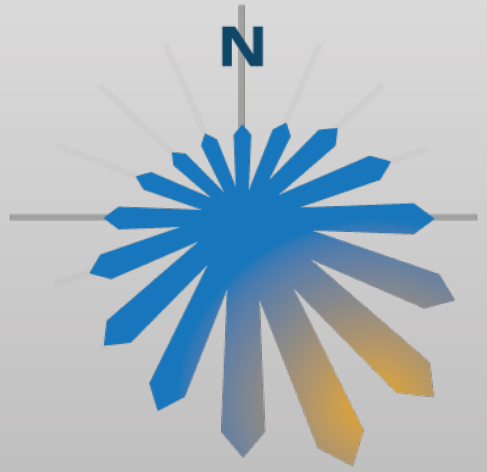
EO 57 Work Group
Wind Energy

January 10, 2017

Katharine Kollins, President, SEWC



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SEWC Overview

- SEWC focuses on outreach and education to advance the wind industry in the Southeast. We take an objective, data-driven, and business focused approach to understanding and communicating the economic case for wind energy in the Southeast
- We promote collaboration, information sharing, working together to make wind a more viable option
- Given how new the resource is to the Southeast, resistance to wind can be strong – SEWC plays an important role in education

EO 57 Recommendations

1. Declare wind energy in the best interest of the ratepayer (similar to solar and offshore wind declarations)
   - Based on Cost and Economic Development Benefits
2. Allow the SCC to consider fuel diversity and economic development implications when assessing cost of new generation
3. Identify a task force consisting of DMME, the SCC, and Virginia utilities to reduce barriers to deployment of utility scale wind energy

Resource and Deployment

Does Virginia have developable wind resources?

Wind Generation by State

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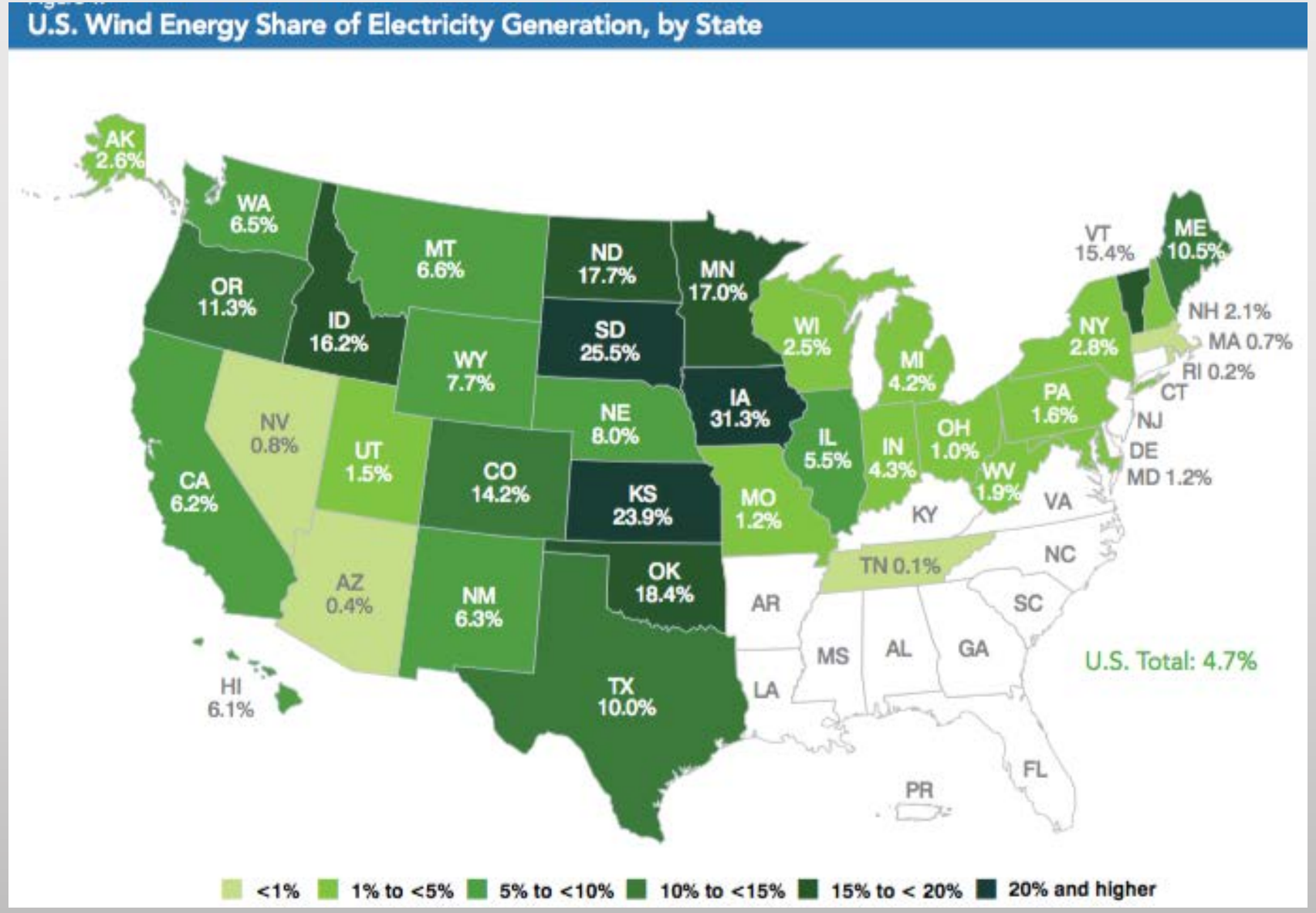
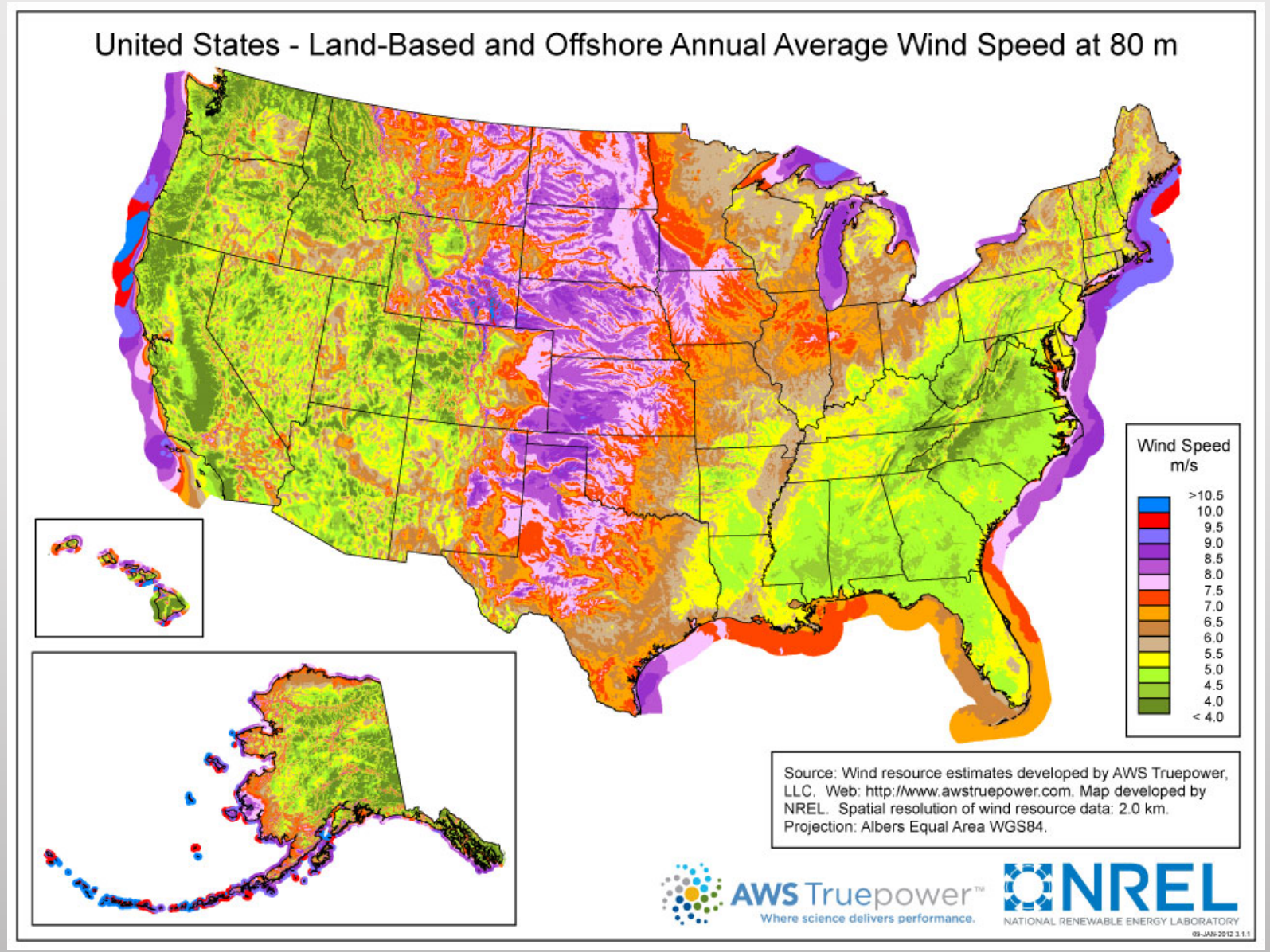


Source: AWEA 2015 Annual Market Report

U.S. Wind Speed at 80 m



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Technology

How to access better wind

Towers get Taller and Blades get Longer

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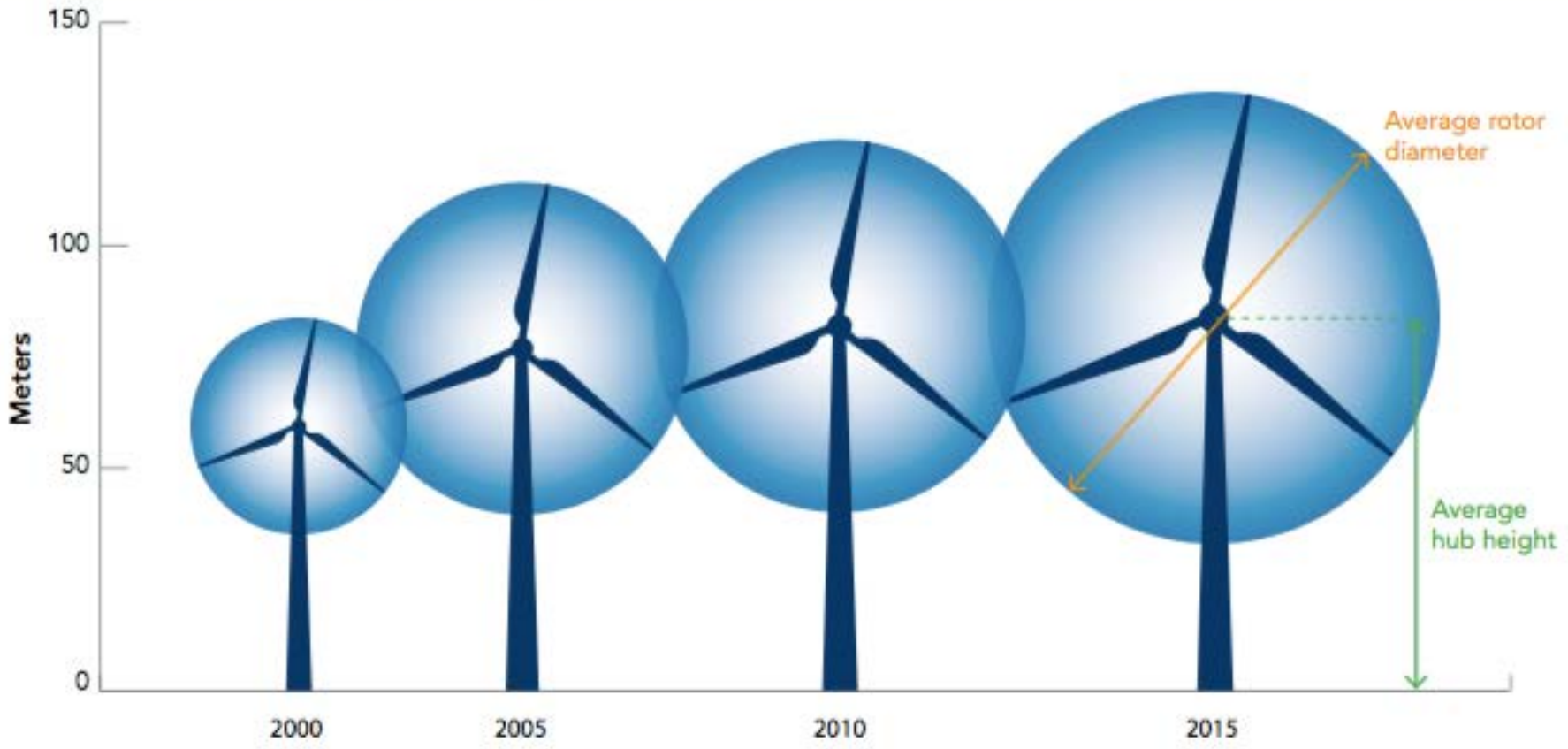
Evolution of the "Average" Utility-Scale Turbine



Year	Average Hub Height (m)	Average Rotor Diameter (m)
2000	58	49
2005	75	75

Year	Average Hub Height (m)	Average Rotor Diameter (m)
2010	80	84
2015	82	102

Source: AWEA 2015 Annual Market Report

Wind Technology Changes Open Up the Southeast

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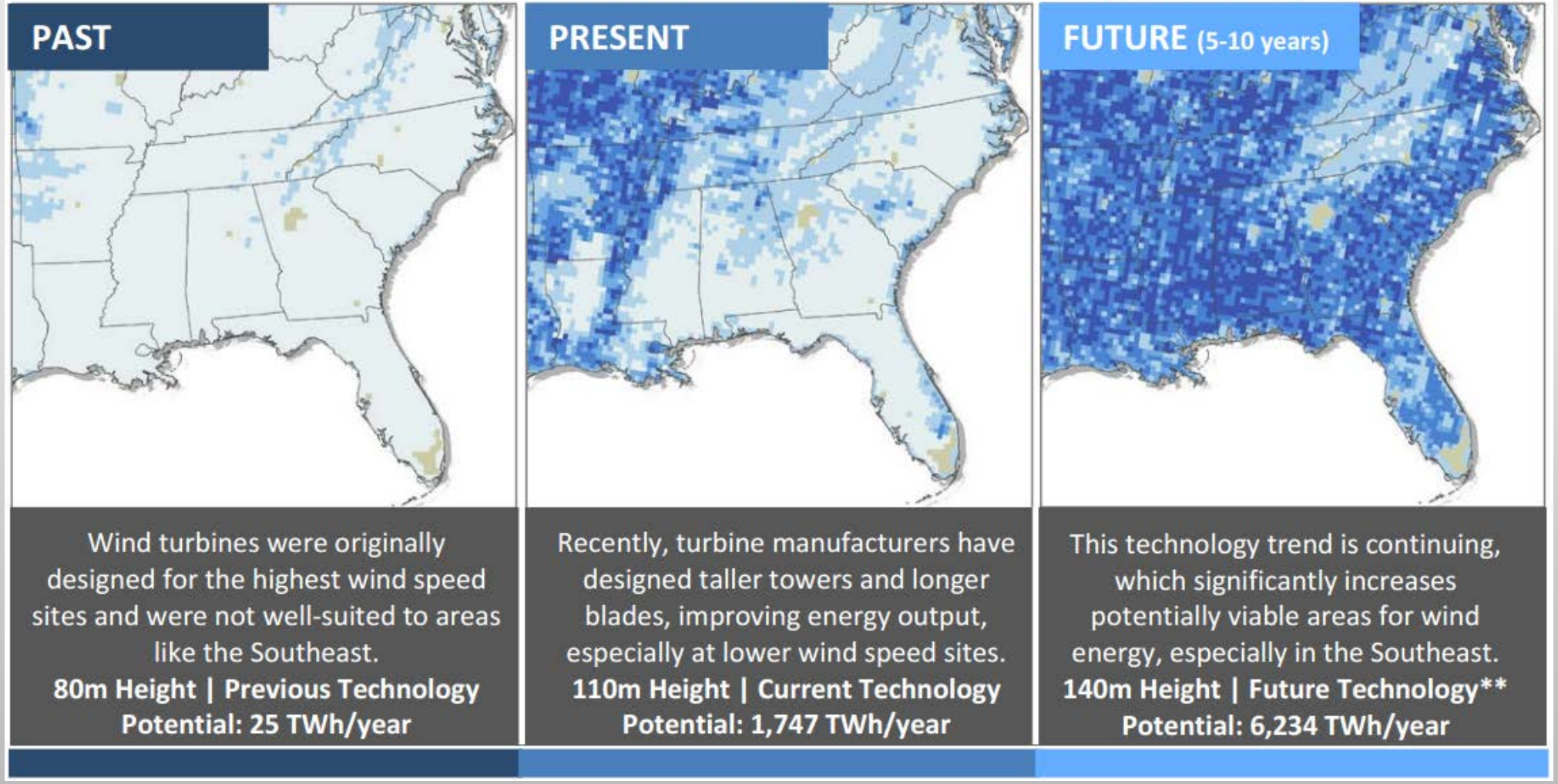
Resource Potential

Maps below estimate areas where wind energy could be economically viable* when using available turbine technology. Not all areas shown can be developed.



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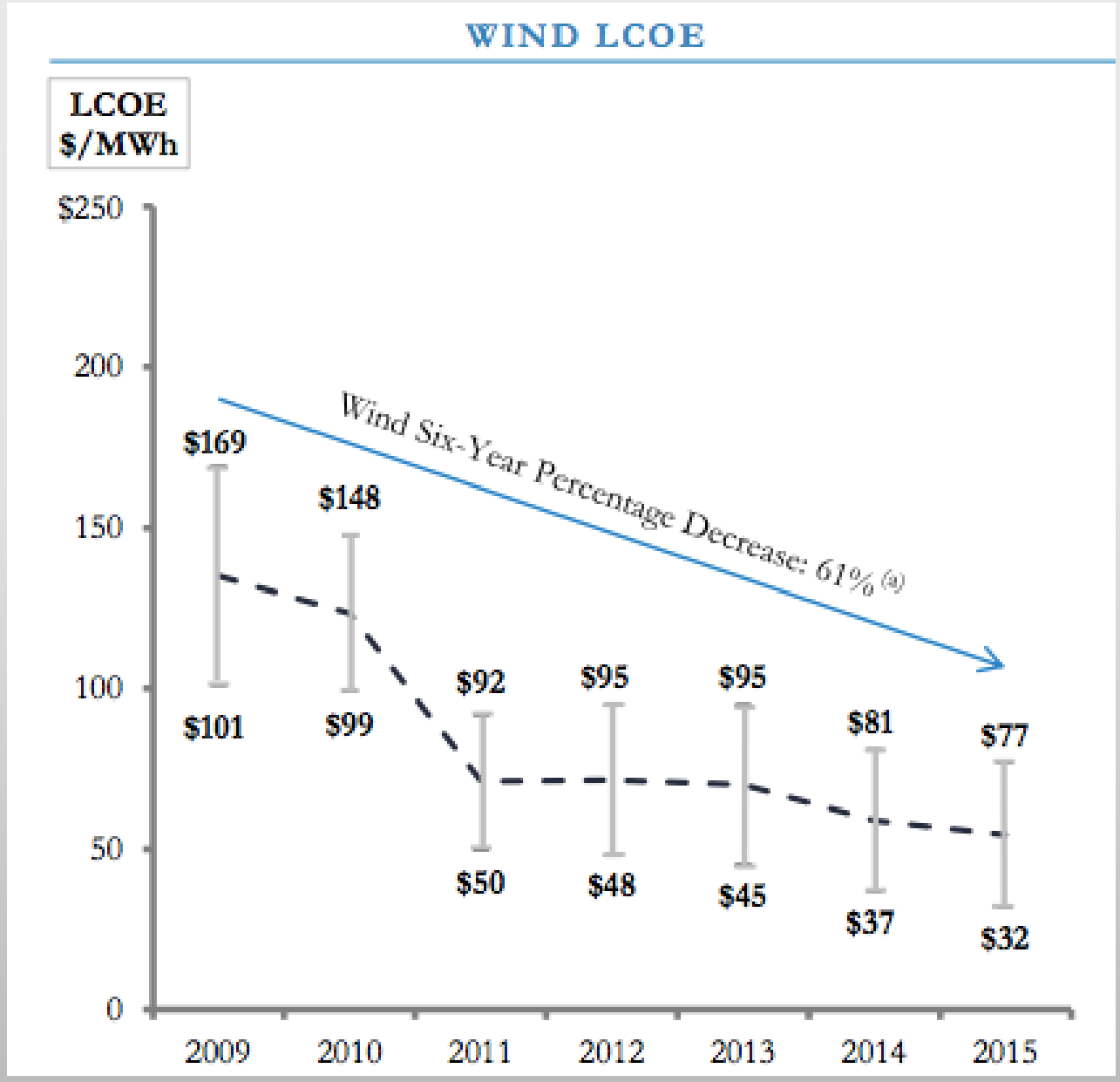
Cost

Energy cost comes down and county revenues go up

Levelized Cost of Energy over Time



Cost Comparison

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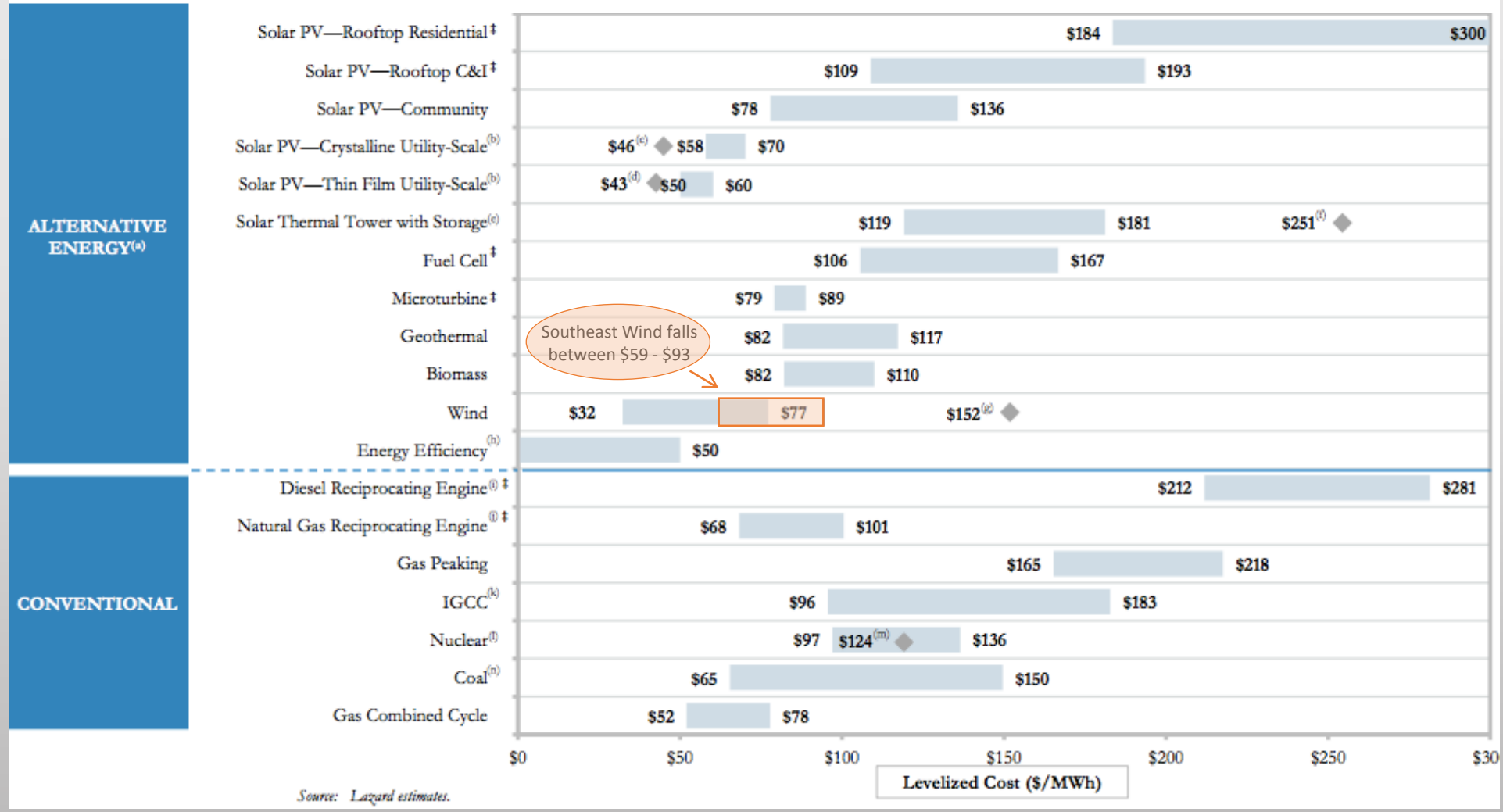
Unsubsidized Levelized Cost of Energy Comparison

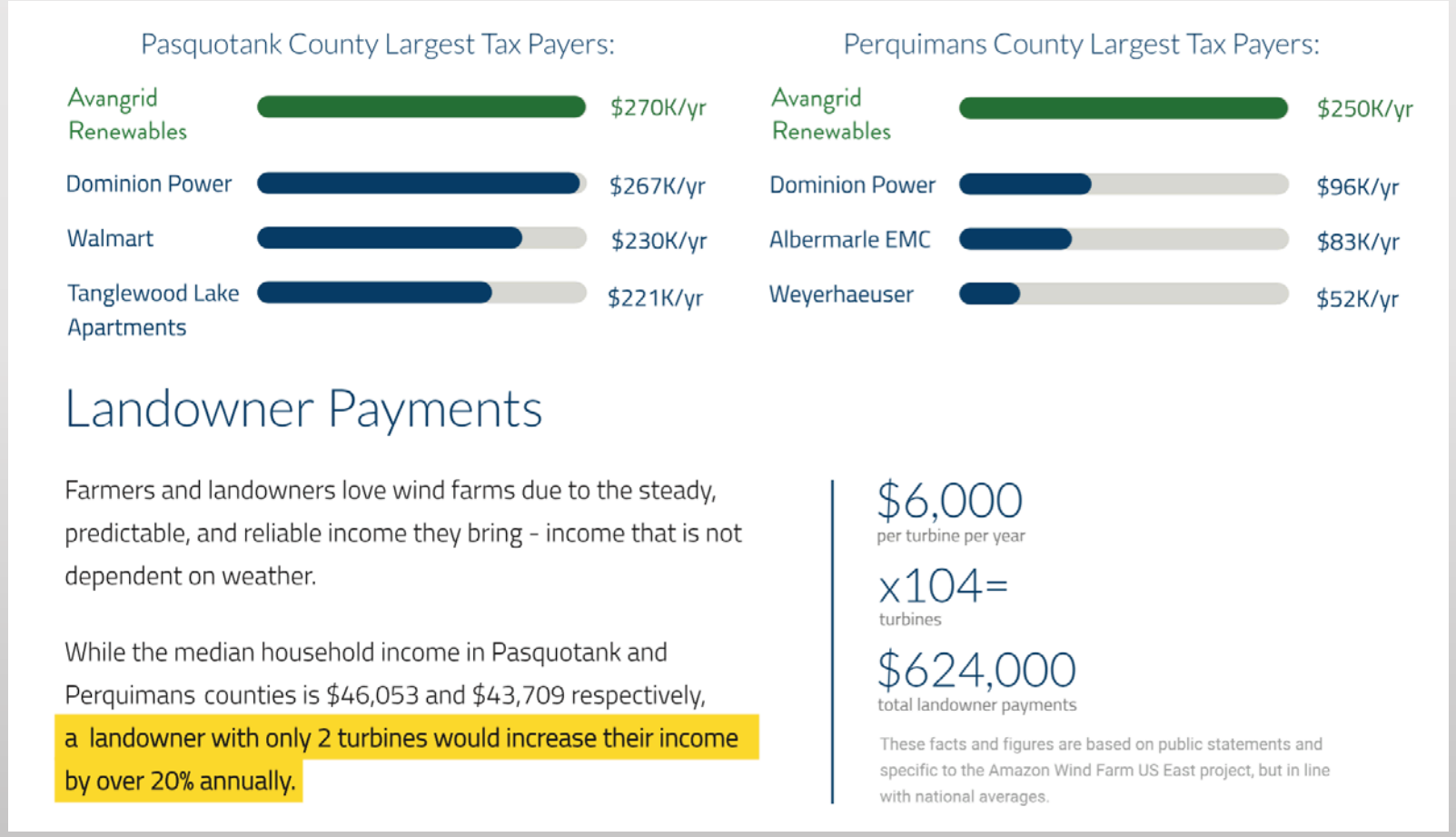
Certain Alternative Energy generation technologies are cost-competitive with conventional generation technologies under some scenarios; such observation does not take into account potential social and environmental externalities (e.g., social costs of distributed generation, environmental consequences of certain conventional generation technologies, etc.) or reliability-related considerations (e.g., transmission and back-up generation costs associated with certain Alternative Energy technologies)



Source: Lazard estimates.

Economic Development Benefits

- Wind energy is one of the best economic development tools available to rural communities
- Wind farms provide substantial tax revenues without the burden of additional service needs (new schools, roads, water, sewer)
- Just south of VA, the Amazon Wind Farm U.S East is already providing significant revenue to the counties and local landowners (see figures to right)
- Wind farms provide good paying jobs (~10 jobs / 100MW) that allow residents who want to stay in a rural setting to do so



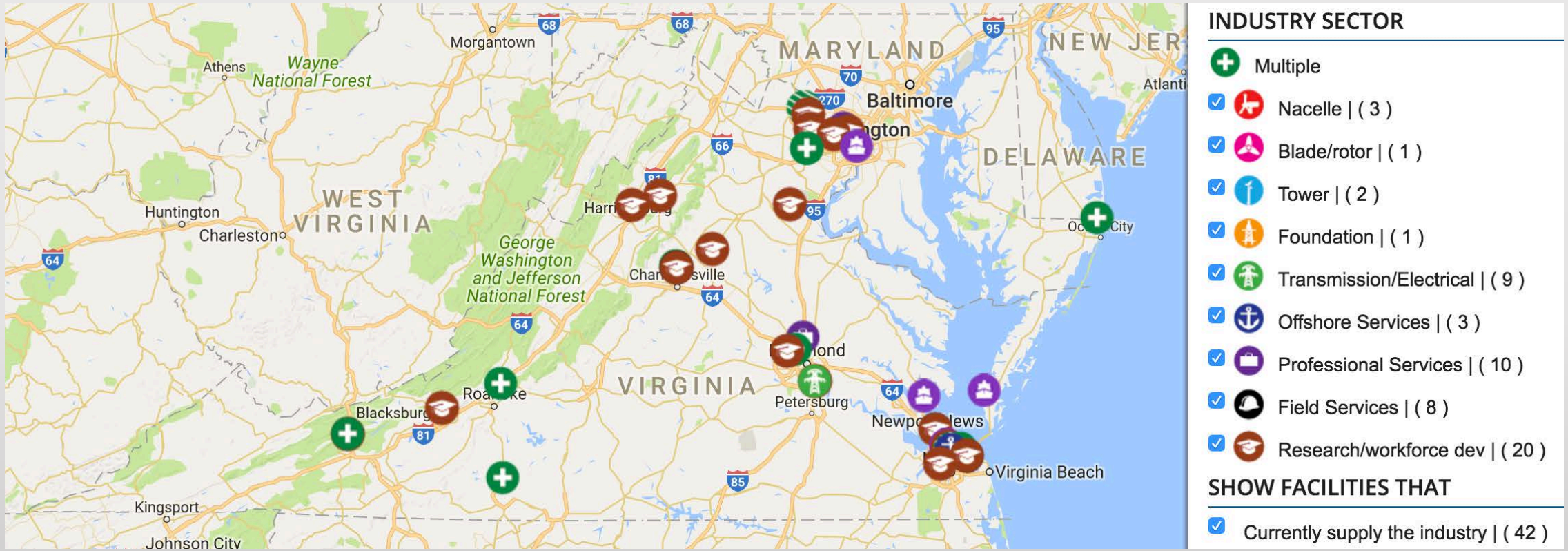
Virginia’s Wind Assets

wind How to leverage the state’s incredible wind assets and reduce barriers to adoption

Proposed Projects in Virginia

- Apex Clean Energy's Rocky Forge – 75 MW project being explored in Botetourt County
  - Up to 25 turbines to provide enough power to supply up to 20,000 homes annually
  - 150 FTE jobs during construction
  - $25-$30 million in county and state tax revenue over the life of the project
- EDP Renewables – approximately 72 MW project in Carroll County
  - Early stage development
- Dominion - project in Tazewell County
  - project has been stalled by local laws prohibiting wind
- Virginia Offshore Wind Technology Advancement Project – two turbine, 12 MW project 24 nm off the coast of Virginia Beach
  - Currently on hold due to estimated cost

Wind Energy Supply Chain in Virginia



Virginia is home to 29 companies and 35 facilities currently participating in the wind sector

- Virginia wind companies include: Apex Clean Energy, Defense Holdings Inc, BGB Technology Inc, Tetra Tech, and Renewable Engineered Systems
  - Apex Clean Energy – 250-person renewable energy company headquartered in Charlottesville and built more new wind projects than any other company in the country last year

Virginia's Port Assets Can Support Thousands of Offshore Wind Jobs

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- In total, the continental shelf off Virginia could support 47,900MW of wind generation
- In April 2015, BVG Associates performed an evaluation of 10 Virginia ports to assess readiness to accommodate seven different offshore manufacturing and construction activities (blade manufacturing, generator manufacturing, nacelle assembly, tower manufacturing, foundation manufacturing and staging, submarine cable manufacturing, and construction staging)
    - The report found that five of these ports offer a high level of readiness, with the top two, Portsmouth Marine Terminal and Newport News Marine Terminal, potentially requiring less than $10M in upgrades to allow for co-located offshore activities.
- A 2013 Navigant offshore supply chain study estimated the economic impacts of upgrades to a port that might serve the offshore wind market include
    - Employment levels of 600 to over 17,000 FTE jobs
    - Incremental state GDP ranging from $48M to $1.3B
    - Each additional component manufacturing facility added to the port supports 4.200 FTE jobs and $440 M incremental GDP

EO 57 Recommendations

1. Thanks to continually improving technology, wind can be cost competitive in Virginia, especially when economic development benefits are considered.
   - Declare wind energy in the best interest of the ratepayer (similar to solar and offshore wind declarations)
   - Allow the SCC to consider fuel diversity and economic development implications when assessing cost of new generation

2. Virginia has incredible infrastructure and assets to support an industry that would provide thousands of jobs and billions in private investment capital. Stakeholders must work together to find the best path forward for unleashing this potential and capitalizing on existing assets.
   - Identify a task force consisting of DMME, the SCC, and Virginia utilities to reduce barriers to deployment of utility scale wind energy (both land-based and offshore)

Thank you!

Questions?

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