Strategy consulting. Practical thinking.

VIRGINIA Offshore Wind Industry ADVANTAGE

DMME Virginia Department of Mines Minerals and Energy

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

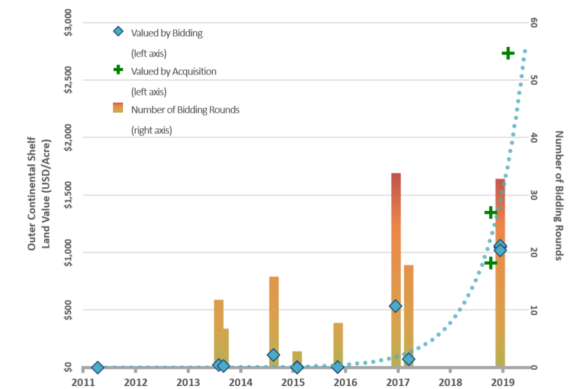
BVGassociates

US East Coast offshore wind market

Significant market changes since 2017 BOEM NC VA Task Force meeting

Ørsted Completes Acquisition of Deepwater Wind

Block Island windfarm installation



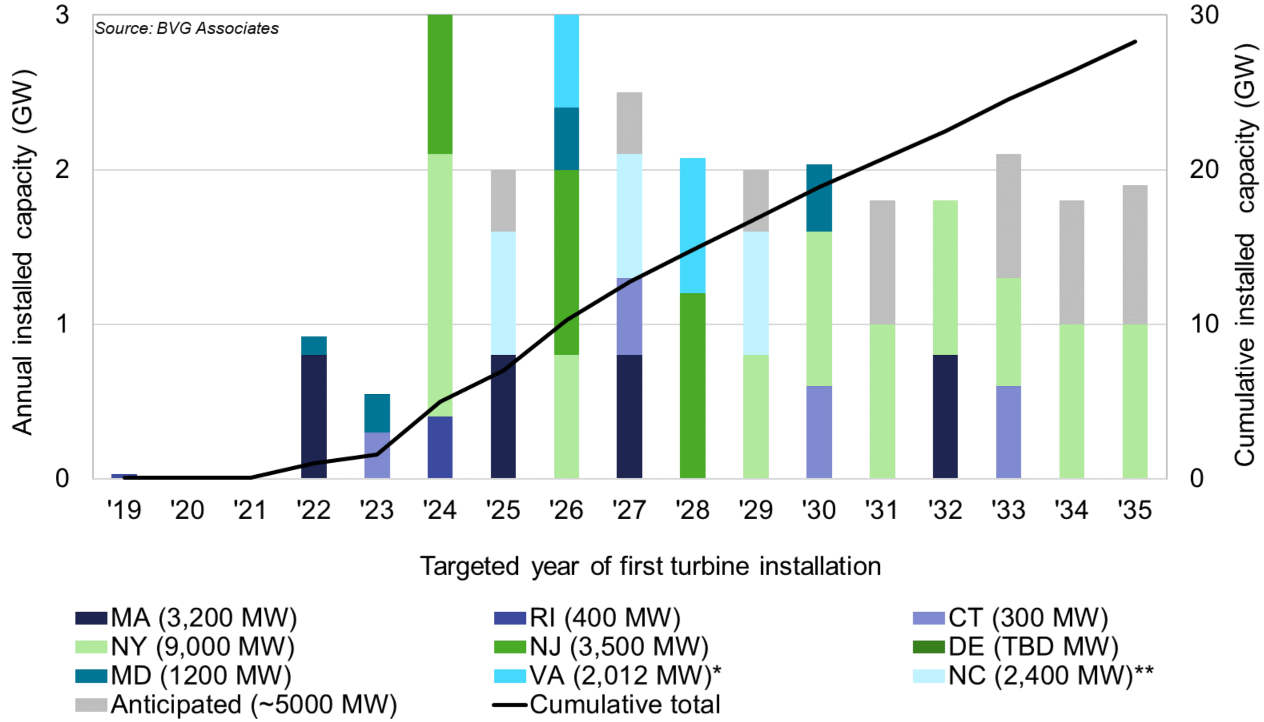
Created by Austin Connito, Offshore Wind Data Analyst, Old Dominion University, based on publicly available data at www.boem.gov/Renewable-Energy-State-Activities

- Awarded offtake agreements expected to exceed 4 GW in 2019
- 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	(MW, based on 3MW per km^2)	BOEM Auction
MA	0500	Ørsted (BSW)	3,036	2015
MA	0501	Avangrid/ CIP/ (VW)	2,702	2015
MA	0520	Equinor	2,085	2018
MA	0521	Shell/EDPR (MF)	2,062	2018
MA	0522	CIP/ (VW)	2,143	2018
RI	0486	Ørsted	1,578	2013
RI	0487	Ørsted	1,089	2013
NY	0512	Equinor	1,285	2016
NJ	0499	Shell/EDF (AS)	2,968	2015
NJ	0498	Ørsted	2,598	2015
DE	0482	Ørsted	1,561	2012
MD	0489	US Wind.	530	2014
MD	0490	US Wind	760	2014
VA	0483	Dominion	1,826	2013
NC	0508	Avangrid	1,981	2017
Northern total	**15,978**		**Southern total**	**12,224**
Total				**28,203**

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

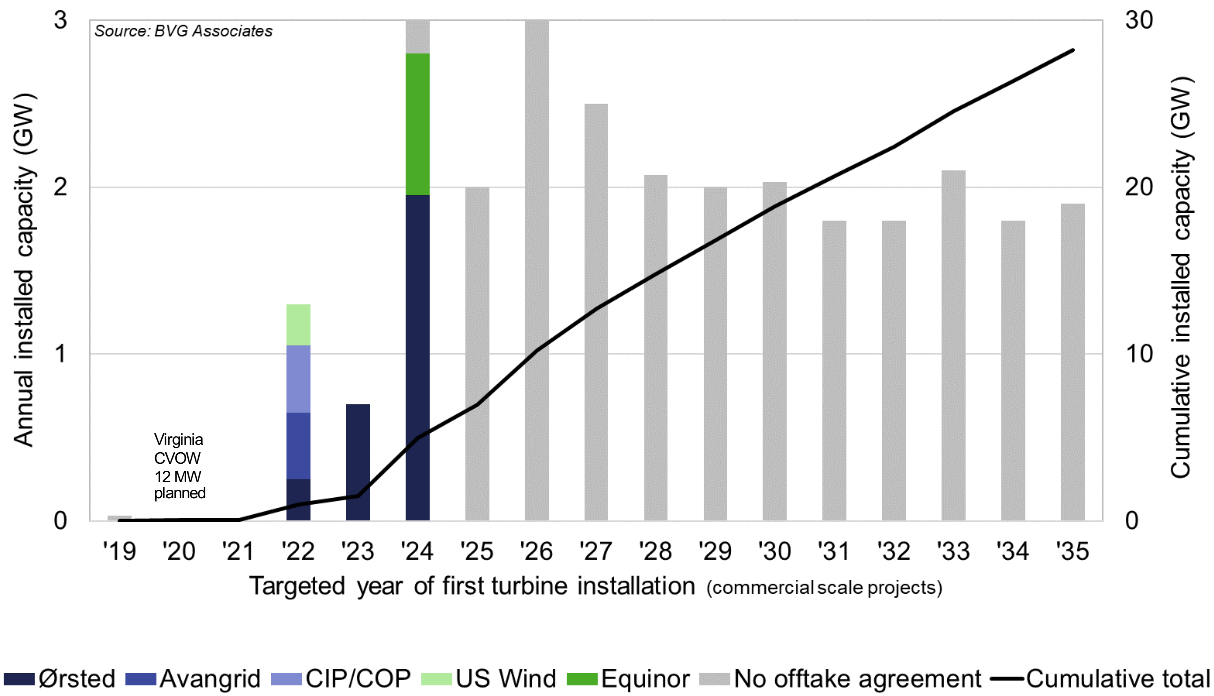
State	MW per 15-yr policy targets	BVGA forecast MW
MA	3,200	3,200
RI	400	430 **
CT	2,000	2,000
NY	9,000	9,000
NJ	3,500	3,500
MD	1,200	1,200
VA	2,000 *	2,012 **
NC		2,400 ***
Anticipated future plans in multiple states	-	~4,500 MW
Total	**21,300**	**~28,000 MW**

* 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)



- ~ 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**

Recommendations for regional offshore wind industry development

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

Virginia Governor’s Office

Virginia DMME

VEDP

TCE

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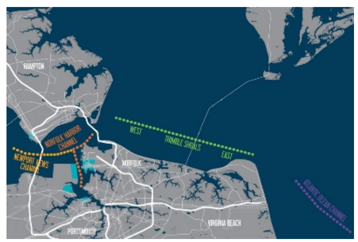

VA EXCOM

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Thank you

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