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US East Coast offshore wind market, and, Recommendations for regional offshore wind industry development

Selected slides for BOEM NC VA Intergovernmental Renewable Energy Taskforce Webinar, 23 July 2019 Andy Geissbuehler



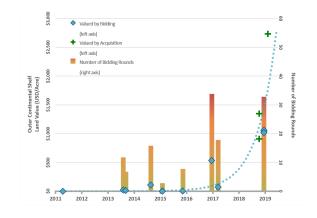
US East Coast offshore wind market

Significant market changes since 2017 BOEM NC VA Task Force meeting

New York Charts 9GW by 2035 Offshore Wind Path

Ørsted Completes Acquisition of **Deepwater Wind**





Created by Austin Connito, Shell, EDF Acquire US Wind's New Offshore Wind Data Analyst, Old Dominion University, based on publicly available data at www.boem.gov/Renewable-**Energy-State-Activities**

Awarded offtake agreements expected to exceed 4 GW in 2019

Jersey Lease Area

- New York State nearly quadruples offshore wind policy targets
- Lease area winning bids and acquisitions exponential increase • in unit price (USD per acre; see graph at right)
- Numerous strong industrial stakeholders pursuing US market



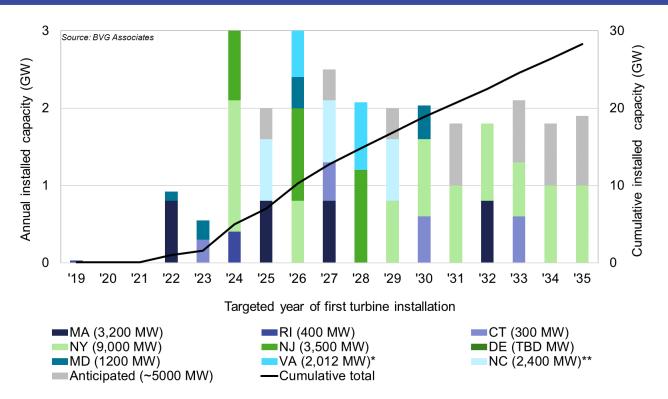




US East Coast OSW market: policy targets to 2035

OSW targets announced by East Coast States

Capacity by annual installation (MW)



- State driven offshore wind commitments exceed 21 GW by 2035
- Additional commitments anticipated, currently estimated at 7 GW

*2018 Virginia energy plan calls for 2000MW of offshore wind by 2028 **North Carolina anticipated based on PJM interconnection queue





US East Coast OSW market: policy targets to 2035

OSW targets announced by East Coast States

Auctioned BOEM lease areas (MW) as of Dec 2018							
State	Lease No.	Developer	· · · · · · · · · · · · · · · · · · ·	IW, based on MW per km ²)	BOEM Auction		
MA	0500	Ørsted (BS	SW)	3,036	2015		
MA	0501	Avangrid/ CIP/ (VW)		2,702	2015		
MA	0520	Equinor		2,085	2018		
MA	0521	Shell/EDPR (I	MF)	2,062	2018		
MA	0522	CIP/ (V	/W)	2,143	2018		
RI	0486	Ørs	ted	1,578	2013		
RI	0487	Ørs	ted	1,089	2013		
NY	0512	Equi	nor	1,285	2016		
NJ	0499	Shell/EDF (AS)	2,968	2015		
NJ	0498	Ørs	ted	2,598	2015		
DE	0482	Ørs	ted	1,561	2012		
MD	0489	US W	ind.	530	2014		
MD	0490	US Wind		760	2014		
VA	0483	Dominion		1,826	2013		
NC	0508	Avangrid		1,981	2017		
Northern total		15,978	15,978		12,224		
Total				28,203			

Capacity (MW) driven by State policy, expected by 2035

MW per 15-yr policy targets	BVGA forecast MW
3,200	3,200
400	430 **
2,000	2,000
9,000	9,000
3,500	3,500
1,200	1,200
2,000 *	2,012 **
	2,400 ***
-	~4,500 MW
21,300	~28,000 MW
	3,200 400 2,000 9,000 3,500 1,200 2,000 *

* 2018 Virginia Energy Plan calls for 2000MW of offshore wind by 2028 ** Includes 30MW Block Island Wind Farm and 12MW CVOW project *** Based on Avangrid interconnection requests in PJM queue

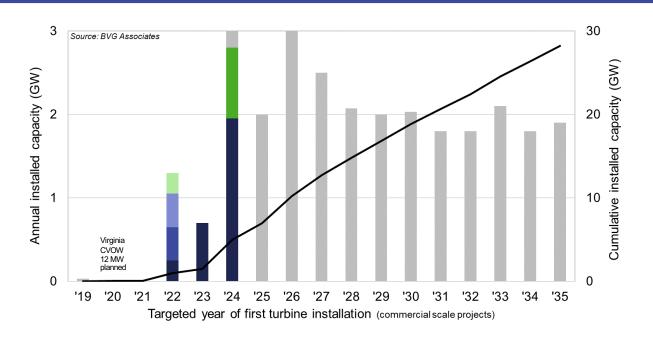




US East Coast OSW market: offtake agreements to 2035

Offtake agreement status

Capacity by annual installation and developer (MW)



Ørsted Avangrid CIP/COP US Wind Equinor No offtake agreement —Cumulative total

- ~ 5 GW of offtake agreements awarded, with additional GW's expected for 2019
- Cumulative forecast within the currently available lease areas enabling ~ 28 GW





Recommendations for regional offshore wind industry development

US East Coast opportunity



- "PPA's" awarded: ~ 4.9 GW
- "PPA's" anticipated for 2019: > 0.8 GW
- 10 year conservative forecast: > 15GW

"Momentum driver" Recommendations

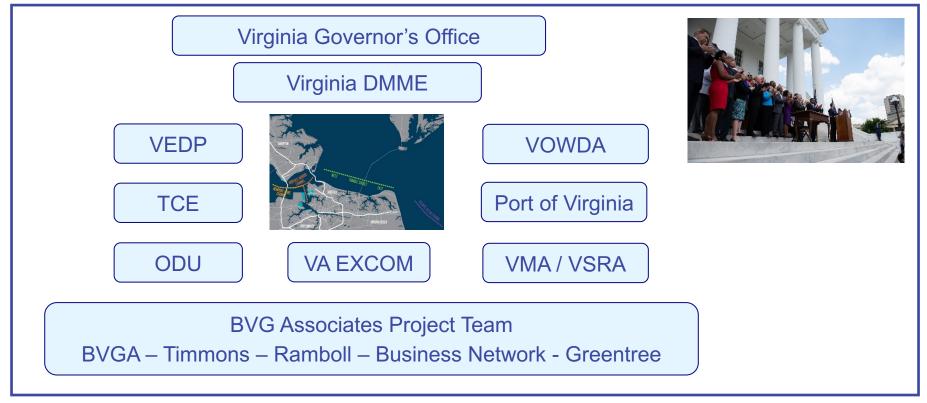
- 1. Create "Virginia Office for Offshore Wind"
- 2. Work towards a multi-state regional supply chain cluster
- 3. Solicit and attract "anchor tenant" companies for major components
- 4. Enable and grow opportunities through partnerships and infrastructure
- 5. Grow opportunities through workforce development

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Recommendations for regional offshore wind industry development

Integrated team with strong leadership by Governor's Office and DMME



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Thank you

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