Energy Webinar

MGA

America's Smartland

Midwestern Governors Association

June 26, 2018

The Smartland: Prepared, Agile and Empowered for the Future - Workforce, Infrastructure, Energy & Life

http://www.midwesterngovernors.org/chairagenda.htm

http://www.midwesterngovernors.org/AgileWorkforce.htm

Meeting Tomorrow's Workforce Needs

Nate Melby
Chief Information Officer

DAIRYLAND POWER COOPERATIVE
A Touchstone Energy® Cooperative

About Me

- Chief Information Officer (CIO)- Dairyland Power Cooperative
  - Practitioner/Academic Background
- Ph.D., Information Systems, Nova Southeastern University
- MBA, Technology and Training, University of Wisconsin- Whitewater
- B.S., Information Systems, University of Wisconsin- La Crosse
- Previously led cybersecurity for large global enterprise.

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Increasing Pace of Change

- Technology is adopted faster than every before [1].
  - Telephone: 75 years to reach 50 million users.
  - Airplanes: 68 years
  - Cars: 62 years
  - Lightbulbs: 46 years
  - Television: 22 years

[1] Ritholtz, B. (2017). *The World is About to Change Even Faster*. Bloomberg, July 2017.

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Increasing Pace of Change

- YouTube: 4 years
- Facebook: 3 years
- Twitter: 2 years
- Angry Birds: 35 days

- Creative Disruption causes demand for new skills.

Needed Skills

- Networking/Data Communications
- Data Analytics
- Project Management
- SCADA (Supervisory Control and Data Acquisition)
- IIoT (Industrial Internet of Things)
- GIS (Geographic Information Systems)
- Cybersecurity

Looking to the Future

- Trends
  - More data
  - Faster decisions require analytics
  - Technology is business… not just one part

- Mitigations
  - Local college partnerships
  - Internships

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Cybersecurity

- Skills needed
  - Threats change by the day
  - Skills need to match threats and best practices
  - Need to be able to rapidly learn

- Trends
  - Utility as cyber expert
  - Partnerships and outsourcing to gain skills

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Disruptive Industry Changes

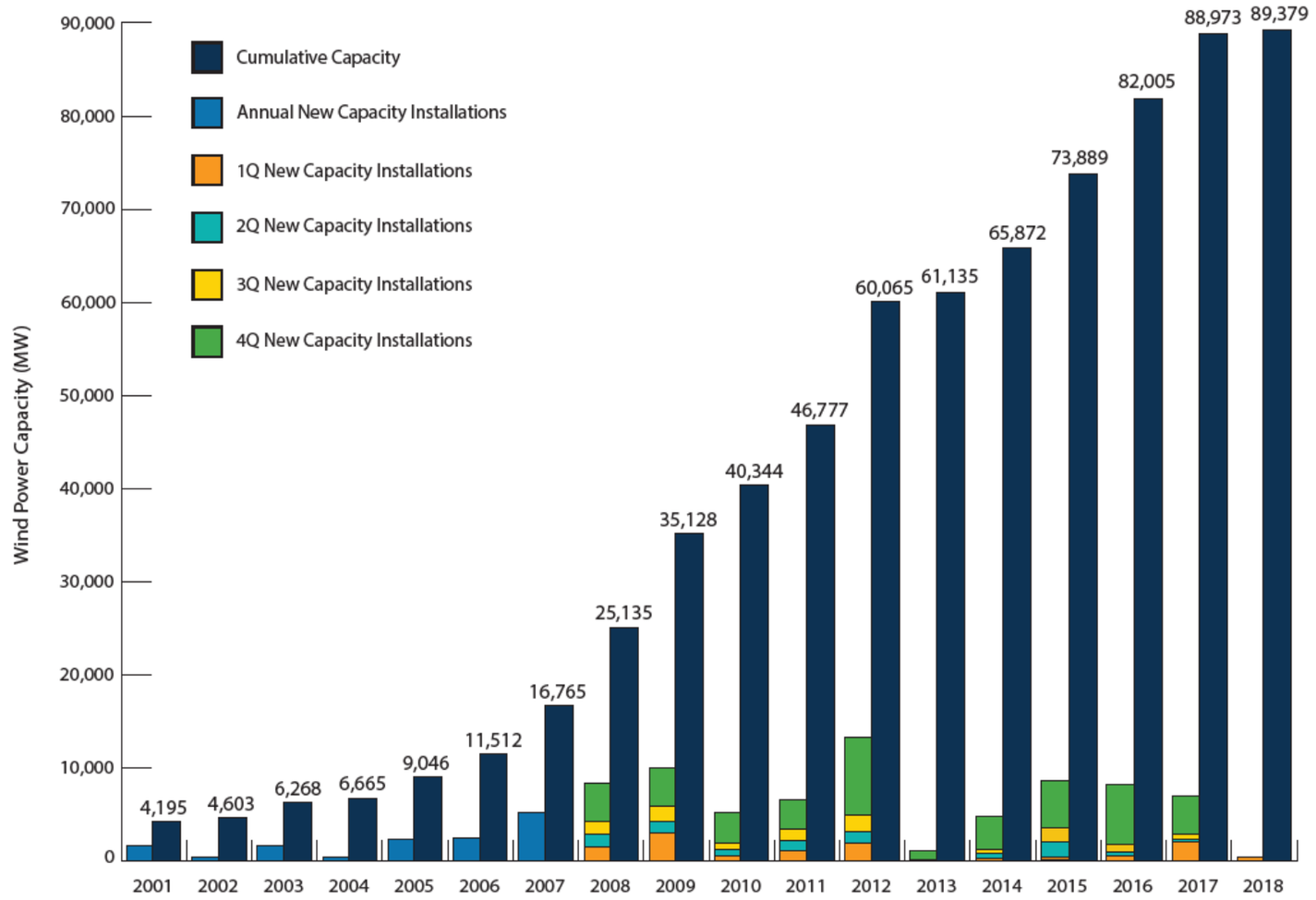
- Responding to Distributed Generation
  - Less centralized resources
    - Yesterday, power plants
    - Tomorrow, wind farms, solar, batteries, etc.
      - Greater need for data and expertise to build analytics for business decisions
  - More virtual
    - Yesterday, talent is local
    - Tomorrow, specialized talent is where the talent is

Energy Transformation: Wind in the Midwest

John Hensley
Sr. Director, Research & Analytics
American Wind Energy Association

AWEA® AMERICAN WIND ENERGY ASSOCIATION

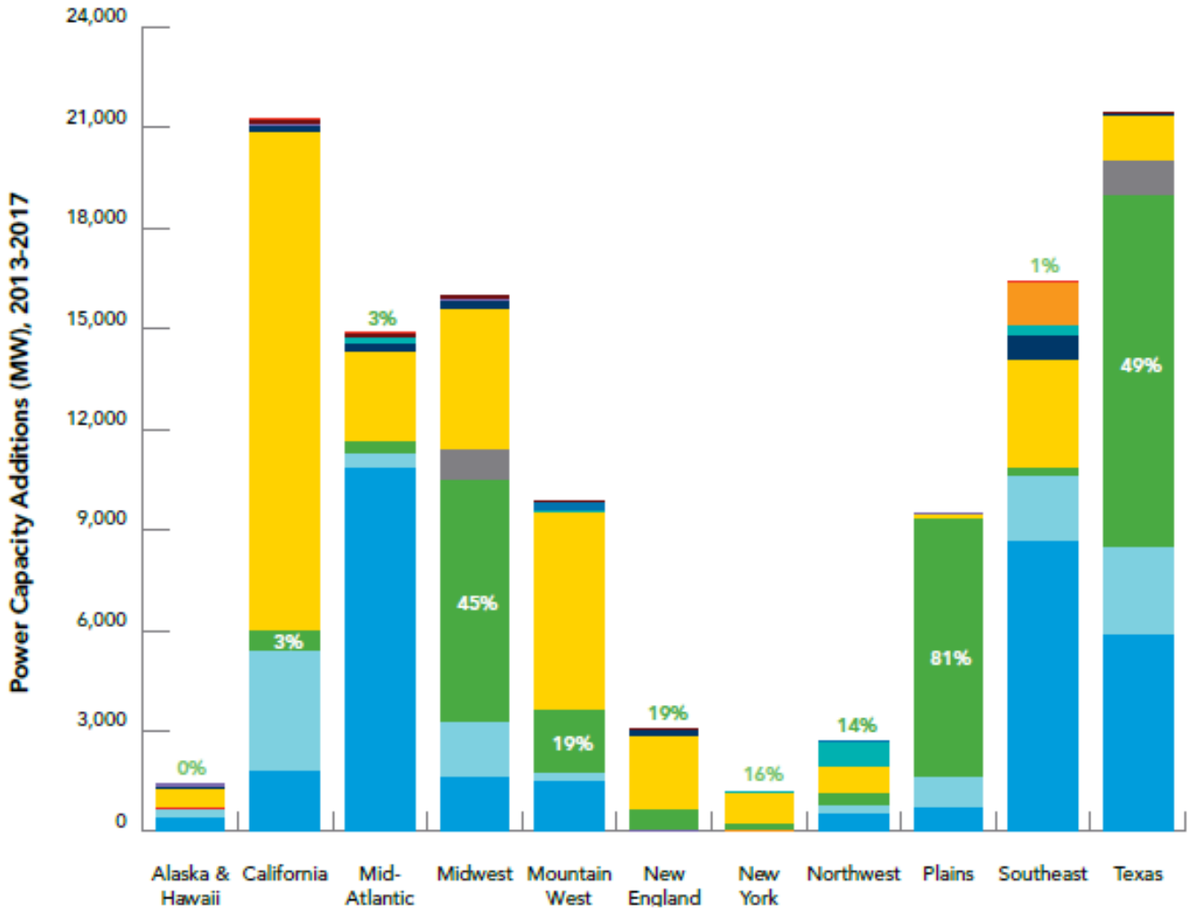
U.S. Annual and Cumulative Wind Capacity Growth

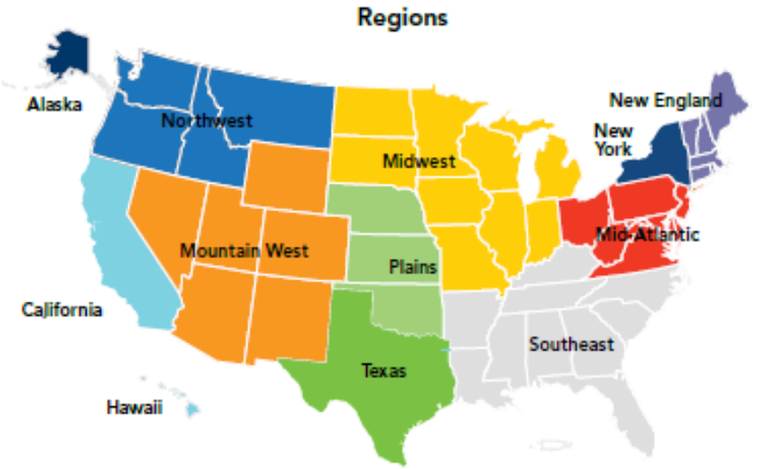


- Wind energy capable of powering 27 million American households with nearly 90,000 MW of wind power capacity operating at the end of 1Q 2018
- Over 54,000 wind turbines across the U.S.
- U.S. wind power capacity has more than tripled since 2008
- Wind is #1 renewable energy capacity source
- Over 7 GW added in each of last three years

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

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

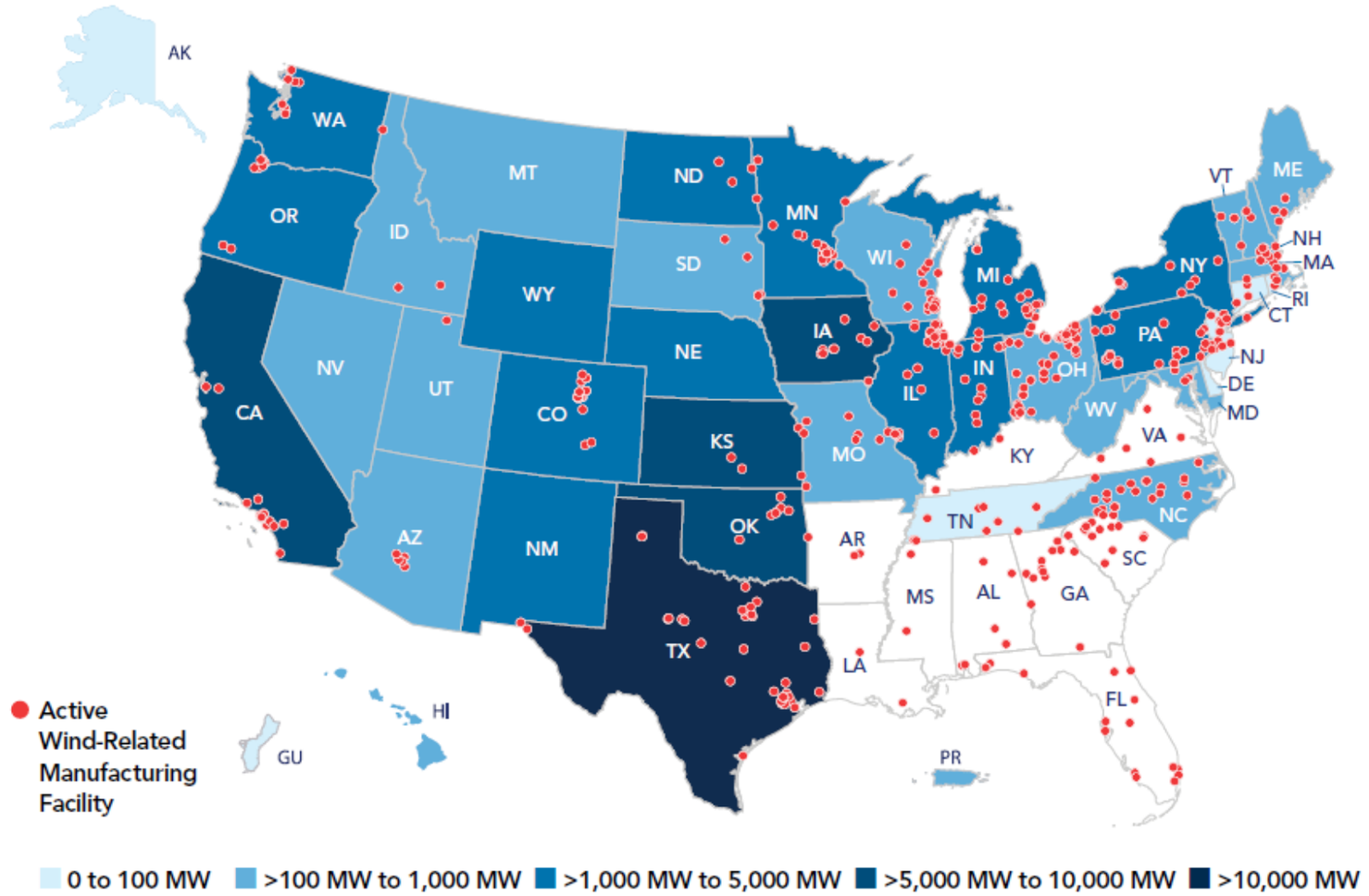




- Other
- Batteries
- Nuclear
- Petroleum
- Geothermal
- Hydro
- Biomass
- Solar
- Coal
- Wind
- Gas Internal Combustion/Turbine
- Gas Combined Cycle

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

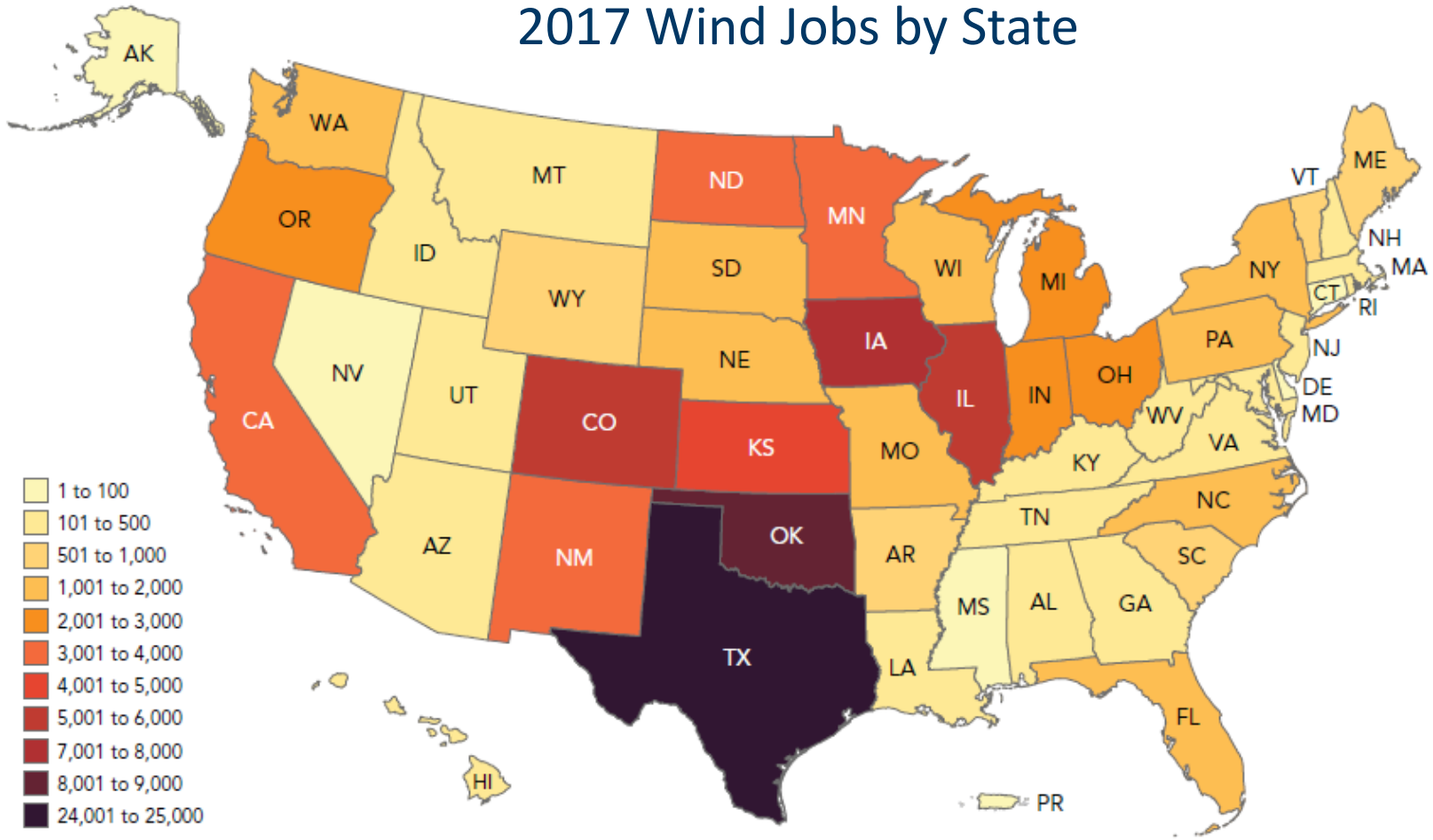
Strong manufacturing and project presence in Midwest



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

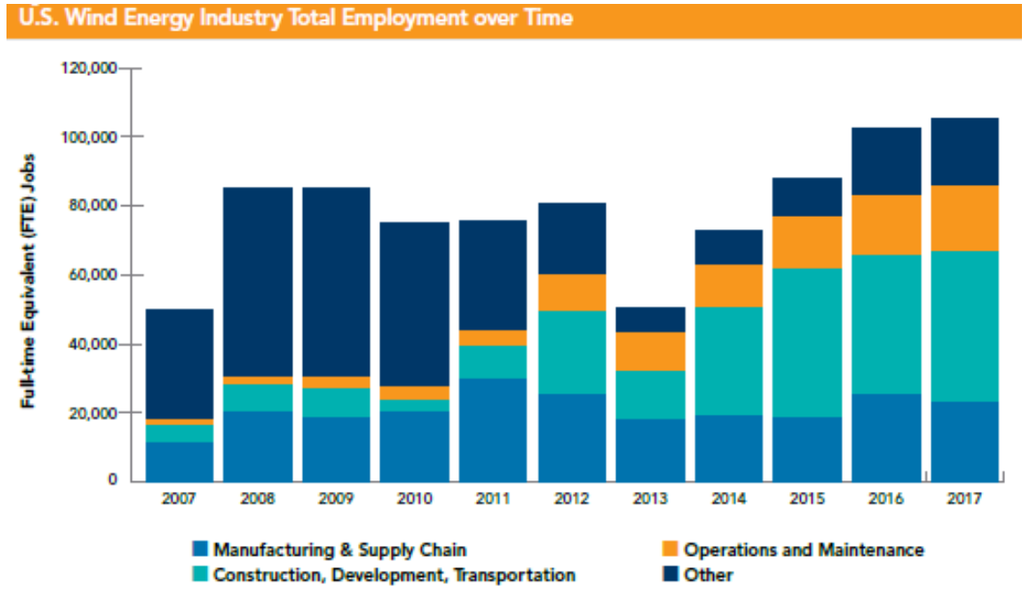
U.S. Wind Industry Employs 105,500 Americans

2017 Wind Jobs by State



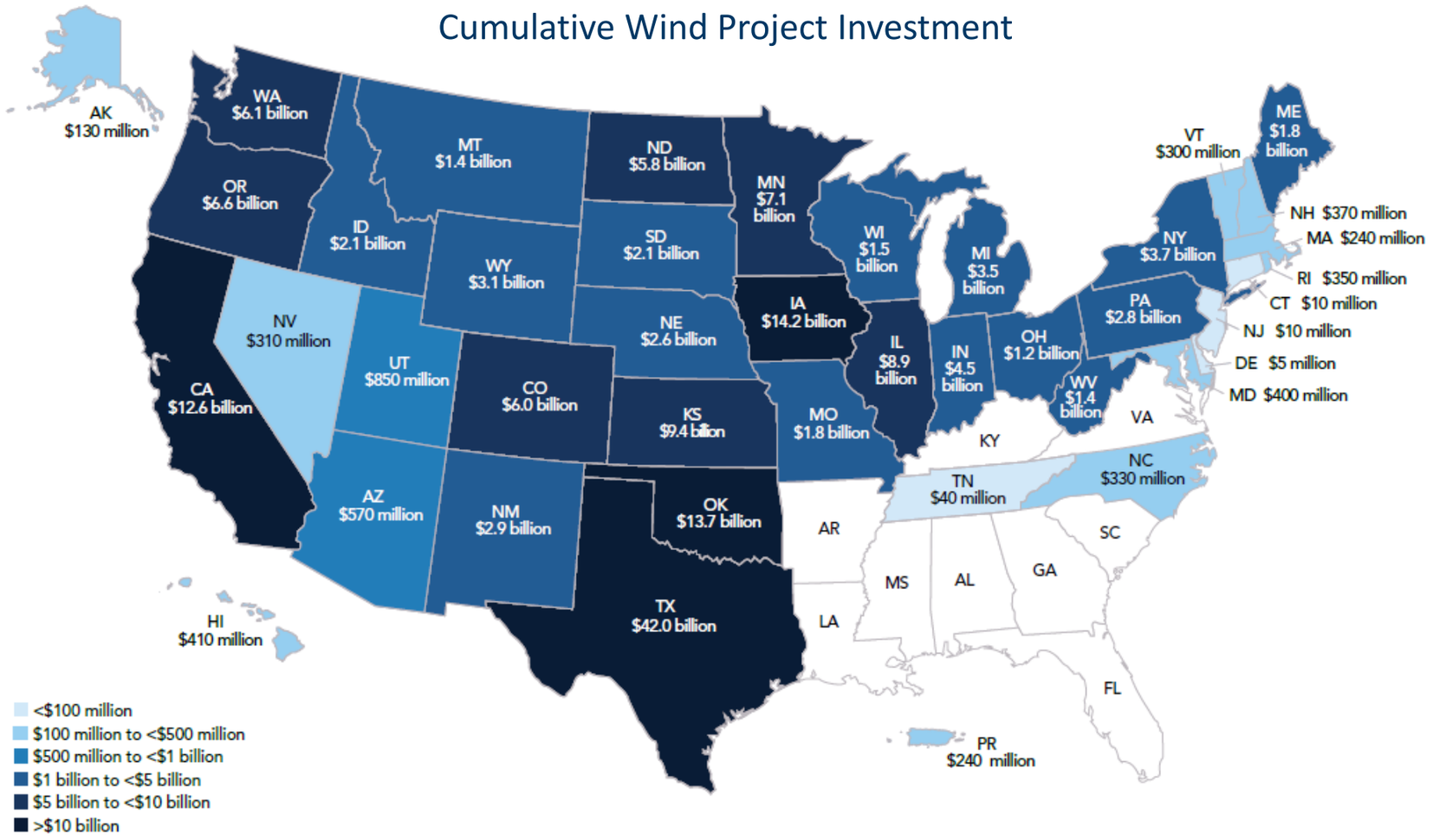
Top 5 States

1. Texas (24,001 to 25,000)
2. Oklahoma (8,001 to 9,000)
3. Iowa (7,001 to 8,000)
4. Colorado (5,001 to 6,000)
5. Illinois (5,001 to 6,000)



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

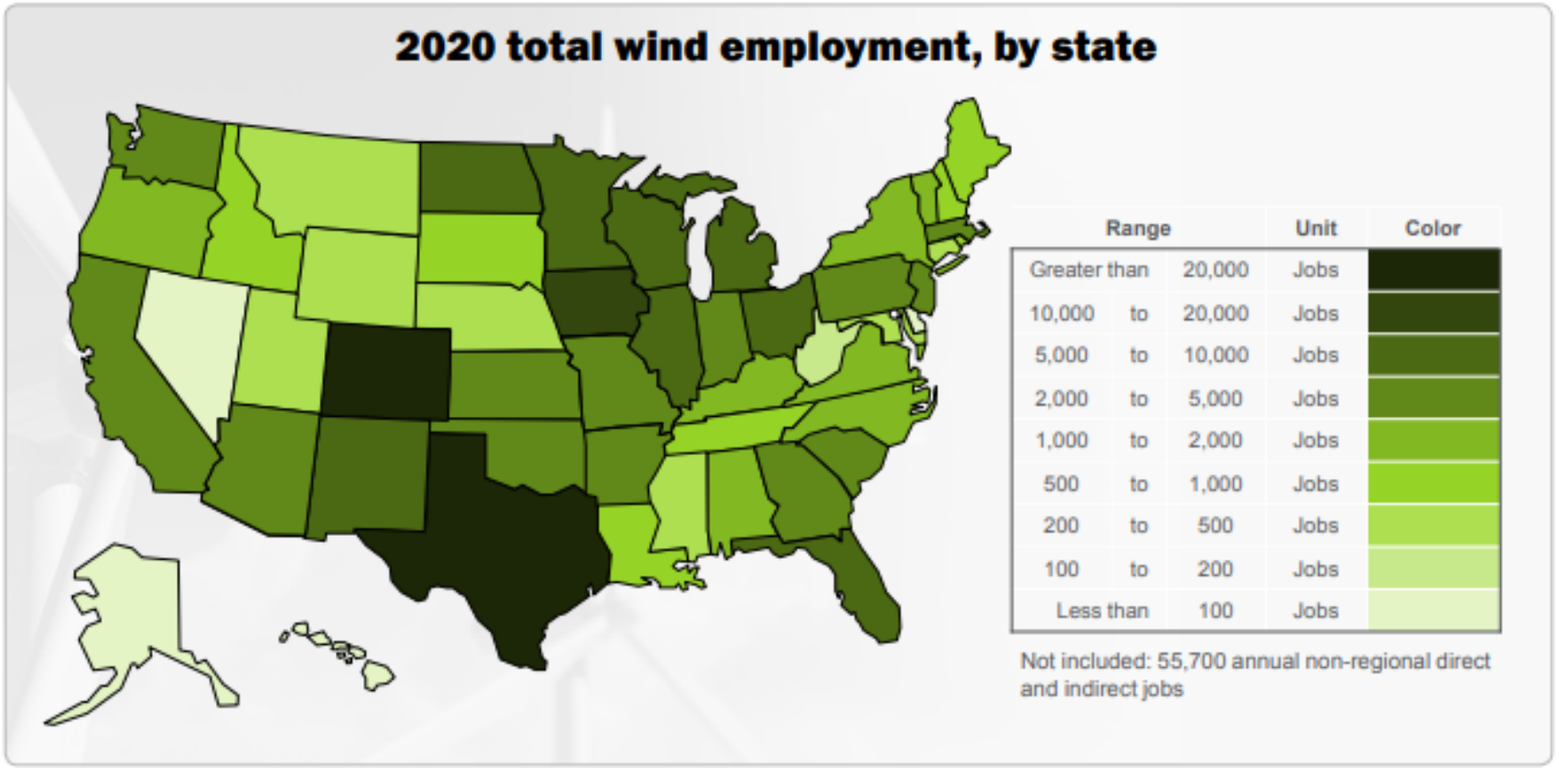
Wind delivers economic growth



- $145 billion in private capital investment over past 10 years
- Landowner lease payments
  - ~$267 million in 2017
- Property, local, and state tax revenue

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

U.S. wind industry expected to continue growing jobs…

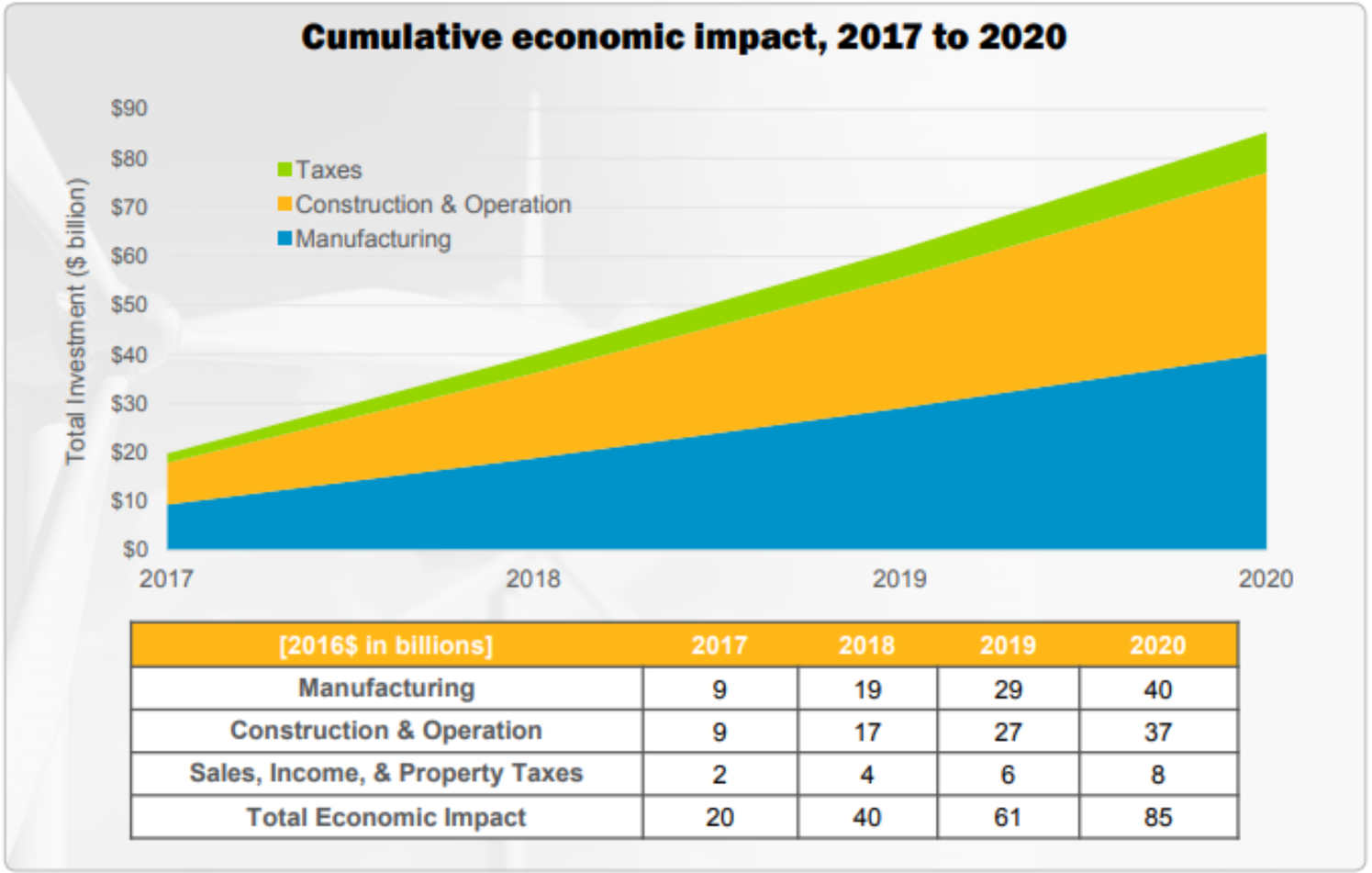


Navigant Consulting, 2017

- Navigant Consultant estimates direct wind industry jobs will reach 147,000 in 2020 – nearly a 50% increase from today's levels
- With a strong wind component manufacturing base and solid wind resource, the Midwest is expected to be a hub of growth
- Wind turbine technician is the second fastest growing job in the country. Jobs in construction, transportation and logistics, and manufacturing are also expected to grow
- Encouraging necessary skills and training important to ensure workforce is available

…and fueling economic development

- In years 2017-2020, the U.S. wind industry is expected to drive $85 billion in economic activity
- Component manufacturing is expected to add $10 billion a year to the economy as the domestic supply chain works to fill turbine orders
- The industry will also continue to support state and local governments through sales, income, and property tax payments. Often these funds are critical to improving schools or rebuilding local infrastructure



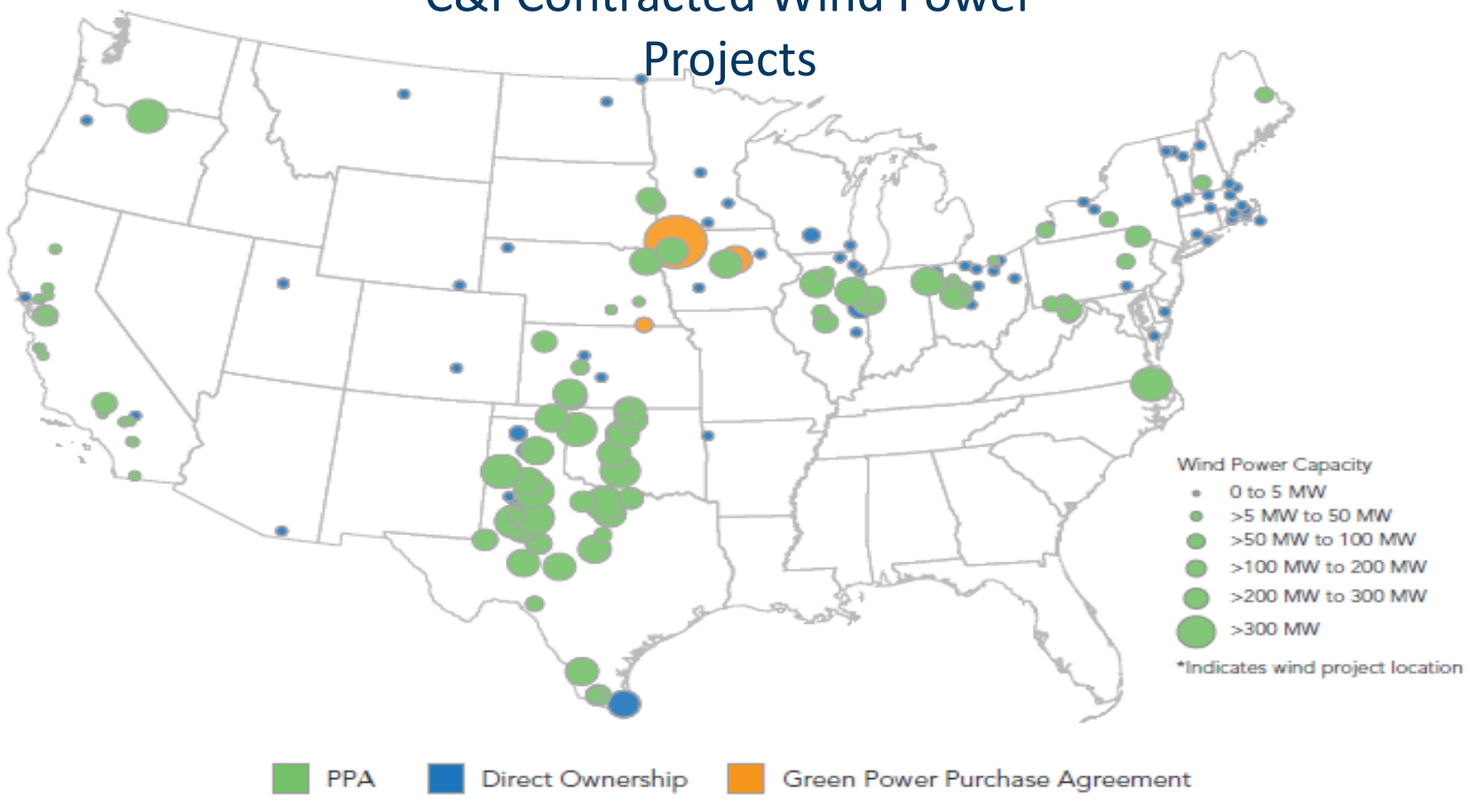
[2016$ in billions]	2017	2018	2019	2020
Manufacturing	9	19	29	40
Construction & Operation	9	17	27	37
Sales, Income, & Property Taxes	2	4	6	8
Total Economic Impact	20	40	61	85

Navigant Consulting, 2017

Embracing the market: Corporate and Non-Utility Customers

- Corporations are investing in wind energy not just because it is low cost and clean
- Looking to invest in local communities, create jobs, and develop partnerships with local governments
- Demand is not just concentrated among tech companies – Wal-Mart, Anheuser Busch, GM, and others are also aggressively pursuing wind energy

C&I Contracted Wind Power Projects



Note: Data include publicly announced physical and virtual power purchase agreements (PPA), direct ownership of onsite or offsite wind projects, and large-scale REC purchases associated with specific wind projects. Data is recorded at the time of announcement and does not indicate when the associated wind project is placed into operation.

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

Embracing the market: Utilities should consider more wind

Top Five Utilities with
Construction and Advanced Development Project Capacity (MW)

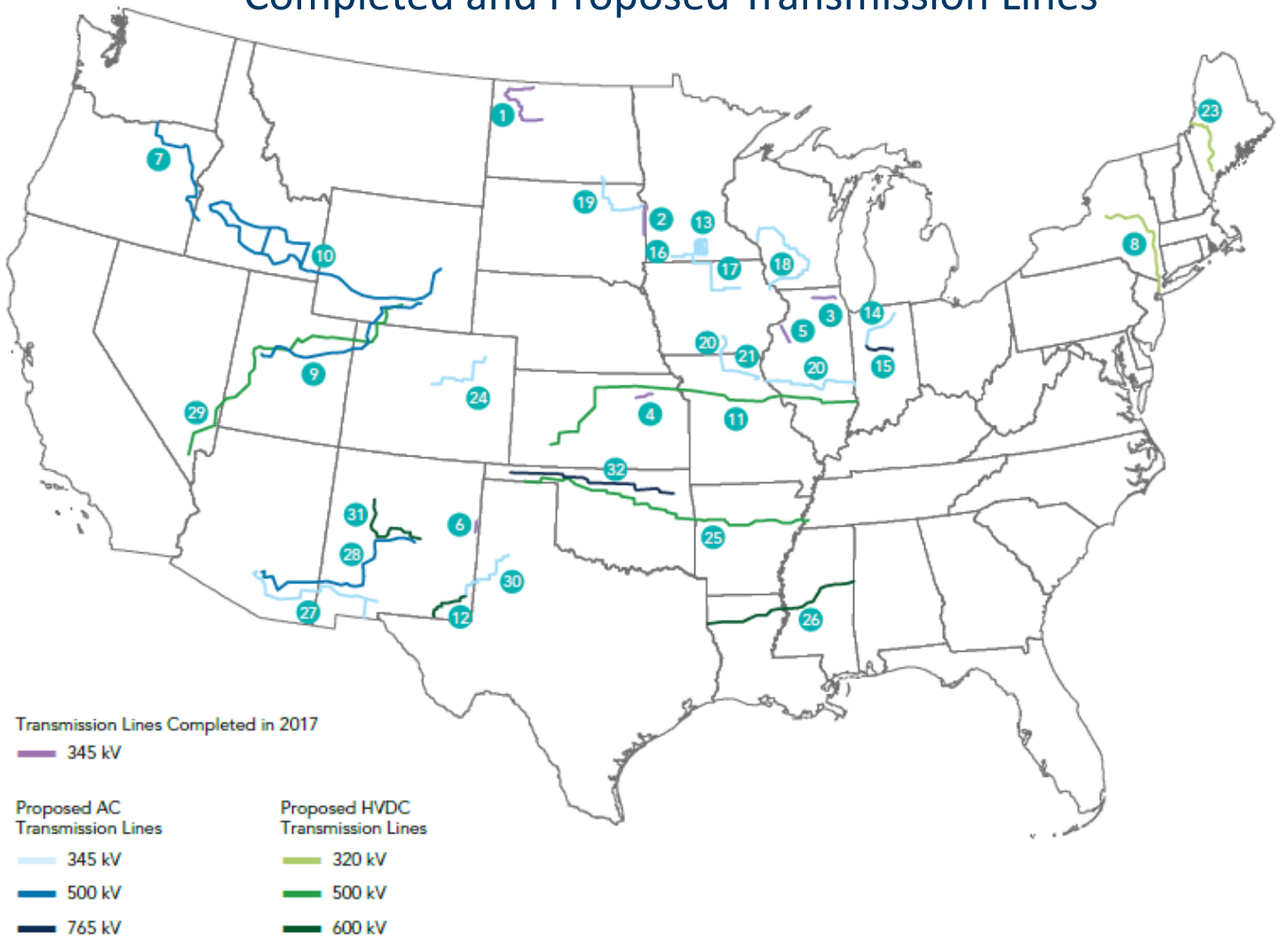
Company	Direct Ownership	Long-Term Contract	Total
Xcel Energy	3,050	636	3,686
Berkshire Hathaway Energy	2,773	800	3,573
American Electric Power	2,228	0	2,228
Alliant Energy	1,002	202	1,203
Great Plains Energy	0	444	444

- Utilities increasingly looking to renewables to meet customer demand, lower cost, and grow their business
- In some cases, utility investments in wind power represent some of the largest infrastructure spending projects in their states – helping to drive significant economic development and job growth
- Activity has been concentrated among a handful of utilities. More utilities should consider wind energy and the value it delivers to consumers and shareholders

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

Investment in Transmission Critical

Completed and Proposed Transmission Lines



- Transmission critical to transport wind energy from remote areas to load centers
- Near-term transmission projects in development could support tens of thousands of additional wind MWs
- Critical to position the Midwest as a major renewable energy exporter.

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

Final Thoughts

- Workforce development key. Industry will require skills ranging from welders, mechanics, and maintenance technicians to electrical engineers, data scientists, and control room operators. Education programs, including technical and degree programs, required to ensure necessary skills are available

- Addressing policy obstacles can further unleash the development potential of the industry. Overbearing siting restrictions, difficult energy procurement regulations, slow interconnection review, among other policies, will limit wind development and its associated job and economic development impacts.

- Public Utility Commissioners and utility decision-makers should take a fresh perspective when evaluating the value of wind projects. Declining costs, improved technology, and enhanced capabilities can add value to utility portfolios – helping to decrease costs to consumers, drive economic growth, and lower power emissions.

Questions & Answers

Upcoming Events

July 24 - Technology: What are the existing technology assets—networks, AI, data analytics, research centers—that we can strengthen and what do we need to add in order to compete with and surpass the global competition?

September 19-20 - Summit in Columbus: Will expand upon the webinar themes and bring these topics together to help create the Midwestern workforce for the future.
http://www.midwesterngovernors.org/AgileWorkforce.htm