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REPORT

CLEAN ENERGY SWEEPS ACROSS RURAL AMERICA



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Clean Energy Sweeps Across Rural America

Clean energy creates jobs, supports local infrastructure development, and provides new opportunities to build thriving economies. While many rural American communities have faced economic challenges, they have also recently experienced incredible growth in wind energy, solar power, and energy efficiency. We examined case studies and clean energy employment and generation data to explore the exciting growth in the clean energy economy in the rural Midwest.

The analysis in this report reveals strong growth in the form of infrastructure investments, tax revenues, and jobs from clean energy in the rural Midwest. Though we focus on direct economic benefits in our analysis, these benefits are complemented by reductions in emissions that damage people's health and exacerbate climate change.

Rural areas hold 99 percent of all U.S. wind capacity—enough to power more than 25 million homes.¹ Wind energy development has considerably increased the tax base in many rural places in midwestern states. Furthermore, wind energy developers pay landowners to host turbines, providing an additional, reliable source of income. Wind projects also often directly invest in infrastructure improvements, and they also attract investments from corporations seeking renewable power for new facilities.

Solar energy, too, is growing in rural places in the Midwest, as new models for solar energy development expand access to more communities. Energy efficiency also provides unique opportunities in rural areas to cut costs for agricultural facilities and provide lower electricity bills to rural households.

Moreover, wind, solar, and energy efficiency have created impressive job growth in rural regions throughout the Midwest. In these regions, the number of clean energy jobs grew by 6 percent from 2015 to 2016 and totaled nearly 160,000 in 2017. That year, in fact, in the rural parts of every midwestern state except North Dakota and Kansas, more people worked in clean energy than in the entire fossil fuel industry.

The economic benefits of clean energy make it a great resource to meet the nation's changing energy and economic needs.

THE NATION THRIVES ON CLEAN ENERGY

Wind has rapidly become a mainstream energy source in the past two decades. In 2016, wind energy exceeded the capacity of hydroelectric power plants.² In just the first three months of 2017, a period of near-record growth in wind energy, the United States created 2 gigawatts (GW) of new capacity.³ By the end of 2019, total installed wind capacity is projected to grow by another 20 percent, relative to 2017.⁴ The rapid growth in wind investments is driven by continued technological advancements and associated cost reductions, which have brought wind prices to record lows.^{5,6}

The solar industry has experienced even more growth. The United States now has about 53 GW of total installed solar capacity, or enough to power 10 million average American homes. That reflects an increase of 88 percent relative to 2015.^{7,8} And solar installations have grown at a rate of 68 percent annually over the past decade. There are currently more than 1.5 million installations in the United States, and the industry is poised to reach 4 million by 2023.⁹ Solar energy just saw one of its largest periods of expansion in history, with nearly 2.4 GW of solar photovoltaic (PV) energy added in the second quarter of 2017.¹⁰ In addition, the cost of solar energy has fallen by a remarkable 86 percent since 2009.¹¹ In fact, Austin Energy, a Texas-based utility, recently signed a contract for a new power purchase agreement (PPA) that analysts estimate has a record-low solar price of \$23 to \$27 per megawatt-hour (MWh).¹² These prices, and the prices of other recent projects, indicate that solar projects are significantly cheaper than new gas plants and can even be cheaper than the cost of operating a preexisting coal plant.^{13,14,15} For comparison, the average cost of electricity ranged from \$20-35/MWh throughout the U.S. in 2017.¹⁶

With costs declining so quickly, it is not surprising that wind and solar made up 60 percent of all new utility-scale generation additions in the nation in 2016, according to estimates from the U.S. Energy Information Administration (EIA).¹⁷ In fact, several CEOs of large electric utility companies have spoken about this “exciting time” as utilities invest heavily in renewable energy technologies.¹⁸ In 2016, wind and solar jobs across the country increased by 32 and 25 percent, respectively.¹⁹ Solar PV installers and wind turbine service technicians were the two fastest-growing U.S. occupations of any kind in 2016—a trend that is expected to continue over the next decade.²⁰

While wind and solar boom, energy efficiency remains the cheapest way to meet the nation’s growing energy demand. In 2016, electric and natural gas utilities spent more than \$7.8 billion on energy efficiency, resulting in almost 26,000 gigawatt-hours (GWh) of electricity savings.²¹ Energy efficiency is the single largest employer within the energy sector, and as we continue to build more efficient homes and businesses, Americans will feel the benefits through new jobs, electricity bill savings, and cleaner air.

MIDWEST IS A CLEAN ENERGY POWERHOUSE

Clean energy is booming in the Midwest as a whole, but most of the recent additions are in rural areas. Across the 12 midwestern states, about 2.3 GW of new renewable capacity was added in rural areas in 2017 (see Figure 1). That’s an increase of more than 10 percent over 2016 capacity.²² For context, 2.3 GW represents the potential output of about 10 million solar panels or more than 1,000 large wind turbines. By comparison, 0.7 GW of renewable capacity was added in urban areas in 2017 (see Figure 1).²³ The previous year, rural areas gained 2.7 GW of renewable capacity while urban capacity grew by about 1 GW.²⁴ By the end of 2017, more than 31 GW of wind and solar capacity had been dispatched throughout the Midwest, about 24 GW of it in rural areas.²⁵

A NOTE ON METHODOLOGY

For the purposes of our research, we confined the Midwest to 12 states: Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin. To apportion employment and energy data, we defined urban areas—cities and their surroundings—as those designated Metropolitan Statistical Areas (MSAs) by the U.S. Office of Management and Budget (OMB). Rural areas are those designated Nonmetropolitan Areas by the OMB. Figure A in the Appendix shows the MSAs and Nonmetropolitan Areas in the Midwest.

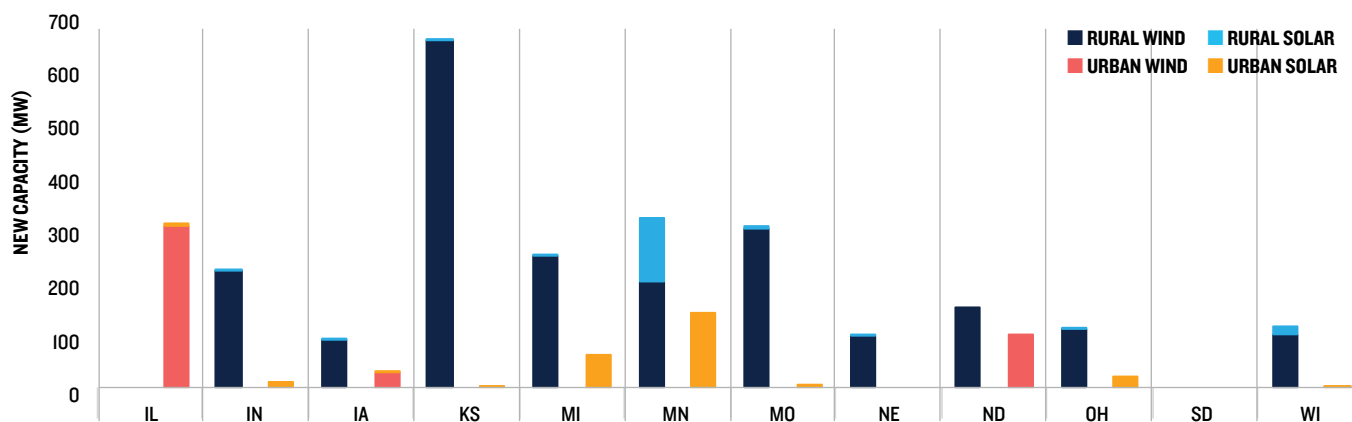
MSAs and Nonmetropolitan Areas do not perfectly align with urban and rural as we commonly understand these terms, but they are the best available indicators to distinguish the two. A significant portion of people living in rural areas live within MSAs, and some people in Nonmetropolitan Areas live in places that are not entirely rural.²⁶ The distinction is granular, and not all rural or urban areas have the same characteristics. Moreover, federal agencies define urban and rural in different ways that have varied over time, and several classifications include a spectrum of urbanization.^{27,28} Because it is not a perfect distinction, some of the supporting examples in this report are inside MSAs but still within rural areas, as reported by the sources we use, or otherwise sparsely populated regions.

Clean energy jobs cut across fields, including manufacturing, installation, and operations. Covered technologies include renewable energy (solar, wind, biomass, geothermal, and low-impact hydropower), advanced transportation (hybrid, natural gas, hydrogen fuel cell, and electric vehicles), alternative fuels, advanced grids (smart grids and storage), and energy efficiency (equipment manufacturing, installation/construction, and services). When we reference clean energy employment or clean energy jobs, we include all of the above sectors. Total or economy-wide employment encompasses all jobs, including those in the clean energy sectors. We used 2017 jobs data, the most recent numbers available from BW Research Partnership, a research firm that previously collected the data for the Department of Energy’s *U.S. Energy and Employment Report*.²⁹ We also used 2015 and 2016 jobs data to report the change over time. We do not compare 2015 or 2016 numbers to 2017 numbers because parts of BW Research Partnership’s methodology changed in 2017, so the differences at the MSA level do not reflect real changes in clean energy employment.

For renewable energy capacity, we report 2016 and 2017 data for wind and solar energy. Detailed data on employment and capacity are presented in tables in the Appendix.

See the January 2017 and May 2018 versions of the *U.S. Energy and Employment Report* for more details on the original data collection methodology and jobs categories.³⁰

FIGURE 1: 2017 WIND AND SOLAR CAPACITY ADDITIONS IN RURAL AND URBAN AREAS



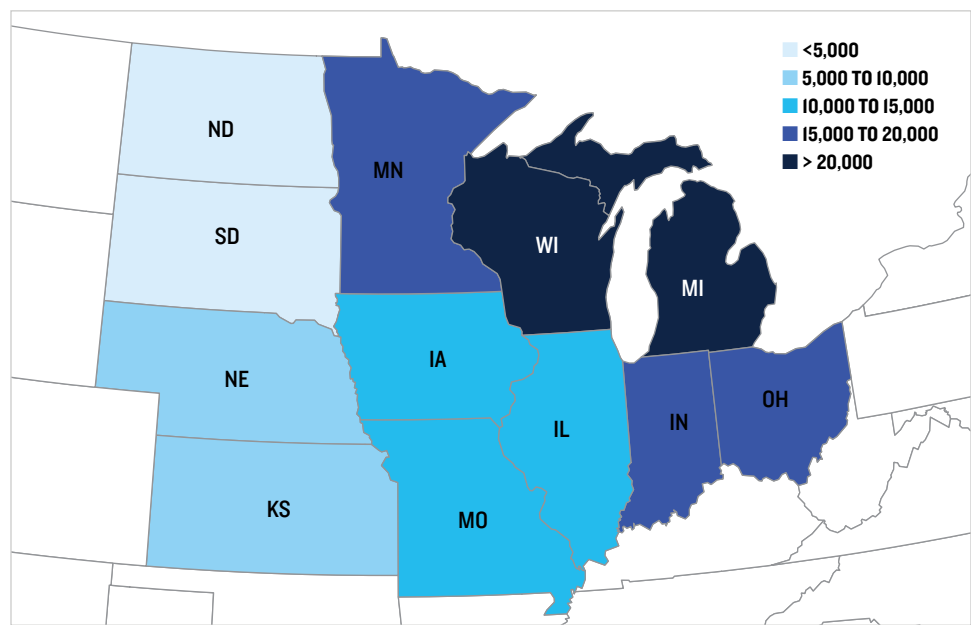
See Table 1 in Appendix for details.

Along with capacity, clean energy employment is growing quickly throughout the rural Midwest. More than 8,000 new rural jobs in the clean energy sector were added in 2016, a 6 percent increase from 2015 (see Table 4 in the Appendix). In 2017, the clean energy sector supported 158,000 jobs in the rural Midwest (see Figure 2 and Table 2 in the Appendix). Of those 158,000 jobs, almost 17,000 are in renewable energy generation. About 116,000 are in energy efficiency (including equipment manufacturing, delivery, construction, installation, and maintenance), and

the rest are in sustainable transportation and advanced grids (see Table 2 in the Appendix).

Since 2015, clean energy jobs in the Midwest have grown at a much faster rate than have jobs economy-wide (see Figure 3). In 2016, the number of rural clean energy jobs increased by more than 5 percent for 9 midwestern states, with 5 states experiencing growth of 7 or 8 percent. Most of these states had seen no growth or even losses across their entire economies, so the gains from clean energy were especially welcome.

FIGURE 2: CLEAN ENERGY JOBS IN RURAL AREAS IN 2017



Map is based on BW Research Partnership data concatenated among Nonmetropolitan Areas. See Table 2 in the Appendix for details.

FIGURE 3: 2015–2016 GROWTH IN CLEAN ENERGY JOBS AND ECONOMY-WIDE JOBS FOR RURAL AND URBAN AREAS

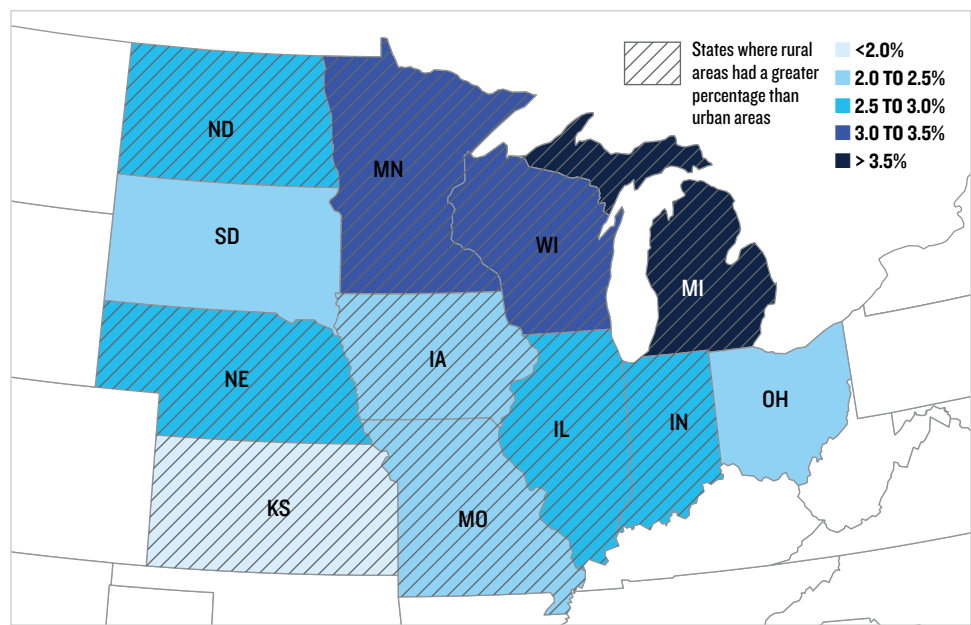


See Table 4 in Appendix for details.

While in absolute terms the majority of clean energy jobs are in urban places (Table 2 in the Appendix), clean energy plays an outsized role in rural areas relative to the size of rural economies. In 2017, clean energy jobs made up a greater percentage of total jobs in rural areas than in urban areas in 10 of the 12 midwestern states (Figure 4). For the exceptions, Ohio and South Dakota, the difference was minuscule. In both states, clean energy’s share of total jobs exceeded the regional rural and urban averages. Michigan leads the Midwest in clean energy’s share of total jobs, with 4.2 percent of total rural jobs coming from clean energy (Figure 4).

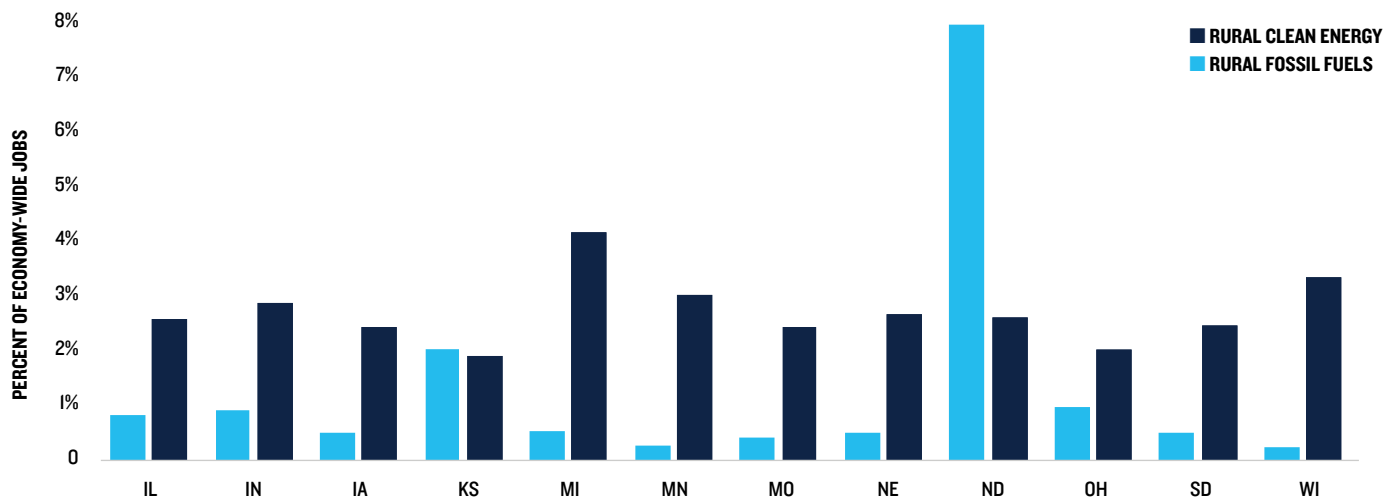
In 2017, more people in the rural Midwest were employed by clean energy than by fossil fuel power plants, extraction, refinement, and transportation combined in 10 of 12 midwestern states (see Figure 5). Kansas has a similar number of fossil fuel and clean energy jobs, and the only state with significantly more fossil fuel jobs, North Dakota, engages in heavy oil and gas extraction. However, the state still boasts a strong clean energy economy, with more than 4,500 rural clean energy jobs that make up about 2.6 percent of total employment (see Tables 2 and 3 in the Appendix).

FIGURE 4: RURAL CLEAN ENERGY JOBS AS A PERCENTAGE OF TOTAL RURAL JOBS, 2017



Map is based on jobs data from BW Research Partnership and economy-wide jobs numbers from U.S. Department of Labor. See Table 3 in the Appendix for details.

FIGURE 5: CONTRIBUTION OF FOSSIL FUELS AND CLEAN ENERGY TO TOTAL EMPLOYMENT IN RURAL AREAS, 2017



“Fossil fuels” includes extraction, refinement, transportation, and generation. See Table 5 in the Appendix for details.

The federal government has played a huge role in the clean energy boom, through efforts that include innovation programs, rural development grants, and tax credits. Continued federal investment can further accelerate the booming clean energy economy in rural communities. Several U.S. Department of Agriculture (USDA) programs, including the Rural Energy Assistance Program (REAP) and the Energy Efficiency and Conservation Loan Program (EECLP), support clean energy development in rural areas.³¹ For example, in November 2017, the USDA announced a \$2.5 billion investment in rural electric infrastructure improvements. These funds will help rural communities in Minnesota, Missouri, North Dakota, and elsewhere improve power lines and distribution systems, build new renewable energy projects, and develop smart grids.^{32,33}

Programs that incentivize energy efficiency improvements, like the Weatherization Assistance Program, the Low-Income Home Energy Assistance Program, and codes and standards for building efficiency, help drive growth in the rural energy efficiency economy. These programs lead to more jobs, as well as savings on electricity bills and safer homes.

Unfortunately, many programs that have helped the clean energy boom are now threatened by the current administration's proposed budget cuts and rollbacks of environmental safeguards. Increased investment in these programs would further boost the clean energy economies of rural America.

BIG WINDS IN SMALL TOWNS

Wind energy generation is cheap, clean, and predominantly rural, given the space required for large-scale installations.^{34,35} In 2017, rural areas of the Midwest gained almost 2.2 GW of new wind capacity (Figure 1).

Rural electric cooperatives—which are owned collectively by their customers—are taking advantage of cheap wind resources, by both building their own plants and buying power from others. Co-ops added more than 900 megawatts (MW) of new wind capacity in 2016. For example, largely due to the economic advantages of using low-cost wind energy, North Dakota's Basin Electric Power Cooperative owns or holds power purchase agreements (PPAs) for almost 1.4 GW of wind power—more than 20 percent of the co-op's total generation capacity.³⁶

Wind energy brings revenue and infrastructure improvements

Financial investments in rural wind energy projects produce direct economic benefits in surrounding communities. Many investors are collaborating with local communities to develop projects that will have a long-term positive impact on the region.

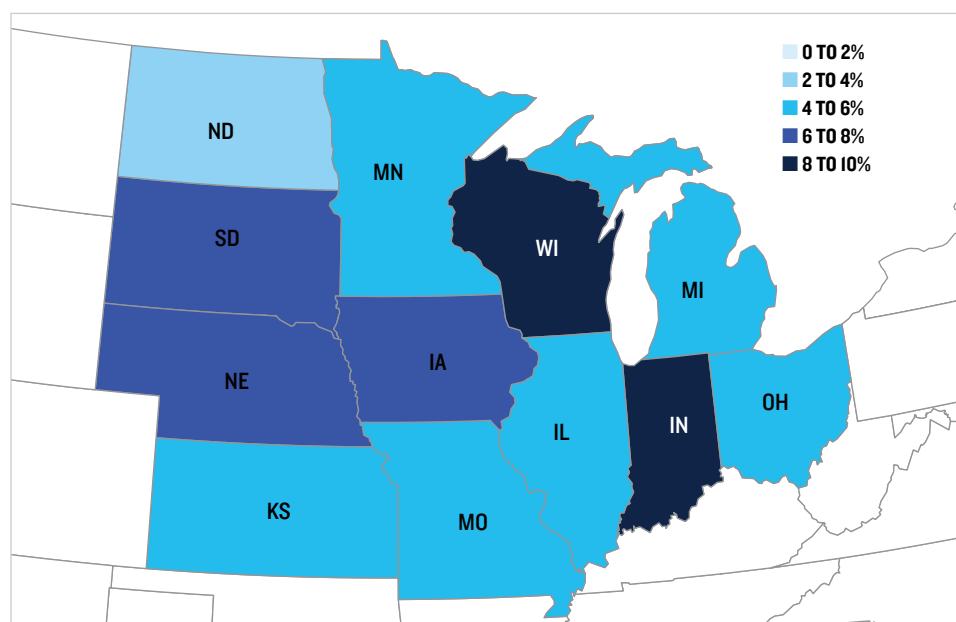


Some benefits come from increased tax revenues, which are frequently channeled into school districts and community development projects. For example, wind energy projects in Illinois paid \$36 million in property taxes in 2016.³⁷ In Colfax, Illinois, a town of 1,000 people, new wind projects increased the property tax base from \$61 million in 2006 to \$102 million in 2008. This new revenue allowed the local schools to fund new projects, pay off debt, and weather the 2008 recession.³⁸ Similarly, in Adair County, Iowa, 10 wind farms built over the last decade have increased the tax base by 30 percent. In Jackson County, Minnesota, taxes on wind energy generate about 20 percent of the county's operating revenue and have helped fund public works improvements.^{39,40}

Moreover, every year, wind farms provide \$245 million in lease payments to farmers and ranchers who host wind turbines on their land.⁴¹ Within the Midwest, rural landowners in Iowa, Illinois, and Kansas receive more than \$10 million annually from wind leases. Farmers and ranchers in North Dakota, Minnesota, and Indiana receive between \$5 million and \$10 million.⁴²

Wind projects also directly fund infrastructure improvements. For example, in Benton County, Indiana, wind farm developers have spent \$33 million to improve local roads.⁴³ The wind farms also created hundreds of temporary construction jobs and more than 100

FIGURE 6: GROWTH IN RURAL CLEAN ENERGY EMPLOYMENT, 2015–2016



Map is based on data from BW Research Partnership. See Table 4 of in the Appendix for details.

permanent jobs for service and maintenance technicians.⁴⁴ This development is part of a larger trend across the state. Between 2015 and 2016, Indiana saw the greatest percentage increase in rural clean energy jobs (more than 8 percent, from the addition of more than 800 jobs) out of all Midwest states (see Figures 3 and 6). This trend is likely to continue in the coming years, particularly in Benton County, which contains more than half of Indiana's wind capacity.⁴⁵

Wind energy is an investment magnet

Businesses from around the country are flocking to the rural Midwest to build data centers and other facilities that will run on clean energy. Rural communities with abundant wind energy resources have garnered significant corporate interest. Corporations drawn to an area create local jobs. At best, they can also provide significant tax revenue and infrastructure improvements. The long-term, sustained impact on local communities will depend on the deals municipalities negotiate with corporate investors, but clean energy resources are a useful bargaining chip.

Apple's new data center in Iowa's Dallas County will be 100 percent powered by wind energy. The company's \$1.3 billion investment will create more than 550 temporary construction jobs and 50 permanent jobs. In addition, the company will contribute up to \$100 million to a newly established public improvement fund that will support the area's current infrastructure needs and community development projects such as parks, libraries, and playgrounds.^{46,47}

In fact, Iowa's renewable investments have become a magnet for growth. With almost 7 GW of wind capacity, Iowa now has the second-highest amount of installed capacity nationwide and the largest percentage of in-state generation from wind (36 percent).⁴⁸ The state uses that fact to encourage more economic development. As the director of the Iowa Economic Development Authority recently declared, "We use this wind portfolio, this renewable portfolio, as a calling card when we are talking to companies."⁴⁹ Deere & Co. recently proposed building a \$32.6 million technology center in Iowa as part of an effort to meet its sustainability goals.^{50,51} Several other companies—including Google and Microsoft—have also made major investments in the state.^{52,53}

The corporate demand for clean energy is also changing the way electric utilities operate in the Midwest and across the country. Many utilities are adding more renewable resources to their portfolios and offering "green tariffs," rate designs that essentially allow customers to purchase renewable power at competitive fixed prices. These efforts are meant to attract or retain customers who have high electricity demand and want that electricity to be clean.⁵⁴ Green tariffs have already helped drive more than 900 MW of renewable energy capacity nationwide. Utility commissions are often eager to approve these tariffs because of the additional benefits that come with clean energy.⁵⁵

Sarpy County, Nebraska, offers a great example of how green tariffs can spur local investment. Last year the county was selected as the site of a Facebook data center that will be 100 percent powered with wind energy. The



company collaborated with the Omaha Public Power District, the state's largest electric utility, to design a new green tariff to ensure that Facebook can meet all of its renewable energy needs.⁵⁶ According to Facebook's vice president of infrastructure, the ability to power the facility solely with wind-generated electricity was a key factor in the decision to site the data center in the Cornhusker State.⁵⁷ In 2016, Nebraska's rural renewable energy capacity almost *doubled*, with a 94 percent increase from 2015.⁵⁸ Sustained growth in clean energy will help the state attract future investments.

Facebook's Nebraska facility will create about 1,000 temporary construction jobs and 100 permanent jobs in the area. The mayor of the nearby town of Papillion has praised the project for its positive impact, stating that the resulting infrastructure improvements will spur economic growth throughout the county.⁵⁹

Kent County, Michigan, is also poised to benefit from a major tech company investment driven in part by the availability of low-cost renewable energy. Switch Communications Group is in the process of building several data centers in the county that will be powered entirely with wind energy. The first data center is open and operating on the company's campus just outside Grand Rapids.^{60,61} According to Switch's executive vice president of strategy, "Sustainably running the internet is one of the driving principles of Switch, which is why in our site selection process . . . we had to find a local utility who could provide a pathway to 100 percent renewable power."⁶² Switch's \$5 billion investment is expected to create 1,000 jobs, almost all of which will be filled by Michiganders.^{63,64} These jobs add to the indirect impact of clean energy, which already directly employs 24,000 people in rural Michigan, more than any other state in the Midwest (See Figure 2 and Appendix Table 2).

SOLAR LIGHTS A NEW PATH IN RURAL AMERICA

Jobs in solar energy make up more than 45 percent of the total renewable energy jobs throughout the Midwest. Although we do not have data for solar jobs in rural areas specifically, the recent growth in rural solar is a surefire sign that rural communities are out to get their fair share of the benefits.

Co-ops have taken great strides to bring solar energy to rural communities throughout the country, with more than half of them offering solar energy to their members.⁶⁵ Co-ops provided (either through their own power plants or through purchase agreements) 868 MW of solar energy capacity by the end of 2017, and that number is expected to reach 1 GW by the end of 2019.⁶⁶

Community solar programs allow participants to buy a share of a solar project and then benefit from the electricity generated. These projects bring solar energy to people who cannot or do not want to install their own rooftop solar panels. This can apply to homeowners who can't afford the large up-front costs or have rooftops that are shaded or inconveniently oriented. It can also benefit those who don't own their home and can't alter their roofs. More and more rural areas are subscribing to community solar programs.^{67,68} The majority of utility-sponsored community solar programs are operated by co-ops. In fact, there are currently more than 190 co-ops spanning 31 states that offer community solar.^{69,70} Total co-op community solar capacity tripled in just the past three years; it exceeded 100 MW nationwide in 2016.^{71,72}

Minnesota has invested heavily in community solar, with 17 co-ops using it today. Many Minnesota entities have chosen to invest in community projects that will broaden access to solar energy.⁷³ For example, the Rural Renewable

Energy Alliance recently developed Minnesota's first community solar array dedicated to low-income families. The array, which serves the Leech Lake Reservation, powers more than 100 homes and helps low-income residents reduce their energy costs, while also providing training and employment opportunities to Leech Lake Tribal College students and other residents.^{74,75}

In addition, Minnesota's solar garden program, a state initiative that makes community solar projects easier to implement, has enabled the utility Xcel Energy to expand community solar to farmers and small-business owners. The program currently has more than 50 community solar gardens in operation, generating more than 200 MW of power, making it the largest and one of the most successful community solar programs in the country.⁷⁶

Ohio has similarly taken advantage of community solar programs operated by co-ops. Through the OurSolar initiative, Ohio's 25 electric cooperatives have installed 23 community solar systems with 2.1 MW of total capacity.⁷⁷

In Missouri, Platte-Clay Electric Cooperative built a 100 kW solar farm, the state's first community solar project.⁷⁸ The decision to build this farm stemmed in large part from consumer demand; in a 2015 poll, 70 percent of Missourians said that they wanted more solar options and more solar throughout the state.^{79,80}

Many rural electric cooperatives have taken advantage of the low cost of solar power to develop projects that are both innovative and lucrative. For example, the Farmers Electric Cooperative in Kalona, Iowa, generates 15 percent of its power from solar energy and distributes 2.5 kilowatts (kW) per member. That's more locally produced energy per customer than any other utility in the country has been able to achieve. The cooperative has also encouraged smart financial investments in the area. Farmers Electric bought nine acres of vacant land for a 1.7-MW solar farm. The original landowners then invested the income from the sale in a nearby facility for four new businesses. All four businesses now purchase electricity from the solar farm.⁸¹

Dairyland Power Cooperative—which has solar sites in Wisconsin, Minnesota, Iowa, and Illinois—has also made significant contributions in rural solar. The cooperative boasts one of the nation's largest solar projects run by a rural electric co-op and has helped to install solar panels at local public schools and universities for educational and training purposes. In addition to the economic benefits, Dairyland's solar projects have included an array of local environmental boons. For example, the co-op has built 15 solar projects that include habitat for bees, butterflies, and other pollinators. These sites also provide deep-rooted plants to reduce runoff, control erosion, and enhance the quality of underlying soils.^{82,83}

Co-ops are helping bring the benefits of solar energy to communities that historically have not had access. More than 90 percent of the nation's persistent poverty counties

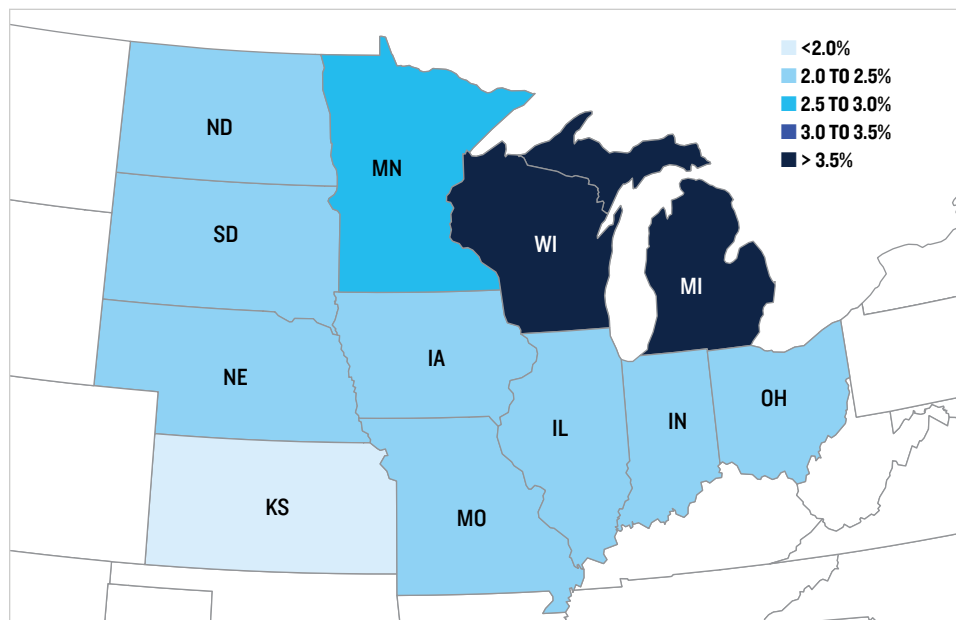
(where the poverty rate has exceeded 20 percent of the population for the past 30 years) are served by electric cooperatives.⁸⁴ Importantly, rural low-income households pay 9 percent of their income on energy, on average—a proportion three times that of their higher-income counterparts.⁸⁵ When designed properly, community solar programs can address many of the barriers that prevent households from adopting solar and, in doing so, can reduce electricity bills and lower household energy burden. In fact, four states include low-income carve-outs in their community solar programs to make sure that all households have access to clean and cheap energy.⁸⁶ It's promising to see co-ops developing creative ways to bring low-cost solar energy to more of their members. Co-ops in the Midwest should be sure to include the most energy-burdened households in their programs.

Investor-owned utilities are also pushing for more solar generation in rural communities. American Electric Power (AEP), which serves 11 states, plans to invest heavily in wind and solar.⁸⁷ In October 2017, AEP filed a request for proposals (RFP) for 400 MW of solar energy in Ohio, adding to an energy portfolio that already includes several wind and solar farms.⁸⁸ The RFP will prioritize projects in Appalachian Ohio that will hire military veterans and create permanent manufacturing jobs.⁸⁹

These examples illustrate the exciting growth of solar energy in rural America, rooted in electric utilities' success with bringing solar energy to communities that have found it difficult to gain access.



FIGURE 7: RURAL ENERGY EFFICIENCY JOBS AS A PERCENTAGE OF TOTAL RURAL JOBS 2017



Map is based on jobs data from BW Research Partnership and economy-wide jobs numbers from U.S. Department of Labor. See Table 6 in the Appendix for details.

ENERGY EFFICIENCY SAVES MONEY AND CREATES LOCAL JOBS

The rural energy efficiency economy is also very strong. Investment in energy efficiency advances employment opportunities and fuels economic growth while helping homes and businesses use less energy and save money on electric bills. Thanks to energy efficiency measures, midwesterners saved almost 7,000 GWh of electricity in 2016, and the potential exists to save much more with greater investment.⁹⁰

Throughout the rural Midwest, more than 115,000 people work in jobs related to the production, distribution, and installation of efficient appliances, building materials, and other efficiency services (see Table 2 in the Appendix).⁹¹ These jobs make up the largest portion of the rural clean energy economy. Moreover, it's impossible to outsource installation and repair of energy efficiency equipment. These jobs must be local. In communities that have struggled with rural flight, quality local jobs are especially important.

Both rural and urban regions have strong—and growing—energy efficiency economies. In rural areas, energy efficiency jobs account for about 2 percent of total jobs; in urban areas, they account for just over 1.5 percent, employing almost 400,000 people. In every midwestern state, energy efficiency jobs make up a greater share of total jobs in rural areas than in urban ones, but the differences are slight (see Table 6 in the Appendix and Figure 7).

Throughout the rural Midwest, many farms—which are often energy intensive—are saving money by cutting energy usage in their daily operations. For example, the Prairieland Dairy Farm in Firth, Nebraska, conducted an energy audit to identify the biggest energy wasters in its operations and the efficiency measures that would provide the biggest payback. The audit revealed a potential savings of \$18,000 per year through energy efficiency modifications. Many of these changes, such as an efficient lighting system and an efficient low-temperature detergent, were easy to implement and almost immediately improved the farm's bottom line. Prairieland worked with the USDA's Natural Resources Conservation Service (NRCS) to evaluate and implement its energy efficiency measures, and the farm is just one of many that have received such support from NRCS.⁹² This kind of support is particularly valuable in the Midwest, which contains seven of the top ten agricultural producing states as of 2017.⁹³

Other USDA programs have helped bring energy efficiency to rural communities. REAP provides grants and loans for rural businesses and farms to invest in renewable energy and energy efficiency.⁹⁴ In 2015, about 40 percent of REAP awards supported energy efficiency projects.⁹⁵ The EECLP similarly provides loans to electric cooperatives and other rural electricity providers for energy efficiency programs.⁹⁶

The USDA's Rural Development loan program for affordable housing provides financing for projects in rural communities, including energy efficiency improvements in homes.⁹⁷ In 2016 the USDA provided loans for energy efficiency in multifamily housing in rural Michigan,

including many buildings that were nearly 40 years old and in desperate need of repairs. To date, six multifamily housing projects in Michigan have been approved for Property Assessed Clean Energy (PACE) financing through the Rural Development program. This funding, which is the first PACE-financed project approved under a USDA program, means that the property owners can now afford to install energy efficiency upgrades that will significantly reduce their long-term energy costs, such as light-emitting diode (LED) lighting, more energy-efficient boilers, low-flow water fixtures, and ENERGY STAR®-certified appliances.⁹⁸ Continued use of Rural Development financing for energy efficiency will reduce the energy costs for more rural households.

Though the energy efficiency sector is already a large part of the rural Midwest's clean energy economy, there is still much work to be done to take full advantage of energy efficiency and bring savings to more homes and businesses. Rural communities face a higher energy burden than the national average. Recent analysis shows that targeted energy efficiency improvements could significantly reduce energy costs for rural, low-income households, which would help reduce inequality and stimulate job growth.⁹⁹

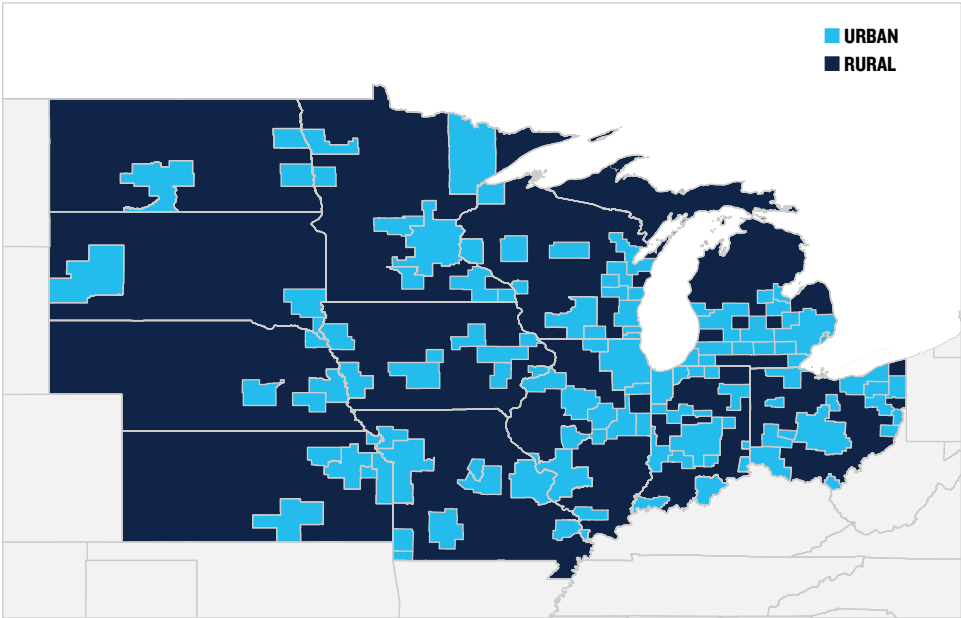
CONCLUSION

Renewable energy and energy efficiency resources are proven drivers of job creation and economic growth. Their progress in the rural Midwest is part of a national trend—wind and solar energy are booming throughout rural America, and nationwide investments in energy efficiency continue to pay off in energy and cost savings. Given the increasing appeal of low-cost renewable energy in rural communities, the clean energy revolution will only gain speed throughout rural America.

Wind and solar are well positioned for rapid growth over the next several years, but uncertain energy policy—including the phaseout of wind and solar tax credits and the proposals to cut federal clean energy innovation programs—could undermine this potential. Policy makers at every level of government should look for ways to sustain the great growth in renewable energy and support rural economies in the process. Federal leaders should increase funding for clean energy research, development, and demonstration projects that will continue to bring down the costs of clean energy and allow more people to gain access. Congress should also protect important programs that accelerate deployment in rural regions, like USDA's Rural Energy Assistance Program and DOE's Weatherization Assistance Program, and support further incentives to accelerate the clean energy transition.

In the absence of federal leadership, decision makers at the state and county levels should promote policies that support clean energy programs. State lawmakers should set strong targets for clean energy deployment, and utility regulators should ensure that utilities are responding to the call for more clean, affordable energy and planning for a clean energy future with more wind energy, solar power, and energy efficiency. County and municipal governments can develop programs to ensure that all of their constituents are benefiting from clean energy; community solar programs are a great place to start. Policies that support clean energy at all levels of government will spur more economic growth, help mitigate the dangerous impacts of climate change, and demonstrate a commitment to a sustainable future for all communities and future generations.

FIGURE A: RURAL AND URBAN AREAS IN 12 MIDWESTERN STATES¹⁰⁰



Map is based on shapefiles from the U.S. Census Bureau for Metropolitan Statistical Areas.

TABLE 1: NEW WIND AND SOLAR ENERGY CAPACITY, 2017 (MW) ¹⁰¹						
	WIND		SOLAR		TOTAL WIND AND SOLAR	
	RURAL	URBAN	RURAL	URBAN	RURAL	URBAN
Illinois	0	306	0	4	0	310
Indiana	220	0	3	9	223	9
Iowa	89	27	1	4	90	31
Kansas	659	0	1	2	660	2
Michigan	249	0	2	61	251	61
Minnesota	200	0	119	140	319	140
Missouri	300	0	6	3	306	3
Nebraska	97	0	4	0	101	0
North Dakota	150	99	0	0	150	99
Ohio	108	0	2	20	110	20
South Dakota	0	0	0	0	0	0
Wisconsin	98	0	17	2	115	2
Total	2,170	432	156	246	2,326	678

Note: The numbers are rounded to the nearest whole number, so the state numbers may not add up to the Midwest total.

TABLE 2: CLEAN ENERGY EMPLOYMENT, 2017¹⁰²

	CLEAN ENERGY		RENEWABLE ENERGY		ENERGY EFFICIENCY	
	RURAL	URBAN	RURAL	URBAN	RURAL	URBAN
Illinois	13,359	106,019	1,747	15,208	9,853	77,063
Indiana	16,095	67,656	1,332	9,351	10,884	43,079
Iowa	13,567	16,970	2,564	3,116	8,714	10,980
Kansas	7,586	15,675	1,082	2,432	5,459	11,169
Michigan	24,512	97,752	2,158	9,049	16,916	67,136
Minnesota	15,781	43,298	1,041	6,200	12,722	32,137
Missouri	12,245	42,336	1,274	3,797	8,899	31,267
Nebraska	7,856	10,580	1,443	1,725	5,480	7,544
North Dakota	4,804	4,012	1,225	1,008	2,797	2,331
Ohio	17,711	90,319	1,173	8,195	13,340	66,314
South Dakota	4,790	6,288	1,181	1,167	3,775	3,537
Wisconsin	20,226	54,817	839	4,820	17,413	44,886
Total	158,531	555,724	17,060	66,068	116,251	397,444

Note: The numbers are rounded to the nearest whole number, so the state numbers may not add up to the Midwest total.

TABLE 3: CLEAN ENERGY JOBS AS PERCENTAGE OF TOTAL EMPLOYMENT IN RURAL AND URBAN AREAS, 2017¹⁰³

	RURAL	URBAN
Illinois	2.6%	2.0%
Indiana	2.9%	2.8%
Iowa	2.5%	1.7%
Kansas	1.9%	1.6%
Michigan	4.2%	2.7%
Minnesota	3.0%	1.9%
Missouri	2.5%	1.9%
Nebraska	2.7%	1.6%
North Dakota	2.6%	1.8%
Ohio	2.0%	2.1%
South Dakota	2.5%	2.8%
Wisconsin	3.3%	2.5%

TABLE 4: JOB GROWTH, 2015 TO 2016

	CLEAN ENERGY		ECONOMY-WIDE ¹⁰⁴	
	RURAL	URBAN	RURAL	URBAN
Illinois	5.5%	4.7%	-0.6%	0.9%
Indiana	8.4%	8.1%	0.5%	1.7%
Iowa	7.0%	6.8%	0.4%	0.9%
Kansas	4.9%	4.7%	-1.3%	0.8%
Michigan	5.8%	5.2%	1.4%	2.2%
Minnesota	5.6%	5.2%	0.1%	1.6%
Missouri	5.8%	5.1%	0.2%	1.6%
Nebraska	7.5%	5.4%	0.0%	1.4%
North Dakota	3.3%	3.1%	-10.3%	0.2%
Ohio	4.7%	4.6%	0.8%	1.2%
South Dakota	7.5%	3.4%	0.3%	1.6%
Wisconsin	8.1%	6.2%	0.5%	1.5%

TABLE 5: FOSSIL FUELS AND CLEAN ENERGY JOBS AS PERCENTAGE OF TOTAL EMPLOYMENT IN RURAL AREAS, 2017¹⁰⁵

	FOSSIL FUELS¹⁰⁶	CLEAN ENERGY
Illinois	0.8%	2.6%
Indiana	0.9%	2.9%
Iowa	0.5%	2.5%
Kansas	2.0%	1.9%
Michigan	0.5%	4.2%
Minnesota	0.3%	3.0%
Missouri	0.4%	2.5%
Nebraska	0.5%	2.7%
North Dakota	8.0%	2.6%
Ohio	1.0%	2.0%
South Dakota	0.5%	2.5%
Wisconsin	0.2%	3.3%

TABLE 6: ENERGY EFFICIENCY JOBS AS PERCENTAGE OF TOTAL EMPLOYMENT IN RURAL AND URBAN AREAS, 2017¹⁰⁷

	RURAL	URBAN
Illinois	1.91%	1.46%
Indiana	1.95%	1.81%
Iowa	1.57%	1.11%
Kansas	1.38%	1.17%
Michigan	2.88%	1.87%
Minnesota	2.46%	1.41%
Missouri	1.78%	1.42%
Nebraska	1.87%	1.14%
North Dakota	1.53%	1.02%
Ohio	1.53%	1.52%
South Dakota	1.95%	1.56%
Wisconsin	2.88%	2.05%

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