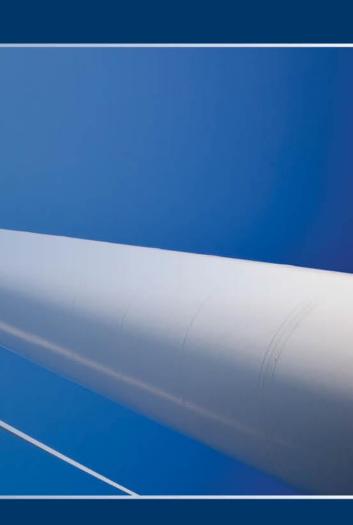
U.S. Wind Energy Industry

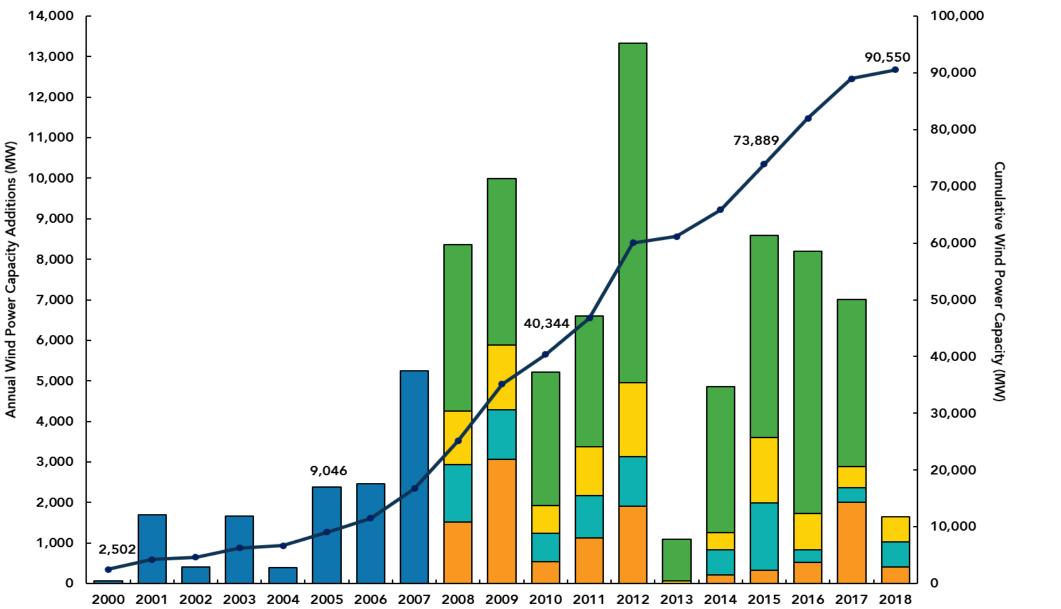
John Hensley American Wind Energy Association







U.S. Annual and Cumulative Wind Capacity Growth



- the U.S.



• 90,550 MW of wind power at the

• Over 54,000 wind turbines across

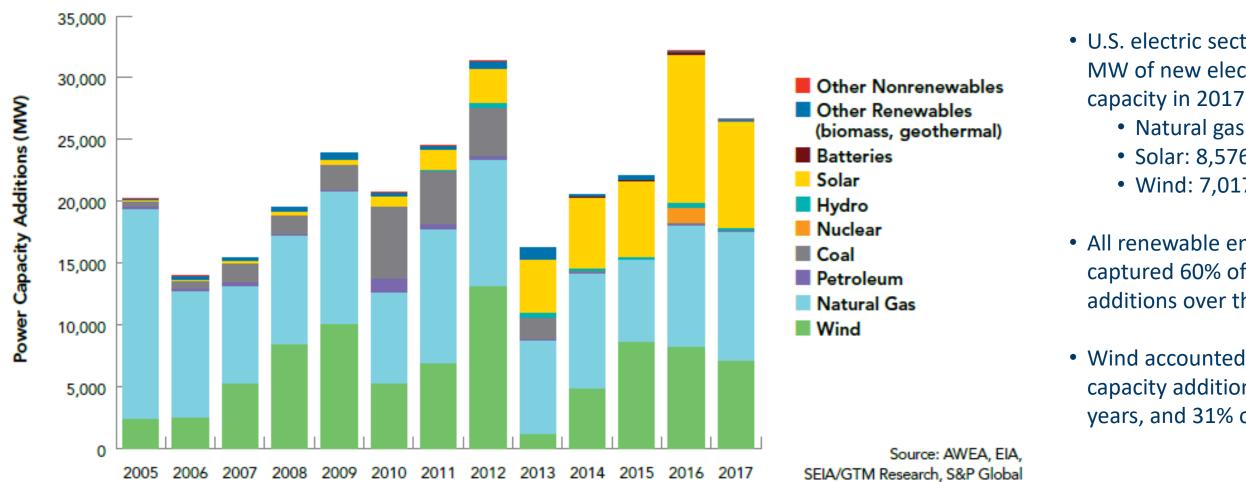
• U.S. wind power capacity has more than tripled since 2008

 Wind is #1 renewable energy capacity source in U.S.

• Total installed wind capacity can power 27 million American homes



Wind Energy Provided 26% of Capacity Additions in 2017



Annual Power Capacity Additions



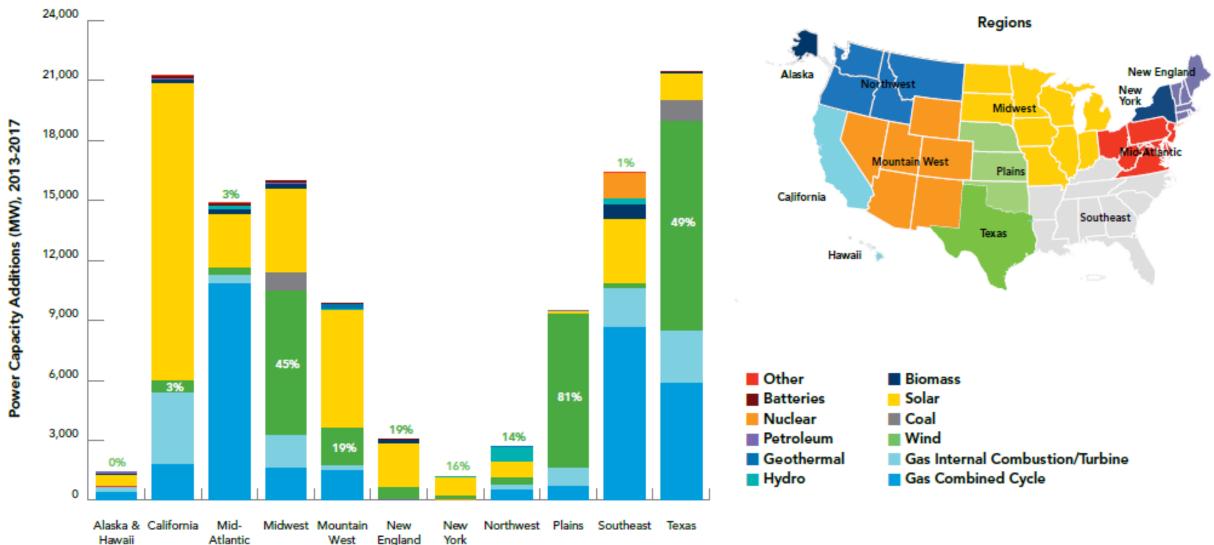
• U.S. electric sector added 26,716 MW of new electricity generating Natural gas: 10,502 MW • Solar: 8,576 MW • Wind: 7,017 MW

• All renewable energy sources captured 60% of new capacity additions over the last five years.

 Wind accounted for 25% of capacity additions over last 5 years, and 31% over last 10 years



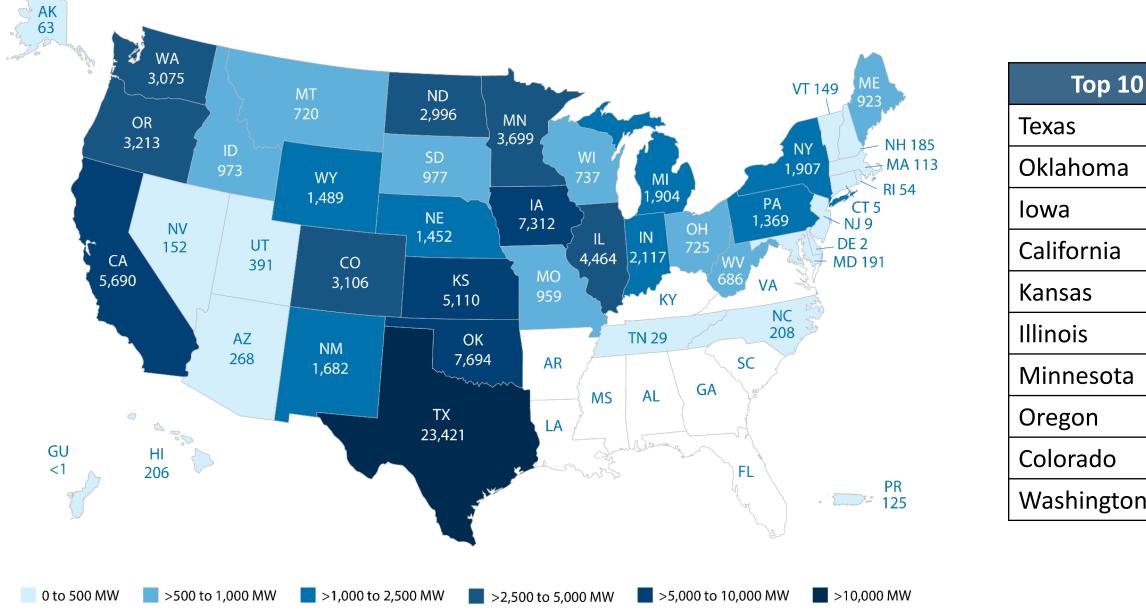
Wind #1 source of new capacity in Midwest, Plains, & Texas







Wind Power Capacity in 41 States, Guam, and Puerto Rico

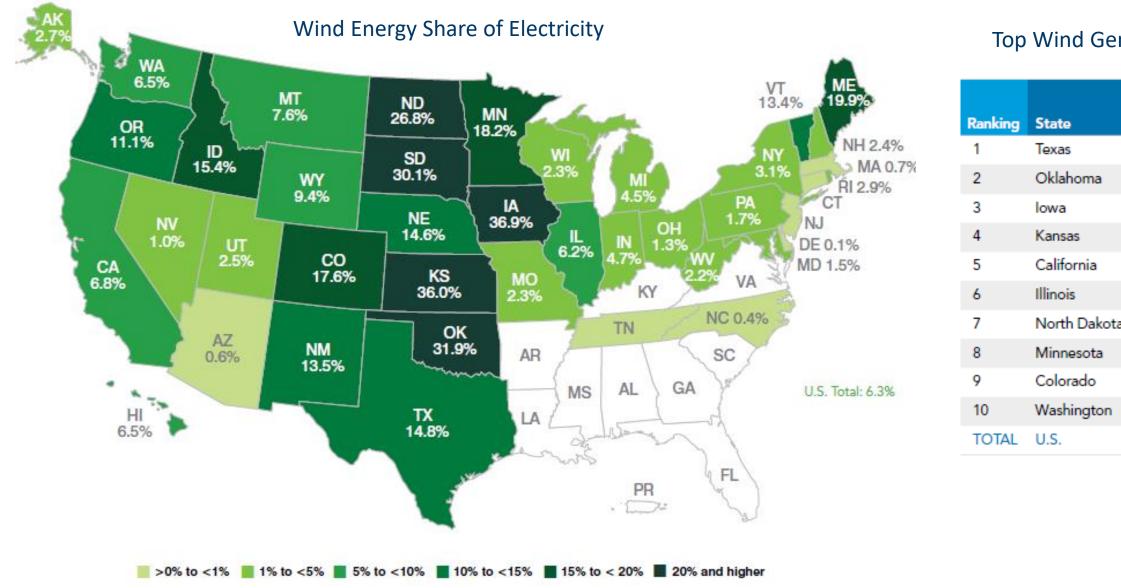


Source: AWEA U.S. Wind Industry Third Quarter 2018 Market Report

Wind States					
	23,421 MW				
	7,694 MW				
	7,312 MW				
	5,690 MW				
	5,110 MW				
	4,464 MW				
	3,699 MW				
	3,213 MW				
	3,106 MW				
ו	3,075 MW				



Wind Energy Provided 6.3% of U.S. Electricity in 2017



Source: AWEA U.S. Wind Industry Annual Market Report Year Ending 2017

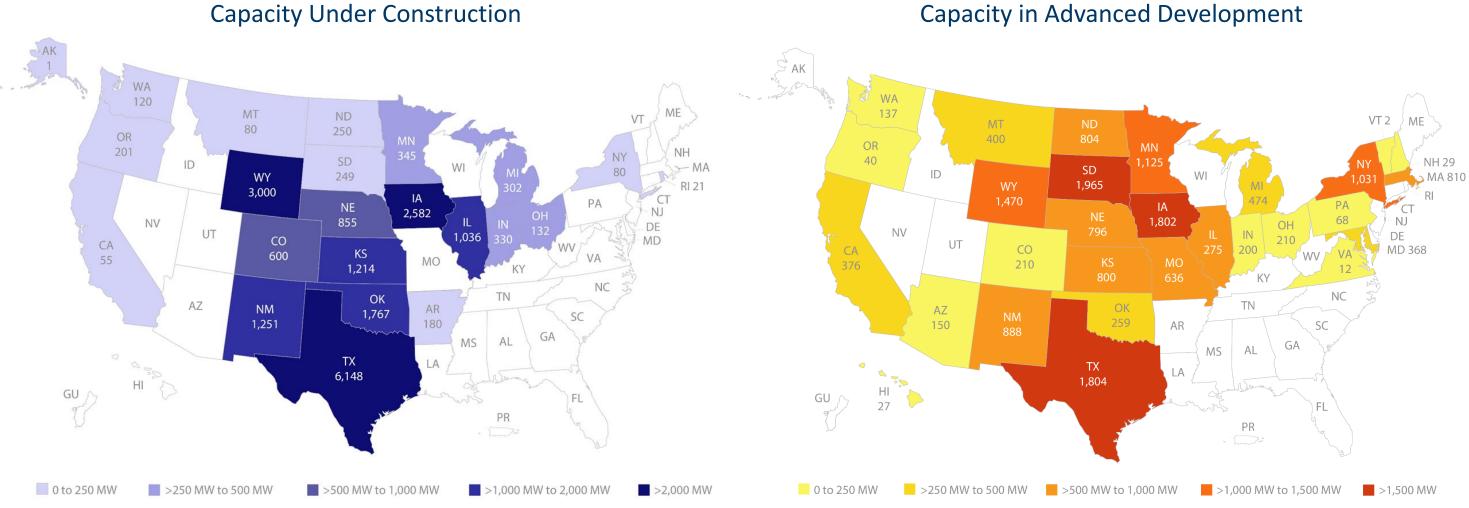


Top Wind Generation States in 2017

	Wind Generation (Thousand MWh)	Equivalent Average U.S. Homes Powered
	67,092	6.24 million
	24,404	2.27 million
	20,816	1.94 million
	18,501	1.72 million
	13,971	1.30 million
	11,297	1.05 million
а	10,987	1.02 million
	10,885	1.01 million
	9,567	889,000
	7,481	695,000
	254,254	23.6 million



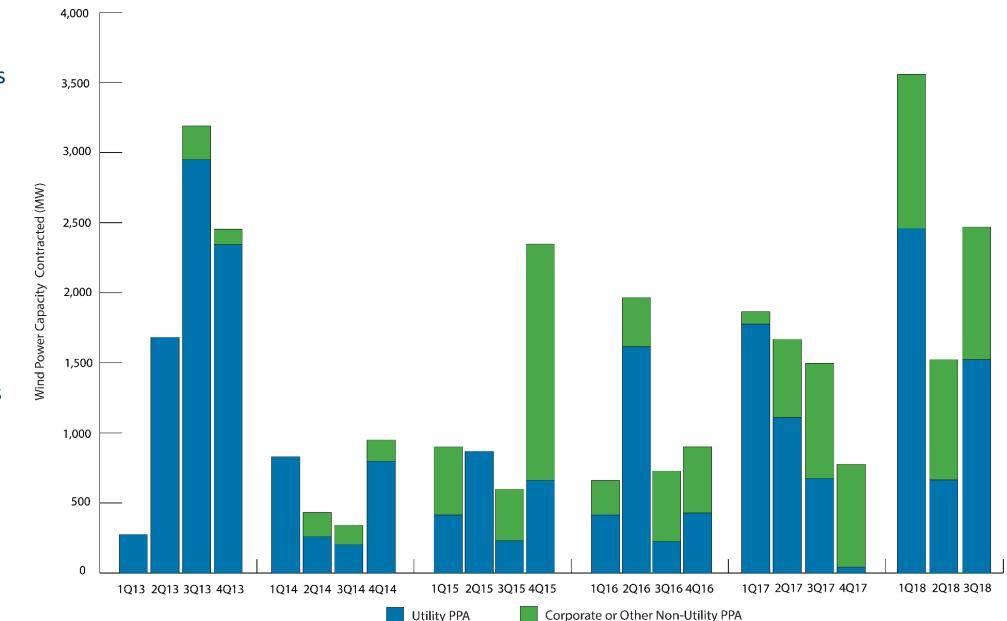
37,965 MW Under Construction or in Advanced Development







PPA activity highlights strong wind demand from utilities and corporates



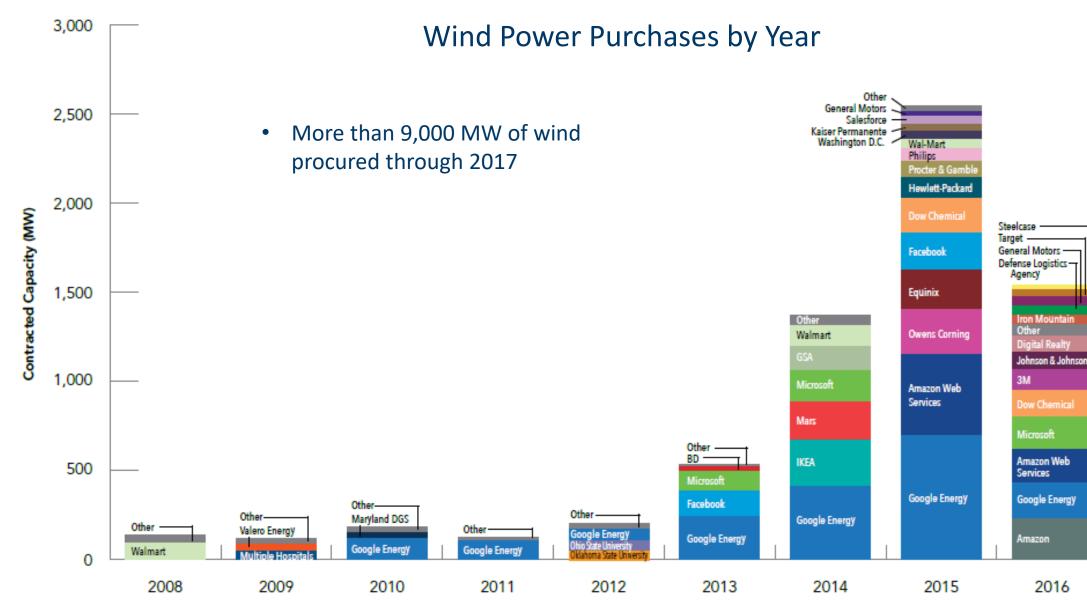
- Developers signed 2,467 MW of PPAs in 3Q, contributing to 7,550 MW for the year
- 2018 is already a record year for corporate procurement of wind power, with companies signing PPAs totaling 2,904 MW through 3Q
- Offshore entered the mix with Vineyard Wind executing a PPA for 800 MW with Massachusetts utilities

Source: AWEA U.S. Wind Industry Third Quarter 2018 Market Report





U.S. Wind Power Purchasers: Corporate and Non-Utility Customers





Other

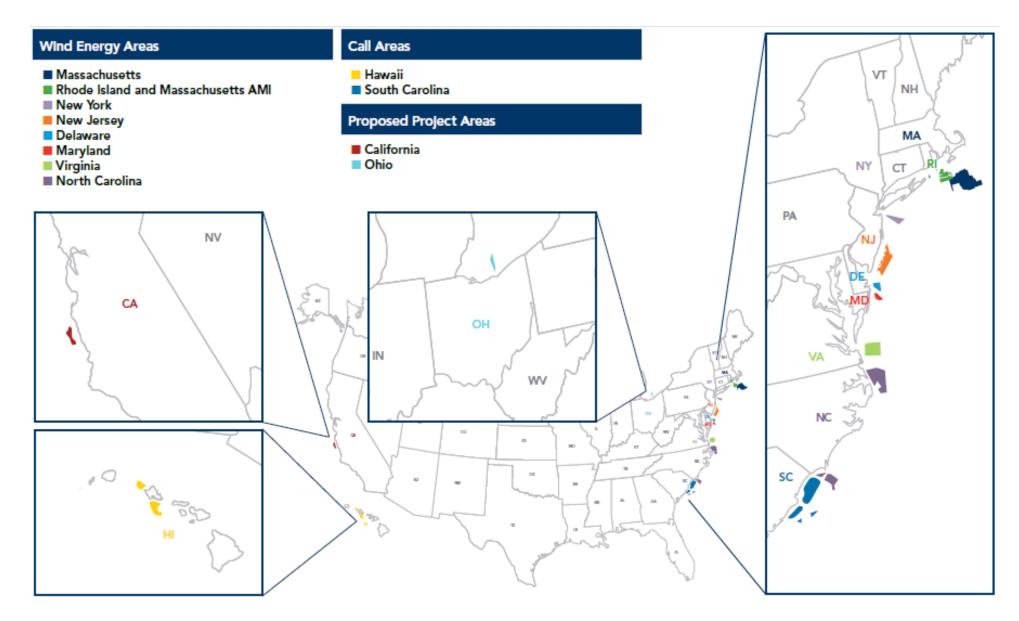
Intuit Home Depot
JPMorgan Chase Digital Realty
BART Goldman Sachs
Cummins
Akamai Technologies
General Mills
Target
Anheuser-Busch
T-Mobile
Facebook
General Motors
General Motors Apple

2017



U.S. Offshore Wind Energy

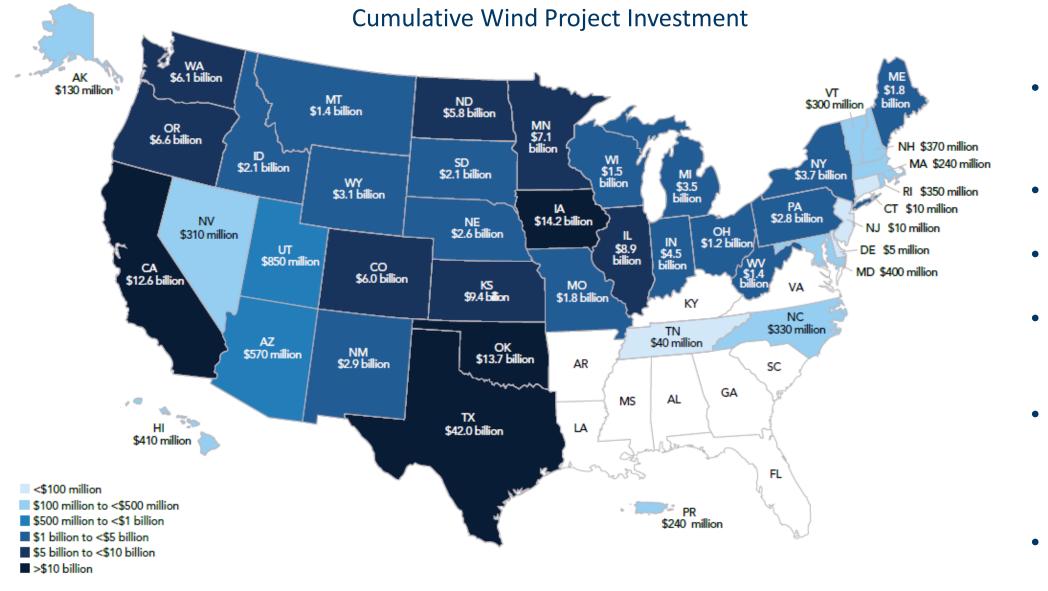
- First U.S. offshore wind project online in December 2016
 - 30 MW Block Island Wind Farm
- 14 proposed offshore wind projects spanning 10 states at the end of 2017
- 5 projects with PPAs or ORECs
- Proposed projects represent over 12,500 MW of potential offshore wind development
- Project sizes range from 12 MW up to 2,000 MW







Economic & Environmental Benefits



• \$145 billion in private capital investment over past 10 years

- 105,500 American jobs
- Wind energy avoided
- nitrogen oxides
- gallons



Landowner lease payments • ~\$267 million in 2017

Property, local, and state tax revenue

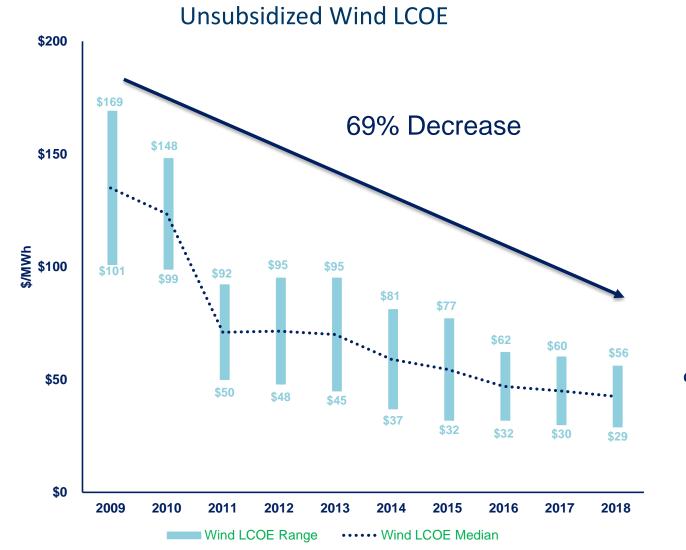
189 million metric tons of CO₂ in 2017

Displaced 415 million pounds of sulfur dioxide and 270 million pounds of

Reduced water consumption at existing power plants by 95 billion



Market Drivers: Cost Reductions





\$111

\$112

\$103

\$100

\$98

Source: Lazard's Levelized Cost of Energy Analysis 12.0



LCOE Comparison

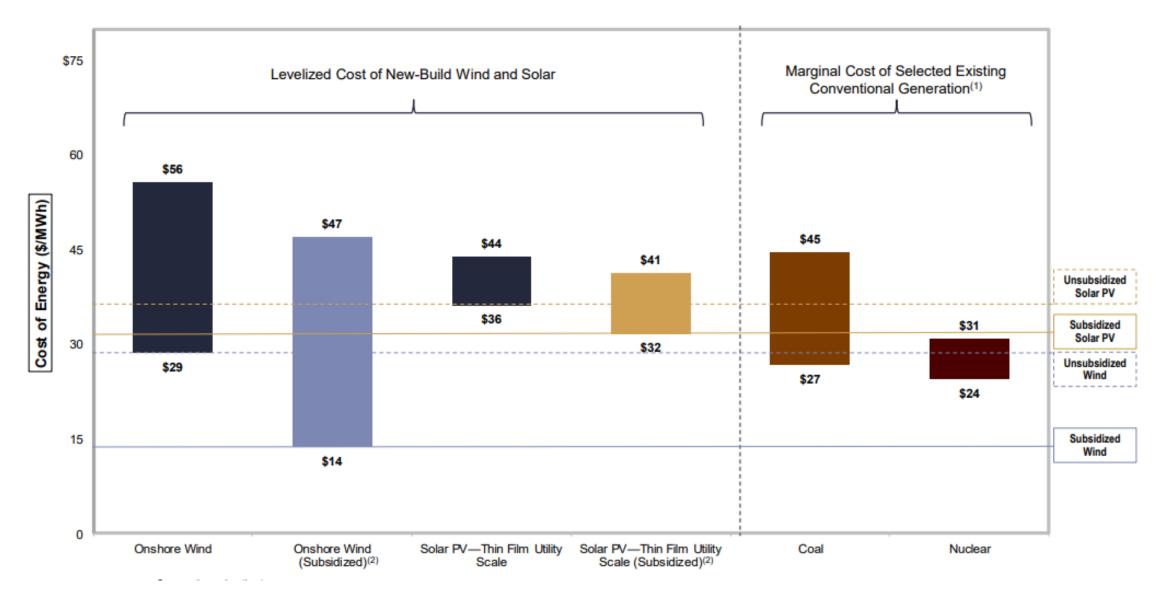


Wind is one of if not the lowest cost sources of new power in most U.S. markets

\$150	\$200	\$250	\$300
ional			



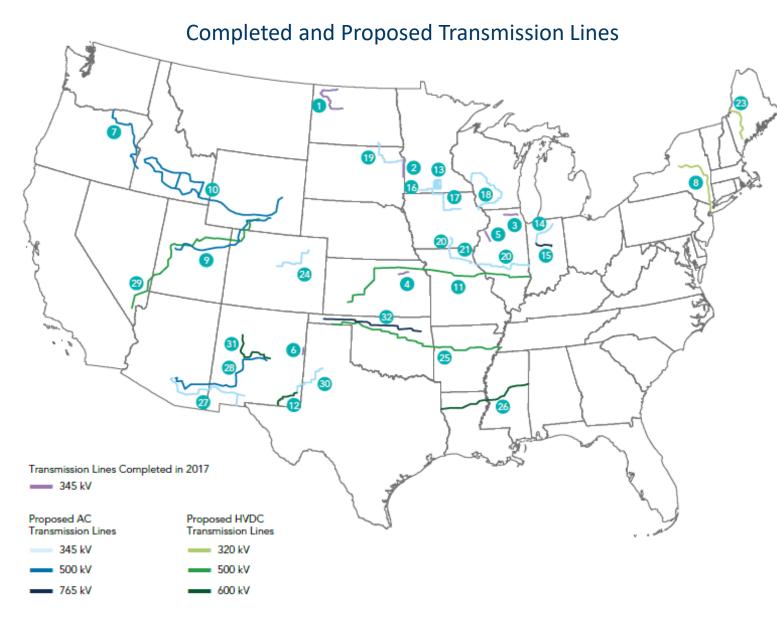
Wind increasingly competitive with existing generation







Drivers: Investment in Transmission Remains Critical



- load centers
- Critical to approve and build \bullet in development
- •

Source: AWEA U.S. Wind Industry Annual Market Report Year Ending 2017



Transmission needed to transport wind energy from remote areas to

transmission projects currently

Near-term transmission projects in development could support tens of thousands of additional wind MWs



Thank You!

