

Overview of the DOE Wind Vision Roadmap

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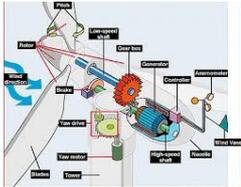
Why a Roadmap?

- Continued wind expansion requires focused attention
- The wind community and related stakeholders have a solid sense of what needs to be done to move wind forward; need to articulate this
- Description of broad needs provides a framework from which stakeholders can define and pursue specific relevant actions
- This framework provides a basis for assessing progress and revision as the situation changes
- Well-defined actions refute claims of vested interests who claim high shares of wind can't be achieved

Wind Vision Roadmap Content

- 9 Action Areas (next slide)
- 33 top-level Actions
- All Actions support one or more of Three Key Themes
 - Reduce Wind Costs
 - Expand Developable Areas
 - Increase Economic Value for the Nation
- More-detailed, second-level actions in Roadmap Appendix

Wind Plant Technology Advancement



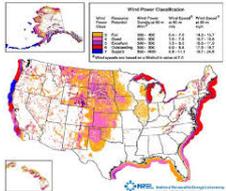
Supply Chain, Manufacturing and Logistics



Wind Power Performance, Reliability, and Safety



Wind Power Resources and Site Characteristics



Wind Electricity Delivery and Integration



Wind Siting and Permitting



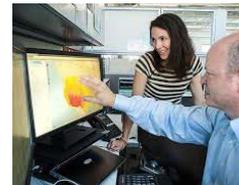
Collaboration, Education, and Outreach



Workforce Development



Policy Analysis



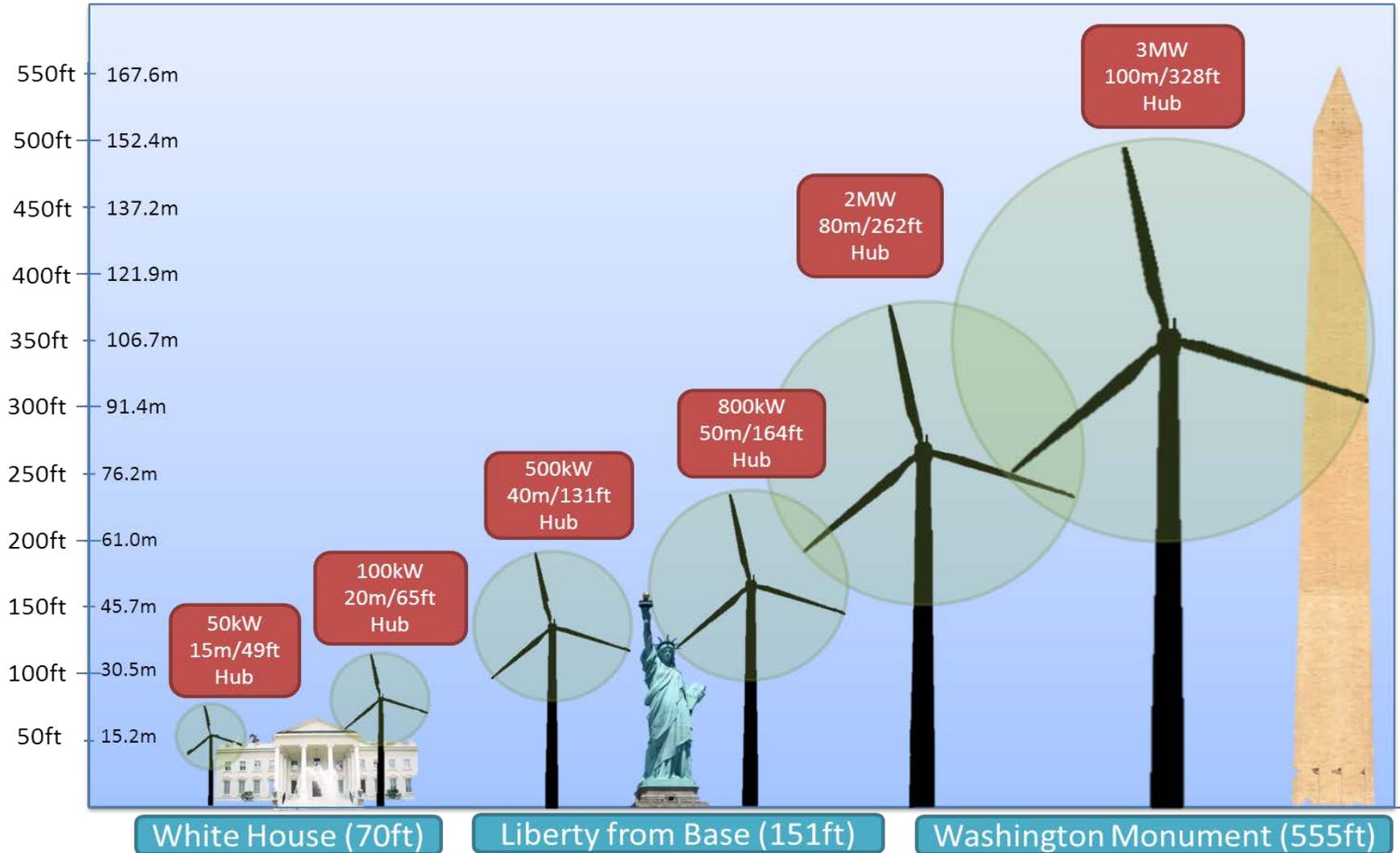
Actions Needed

- Government and Industry Research and Development
- Transmission Expansion, Wildlife Impacts Minimization, Efficient Siting and Permitting
- Continued Wind Energy Education and Outreach
- Consistent State, Regional and National Policy

Roadmap Needs Examples

- Technology advancement to expand wind to all 50 states
- Transmission expansion to bring wind to market and facilitate its integration into the electric power system

Evolution of Wind Turbine Size (Land Based)



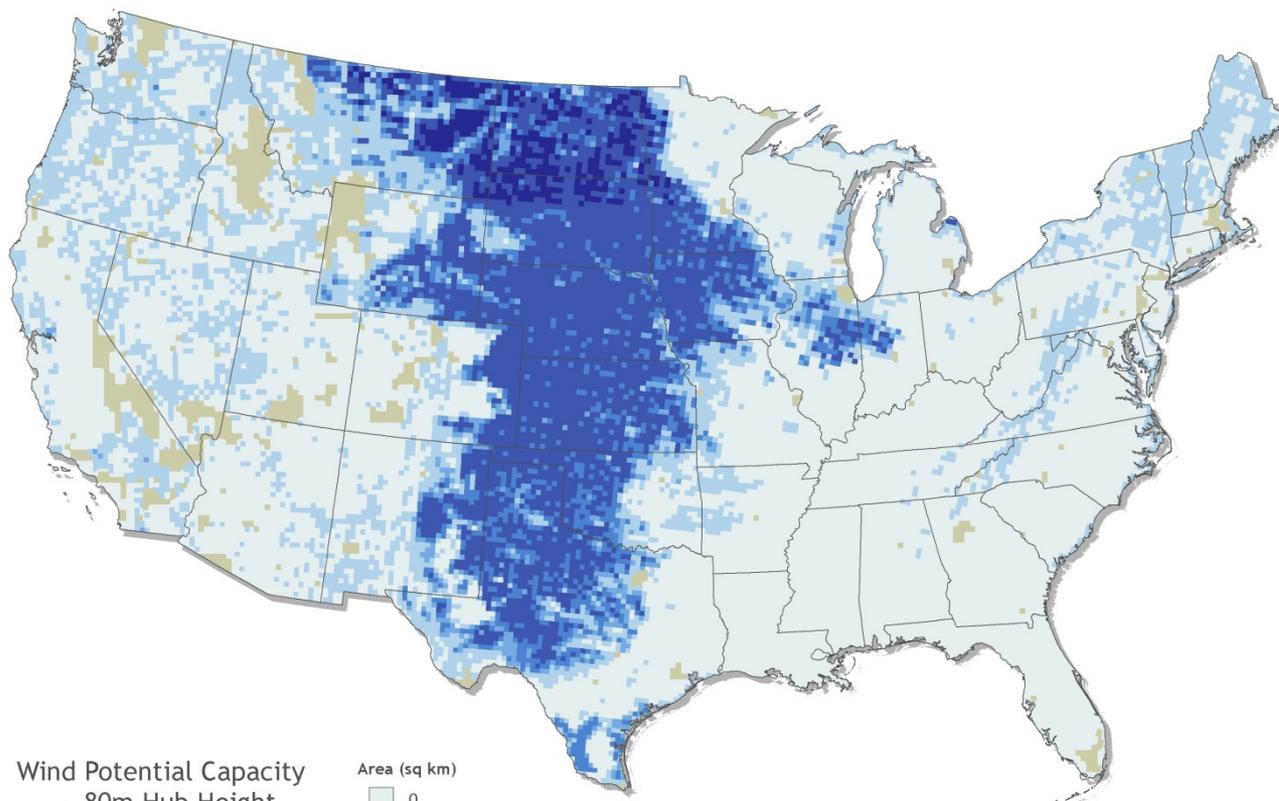
Yesterday's Technology

Estimates of Economically Viable Development

U.S. DEPARTMENT OF
ENERGY

Energy Efficiency &
Renewable Energy

Land area with a gross CF > 35% for a 2008 IEC Class 2 turbine at an 80 m hub height: 634,475 mi² above 35% GCF

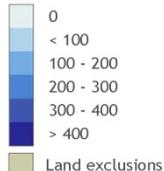


Wind Potential Capacity
at 80m Hub Height

35% or Higher
Gross Capacity Factor

2008 Turbine Technology

Area (sq km)

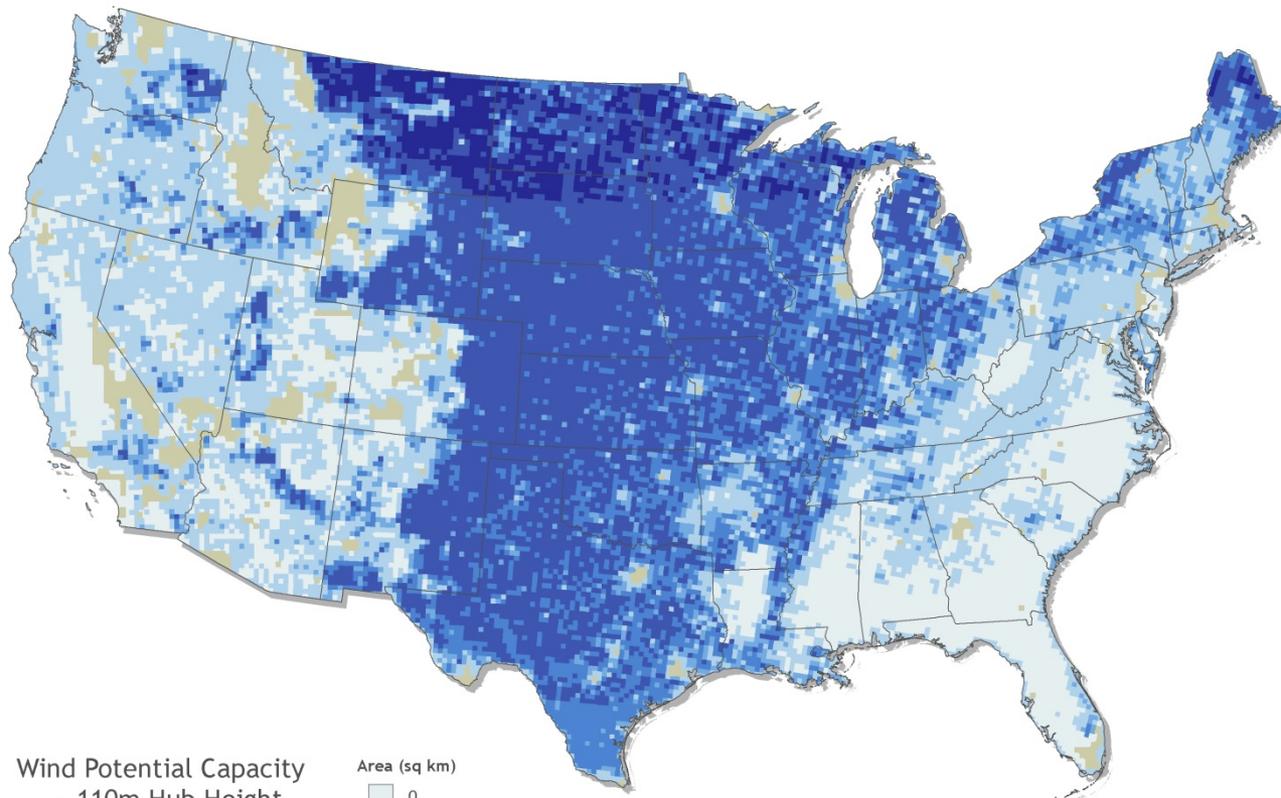


Data sources: AWS Truepower, National Renewable Energy Laboratory

This map was produced by the
National Renewable Energy Laboratory
for the Department of Energy.
October 2014



Land area with a gross CF > 35% for IEC class appropriate GE turbine at an 110 m hub height: 1.3 million mi² above 35% GCF

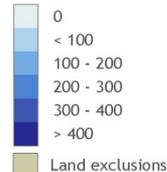


Wind Potential Capacity
at 110m Hub Height

35% or Higher
Gross Capacity Factor

2014 Turbine Technology

Area (sq km)



Data sources: AWS Truepower, National Renewable Energy Laboratory

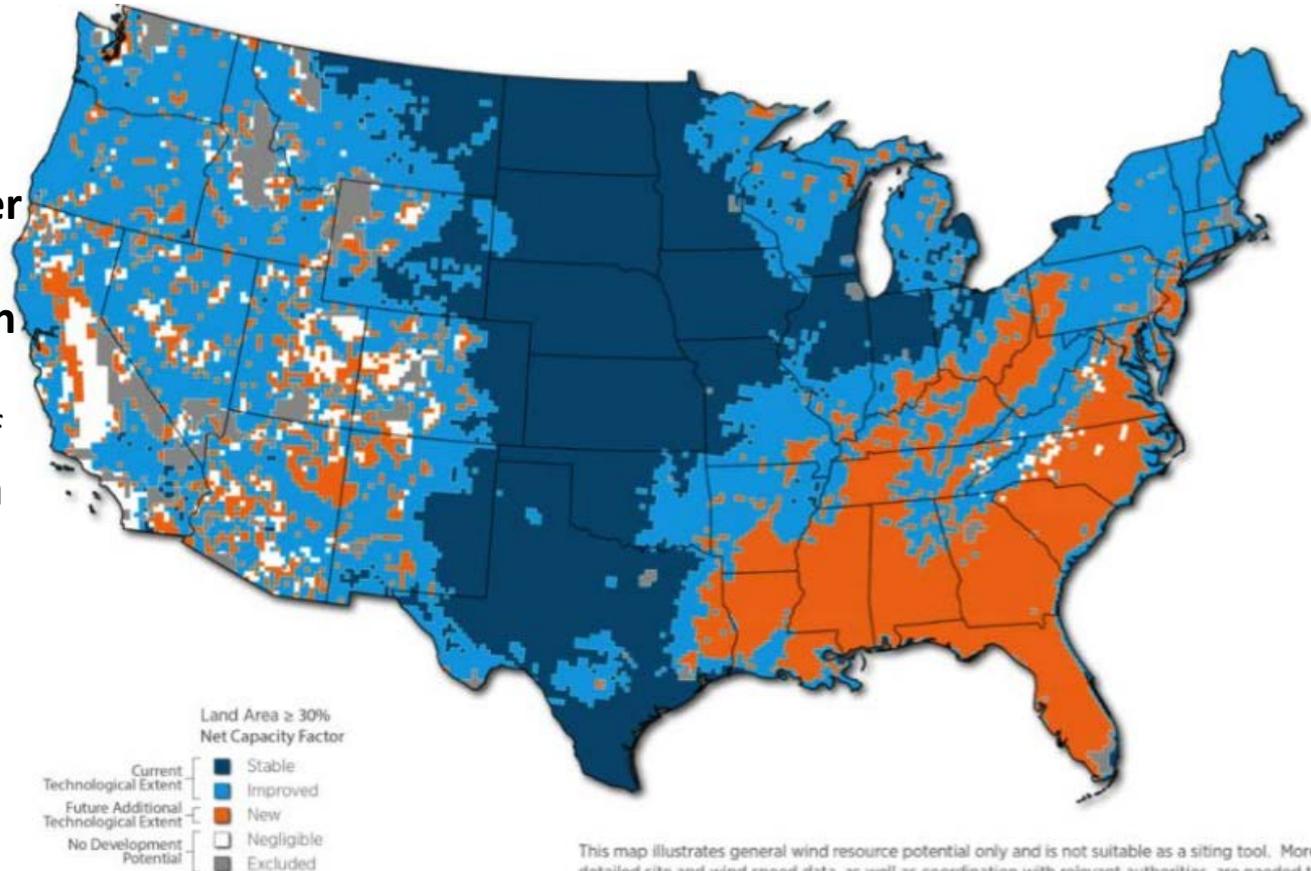
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National Renewable Energy Laboratory
for the Department of Energy.
October 2014



New Opportunities for Wind

Larger rotor designs and a 140 m hub height provide the opportunity for wind power to expand to all U.S. states.

Next generation wind turbines will unlock additional wind power resource potential across over 1.1 million square miles, nearly tripling the amount of developable land area for wind when compared with 2008 turbine technology;

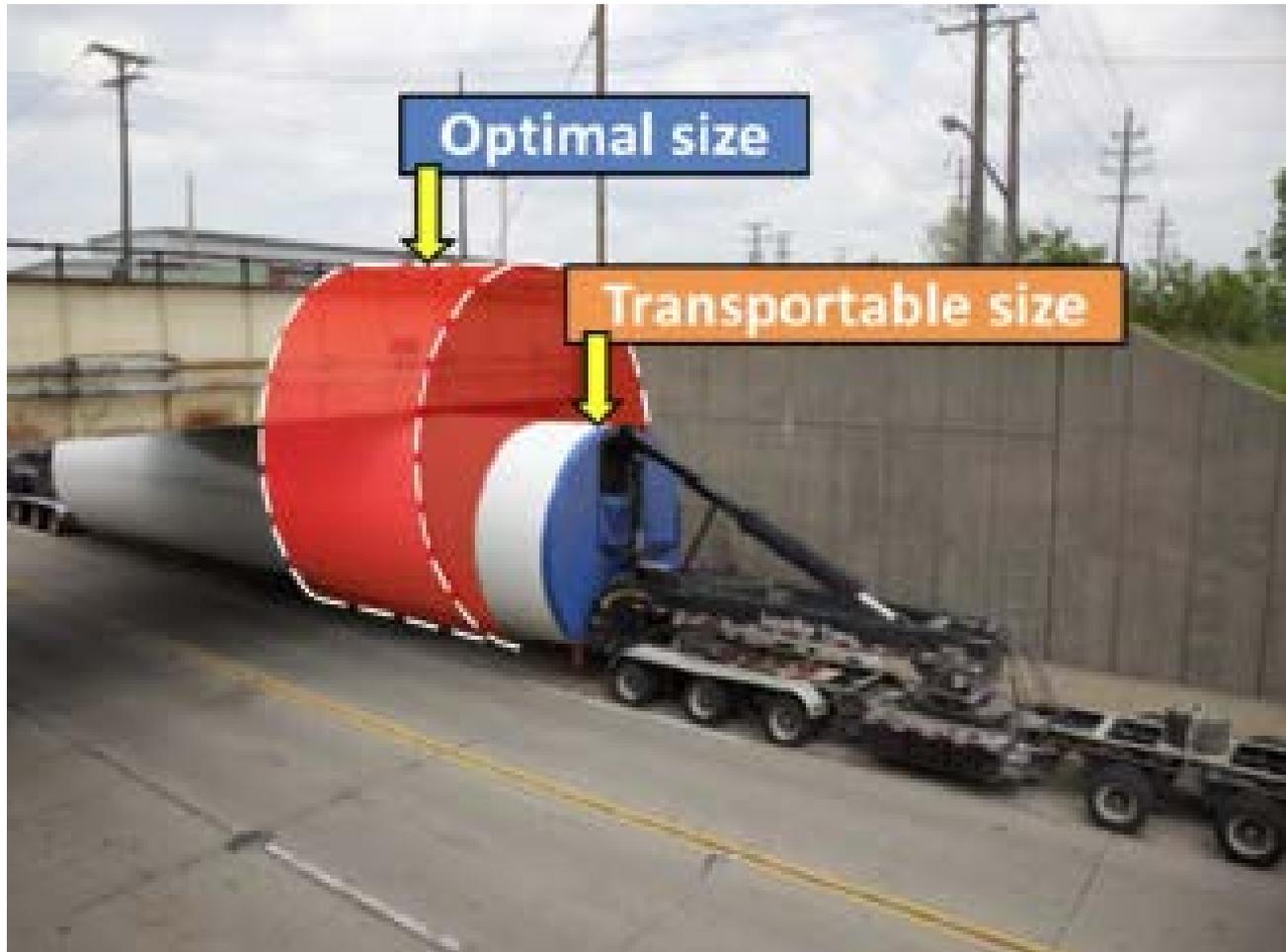


This map illustrates general wind resource potential only and is not suitable as a siting tool. More detailed site and wind speed data, as well as coordination with relevant authorities, are needed to thoroughly evaluate appropriate wind energy development at any given location.
Data sources: AWS Truepower, National Renewable Energy Laboratory

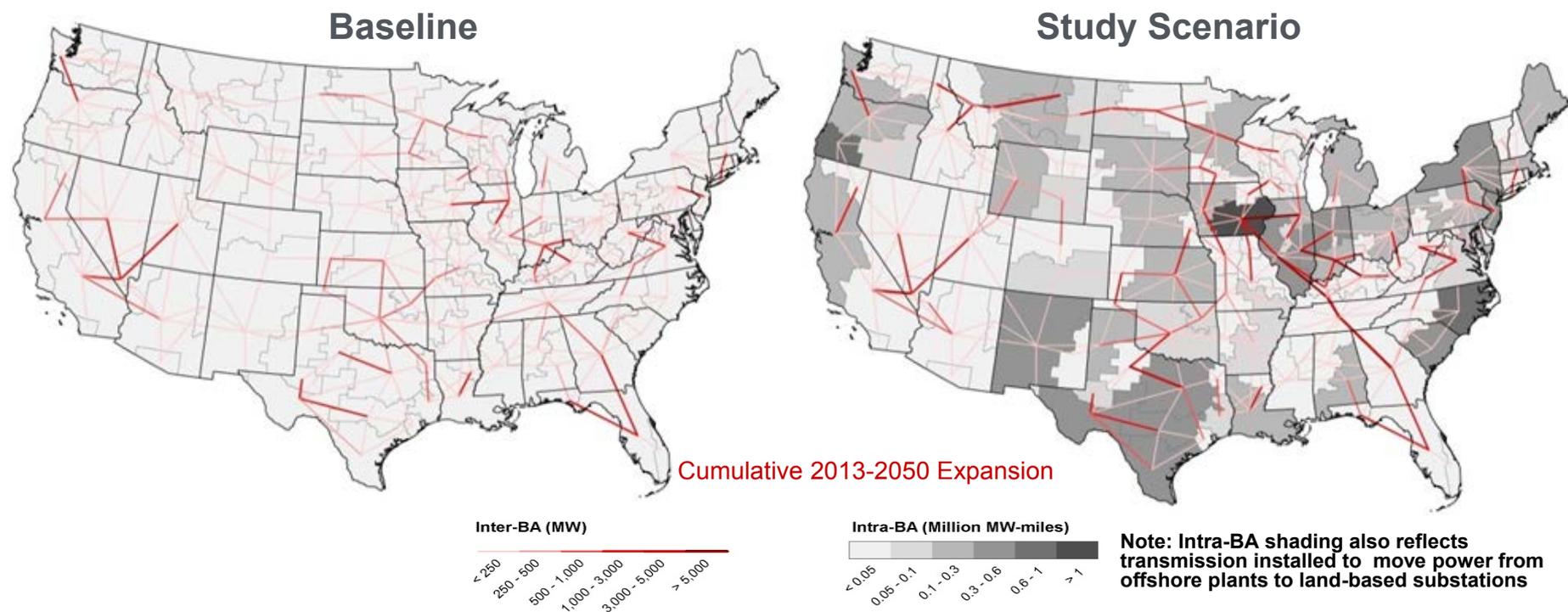
This map was produced by the
National Renewable Energy Laboratory
for the US Department of Energy
March 2015



Tower Transport Limitations



Example Results to Inform Priorities: Transmission Expansion



- Study Scenario requires transmission expansion beyond Baseline needs
- Annual additions comparable to those of recent years through 2030; somewhat higher beyond 2030
- Additions need to be in the “right” places to support wind energy transport and increase power-system flexibility
- Requires regional cooperation in approvals, siting and cost allocation

Pursuing the Roadmap

- All sectors need to engage to move the vision forward: wind industry, manufacturing and supply, electric power, regulatory, environmental-stewardship, state and federal governments
- All are encouraged to review the roadmap contents
 - Major omissions?
 - How can you contribute?
 - Convene periodically to review progress, revise as needed – as stakeholder sectors and with other sectors; process TBD

Roadmap Wrapup

- Expands on activities already under way in the nation
- Defines broad top-level activities for all major stakeholder sectors; based largely on their input
- Includes second level of definition provided in roadmap appendix
- Provides framework from which stakeholders can define specific activities at greater levels of detail
- Requires periodic review to assess progress and revise as needed
- Provides a defensible rationale against interests that may attack a national focus on wind power

Wind Vision

<http://energy.gov/eere/wind/wind-vision>

Enabling Wind Power Nationwide

<http://energy.gov/eere/wind/downloads/enabling-wind-power-nationwide>