Building Good Jobs in the Great Plains Through Clean Energy Investments

Impacts in Minnesota, North Dakota, and South Dakota

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Executive Summary

States across the country are promoting clean energy investments to spur economic growth in the wake of the novel coronavirus diseases (COVID-19) pandemic. Embracing the transition to renewable energy can not only promote both environmental and public health, it could also diversify the economy, boost employment, and create good family-supporting jobs. However, steps must be taken to mitigate the economic hardships faced by workers in traditional energy sectors who could become displaced.

Minnesota, North Dakota, and South Dakota are leaders nationally in clean energy production.

- In Minnesota, renewable energy sources account for 32 percent of electricity production and the state ranks 7th in total generation from wind energy.
- In North Dakota, renewable energy sources account for 42 percent of electricity production and the state ranks 12th in total wind capacity.
- In South Dakota, renewable energy sources account for 70 percent of electricity production, in part because the state is a prime location for utility-scale, land-based wind turbines.
- Prior to the COVID-19 pandemic, annual employment in the clean energy sector grew by 4 percent in these three Great Plains states, while jobs in the traditional electric power and distribution sector fell by a 2 percent and overall employment in all sectors increased by 2 percent.

The clean energy sector is expected to be a major job creator over the next decade. In Minnesota, North Dakota, and South Dakota:

- Every $1 billion invested in clean energy creates 7,300 jobs and $1.29 billion in economic activity compared with just 6,000 jobs and $1.19 billion in economic activity for fossil fuel power plants;
- Nearly 78,000 workers are already employed in clean energy jobs;
- Clean energy firms were reporting shortages of skilled workers prior to COVID-19; but
- Workers in wind and solar power jobs earn 22 percent less ($84,100 per year) in total compensation than their counterparts in fossil fuel power generation ($108,000 per year) and 7 percent less than the average for all traditional energy and infrastructure sectors ($90,700 per year)– which is partially attributable to higher rates of unionization in these other sectors.

Wind and solar power employers can take steps to better compete with fossil fuel companies for skilled workers.

- Currently, the clean energy sector disproportionately relies on out-of-state firms, with nonlocal workers accounting for 86 percent of the workforce on North Dakota's wind projects.
- Attaching prevailing wage standards to clean energy projects would eliminate the pay penalty, boost productivity, reduce on-the-job injuries, and increase market share for local businesses.
- Implementing project labor agreements can include apprenticeship ratios, targeted hire requirements, and no-strike clauses that prevent labor shortages.
- Formalizing partnerships with joint labor-management apprenticeship programs would ensure a just transition for displaced workers from the closure of power plants with union representation.

As Minnesota, North Dakota, South Dakota, and other states continue to battle the COVID-19 public health crisis and take steps to rebound from the COVID-19 recession, public investments will be critical to promoting long-term economic development. While clean energy investments can play a large role in the recovery, other infrastructure projects will also require qualified craft workers. To attract, develop, and retain skilled workers across the Great Plains, clean energy sector employers, environmental groups, and state governments can take steps to improve job quality and ensure broad-based economic prosperity.

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Introduction

A thriving and sustainable economy is dependent upon affordable energy. As public initiatives, private investments, and middle-class careers in the United States have moved towards cleaner alternatives, solar power and wind power have become America's primary sources of renewable energy. Many are now promoting clean energy investments to help spur economic growth in the wake of the novel coronavirus disease (COVID-19) pandemic.

Coal-heavy states such as Minnesota, North Dakota, and South Dakota have rapidly expanded their clean energy and wind power capabilities over the past decade. While these states are well known for their gas and oil extraction, they also have large and growing clean energy sectors– in part because Minnesota, North Dakota, and South Dakota are prime terrain for strong, steady winds that generate wind power. Eco-friendly policies coupled with declining wind and solar costs have resulted in these three states relying less on coal for electricity than they once did.

This transition to renewable energy sources and away from fossil has important implications for environmental and public health, and also for employment and the post-COVID-19 economy as a whole. Mitigating the economic hardships faced by workers in traditional energy sectors and ensuring that the clean energy sector creates good family-supporting careers will be vital to a successful transition. Investing in worker retraining, upholding local construction standards and apprenticeship programs on green projects, and improving job quality in the clean energy sector are all necessary to ensure broad-based economic opportunity in Minnesota, North Dakota, and South Dakota.

Background on Energy Production in Minnesota, North Dakota, and South Dakota

Minnesota, North Dakota, and South Dakota are national leaders in overall energy production (Figure 1). In 2018, the three Great Plains states produced a combined 4,997 trillion British thermal units (btu) of energy, accounting for more than 5 percent of the energy produced in the United States. However, the three Great Plains states had about 7 million residents, accounting for just 2 percent of the U.S. population. North Dakota generated nearly 6 billion btu of energy per capita, which ranks 2nd in the nation behind only Wyoming. South Dakota generated 275 million btu per capita (ranking 16th nationally) and Minnesota generated 94 million btu per capita (ranking 31st nationally). Combined, the three Great Plains states produced 689 million btu or energy per capita, more than double the national average of 278 million btu per capita.

Figure 1: Total Energy Production and National Rank in Three Great Plains States, 2018

Total Energy Production, Total Population, and Per Capita State Rank in 2018				
Energy Source	**Minnesota**	**North Dakota**	**South Dakota**	**All Three States**
Total Energy Production (Btu)	525 trillion	4,229 trillion	243 trillion	4,997 trillion
Total Population	5,611,179	760,077	882,235	7,253,491
Energy Production Per Capita (Btu)	93.6 million	5,563.9 million	275.4 million	688.9 million
Per Capita Rank (*National Average*)	31st	2nd	16th	(*277.8 million*)

Source: U.S. Energy Information Administration's "Rankings: Total Energy Production, 2018 (trillion Btu)" (2019e); U.S. Census Bureau's "2018 National and State Population Estimates" (2018).

Despite a reputation for hydraulic fracturing and coal-fired power plants, Minnesota, North Dakota, and South Dakota are also leaders in U.S. clean energy production (Figure 2). In the fall of 2019, fully 63 percent of electricity at utility-scale facilities was generated from carbon-based sources and 19 percent was derived from nuclear power in the United States. The remaining 18 percent was produced using renewable sources such as solar, wind, hydroelectric energy. In comparison, petroleum-fired, natural gas-fired, and coal-fired plants generated a much smaller share of electricity in these three Great Plains states. Carbon-based sources accounted for just 45 percent of electricity in Minnesota, 58 percent in North Dakota, and 30 percent in South Dakota. By contrast, renewable energy sources accounted for 32 percent of electricity production in Minnesota, 42 percent in North Dakota, and 70 percent in South Dakota (EIA, 2019a).

Figure 2: Energy Production Percentage in the United States and Great Plains Region, October 2019

Utility-Scale Net Electricity Generation (Share of Total) in October 2019				
Energy Source	**United States**	**Minnesota**	**North Dakota**	**South Dakota**
Petroleum-Fired	0.3%	0.1%	0.1%	-
Coal-Fired	20.8%	24.5%	54.6%	16.1%
Natural Gas-Fired	41.5%	20.4%	3.4%	13.6%
Nuclear	19.3%	24.8%	-	-
Renewables	17.5%	32.3%	41.7%	70.3%

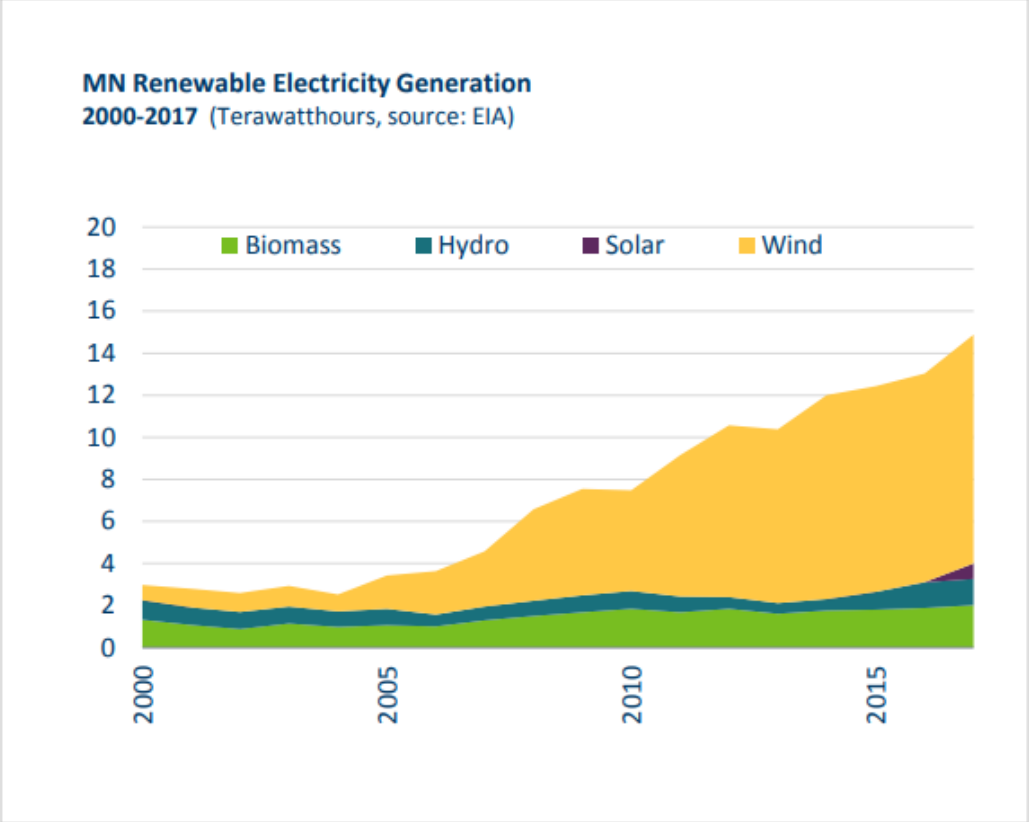
Source: U.S. Energy Information Administration's "Selected State Comparison" (2019d).

Minnesota, North Dakota, and South Dakota have experienced significant changes in their electricity generation over the past decade. In Minnesota, wind energy made up 4 percent of the state's electricity generation in 2007 and grew to 18 percent in 2018 (Figure 3). Nationally, Minnesota ranked 7th in total generation from wind energy despite having the 17th largest economy (EIA, 2019a). There is still room for additional growth, however. Minnesota remains one of the top 10 states with the highest capacity of wind production (Gomberg & Sattler, 2015).

North Dakota, which today produces far more energy than it consumes, is expanding its clean energy production even though it still relies heavily on fossil-fuel energy sources. In 2018, North Dakota accounted for nearly 4 percent of all U.S. coal output and ranked 2nd after Texas in both crude oil production and crude oil reserves (NDGOV, 2019). However, North Dakota ranks 12th in the nation in total wind capacity and wind is the state's most prevalent renewable resource, accounting for 78 percent of the clean energy installed (Pew, 2014). Today, North Dakota ranks 4th in terms of the share of wind power produced, with more than 1,500 wind turbines across the state accounting for about 26 percent of total net energy produced (EIA, 2019b; NDGOV, 2019).

South Dakota ranks in the top 5 states by wind capacity and share of in-state electricity generation provided by wind. The entire state has an estimated average annual wind speed of 5.5 to 9 meters per second at the height of utility-scale, land-based wind turbines. The state is thus a prime location for wind energy because areas with average wind speeds of 6.5 meters per second or higher are generally considered suitable for wind development projects (SDPUC, 2019; USDOE, 2019). As a result, more than 600 wind turbines at 16 active wind farms supplied about one-fourth of South Dakota's net electricity generation in 2018 (EIA, 2019c). Investments in wind power have increased across the state, with eight major wind energy projects being approved totaling $2.6 billion in investment. Once completed, these clean energy projects are expected to add 700 additional wind turbines, which could more than double South Dakota's wind energy production compared to 2018 (*KELO*, 2019).

Figure 3: Minnesota Renewable Energy Generation Over Time, 2000 to 2017, State-Produced Graph



Source: Minnesota Commerce Department's Minnesota Renewable Energy Update: November 2018 *(2018).*

The Economic Impact of the Clean Energy Sector in the Great Plains

The clean energy sector is expected to be a major job creator over the next decade. Globally, research has found that doubling the share of renewable energy by 2030 would create about 24 million total jobs (IRENA, 2016). Nationally, a study by the Political Economy Research Institute (PERI) at the University of Massachusetts found that investments in clean energy create three times as many jobs as fossil fuel energy, on average (Cohen, 2019). Another report found that clean energy investment creates more jobs for every $1 billion invested than the fossil-fuel industry (Pollin et al., 2009).

A 2020 analysis using IMPLAN, an input-output economic impact modeling software, corroborates these findings (Figure 4). For every $1 billion invested in wind and solar power generation in Minnesota, North Dakota, and South Dakota, an estimated 7,300 total jobs are created– including about 2,000 direct construction and operations jobs. By contrast, for every $1 billion invested in fossil fuel power generation, around 6,000 total jobs are created, including about 700 direct jobs. As of 2020, wind and solar power investments also produce a larger multiplier effect on the rest of the economy than investing in fossil fuel energy. Every $1 billion invested in wind and solar energy boosts regional gross domestic product (GDP) by $1.29 billion while every $1 billion invested in fossil fuel energy generates a return of $1.19 billion. Investments in nuclear power, a zero-carbon energy source, produce economic impacts that are comparable to wind and solar power generation. Every $1 billion invested in nuclear energy saves or

creates 6,700 total jobs– including about 1,000 direct jobs– and boosts GDP by $1.29 billion in these three Great Plains states.

Figure 4: Impact of $1 Billion Energy Investment in Minnesota, North Dakota, and South Dakota, 2020

Electric Power Generation	Total Jobs	Direct Jobs	GDP Multiplier
Wind and Solar Power	7,300	2,000	$1.29
Fossil Fuels Power	6,000	700	$1.19
Nuclear Power	6,700	1,000	$1.29

Source: IMPLAN (2020). All jobs estimates are rounded to the nearest hundred.

Great Plains states have experienced the impact of clean energy generation first-hand (Figure 5). Previous clean energy investments in Minnesota already prevent the emission of 5 million metric tons of carbon dioxide annually, save 3 billion gallons of water every year, and support 61,000 jobs (AWEA, 2018; Clean Jobs Midwest, 2019). North Dakota's clean energy sector supports over 9,000 total jobs, including generating more than $170 million in economic activity and over 500 jobs specifically at local wind farms (NDCES, 2017). Meanwhile, more than 11,000 jobs in operations, maintenance, construction, manufacturing, and other industries are directly supported by clean energy investments in South Dakota (AWEA, 2012).

The Great Plains states have seen strong employment growth in the clean energy sector (Figure 5). As of 2018, there were nearly 78,000 total clean energy jobs in Minnesota, North Dakota, and South Dakota. In 2018, while clean energy employment grew by 3.6 percent in the United States, the three Great Plains states added nearly than 3,400 clean energy jobs (Marcacci, 2019). Minnesota's clean energy job growth was 4.7 percent, compared with just a 1.7 percent gain in total employment in all sectors. North Dakota's clean energy jobs growth was 4.3 percent, above the 1.7 percent state average for all sectors. Meanwhile, South Dakota saw a 2.6 percent increase in clean energy jobs while the rest of its economy saw no substantial increase in employment (Clean Jobs Midwest, 2019). Overall, the region experienced a clean energy jobs growth of 4.4 percent while broader employment expanded by just 1.5 percent and traditional electric power generation and distribution industries saw a 2.3 percent decline in jobs (Figure 5).

Figure 5: Clean Energy Job Growth in Minnesota, North Dakota, and South Dakota, 2017 to 2018

Sector	Job Metric	Minnesota	North Dakota	South Dakota	All Three States
Clean Energy	**Total Jobs (2018)**	**61,047**	**9,067**	**11,262**	**77,977**
	2017-2018 Job Growth	**+2,737**	**+376**	**+286**	**+3,399**
	2017-2018 Percent Change	**+4.7%**	**+4.3%**	**+2.6%**	**+4.4%**
Electric Power Generation and Distribution	Total Jobs (2018)	11,276	3,347	1,697	16,320
	2017-2018 Job Growth	-86	-116	-180	-385
	2017-2018 Percent Change	-0.8%	-3.3%	-9.6%	-2.3%
Total for All Sectors	Total Jobs (2018)	2,729,492	346,155	359,771	3,435,418
	2017-2018 Job Growth	+44,445	+5,634	+128	+50,207
	2017-2018 Percent Change	+1.7%	+1.7%	+0.0%	+1.5%

Source: Clean Jobs Midwest (2019); U.S. Census Bureau's 2017 and 2018 County Business Patterns *(2020).*

The growth in direct clean energy jobs also increased demand in the regional economy, as newly-employed workers have additional income to spend at local businesses. As a result, wind projects

constructed in Minnesota in 2018– for example– created between 3,000 and 4,000 full-time equivalent jobs in the state during their construction phases. In addition, due to the geography of the worksites, the boost to local employment was disproportionately located in rural communities in the state (AWEA, 2018).

It is also worth noting that clean energy investments positively impact the economy by protecting the environment. Clean energy investments are associated with reductions in climate-related hazards (e.g., floods) and reduce health risks (e.g., pollution) that can negatively impact workers. The result is fewer days off from work and higher levels of overall worker productivity (IRENA, 2016).

Job Quality in the Clean Energy Sector in the Great Plains

Clean energy jobs were growing so rapidly prior to the COVID-19 recession that firms were reporting a shortage of skilled workers available to fill positions. Clean energy employers and green infrastructure projects require positions in construction, maintenance, and engineering careers as well as electricians, utility and power engineers, crane operators, wind farm operators, laborers, and field technicians. In a 2018 survey, 33 percent of solar energy employers in Minnesota, 100 percent in North Dakota, and 60 percent in South Dakota reported that it was "very difficult" to find qualified employees in these positions (The Solar Foundation, 2018).

While record-low unemployment and a booming economy prior to the COVID-19 recession were partially responsible for the skilled labor shortage, it was also a reflection of relatively lower job quality in the clean energy sector. Attracting, developing, and retaining a qualified workforce requires clean energy companies to compete with traditional energy facilities and contractors building other types of infrastructure for skilled workers.

Figure 6 compares the average compensation per employee in Minnesota, North Dakota, and South Dakota's wind and solar energy industries to similar sectors employing comparable workers. On average, workers in clean energy industries earn about $84,100 in total annual compensation– including wages and fringe benefits– across the region. By contrast, workers in fossil fuel electric power distribution take home about $108,000. Clean energy workers thus earn about 22 percent less in total compensation per year (Figure 6).

The heavy and civil engineering construction sector includes business establishments that construct highways, roads, bridges, dams, pipelines, power lines, and parks. This sector is also often referred to as "heavy and highway" work. Many of the workers employed on heavy and highway projects– including occupations like operating engineers, electricians, and laborers– are needed to build wind turbines and solar facilities. On average, workers in this sector in Minnesota, North Dakota, and South Dakota earn about $89,400 in annual compensation. Relative to heavy and highway workers, the pay penalty for clean energy workers is 6 percent less per year (Figure 6).

By contrast, employment in the wind and solar industry compares favorably to the distribution of natural gas sector (Figure 6). In the natural gas sector, the average employee earns about $74,900 per year in these three Great Plains states. Accordingly, clean energy workers earn about 12 percent more in annual compensation than their counterparts at natural gas facilities.

Figure 6: Employee Compensation in Minnesota, North Dakota, and South Dakota's Wind and Solar Electric Power Generation Compared with Similar Sectors, 2016

Economic Sector	Total Compensation Per Employee	Difference
Wind and Solar Electric Power Generation	**$84,102**	--
Fossil Fuel Electric Power Generation	$107,979	-22.1%
Natural Gas Distribution	$74,885	+12.3%
Heavy and Civil Engineering Construction	$89,392	-5.9%
Totals for Three Comparison Sectors	$90,677	-7.3%

*Source: U.S. Census Bureau's 2016 County Business Patterns (2019). *Note: Some data was not reported for South Dakota and North Dakota.*

It is important to note that, while these energy and infrastructure sectors in Minnesota, North Dakota, and South Dakota tend to pay middle-class incomes, there may be greater variance in these industries than reported. The data, which is compiled and released by the U.S. Census Bureau, includes only payroll employment for W-2 employees and does not capture individuals who are misclassified as 1099 independent contractors. Worker misclassification is rampant in construction, affecting between 12 percent and 21 percent of the industry's workforce in any given month (Ormiston et al., 2020). As a result, it is possible that Figure 6 is missing data on clean energy workers in Minnesota, North Dakota, and South Dakota who were misclassified or paid off the books.

Nevertheless, the takeaway is that workers in wind and solar power jobs earn about $84,100 per year in total compensation, which is about 7 percent less than the average annual earnings of comparable workers ($90,700 per year) (Figure 6). This pay penalty is in large part due to unionization. The traditional energy sector and the heavy and civil construction engineering sector are more highly unionized than the clean energy sector. Years of collective bargaining in the traditional energy and infrastructure sectors have produced workplaces and worksites where hourly wages, health insurance coverage, retirement plans, paid sick leave benefits, and training contributions are generally better for workers. By contrast, the clean energy sector– and particularly subsegments like residential solar– have smaller firms with minimal or no union representation and less job security for workers (Jones et al., 2016).

Creating Good Jobs and Retaining Skilled Workers in the Clean Energy Sector

As Minnesota, North Dakota, South Dakota, and other states look to rebound from the COVID-19 recession, public and taxpayer-subsidized investments in infrastructure and energy projects will be critical to promoting economic development. While clean energy investments can play a large role in the recovery, other expenditures in roads and bridges, water and sewer systems, broadband connectivity, and vital infrastructure projects are also likely to require qualified craft workers. To attract, develop, and retain skilled workers across the Great Plains, wind and solar power employers, environmental groups, and state governments can take steps to improve job quality at clean energy jobsites and facilities.

Implementing **prevailing wage standards** on wind and solar projects is the most effective way to level the playing field for clean energy employers with other local contractors. Prevailing wage policies establish local minimum wages for different types of skilled construction work on publicly-supported projects, based on what qualified craft workers are paid for comparable work in the area. Prevailing wage rates differ by location, trade, and equipment but are proven to reduce inequality and discrimination on

construction projects because all workers at the same location in the same occupation performing the same work earn at least the local market rate.

Prevailing wage standards are also associated with promoting ladders into the middle class. Minnesota's prevailing wage law, for example, boosts the earnings of blue-collar construction workers by 5 percent on public projects (Manzo & Duncan, 2018). Minnesota's policy also expands health insurance coverage by 7 percent and increases the share of construction workers with employer-provided retirement plans by 14 percent. Attaching prevailing wage standards to clean energy projects in Minnesota, North Dakota, and South Dakota would close the pay gap for workers and attract talented young individuals into middle-class careers in the clean energy sector.

Prevailing wages are also associated with better retention of high-skilled workers. Apprenticeship enrollments are up to 8 percent higher– and apprentices complete their programs faster– in states with prevailing wage laws (Bilginsoy, 2003). Because they tend to be better trained, research shows that workers in states with prevailing wage laws are 14 percent and 33 percent more productive and suffer 14 percent fewer on-the-jobs fatalities (Philips, 2014; Manzo, 2017). By strengthening the apprenticeship system, boosting productivity, and reducing injury rates, prevailing wage standards act as a safeguard against skilled labor shortages.

Currently, the clean energy sector in the Great Plains relies on out-of-state firms. For example, North Dakota's economy loses an estimated $62 million per year to out-of-state contractors on wind energy infrastructure projects alone. Nonlocal workers account for approximately 86 percent of the construction workforce on North Dakota's wind projects (Schramm, 2019). Moreover, the Red Pine Wind Farm in Lincoln County, Minnesota and the Lake Benton II Wind Energy Center in Pipestone County, Minnesota are two projects constructed between 2017 and 2019 that employed majorities of out-of-state workers at the expense of local residents (Hatt & Franco, 2018; Next Era Energy, 2019).

Implementing prevailing wage standards in the clean energy sector could help change this dynamic, supporting local businesses and local contractors. Research in Minnesota finds that local contractors account for 10 percent higher market share when prevailing standards are attached on public projects (Manzo & Duncan, 2018). Additional research has found that increasing the local share of the workforce on wind farm projects in southern Minnesota by between 10 percent and 20 percent would grow the local economy by an estimated $32 million (Hatt & Franco, 2018). By increasing hiring of local workers, supporting local businesses, and keeping income in the communities where the projects are being built, prevailing wage standards can deliver value for clean energy companies, environmental groups, and state governments– without increasing total infrastructure costs (Duncan & Ormiston, 2017; Kelsay & Manzo, 2019).

While prevailing wage standards usually only apply to taxpayer-funded public works projects, states have begun to attach them to private projects that receive public subsidies such as tax incentives, tax credits, and tax abatements. The State of New York recently broadened prevailing wage coverage by including the standards on any project costing $5 million or more that receives at least 30 percent of its funding from public subsidies (Brenzel, 2020). Similar state laws or local ordinances could be enacted in Minnesota, North Dakota, and South Dakota in the clean energy space to level the playing field with traditional power plants and construction contractors in attracting, developing, and retaining qualified workers.

While prevailing wage standards are generally enacted by state lawmakers or local elected officials, **project labor agreements** (PLAs) are an alternative way to attract, retain, and develop skilled workers on

clean energy projects without legislation. PLAs are comprehensive pre-hire collective bargaining agreements for construction projects that establish the terms and conditions of the labor-management relationship before the construction ever occurs. PLAs are common on large private projects because they guarantee a skilled and trained workforce. Typically, PLAs include apprenticeship ratios, targeted hire requirements, and no-strike clauses that prevent labor shortages and help contractors meet project deadlines by eliminating work stoppages. PLAs also often include disadvantaged business procurement policies to help meet workforce diversification goals (Manzo & Bruno, 2015).

Economic research on PLAs finds that they have no negative impact on total construction costs. One analysis of public projects in Massachusetts found that PLAs resulted in cost efficiencies (USDOL, 2011). Another study on PLAs of schools in New York City found that the city saved over $221 million over five years due to the uninterrupted supply of qualified workers (Belman et al., 2007). Finally, most utility-scale solar construction in California has included project labor agreements, resulting in 10,200 construction jobs at family-supporting incomes over five years (Cha & Skinner, 2017). Ultimately, PLAs are privately-negotiated tools that could be utilized by clean energy companies and local building trades unions to ensure that skilled workers have health and safety protections and that employers have access to a pool of reliable, qualified labor.

Clean energy companies, environmental groups, and state governments may also want to take steps to ensure a **just transition** for workers who are currently employed in high-quality jobs with good wages and family-sustaining benefits in traditional energy sectors. A just transition relies on the *quantity* of new jobs and the *quality* of new jobs created by clean energy investments meeting or exceeding current levels in energy, utilities, and infrastructure sectors. The best way to ensure a just transition from fossil fuels towards a clean energy economy is through investments in worker retraining.

Not only must clean energy companies compete with the fossil fuel industry to attract skilled workers, they also can retrain these individuals if their jobs become displaced. Worker retraining can be cost-effective and allow firms to quickly adapt to innovative and emerging technologies. The State of Minnesota has already implemented a policy for displaced workers in nuclear power plants, a zero-carbon energy sector. That agreement provides three main pathways for impacted workers to either obtain similar positions, retrain and transition into new jobs, or retire if they are approaching retirement age (State of Minnesota, 2019). Updating or replicating this policy to establish workplace standards and compensation packages in clean energy sectors that meet or exceed current levels could help promote a just transition from a fossil fuel-based economy to a low-carbon economy.

Developing relationships with existing apprenticeship training programs would be valuable in any just transition policy. While public and private universities, community colleges, vocational schools, and community-based programs are often engaged, formal partnerships with local building trades unions and their respective joint labor-management apprenticeship programs can be equally beneficial. Joint labor-management programs enroll the vast majority of construction apprentices, have proven track records of success over decades, and create thousands of jobs in the Great Plains states (Manzo & Duncan, 2018; Bilginsoy & Glover, 2005).

Conclusion

Despite a reputation for hydraulic fracturing and coal-fired power plants, Minnesota, North Dakota, and South Dakota are leaders in clean energy production. Over recent years, these three Great Plains states have diversified their energy production and consumption, expanding renewable sources and reducing their reliance on coal. With the clean energy sector expected to be a major job creator over the next decade, clean energy employers must compete with the fossil fuel industry for qualified workers. Workers in the clean energy sector, however, currently earn about 7 percent less on average than their counterparts in traditional energy and infrastructure sectors– who are more likely to be unionized. Wind and solar power employers, environmental groups, and state governments can take proactive steps to improve job quality and attract, develop, and retain skilled workers. In particular, attaching prevailing wage standards onto clean energy projects, implementing project labor agreements, and developing worker retraining programs and formalized partnerships with joint labor-management apprenticeship programs can promote a just transition from fossil fuels to a clean energy economy.

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