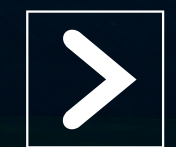




Q1 2020

# GOOD JOBS, WHERE WE NEED THEM

THE BUSINESS CASE FOR INCLUSIVE  
CLEAN ENERGY POLICY ACROSS THE MIDWEST



**BUSINESSFORWARD**  
FOUNDATION



## EXECUTIVE SUMMARY

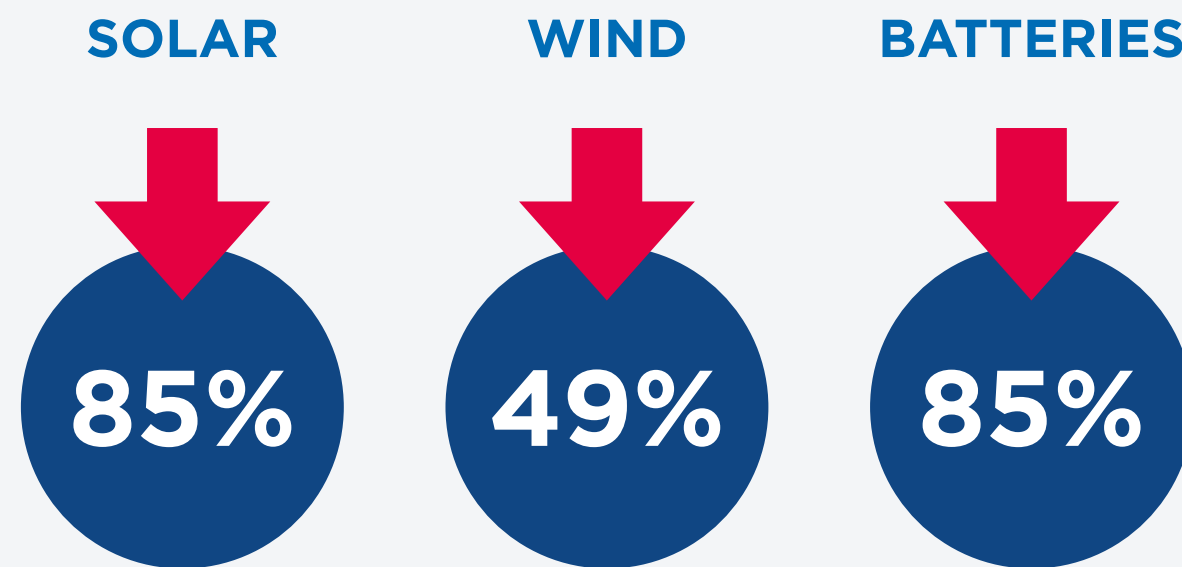
1. The global energy race is over: renewable energy won.
2. As renewable energy grows more efficient, more markets in the Midwest can profit from it.
3. The shift from fossil fuels to wind and solar could redistribute energy jobs from high concentrations in the Gulf Coast - oil and natural gas country - across the Midwest.
4. Few industries are as quality job-intensive as energy. For Midwestern states importing oil, gas, and coal, renewable energy represents a \$104 billion opportunity to “buy local.”
5. Renewable energy investment can help rural communities in the Midwest struggling with declining populations and job growth.
6. Renewable energy investment can replace some of the jobs automation has eliminated in the Midwest.



# THE GLOBAL ENERGY RACE IS OVER: RENEWABLE ENERGY WON

INVESTMENT OVER PAST 10 YEARS  
DROVE PRICES LOWER, WHICH  
CREATED NEW DEMAND, NEW  
CAPACITY, AND MORE INVESTMENT<sup>1</sup>

PRICE DECLINES (2010-2018)

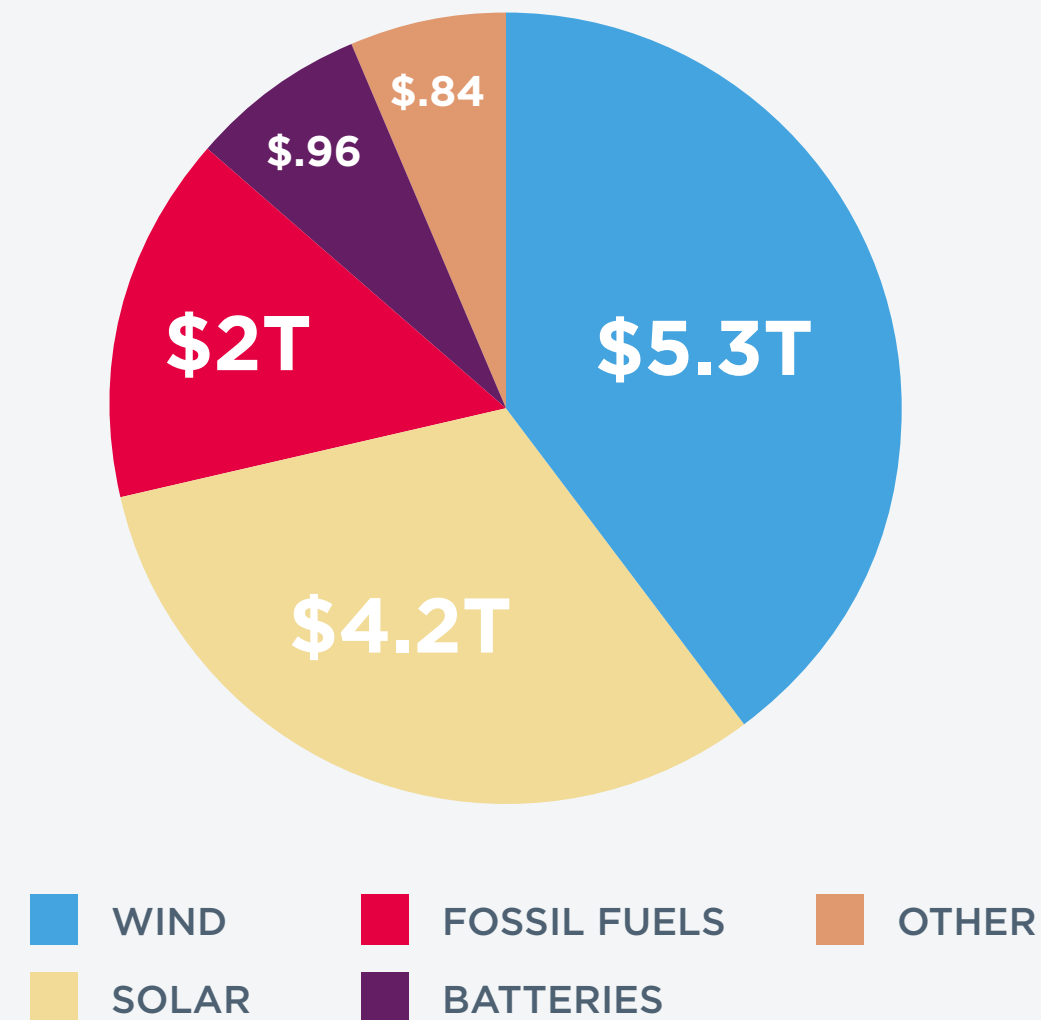


Renewables are more affordable  
than fossil fuels in two thirds of the world.

By 2030, they will be more  
affordable nearly everywhere.

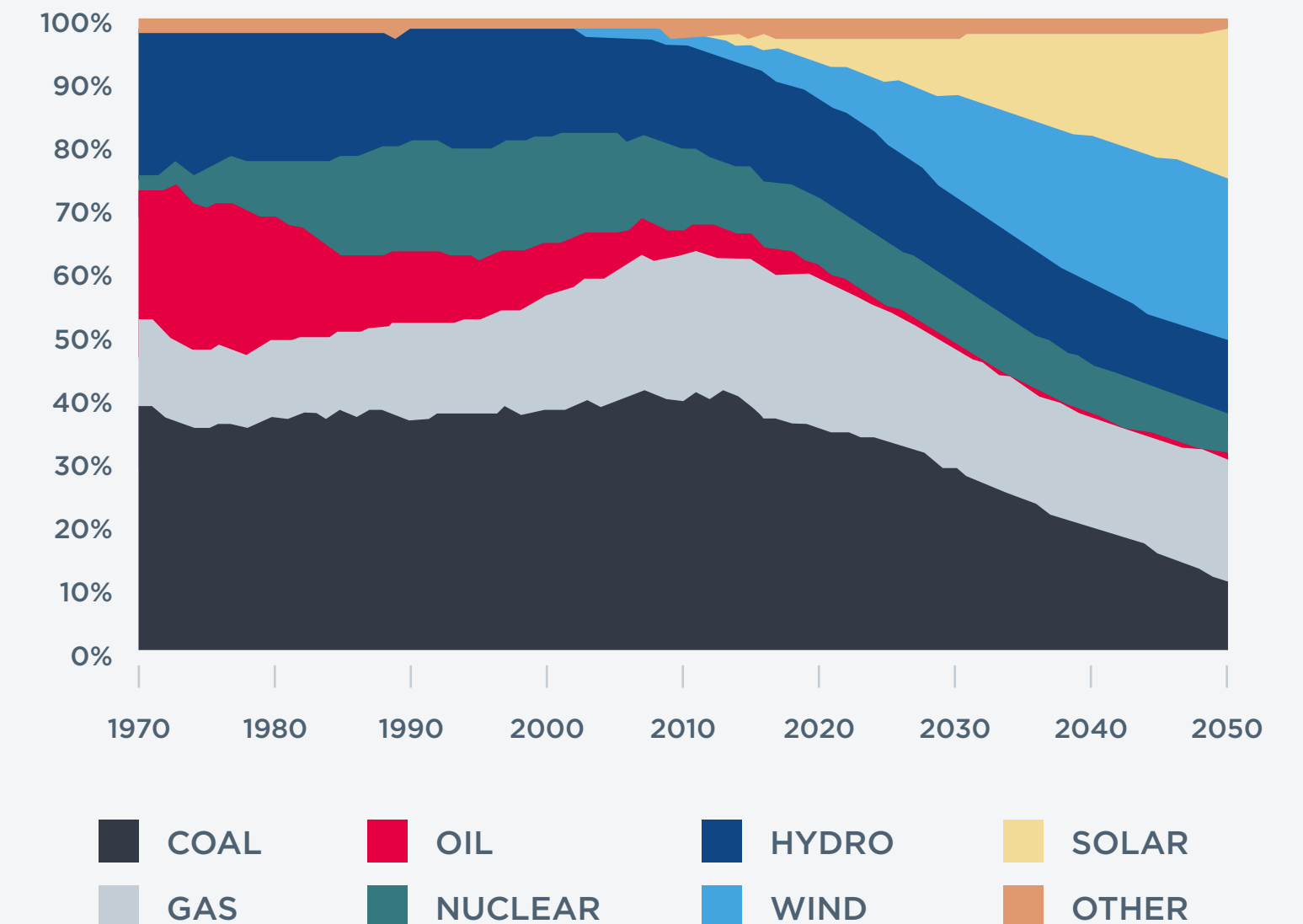
RENEWABLES WILL CAPTURE  
78 CENTS OF EVERY NEW ENERGY  
DOLLAR WORLDWIDE (2018-2050)<sup>2</sup>

\$13.3 TRILLION IN INVESTMENT  
FROM 2018 TO 2050



Result: 80% of new power capacity  
from 2019-2050 will be zero carbon

MARKET SHARE WILL  
SHIFT DRAMATICALLY<sup>3</sup>



BY 2050

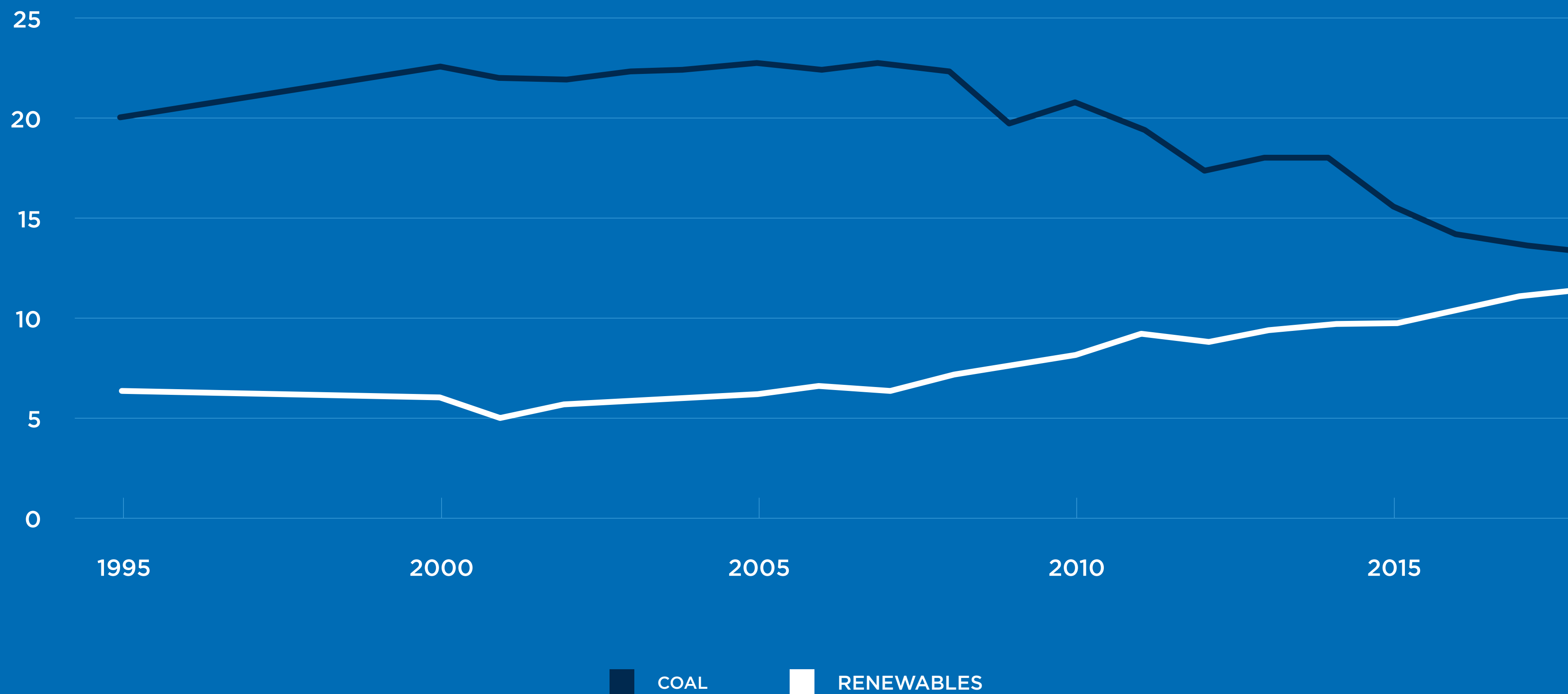
31%  
FOSSIL FUELS

48%  
SOLAR & WIND

62%  
RENEWABLES

# CONSUMERS IN THE U.S. ARE ALREADY MAKING THE SWITCH

U.S. COAL CONSUMPTION VS. U.S. RENEWABLE ENERGY<sup>4</sup>  
(IN QUADRILLION BTUS)



# “BUY LOCAL” : THE MIDWEST IS NOW FERTILE GROUND FOR HOME GROWN RENEWABLE ENERGY PRODUCTION THANKS TO INNOVATIONS IN TECHNOLOGY

**A VIRTUOUS CYCLE OF INVESTMENT,  
INNOVATION, AND CONSUMER DEMAND  
WILL CONTINUE TO DRIVE  
RENEWABLE ENERGY COSTS DOWN.**

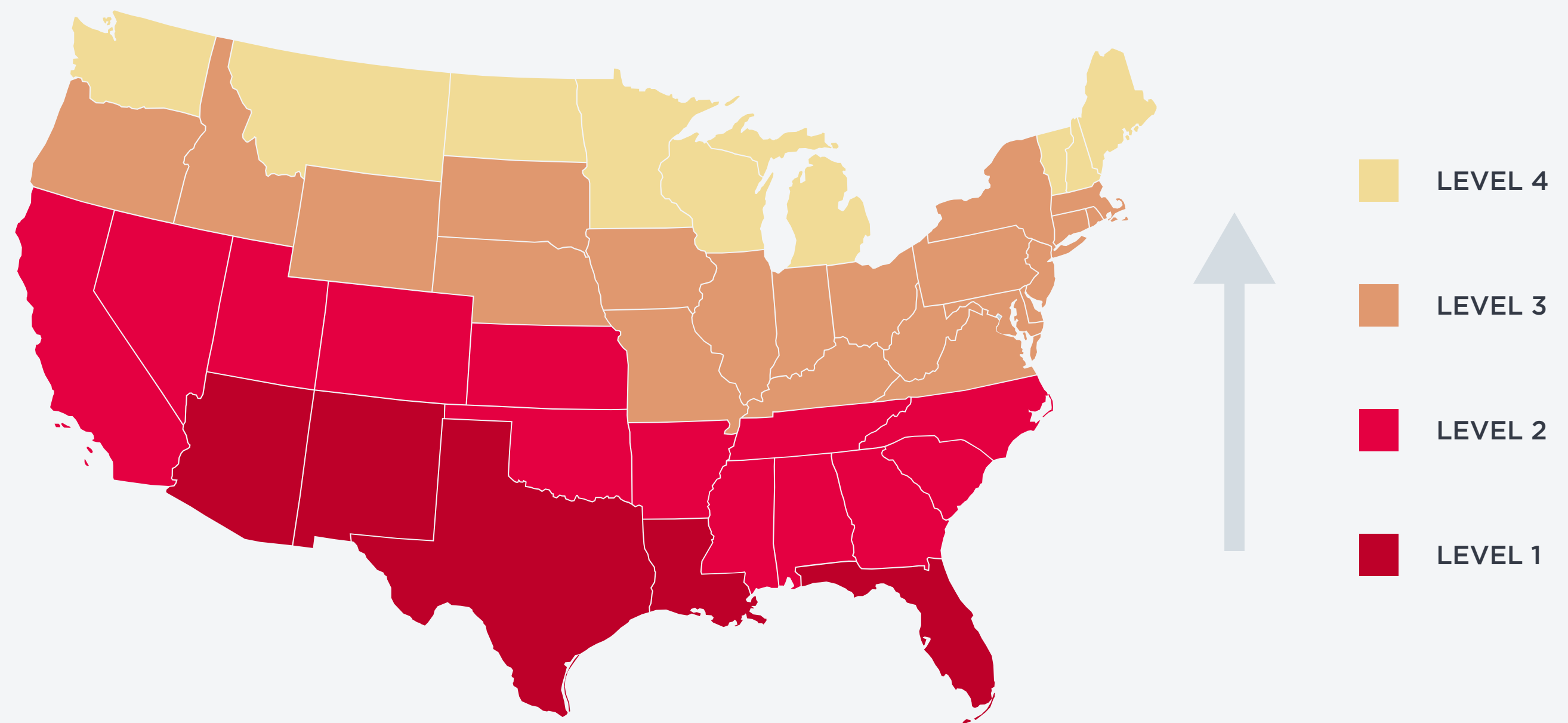
**Over the last 10 years renewable prices fell 88% for solar and 69% for wind, while capacity increased by 339%**

## PRICE VS. CAPACITY OF SOLAR AND WIND ENERGY<sup>5, 6, 7</sup>



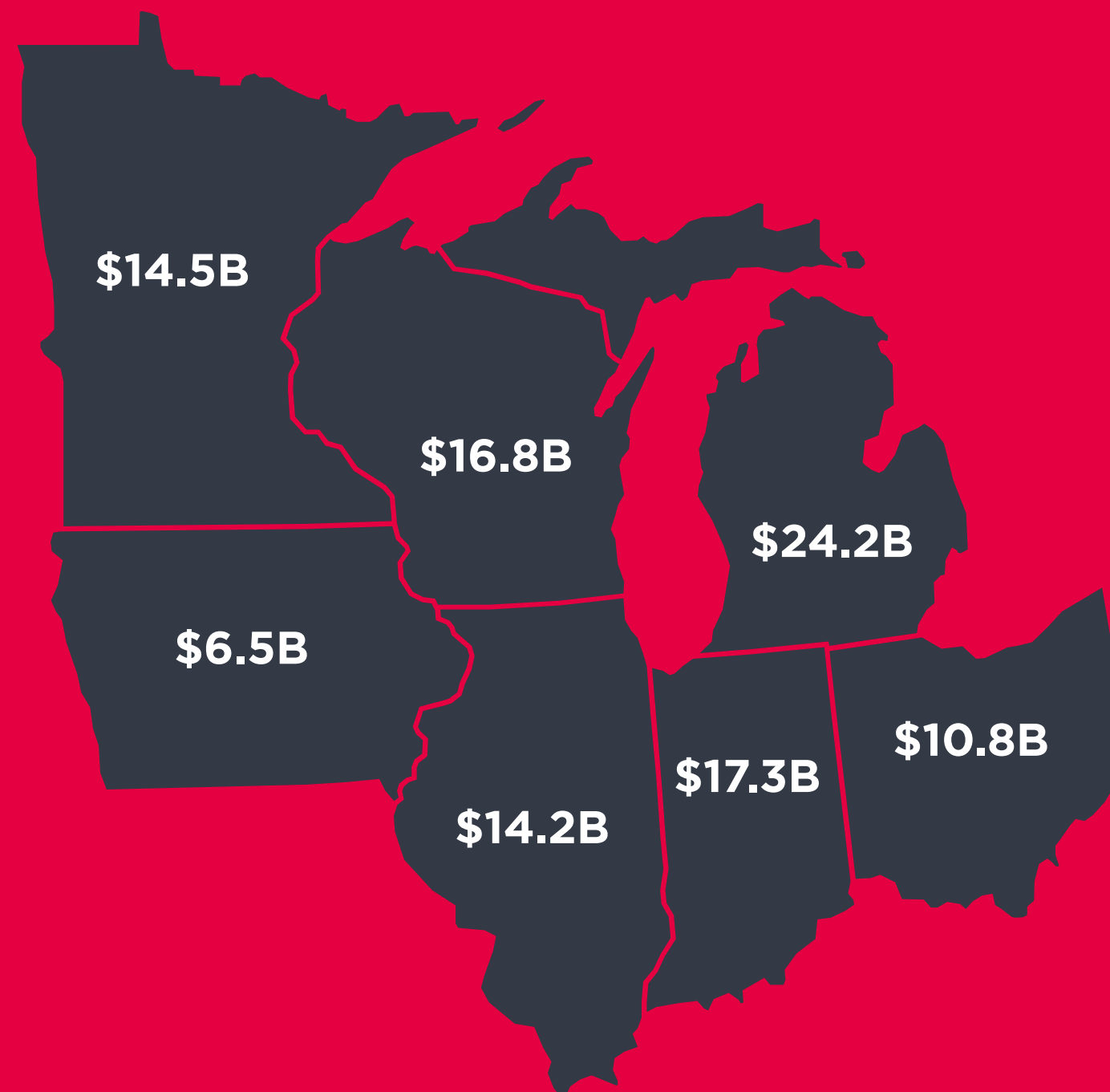
## AS COSTS FALL, RENEWABLE ENERGY BECOMES PROFITABLE IN MARKETS WITH LESS SUN AND WIND

## NATIONAL SOLAR EXPANSION



# WIND AND SOLAR COULD REDISTRIBUTE ENERGY JOBS FROM THE GULF COAST TO THE MIDWEST

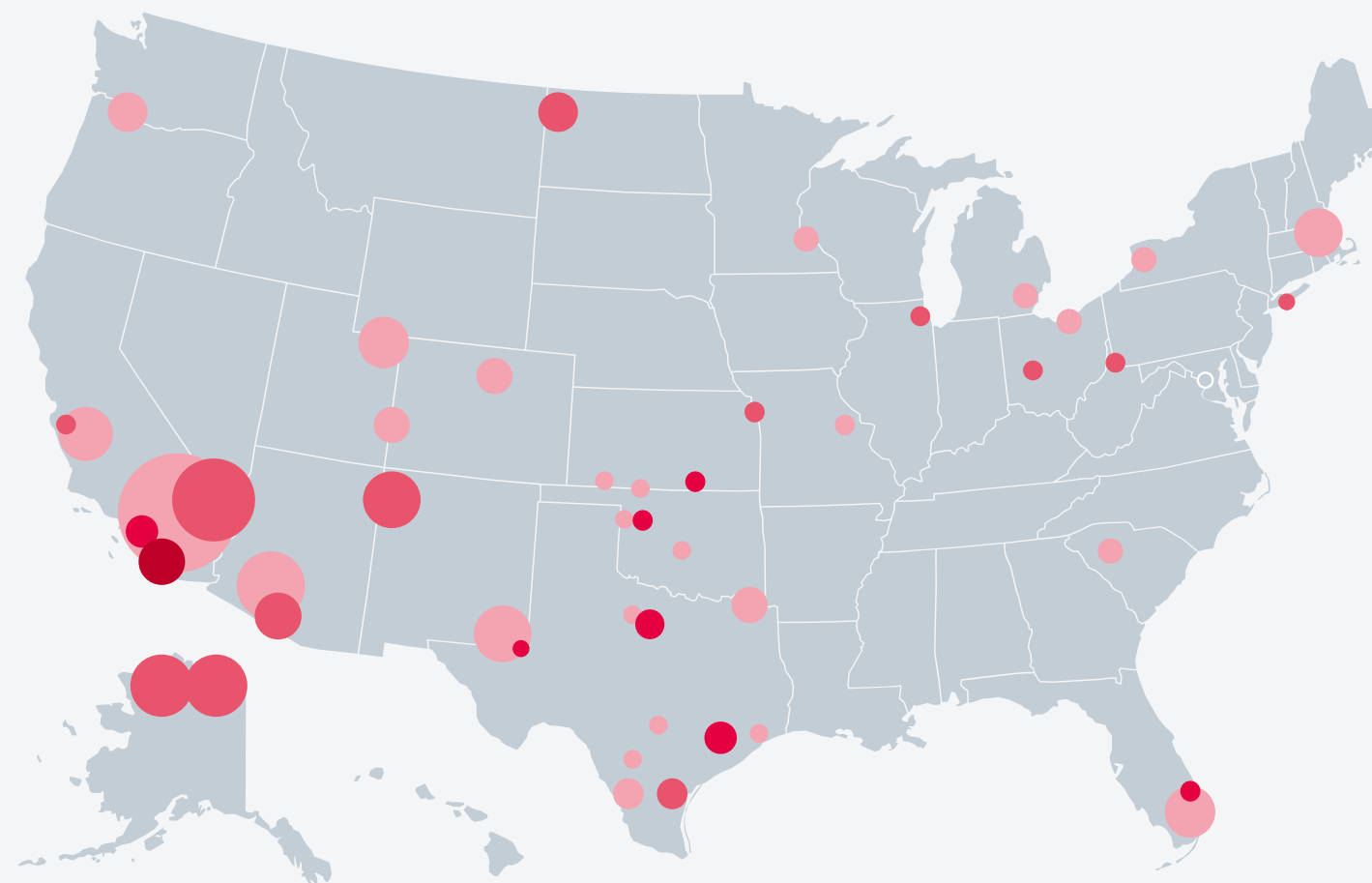
MIDWESTERN STATES SPEND A COMBINED \$104 BILLION EACH YEAR IMPORTING COAL, GAS AND OIL.<sup>8</sup>



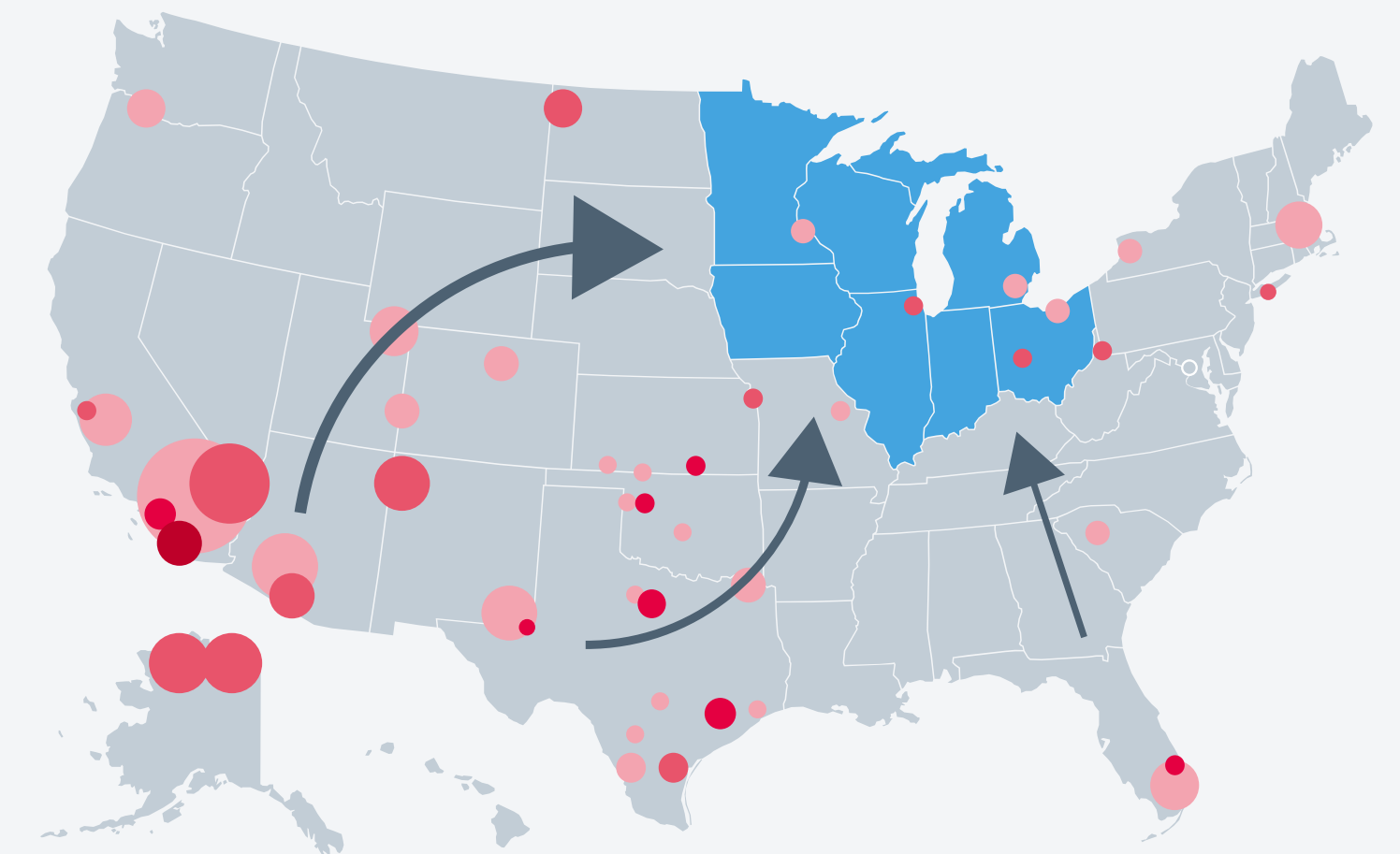
\$104B

THAT SPENDING SUPPORTS JOBS AND INVESTMENT IN FOSSIL-FUEL RICH MARKETS, NOTABLY ON THE WEST AND GULF COASTS

DISTRIBUTION OF NATURAL GAS JOBS<sup>9</sup>



RENEWABLE ENERGY CAN MAKE MIDWESTERN STATES MORE ENERGY INDEPENDENT



# THE MIDWEST IS POSITIONED TO LEAD ON WIND

THE MIDWEST HAS  
**31%**  
OF U.S. WIND CAPACITY<sup>10</sup>

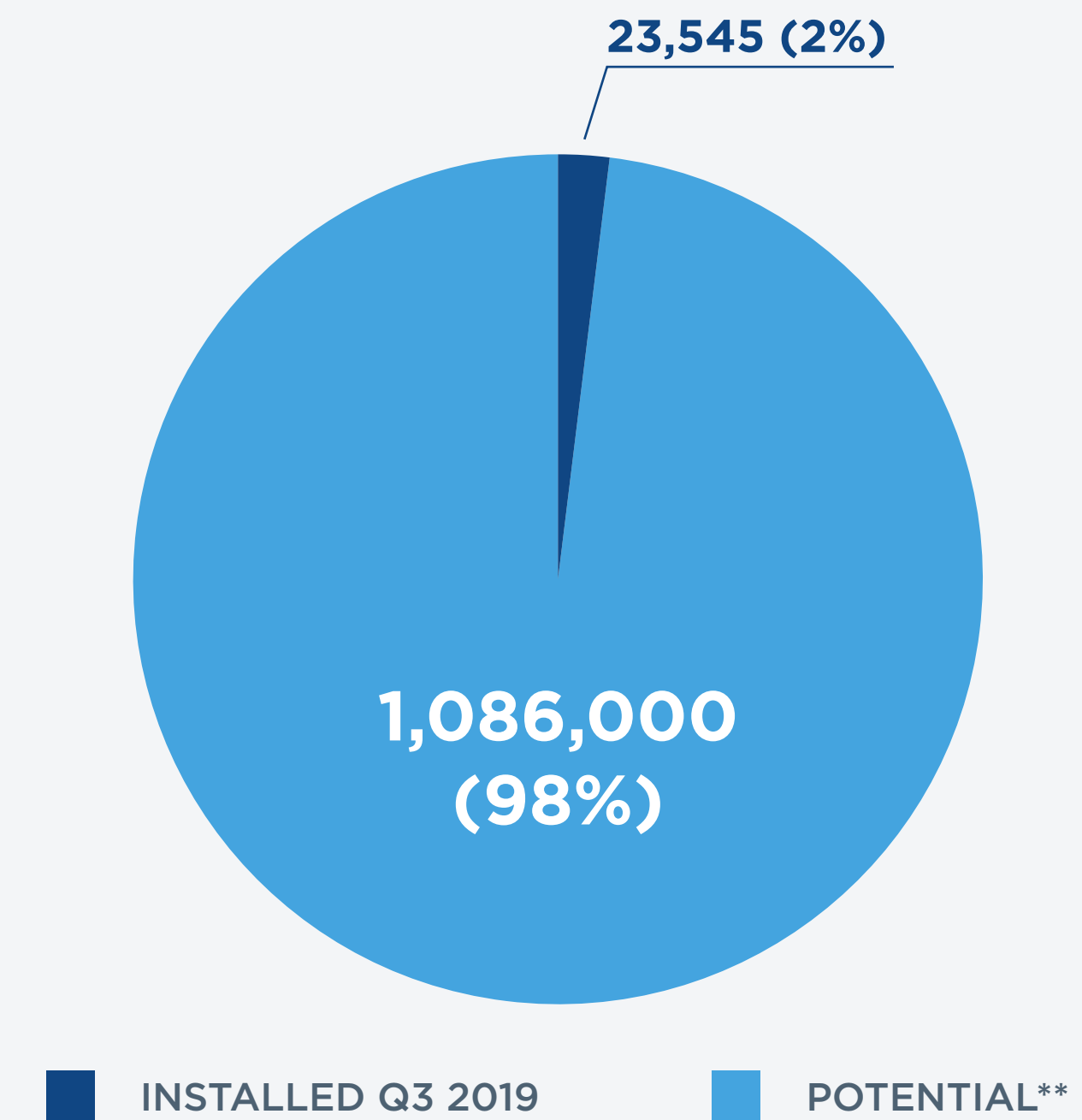
**#1**  
**4200+**  
WIND TURBINES

Iowa ranks number one in the country in per capita wind capacity and represents 8 percent of U.S. total capacity.

Wind turbines raise property values, add and ensure consistent revenue, and grow the tax base.

USING CURRENT TECHNOLOGY, WE ARE CAPTURING ONLY 2% OF THE MIDWEST'S POTENTIAL WIND POWER

WIND POWER CAPACITY (MW) IN THE MIDWEST<sup>\*11</sup>



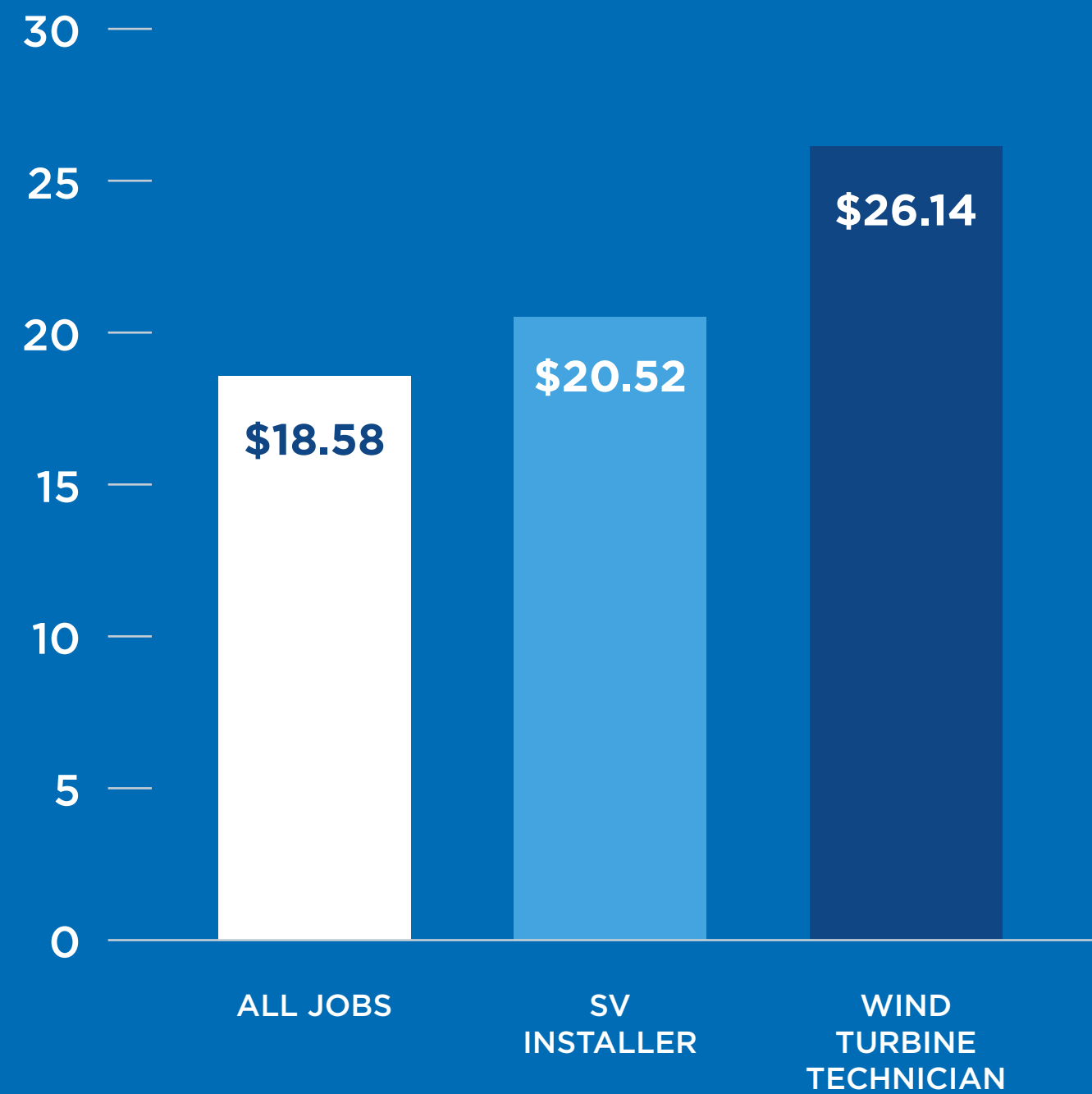
\* MIDWEST STATES INCLUDE IA, MI, OH, WI, IN, MN, IL  
\*\* REFLECTS WHAT IS TECHNOLOGICALLY POSSIBLE TO HAVE INSTALLED



# RENEWABLE ENERGY CREATES GOOD JOBS

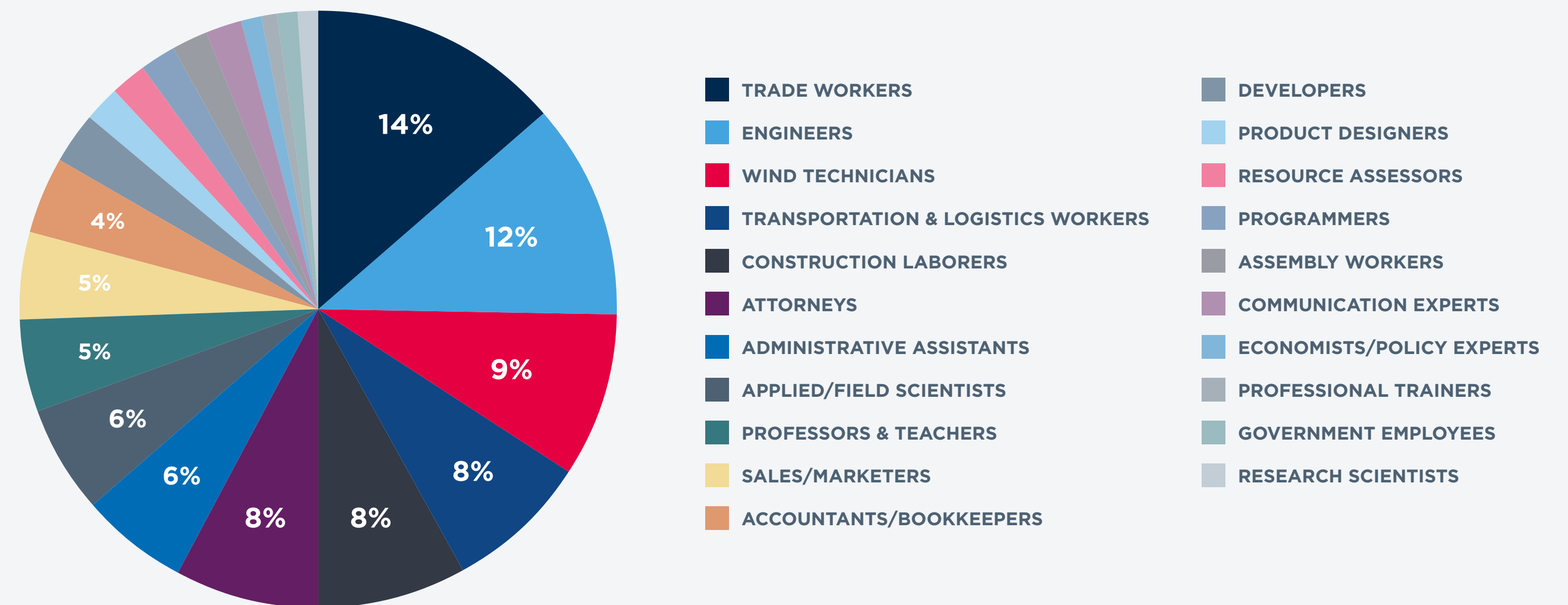
## RENEWABLE ENERGY JOBS PAY WELL

MEDIAN HOURLY WAGE (2018)<sup>12</sup>



## RENEWABLE ENERGY SUPPORTS JOBS ACROSS A RANGE OF SKILL SETS AND LEVELS

WIND POWER JOB FOOTPRINT<sup>13</sup>

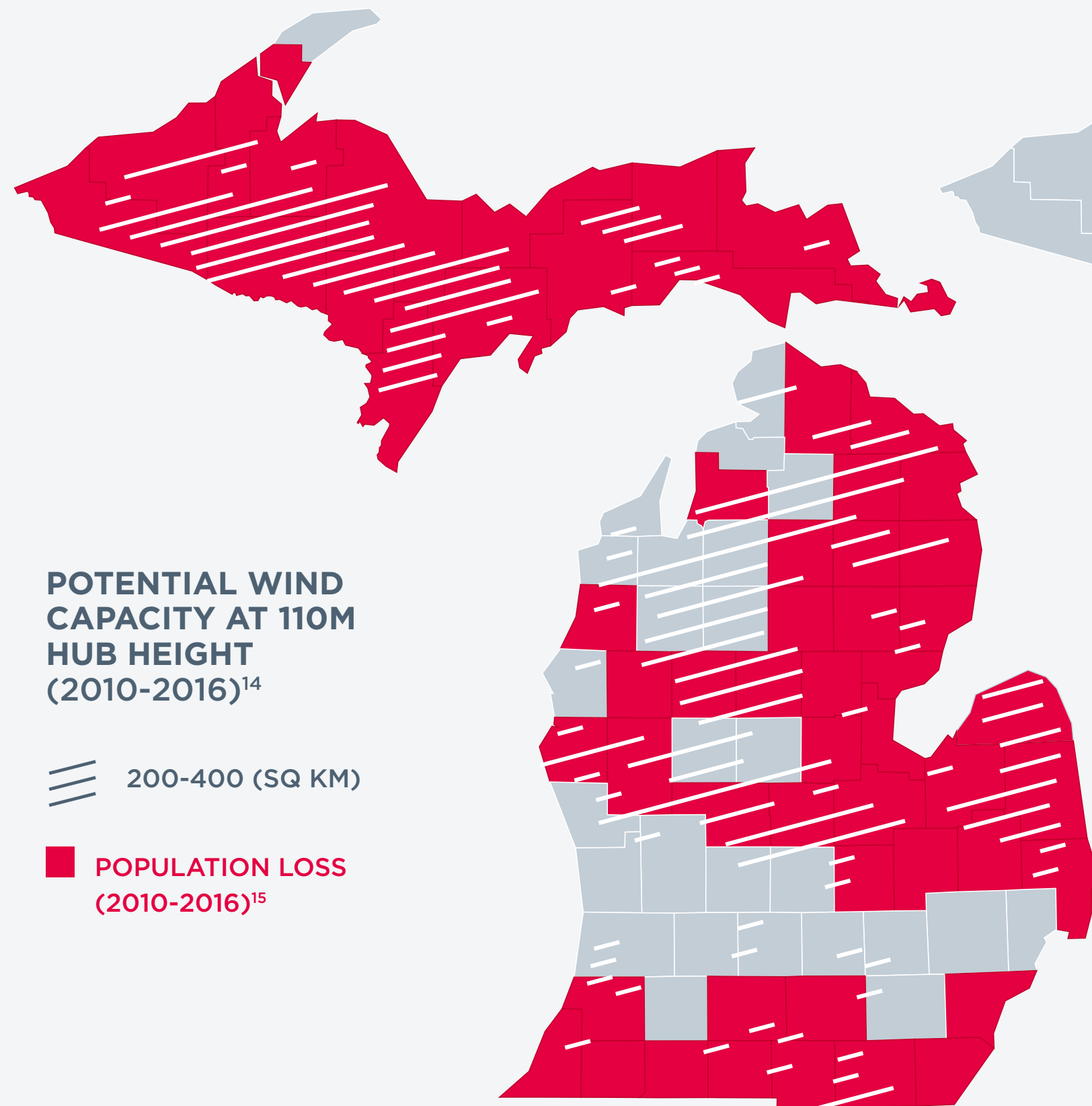


Many of these jobs, including solar panel installation and wind turbine maintenance, are inherently local, which means they are unlikely to be outsourced and automated away.

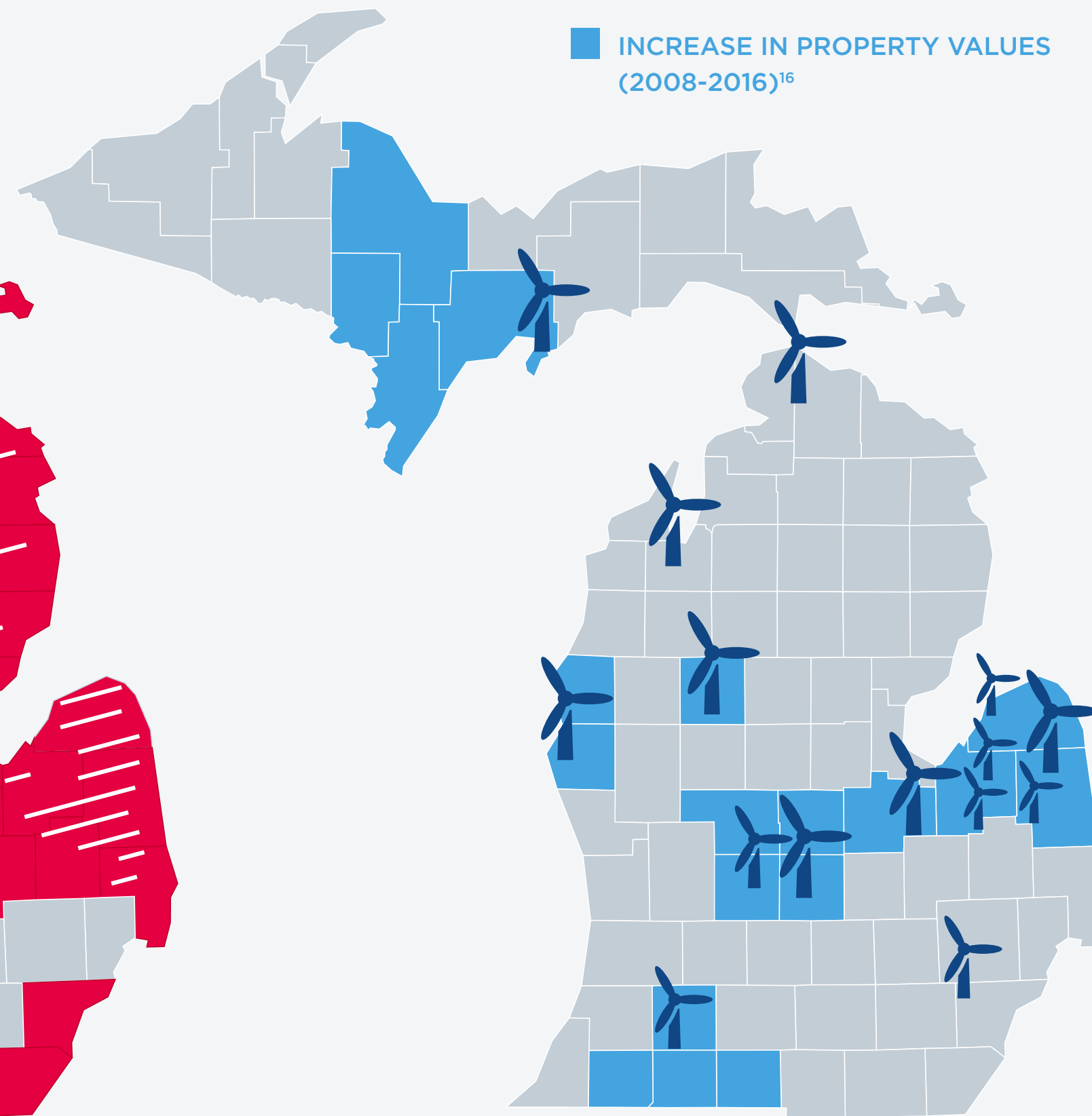


# RURAL AREAS LIKELY TO BENEFIT THE MOST...

MANY OF THE RURAL COUNTIES THAT NEED HELP MOST HAVE STRONG WIND RESOURCES



ADDING WIND POWER CAPACITY CAN INCREASE PROPERTY VALUES



LEASING LAND FOR WIND TURBINES CAN ACT AS SUPPLEMENTAL INCOME FOR FARMERS

The number of farms producing renewable energy doubled from 2012 to 2017 (to 133,100).<sup>17</sup>

“

The way the weather is, crop prices are, I can't hardly make any money. Solar farming is guaranteed income. I don't have to worry about the weather.<sup>18</sup>

”

- JOHN FORELL, MICHIGAN FARMER

## ...BUT EVERYONE WINS

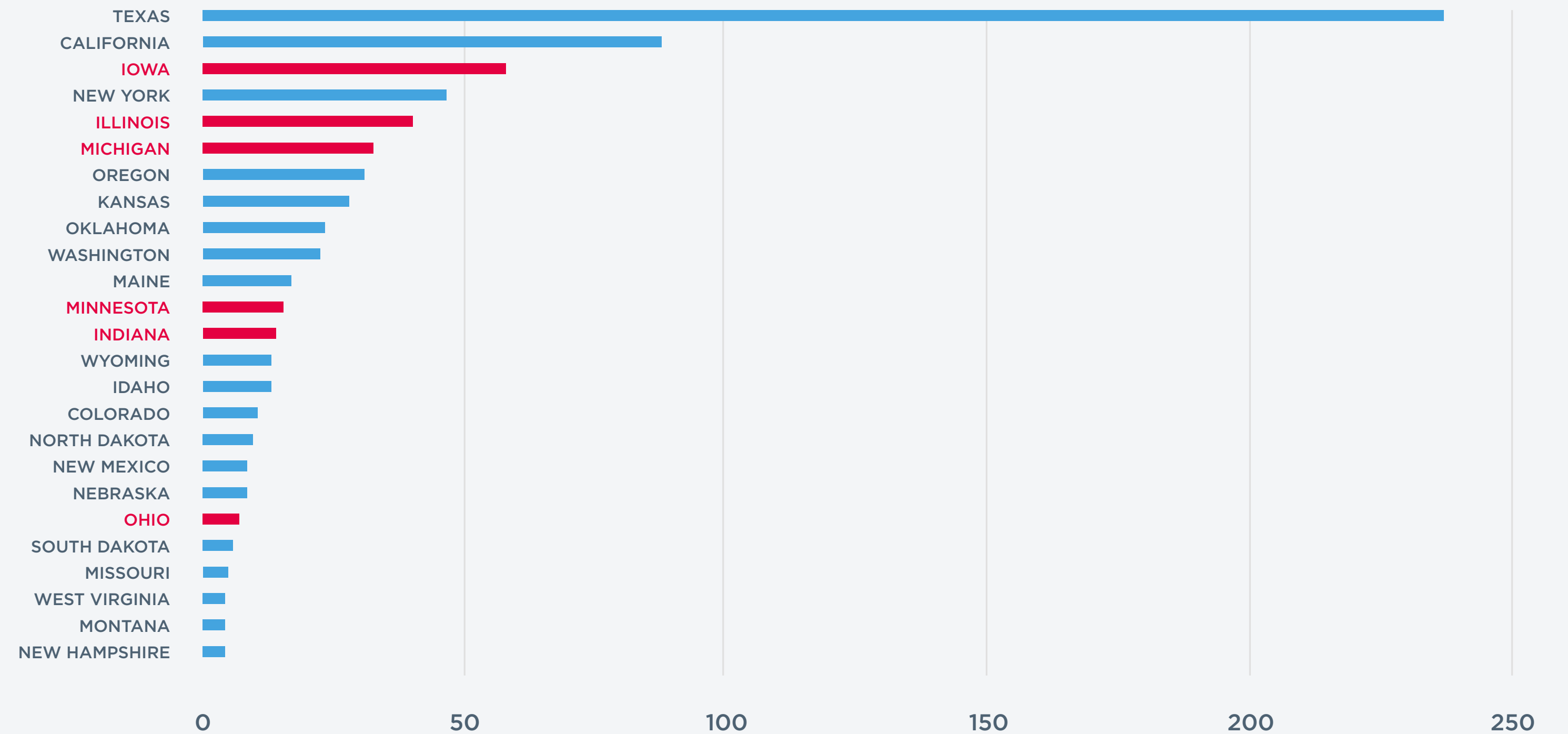
Renewable energy investment is felt statewide, from cleaner air to new funding for public projects, like infrastructure.

Turbines in Huron County, MI and Murray County, MN, power cities downstate and pay taxes that help neighbors downstate.



### MIDWEST IS AMONG REGIONS BENEFITTING MOST FROM RENEWABLE ENERGY INVESTMENT

TOP 25 STATES IN ANNUAL STATE AND LOCAL TAX PAYMENTS MADE BY WIND PROJECTS IN THE U.S., IN MILLIONS OF DOLLARS (2018)<sup>19</sup>

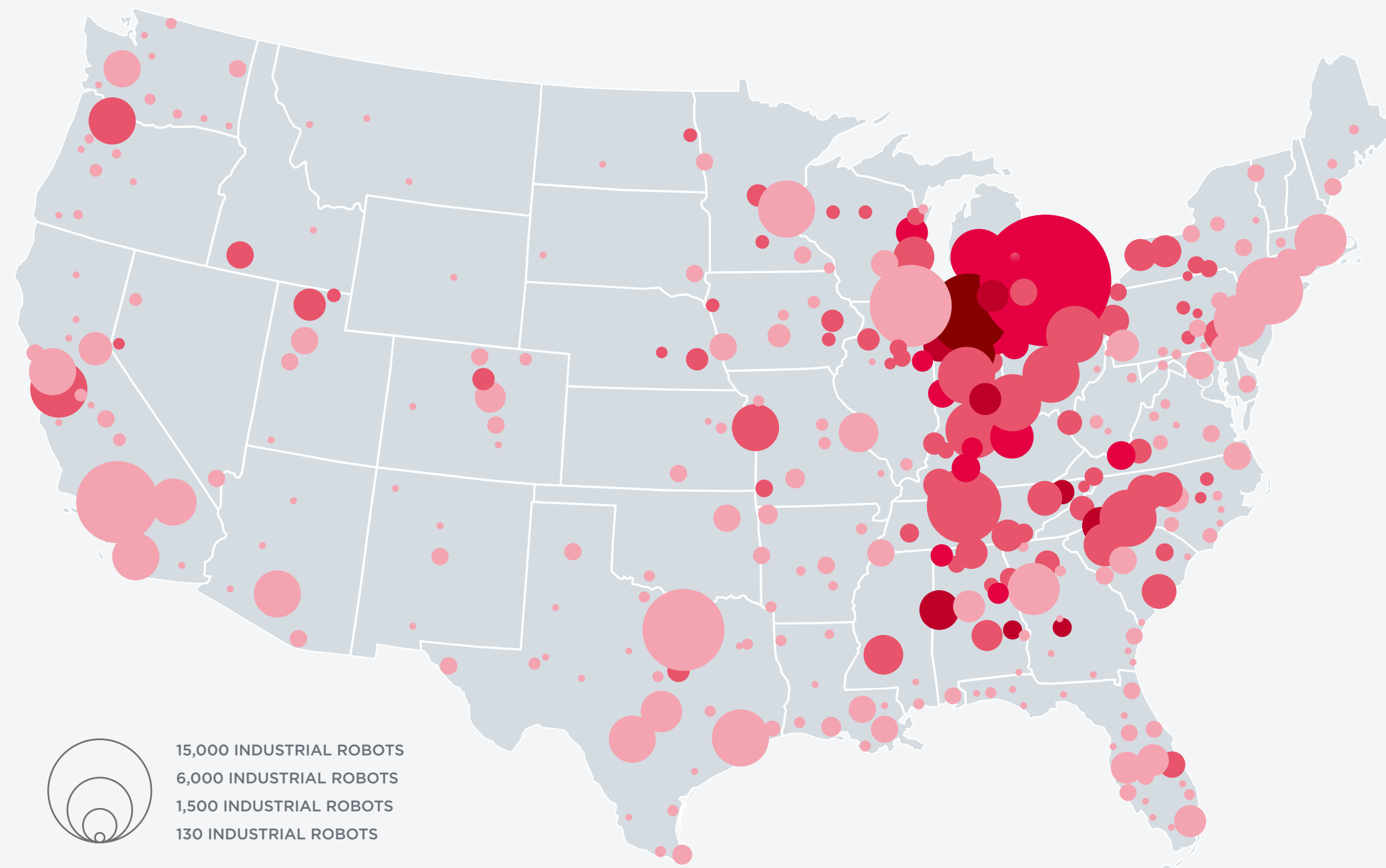




# IF NOT RENEWABLE ENERGY, WHAT?

## AUTOMATION HAS HIT THE MIDWEST PARTICULARLY HARD

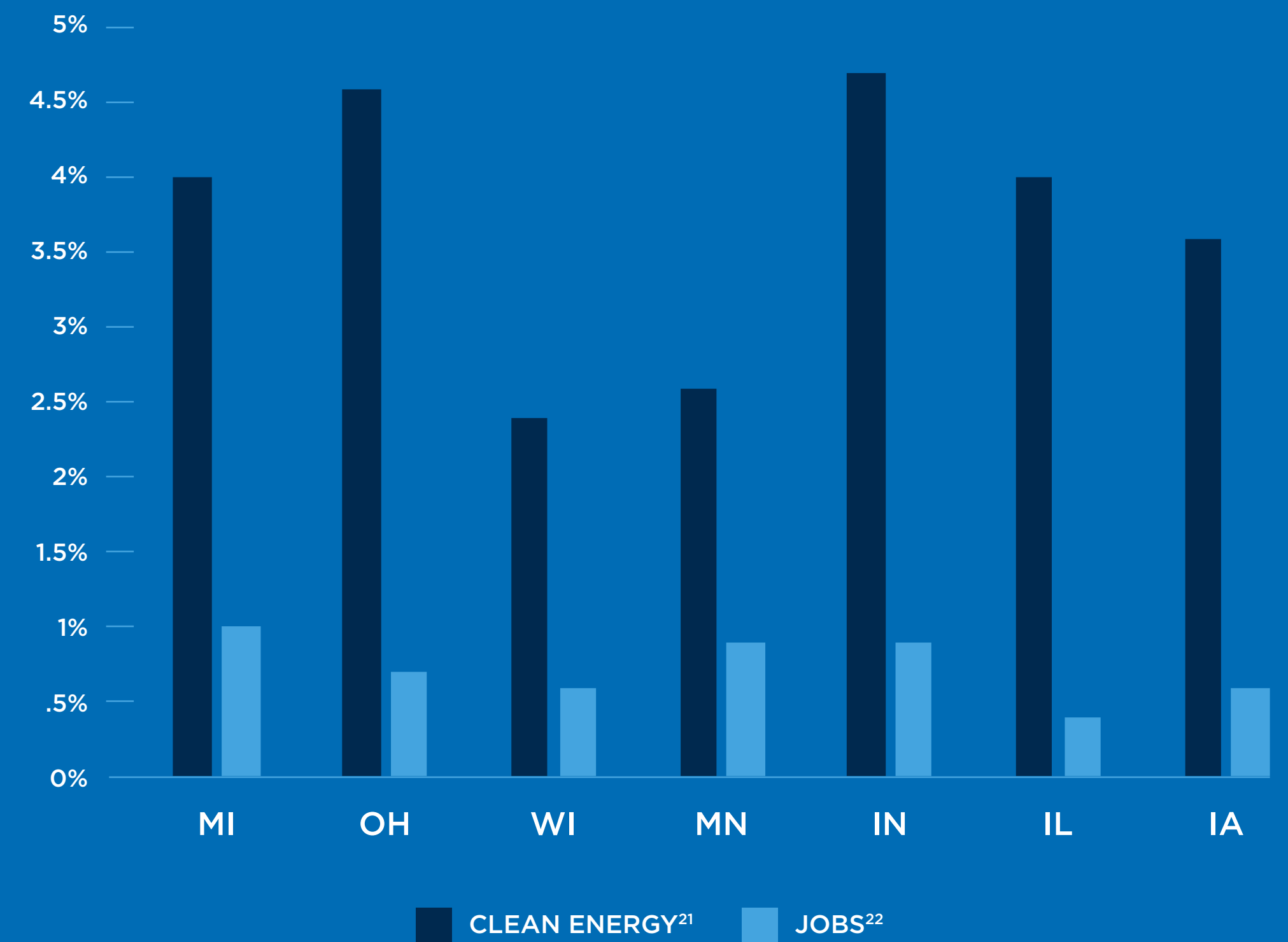
NUMBER & INCIDENCE OF INDUSTRIAL ROBOTS<sup>20</sup>  
(PER THOUSAND WORKERS) BY METROPOLITAN STATISTICAL AREA, 2015



SOURCE: BROOKINGS INSTITUTION

## AS CLEAN ENERGY JOBS MULTIPLY, JOB GROWTH IN OTHER SECTORS REMAINS LOW

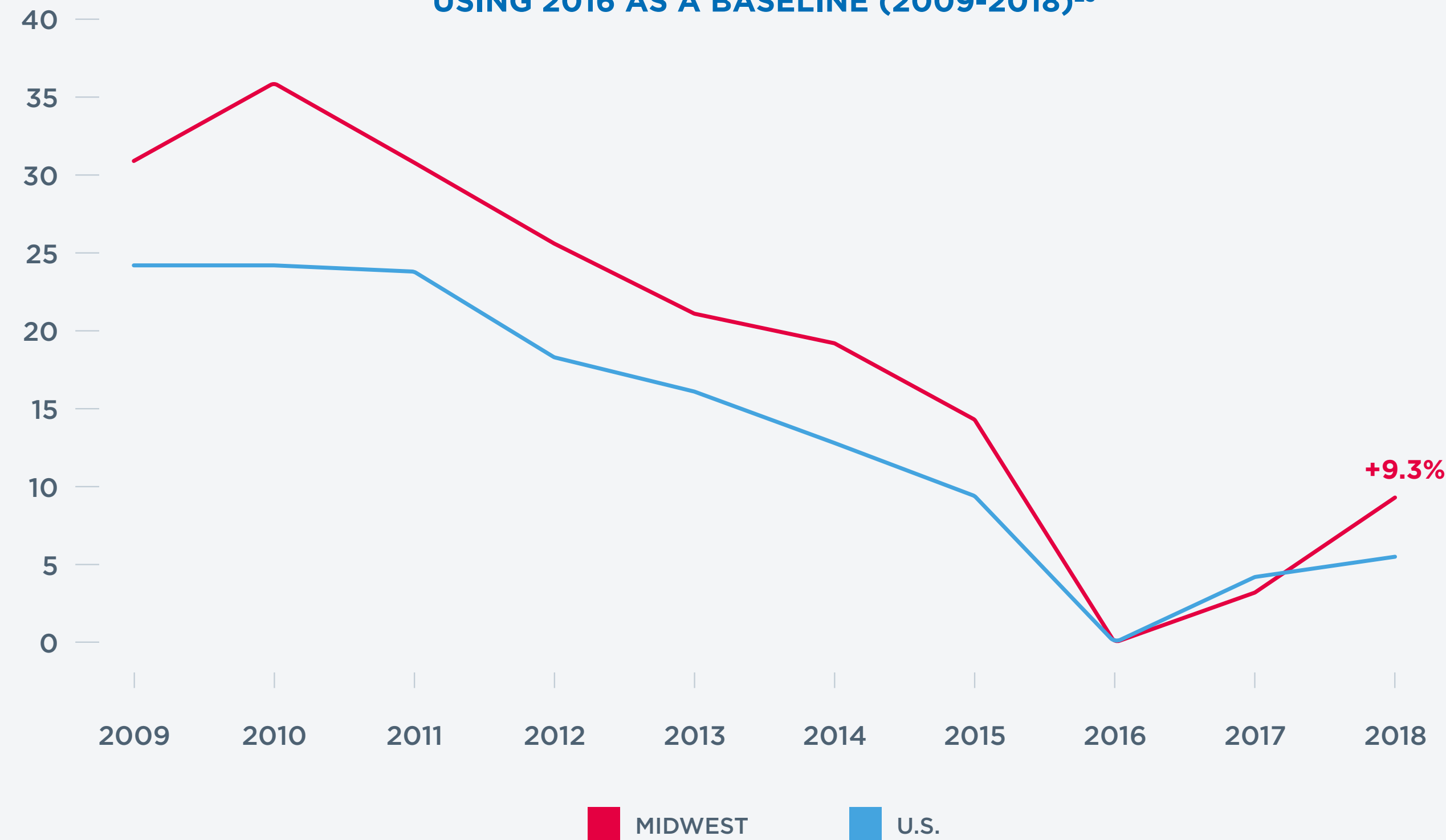
CLEAN ENERGY JOB GROWTH VS. REGULAR JOB GROWTH  
(2017-2018)



# THE COST OF DIRTY AIR

After falling for seven years, pollution levels rebounded from 2016 to 2018 due to increased use of natural gas and decreased enforcement of the Clean Air Act.

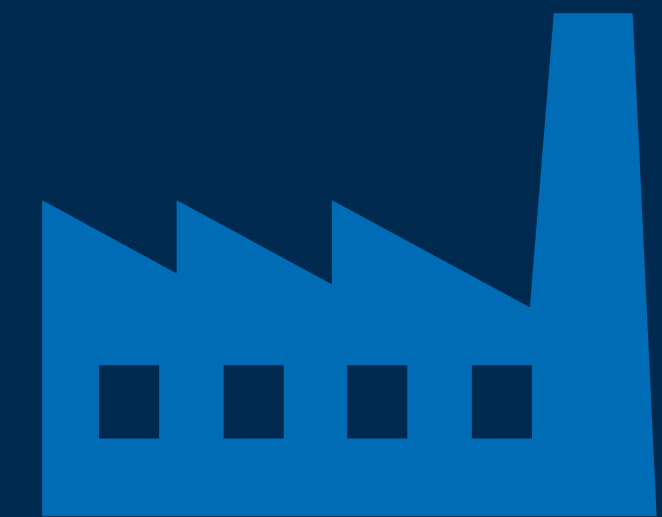
PERCENT CHANGE IN FINE PARTICULATE POLLUTION  
USING 2016 AS A BASELINE (2009-2018)<sup>23</sup>



According to the National Bureau of Economic Research (NBER), from 2016 to 2018, increased pollution led to nearly 10,000 premature deaths of adults over age 30 in the U.S. in 2018.<sup>24</sup>

These damages cost taxpayers:

**\$89.4  
BILLION**





# RENEWABLES ARE SUSTAINABLE, COAL IS NOT

Taxpayers already spend \$4 billion per year protecting coal, or about \$75,000 for every coal job in the U.S.<sup>25</sup> We're also cleaning up 500,000 abandoned coal mines and covering up to \$15 billion in health care costs for injured miners.<sup>26</sup>

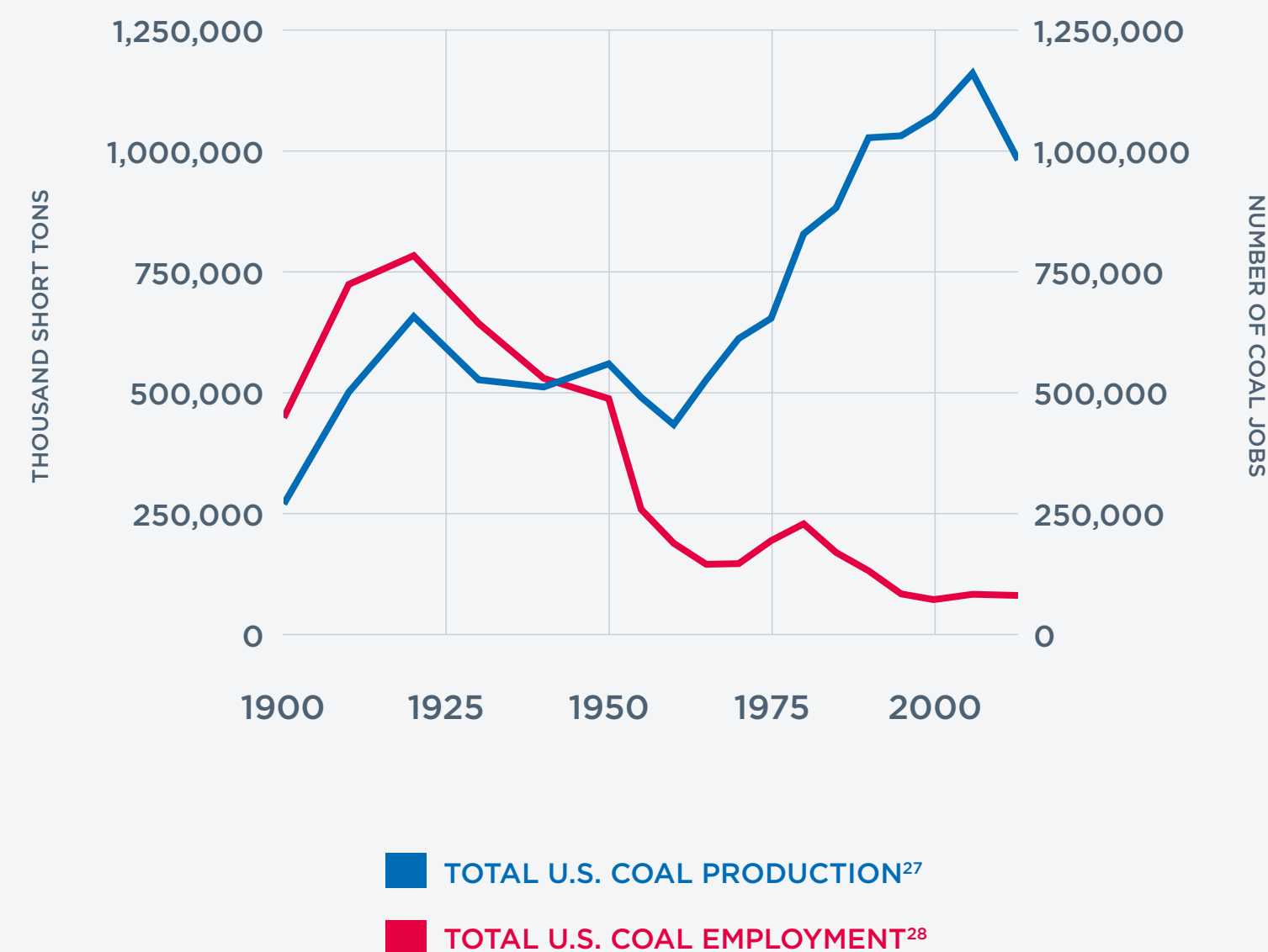
Automation has been eliminating coal jobs since the '50s, just as it has been in many other industries.

Surface mining started eliminating coal jobs in the '90s, because it's cheaper and requires fewer miners. Natural gas started replacing coal jobs about 10 years ago, because it's cheaper and cleaner, which means coal jobs in WV are turning into gas jobs in PA.

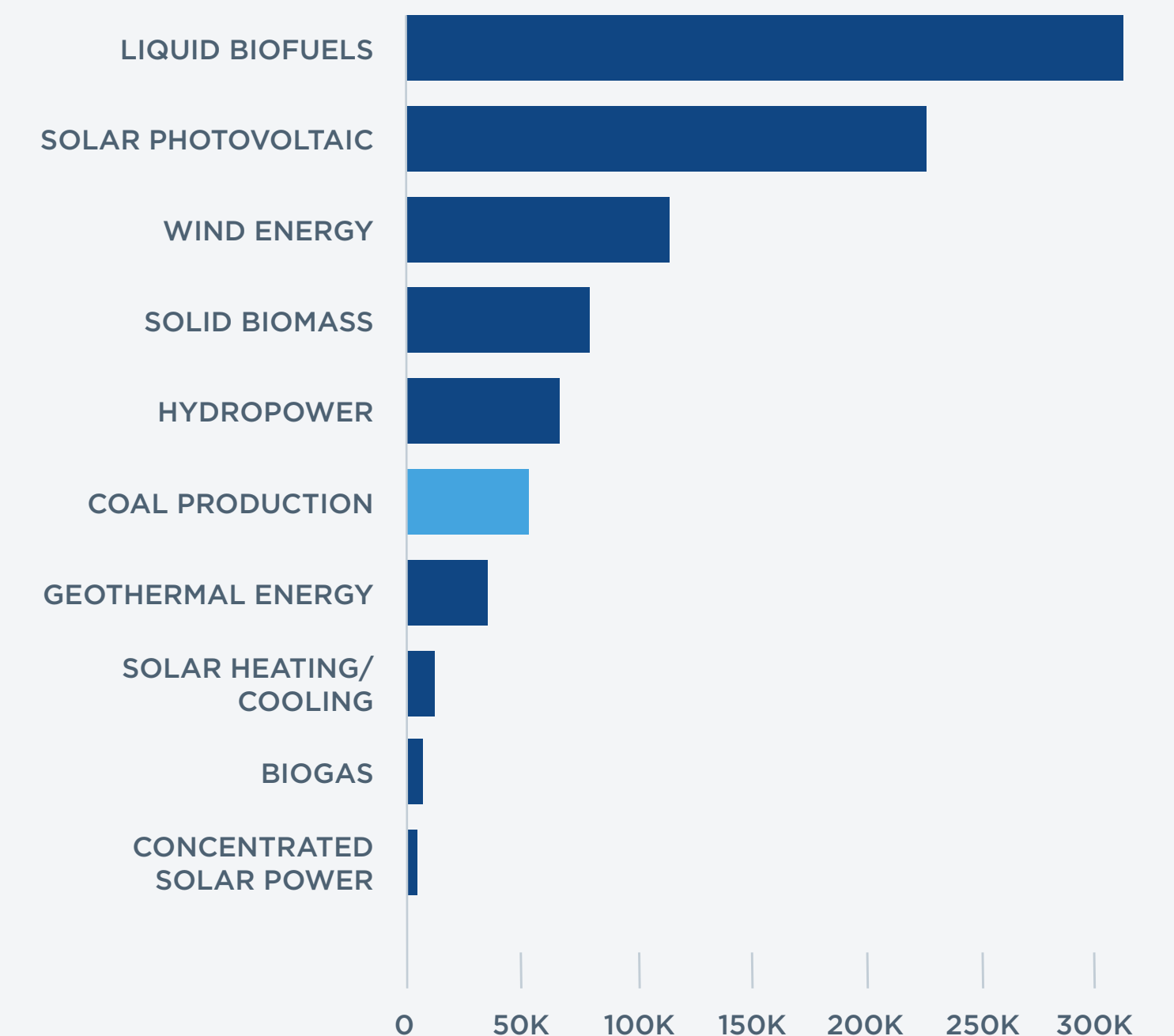
For Iowa, Michigan, Ohio, Wisconsin, Indiana, Illinois, and Minnesota, switching from fossil fuels to renewables could generate \$104 billion in local investment and jobs.

## MORE TONS PER WORKER = FEWER COAL WORKERS

### TOTAL U.S. COAL PRODUCTION AND TOTAL U.S. COAL EMPLOYMENT



## FOR EVERY COAL JOB IN THE U.S., 16 RENEWABLE ENERGY JOBS<sup>29</sup>



# REFERENCES

1. Bloomberg New Energy Finance. New Energy Outlook 2019. New York, NY: BloombergNEF, 2019. <https://about.bnef.com/new-energy-outlook/#toc-download>
2. Ibid.
3. Ibid.
4. U.S. Energy Information Administration. “Energy Consumption By Sector.” Accessed September 25, 2019. <https://www.eia.gov/totalenergy/data/monthly/pdf/sec2.pdf>
5. “U.S. Installed and Potential Wind Power Capacity and Generation.” Office of Energy Efficiency & Renewable Energy, accessed January 8, 2020. <https://windexchange.energy.gov/maps-data/321>
6. Solar Market Insight Report 2018 Year in Review. SEIA, March 13, 2019. <https://www.seia.org/research-resources/solar-market-insight-report-2018-year-review>; “Solar Market Insight Report 2017 Year in Review.” <https://www.seia.org/research-resources/solar-market-insight-report-2017-year-review>; “Solar Market Insight Report 2016 Year in Review.” <https://www.seia.org/research-resources/solar-market-insight-report-2016-year-review>
7. Lazard’s Levelized Cost of Energy Analysis – Version 12.0. Lazard, November 2018. <https://www.lazard.com/media/450784/lazards-levelized-cost-of-energy-version-120-vfinal.pdf>
8. State Energy Profiles: Michigan, Wisconsin, Iowa, Ohio, Minnesota, Indiana, Illinois. U.S. Energy Information Administration. <https://www.eia.gov/state/?sid=US>
9. The 2019 U.S. Energy & Employment Report. National Association of State Energy Officials & Energy Futures Initiative, 2019. <https://www.usenergyjobs.org/2019-report>
10. American Wind Energy Association. “Wind Facts at a Glance.” Accessed September 30, 2019. <https://www.awea.org/wind-101/basics-of-wind-energy/wind-facts-at-a-glance>
11. “U.S. Installed and Potential Wind Power Capacity and Generation.” Office of Energy Efficiency & Renewable Energy, accessed January 8, 2020. <https://windexchange.energy.gov/maps-data/321>
12. “Fastest Growing Occupations.” U.S. Bureau of Labor Statistics, accessed January 8, 2020. <https://www.bls.gov/ooh/fastest-growing.htm>
13. Keyser, David and Suzanne Tegen. The Wind Energy Workforce in the United States: Training, Hiring, and Future Needs. National Renewable Energy Laboratory & Center for the New Energy Economy, 2019. <https://www.nrel.gov/docs/fy19osti/73908.pdf>
14. Office of Energy Efficiency & Renewable Energy. “Michigan 110-Meter Potential Wind Capacity Map.” Accessed September 30, 2019. <https://windexchange.energy.gov/maps-data/191>
15. Wilkinson, Mike. “See how population is changing in your Michigan county (interactive map).” Bridge Magazine, August 31, 2017. <https://www.bridgemi.com/quality-life/see-how-population-changing-your-michigan-county-interactive-map>
16. Balaskovitz, Andy. “Property values surge in Michigan counties with wind energy - but why?” Energy News Network, April 5, 2017. <https://energynews.us/2017/04/05/midwest/property-values-surge-in-michigan-counties-with-wind-energy-but-why/>
17. “2017 Census of Agriculture Data Now Available.” U.S. Department of Agriculture, accessed January 8, 2020. <https://www.usda.gov/media/press-releases/2019/04/11/2017-census-agriculture-data-now-available>
18. Greene, Jay. “Solar panels could be cash crop for farmers.” Crain’s Detroit Business, August 25, 2019. <https://www.crainsdetroit.com/energy/solar-panels-could-be-cash-crop-farmers>
19. U.S. Wind Industry Annual Market Report 2018 – Executive Summary. American Wind Energy Association, 2018. [https://www.awea.org/Awea/media/Resources/Publications%20and%20Reports/Market%20Reports/AWEA\\_AMR2018\\_ExecutiveSummary.pdf](https://www.awea.org/Awea/media/Resources/Publications%20and%20Reports/Market%20Reports/AWEA_AMR2018_ExecutiveSummary.pdf)
20. Muro, Mark. “Where the robots are.” Brookings Institution, August 14, 2017. <https://www.brookings.edu/blog/the-avenue/2017/08/14/where-the-robots-are/>
21. “BLS Beta Labs.” Bureau of Labor Statistics, accessed January 8, 2020. [https://beta.bls.gov/maps/cew/US?period=2018-Q4&industry=10&geo\\_id=US000&chartData=3&distribution=Quantiles&pos\\_color=blue&neg\\_color=orange&showHideChart=show&ownerType=0](https://beta.bls.gov/maps/cew/US?period=2018-Q4&industry=10&geo_id=US000&chartData=3&distribution=Quantiles&pos_color=blue&neg_color=orange&showHideChart=show&ownerType=0)
22. Clean Jobs Midwest 2019, accessed January 8, 2020. <https://www.cleanjobsmidwest.com/>
23. Clay, Karen and Nicholas Z. Muller. Recent Increases in Air Pollution: Evidence and Implications for Mortality. Cambridge: National Bureau of Economic Research, October 2019. <https://www.nber.org/papers/w26381>
24. Ibid.
25. Redman, Janet. Dirty Energy Dominance: Dependent on Denial. Washington, DC: Oil Change International, October 2017. [http://priceofoil.org/content/uploads/2017/10/OCI\\_US-Fossil-Fuel-Subs-2015-16\\_Final\\_Oct2017.pdf](http://priceofoil.org/content/uploads/2017/10/OCI_US-Fossil-Fuel-Subs-2015-16_Final_Oct2017.pdf)
26. House Committee on Natural Resources. “Abandoned Mines.” October, 2016. <https://naturalresources.house.gov/imo/media/doc/Abandoned%20Mines.pdf>
27. Monthly Energy Review. Washington, DC: U.S. Energy Information Administration, September 2019. <https://www.eia.gov/totalenergy/data/monthly/pdf/mer.pdf>
28. Bureau of Labor Statistics. “Employment, Hours, and Earnings from the Current Employment Statistics survey: Coal Mining.” Data extracted September 25, 2019. <https://data.bls.gov/timeseries/CES1021210001>
29. International Renewable Energy Agency. “Renewable Energy Employment.” Accessed September 25, 2019. <http://resourceirena.irena.org/gateway/dashboard/?topic=7&subTopic=10>



INFO@BUSINESSFWD.ORG

---

BUSINESSFWD.ORG

---

1155 CONNECTICUT AVENUE NW  
SUITE 1000  
WASHINGTON, D.C. 20036

---

202.861.1270

