
The Marine Community

Boom and Bust Cycles

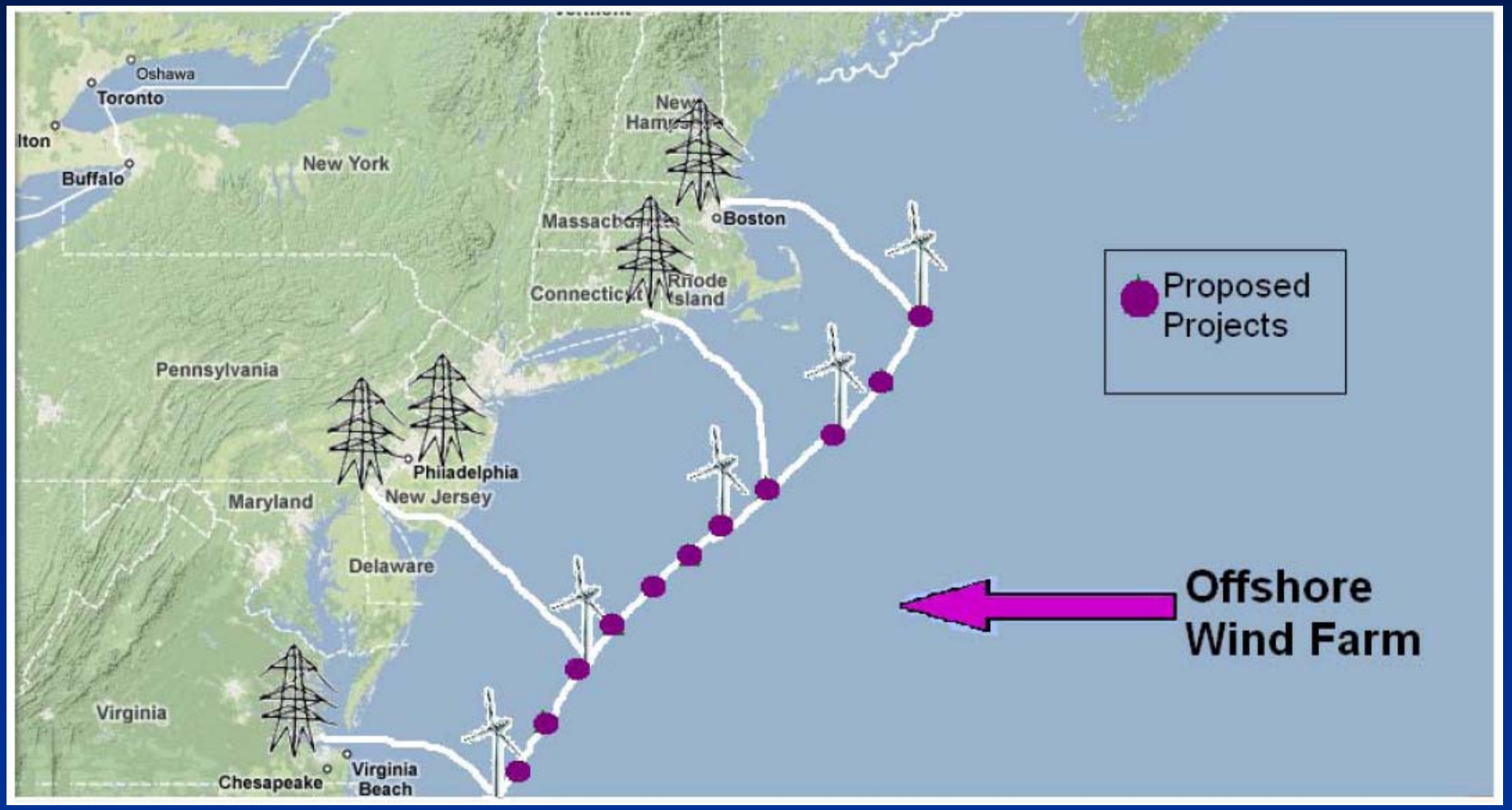


Submarine Telecommunications Industry
Source: TeleGeography Research

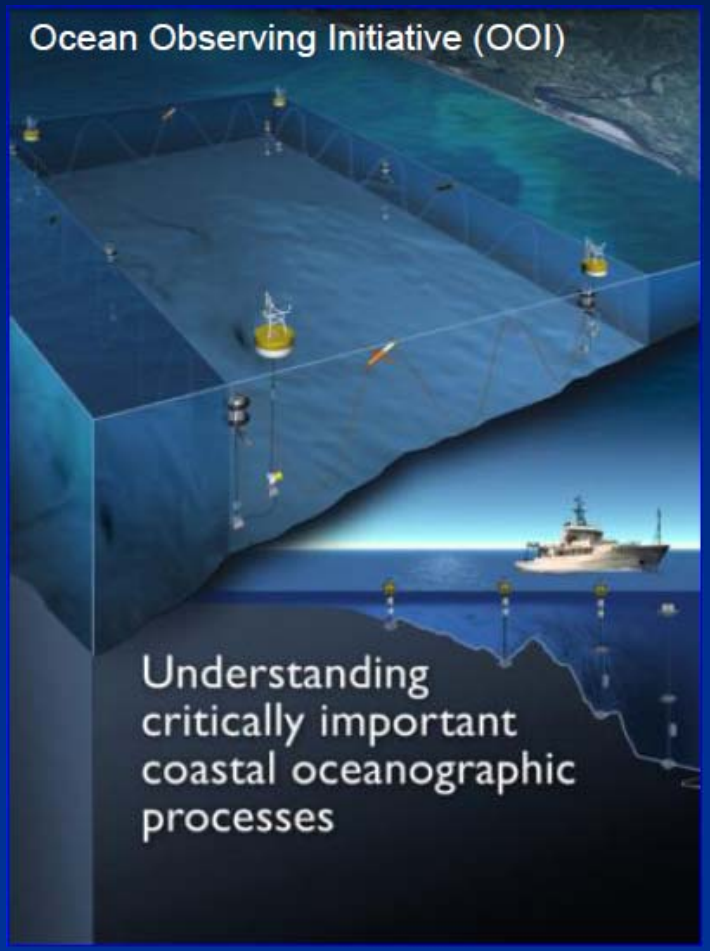
Ocean Energy Industry
(theoretical)

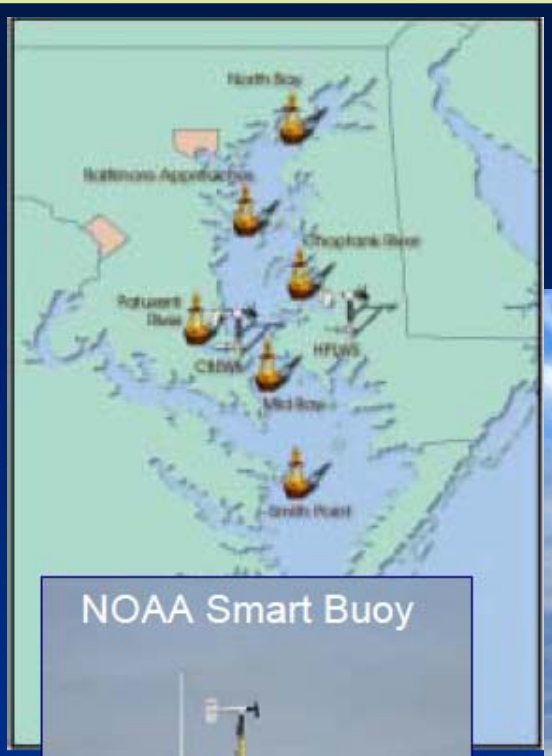


Ultimate Integration: Super Grid-USA



Ocean Observing and Offshore Energy





Wind Turbine,

North Sea, Scotland

Thank You!

Any questions?

Email: rondorfn@saic.com twilkins@paliria.com or hagerman@vt.edu