

QUESTION 5:

CAN WE FIX CLIMATE CHANGE WITHOUT WRECKING OUR ECONOMY?

ANSWER: YES.

SWITCHING TO RENEWABLE ENERGY COULD SAVE OUR ECONOMY.



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1 Republicans who argue that switching to renewable energy will “wreck the economy” ignore how little manufacturers spend on electricity and how much they spend on their supply chains.

2 The global energy race is over: renewable energy won. Of every new energy dollar, 77 cents is going to wind, solar, or batteries — and renewables will produce two-thirds of the world’s power by 2050.

3 As renewable energy grows more competitive, the number of states that can profit from it grows. For Iowa, Michigan, Ohio, and Wisconsin, renewable energy represents a \$58 billion opportunity to “buy local.”

4 By protecting coal plants and cutting funding for solar and wind R&D, Trump’s fighting market forces beyond his control. The U.S. should be leading on energy. We’re at risk of falling behind.

“

The concept of global warming was created by and for the Chinese in order to make U.S. manufacturing non-competitive.¹

”

- DONALD TRUMP
NOVEMBER 2012



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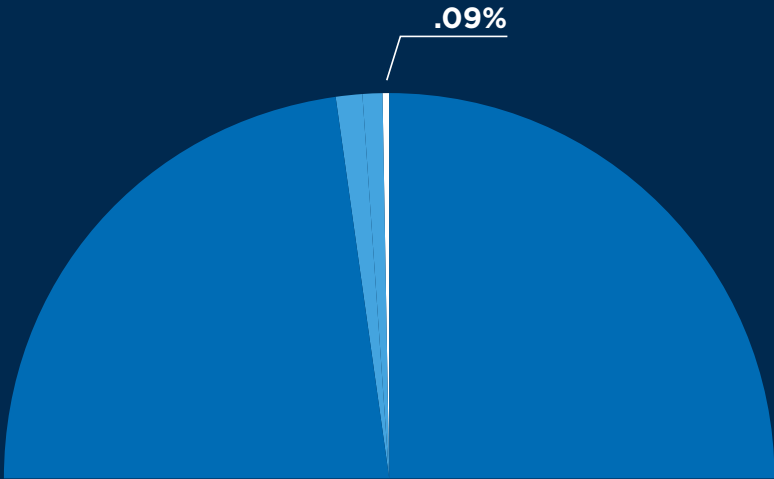
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REPUBLICAN ARGUMENTS ABOUT RENEWABLES “WRECKING THE ECONOMY” IGNORE HOW LITTLE MANUFACTURERS SPEND ON ELECTRICITY AND HOW MUCH THEY SPEND ON THEIR SUPPLY CHAINS

UTILITY COSTS REPRESENT TOO SMALL A SHARE OF A MANUFACTURER’S BUDGET TO “WRECK” IT²

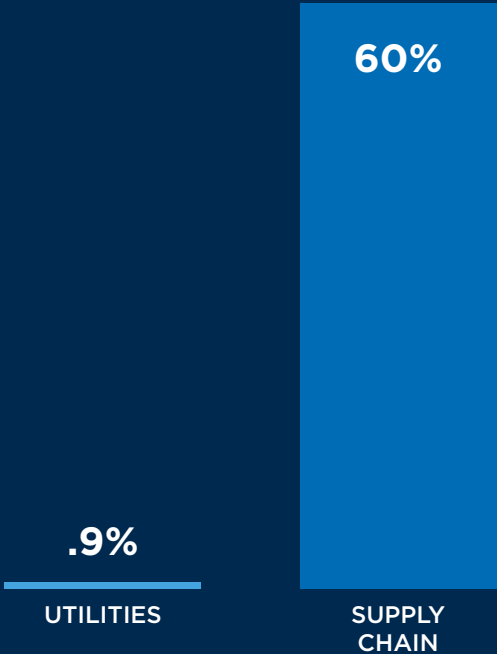
For example, auto manufacturers (OEMs and suppliers) spend .9% of their budgets on utilities. That’s 90 cents for every \$100 of product.

A 10% increase on an auto supplier’s utility costs = 9 cent increase on \$100 of product, or .09%.



AUTO MANUFACTURER’S TOTAL COSTS

Supply chain represents about 60% of total costs, while utilities represent less than 1%.



SUPPLY CHAINS ARE VULNERABLE³

A TYPICAL AUTO PLANT PURCHASES
\$3B
IN PARTS PER YEAR

A typical auto assembly plant purchases \$3 billion worth of parts each year. About half of their parts are imported (20% of those parts come from other continents). Trucks arrive every three to five minutes, nearly 24 hours each day.

TRUCKS ARRIVE EVERY
3-5
MINUTES

If all goes according to schedule, this practice is highly profitable; but, if supplies are disrupted, the plant shuts down. Each hour of down time costs \$1.25 million.

EACH HOUR OF DOWN TIME COSTS
\$1.25
MILLION

Climate change-driven extreme weather events are causing commodity shortages and price swings, disrupting shipments of raw materials and parts, and damaging plants and equipment.



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KEY THEMES FROM FORTUNE 500 WARNINGS ABOUT CLIMATE CHANGE

“JUST IN TIME” EFFICIENCY RAISES CLIMATE RISK

To boost profits, U.S. companies source from across the globe, encourage their suppliers to specialize, and reduce overhead costs with “just in time” inventory.

As our supply chains grow more global, more specialized, and faster, severe weather events grow more expensive.

HIGHER TEMPERATURES AND RISING SEAS ARE STRANDING ASSETS

Ranchers slaughtered herds in Texas, closed ranches and processing plants, and shifted production to the upper Midwest.

New England’s fishing fleets are struggling to survive a drop in their Atlantic cod catch.

Michigan cherries, Iowa soybeans, and Wisconsin dairy are also struggling.

DAMAGE TO THE DEVELOPING WORLD HURTS U.S. COMPANIES

Developing markets face greater climate risk: their populations live in hotter climates and are concentrated in coastal areas with poor infrastructure.

This hurts Fortune 500 companies, because those developing markets are expected to drive their future growth.

WEATHER CAN BE THE DIFFERENCE BETWEEN A GOOD YEAR AND GOING OUT OF BUSINESS

For retailers, restaurants, and the entertainment industry, weather can make or break their year.

Good weather allows golf courses to sell more afternoon rounds and restaurants and sports teams to fill outdoor seating. For low-margin businesses, marginal sales are critical to survival.

SMALL BUSINESSES ARE LESS LIKELY TO SURVIVE SEVERE WEATHER LOSSES

They have smaller cash reserves, are more likely to operate out of a single location, are less likely to have backup systems, and have a harder time relocating.

Small business failures are also bad news for the big companies they supply.



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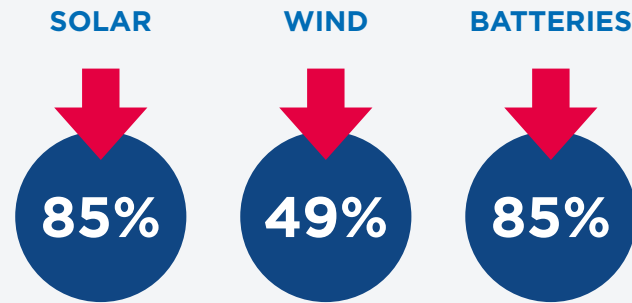
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THE GLOBAL ENERGY RACE IS OVER: RENEWABLE ENERGY WON

INVESTMENT OVER PAST 10 YEARS DROVE PRICES LOWER, WHICH CREATED NEW DEMAND, NEW CAPACITY, AND MORE INVESTMENT⁴

PRICE DECLINES (2010-2019)

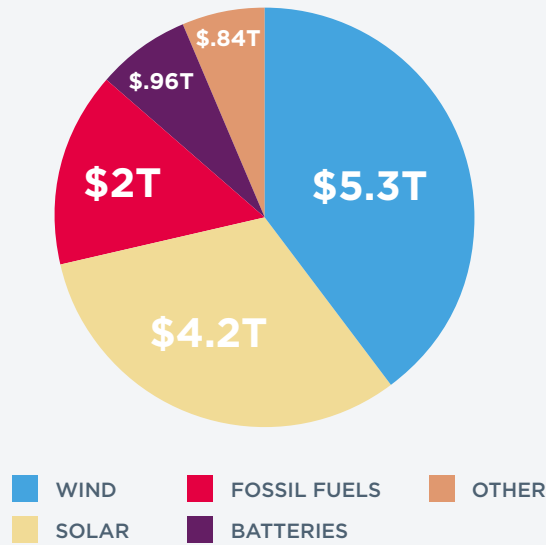


Renewables are more affordable than fossil fuels in two-thirds of the world.

By 2030, they will be more affordable nearly everywhere.

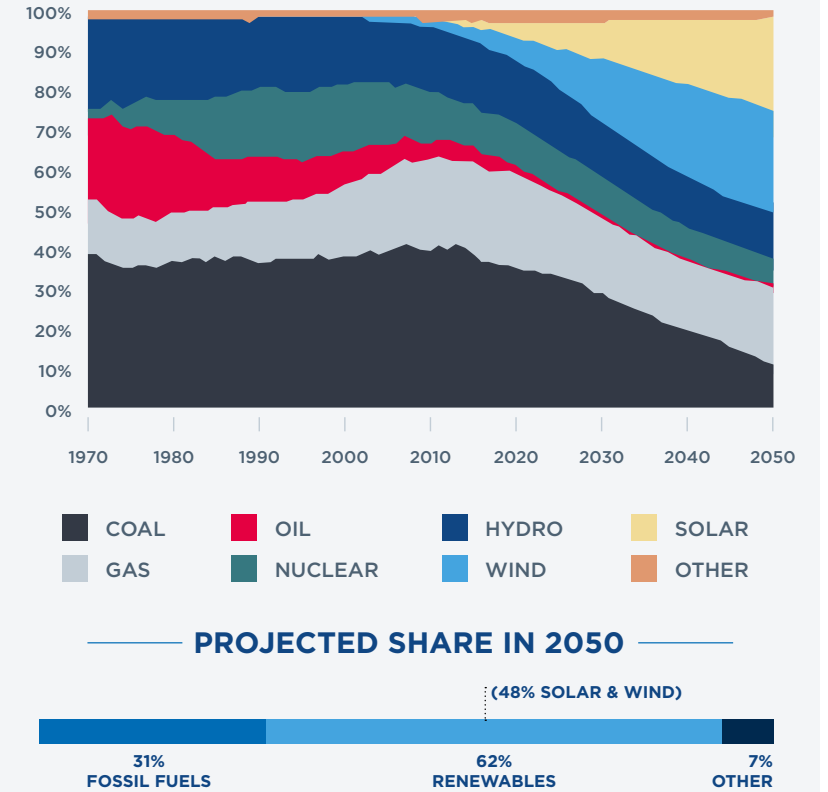
RENEWABLES WILL CAPTURE 77 CENTS OF EVERY NEW ENERGY DOLLAR (2018-2050)⁵

\$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 DRAMATICALLY⁶



SOURCE: Bloomberg New Energy Finance



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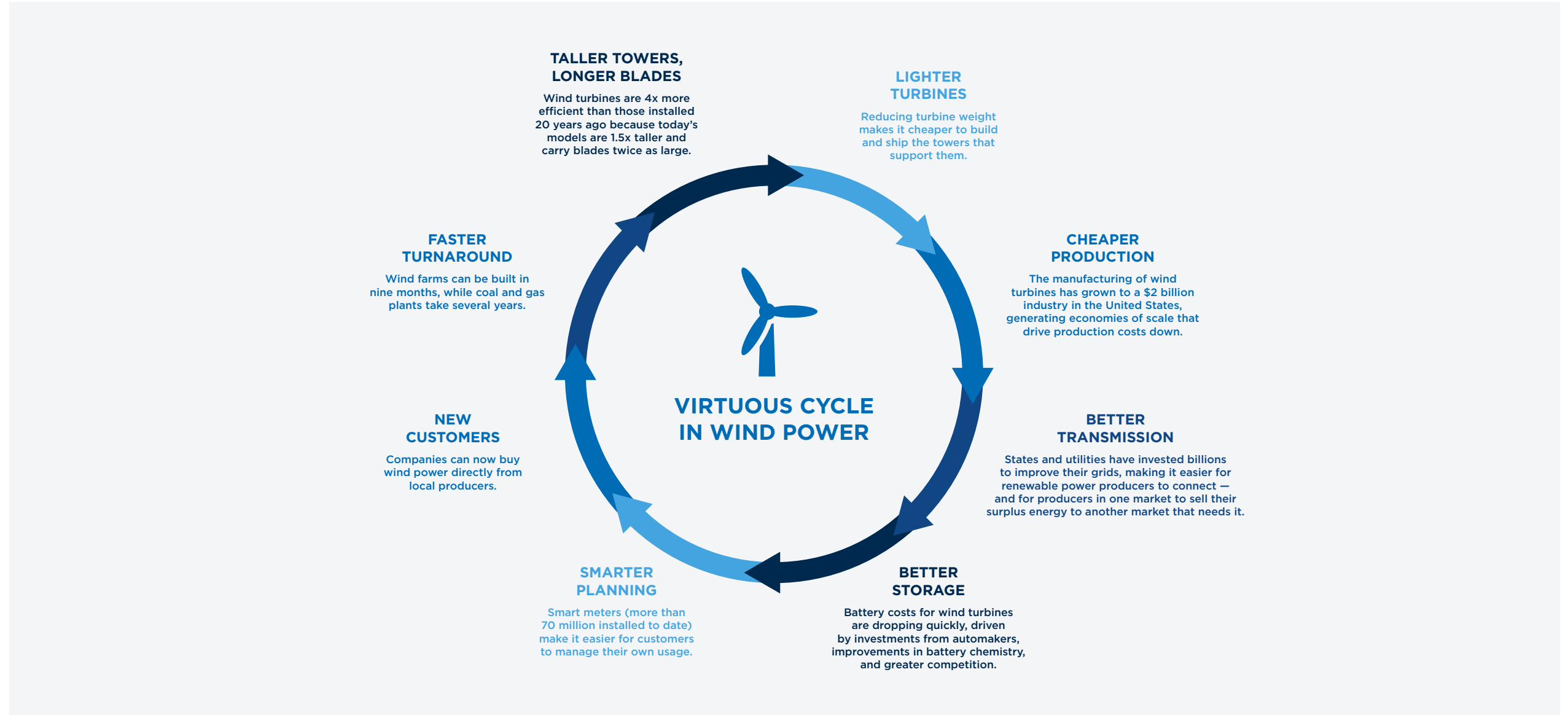
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HOW THE VIRTUOUS CYCLE IN RENEWABLE ENERGY WORKS



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TRUMP'S FIGHTING MARKET FORCES BEYOND HIS CONTROL

INVESTMENTS IN OUTDATED ENERGY⁷

Half of U.S. thermal power capacity will be replaced over the next 12 years, and none of the new plants will burn coal.

Investors worry \$500 billion in new investment for U.S. natural gas plants could be “stranded” by falling solar and wind prices.

AS TRUMP RESISTS, CITIES AND STATES TAKE ACTION

Cities are spending \$47 billion on 240+ climate change remediation projects (like raising coastal highways).⁸

Seven states are committed to switching entirely to zero-emission electricity (CA, HI, ME, NM, NY, NV, WA, plus D.C. and Puerto Rico).⁹

CO, ME, NJ are accelerating switch to zero-emission electricity.

The Regional Greenhouse Gas Initiative will include 11 states by 2021¹⁰ and Pennsylvania recently announced plans to join.¹¹

PA and NY are among the states instituting policies to keep nuclear plants operating.

AS BATTERY PRICES FALL, CAPACITY GROWS 122-FOLD¹²

Cost of lithium ion batteries dropped 85% from 2010 to 2018



Attracting \$662 billion in new investment



This investment will increase battery storage capacity from 9GW in 2018 to 1,095GW in 2040 (a 122-fold increase)



Increasing scale and new investment will cause costs per KW to fall another 50% from 2018 to 2030



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FOR MI, OH, IA, AND WI, RENEWABLES COULD BRING \$58 BILLION IN ENERGY SPENDING HOME

REDISTRIBUTING ENERGY JOBS

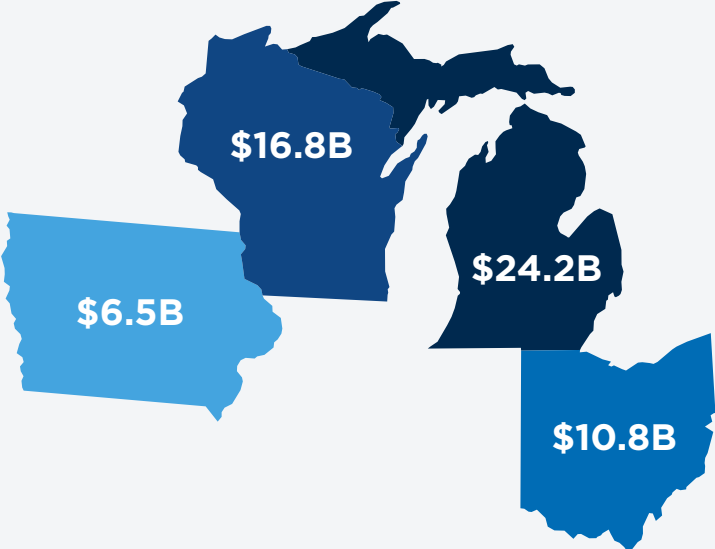
Energy jobs have been centralized in states with oil, gas, and coal reserves.

Renewable energy creates jobs in states that would otherwise import fossil fuels.



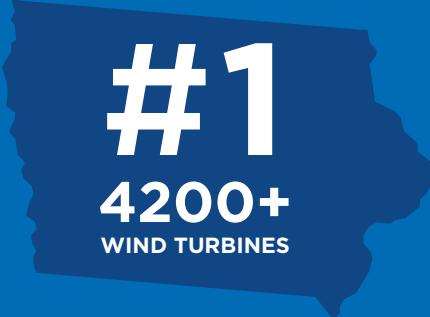
BRINGING ENERGY JOBS TO THE MIDWEST¹³

If MI, OH, IA, and WI moved their energy imports to renewable production at home, tens of billions of dollars would come to the Midwest.



WINNING ON RENEWABLES¹⁴

THE MIDWEST HAS
31%
OF U.S. WIND
CAPACITY



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



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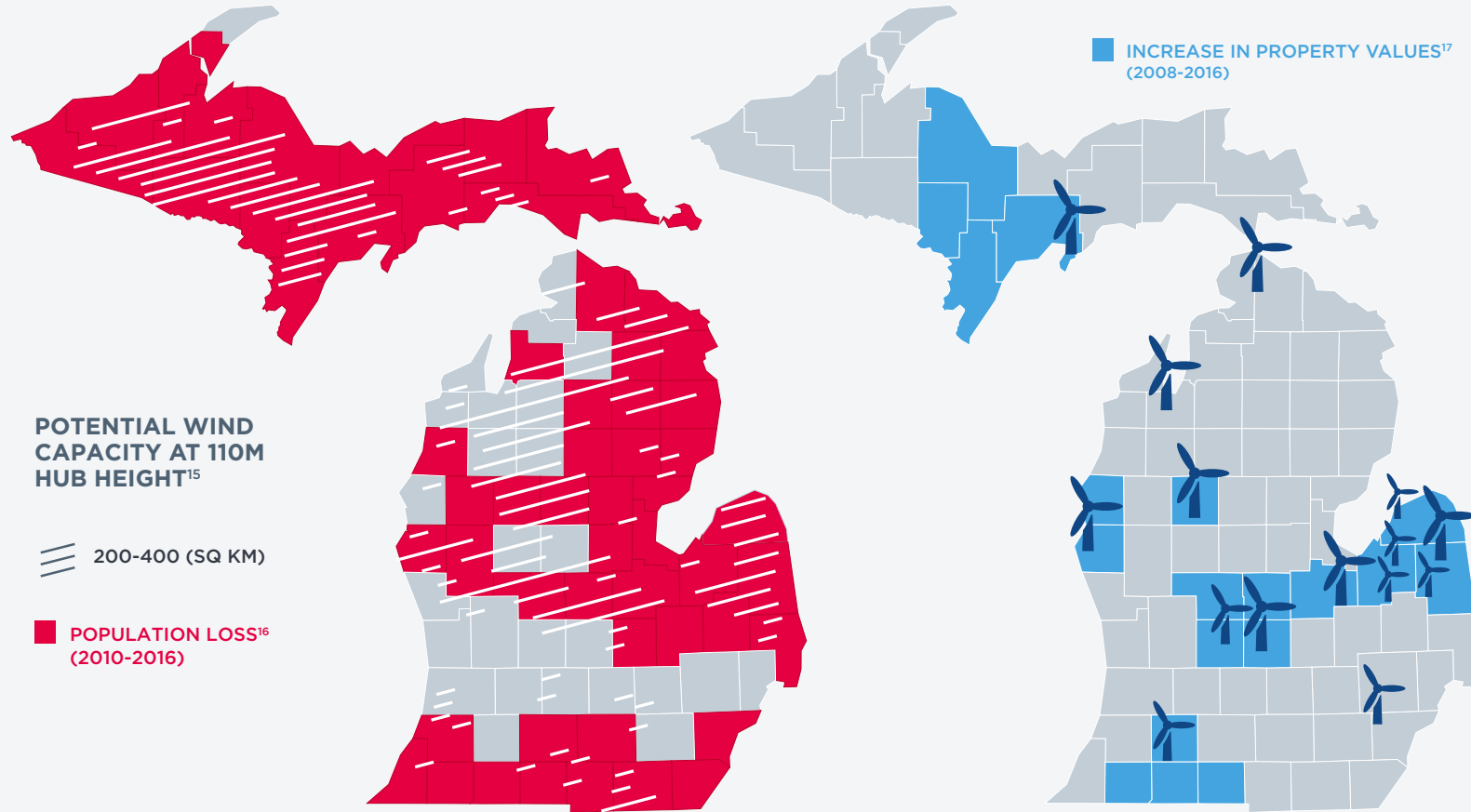
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MANY OF THE RURAL COUNTIES THAT NEED HELP MOST HAVE STRONG WIND RESOURCES

ADDING WIND POWER CAPACITY CAN INCREASE PROPERTY VALUES



SOURCE: Midwest Energy News

By leasing part of their land to wind power providers, farmers obtain new, stable revenue to complement (often volatile) crop revenue.



Turbines can increase property values, particularly in areas with high foreclosure rates and shrinking populations.



Wind companies pay taxes that fund municipalities struggling with shrinking populations and tax bases.



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WE ARE FALLING BEHIND OUR GLOBAL COMPETITORS

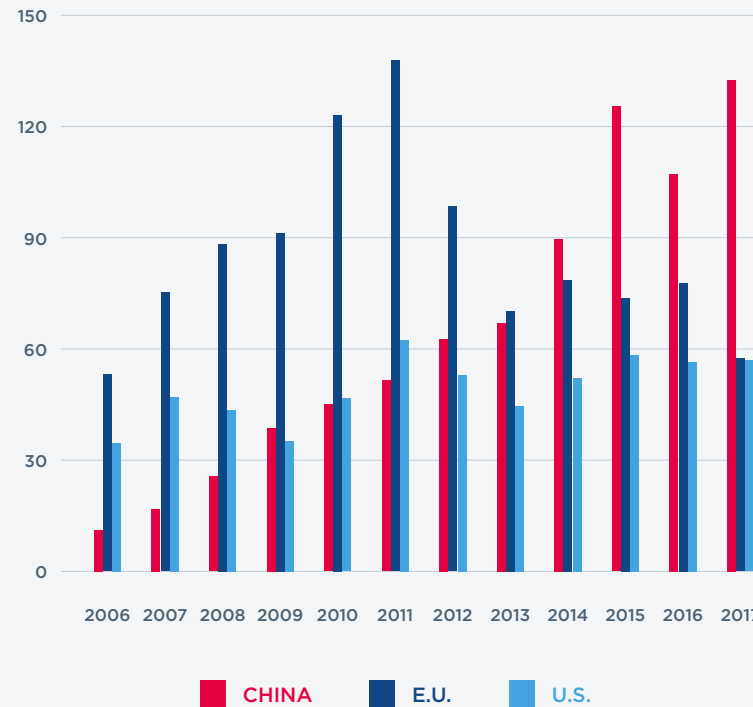
GLOBAL ENERGY DEMAND WILL INCREASE 62% BY 2050¹⁸

Growing population, industrialization, demand for air conditioning caused by higher temperatures, and a shift to electric cars drive strong demand for electricity.



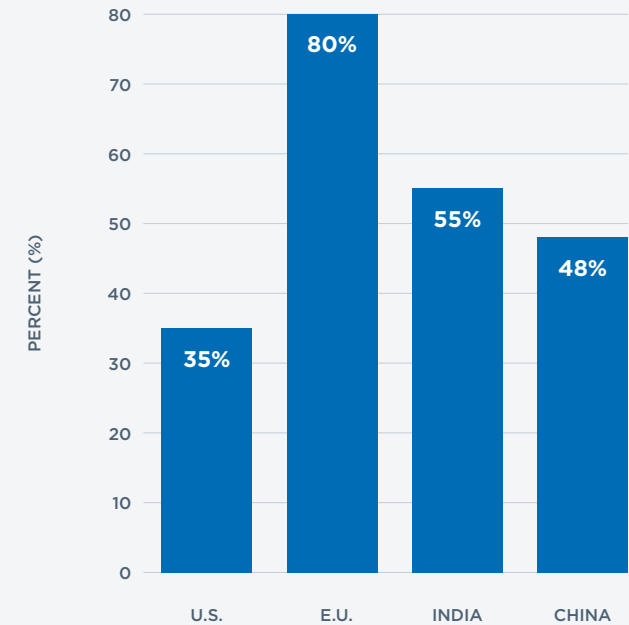
CHINA AND THE EU ARE OUT-INVESTING THE U.S.¹⁹

GLOBAL TRENDS IN RENEWABLE ENERGY INVESTMENT, BY GEOGRAPHY (\$ BILLIONS)



EUROPE WILL LAP U.S. IN SOLAR AND WIND²⁰

SOLAR AND WIND PENETRATION IN 2050



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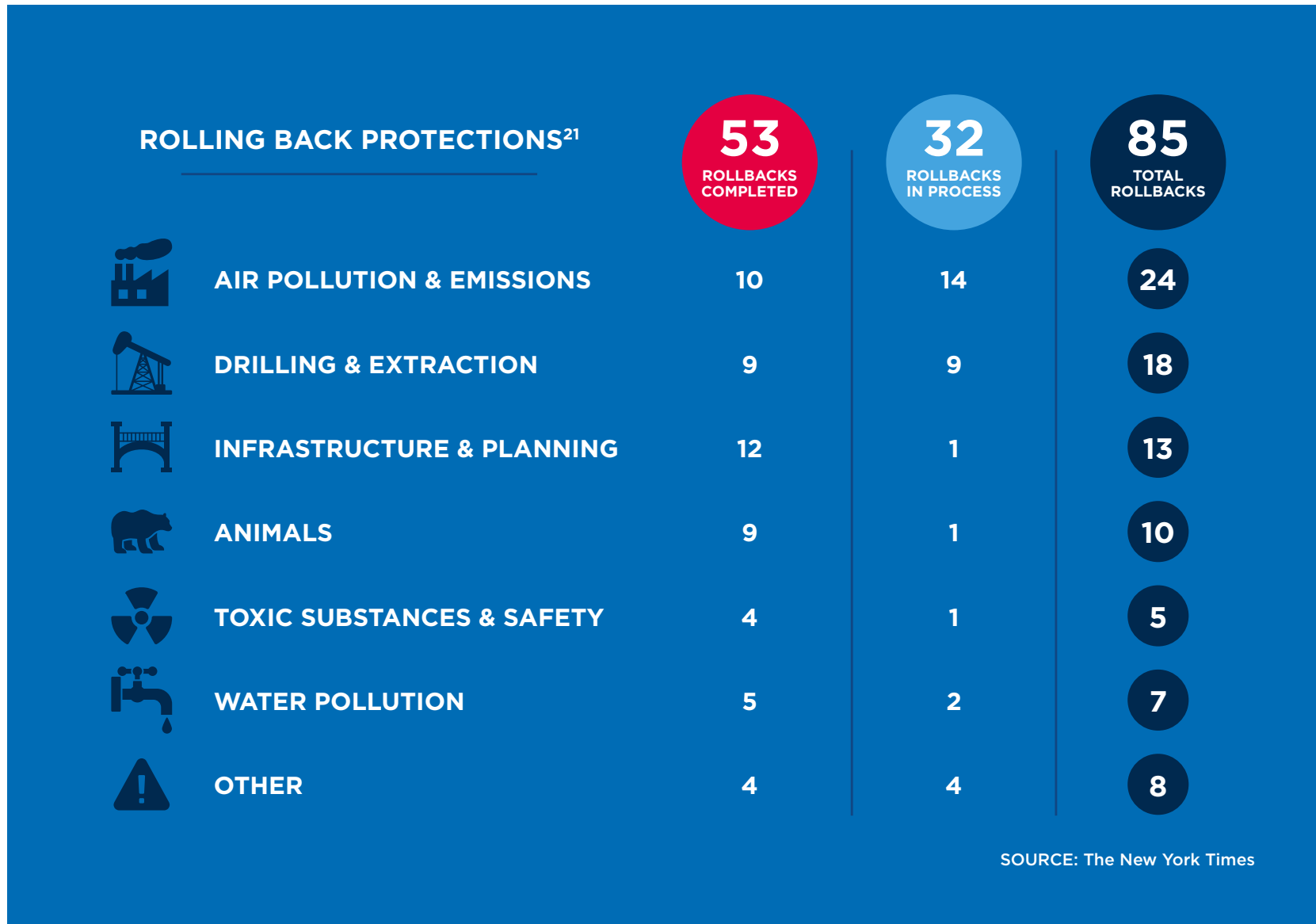
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TRUMP'S ACTIONS ON CLIMATE



OUT OF THE PARIS AGREEMENT

The United States is the only country in the world no longer committed to the Paris Agreement.²²

CUTTING INVESTMENT IN RENEWABLES, BOOSTING DEPENDENCE ON COAL

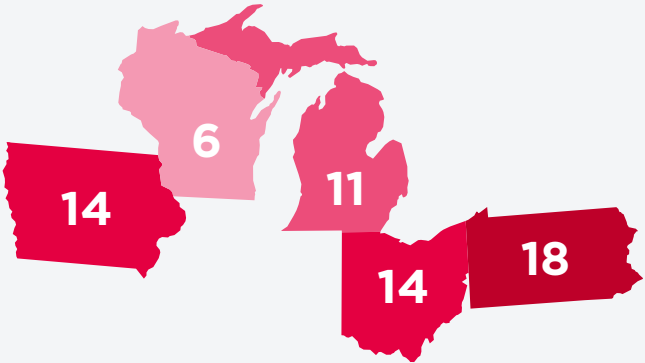
Trump's 2020 budget request cuts funding for renewables by 71 percent.²³

Current subsidies for coal (\$4 billion/year) = \$75,000 per job^{24, 25}

Washington continues subsidizing the declining coal industry, when renewable energy supports more (and better) jobs.

SEVERE WEATHER IS UNDERMINING MANY OF THE MIDWEST'S MOST IMPORTANT COMPETITIVE ADVANTAGES

BILLION-DOLLAR DISASTERS²⁶ (2014-2019)



FORTUNE 500 COMPANIES HEADQUARTERED IN FIVE STATES²⁷

- OH (24)
- PA (20)
- MI (16)
- WI (9)
- IA (2)

OF THE 71 FORTUNE 500
COMPANIES ACROSS
THESE STATES, MORE THAN

80%

HAVE ISSUED SEVERE
WEATHER WARNINGS

THE MIDWEST ECONOMY DEPENDS ON ITS CENTRAL LOCATION, AGRICULTURAL CLIMATE, WATERWAYS, NATURAL RESOURCES, AND INFRASTRUCTURE.

IOWA FARMS AND WISCONSIN DAIRIES

Heat stresses plants and reduces crop yields. With livestock, it hurts milk yield, reproduction, and tolerance to diseases. Climate change is disrupting weather patterns, so rain falls in fewer, stronger bursts. Storms last longer, move farther, and pack more punch. It's also changing the timing and duration of growing seasons.

OHIO'S GROWING E-COMMERCE FULFILLMENT SECTOR

Ohio is an e-commerce powerhouse, in part, because of its 8,000 miles of interstate and 5,338 miles of rails.²⁸ Ohio also has seven commercial airports.²⁹ Ohio's shippers can get to 60% of the U.S. and Canadian population within 24 hours.³⁰ Extreme weather causes delays in shipping and damages critical infrastructure used to ship goods from Ohio to markets across North America.

PENNSYLVANIA INFRASTRUCTURE

Pennsylvania bridges, roads, rail, and power grid are among America's worst. Deficient roadway conditions cost the average Pennsylvania motorist over \$500 in maintenance per year.³¹ Climate change increases the number of freeze-thaw cycles, creating more potholes. Flooding damages bridges and roads. Heat and drought damage Pennsylvania's electrical grid.

GREAT LAKES WATERWAYS AND FISHERIES

Thirty million Americans and Canadians live off the Great Lakes, home of 84% of North America's surface fresh water.³² Climate change is affecting water quality (mostly, algae blooms), which harms fisheries. It's also causing water levels to rise and fall sharply, which harms shipping.



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