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**Maximizing The Benefits of Wind Energy
Development Through Local Construction
Hiring:
A Case Study of the Badger Wind Farm**

June 2022

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Executive Summary

North Dakota's wind energy economy is booming. The state now ranks ninth in the nation in net generation from wind energy. In 2019, wind energy provided approximately 27% of power generated in North Dakota,¹ and despite the onslaught of COVID-19 new wind energy development has continued.

The proposed Badger Wind project will expand North Dakota's clean energy portfolio, while creating an estimated 400 construction jobs, of which many could potentially be filled by local workers.² Yet the full economic benefits of the project may only be realized to the extent that local workers are given the opportunity to fill construction jobs generated by the project. The wages and fringe benefits paid to local workers help to boost local economies, while non-local workers typically take their paychecks home with them when the project is complete.

To better understand the consequences of using local versus non-local workers on the Badger Wind project, we have analyzed the potential economic impact of the project. We find the following:

- If 70% of construction work on a wind installation the size of the proposed Badger Wind project is performed by local workers, construction payrolls can be expected to generate approximately \$30 million in local economic activity.
- The use of a non-local construction workforce (between 10% to 30% local) to build the Badger Wind project could cost local communities \$10.7 million or more in lost payroll and local economic activity compared to a project that employs a largely local workforce (50% to 70% local).
- When deferred retirement benefits are included, the expected difference between a largely local and non-local project grows by \$3.9 million to approximately \$14.6 million.

The reliance on non-local workers to build North Dakota wind farms is an all too common problem that has cost local communities millions of dollars in lost economic benefits in recent years. Two recent wind energy projects, Northern Divide Wind and Aurora Wind, have expanded North Dakota's wind generation capacity by 499 megawatts (MW) and yet each appears to have created relatively few local job opportunities based on our research. These projects had the potential to create hundreds of jobs for local residents in the midst of a COVID-induced

¹ American Wind Energy Association, "Wind Energy in North Dakota," <https://www.awea.org/Awea/media/Resources/StateFactSheets/North-Dakota.pdf>

² Atwell LLC, "Application for a Certificate of Site Compatibility," submitted February 2022, page 50, available here: <https://psc.nd.gov/database/documents/22-0086/001-030.pdf>.

economic crisis. Instead, the projects evidently created a handful of jobs for North Dakotans and residents of neighboring states, while employing hundreds of workers from across the country.

We estimate based on field observations that North Dakota residents accounted for fewer than 10% of construction workers on each project.³ Two-thirds of the Aurora construction workforce apparently came from at least 1,000 miles away, while North Dakota and neighboring states (South Dakota, Minnesota and Montana) accounted for just 14%. Collectively, we estimated that the use of less than 10% local workers on these two projects costs North Dakota communities \$20-\$29 million in lost economic activity.

The wind energy industry's continued reliance on non-local workers comes at a time when many conventional energy workers are facing layoffs. North Dakota's coal and oil industries have historically created high-quality local jobs. The decline of the coal industry in particular could displace thousands of workers. Currently approximately 15,000 people work in jobs that are tied to the lignite industry in North Dakota.⁴

While Rainbow Energy's acquisition of Coal Creek Station and plans to install carbon capture technology amount to a major win for North Dakota workers, it could be the exception not the rule. Coal accounted for 67% of total power production in 2010, while it accounted for only 19% in 2021.⁵ As the reliance on coal declines in North Dakota, local workers will lose good family-supporting jobs. It is critical that these workers have opportunities to work on major renewable energy projects. Unfortunately, our research indicates that, in most cases, a large majority of wind energy construction jobs have gone to non-local workers in recent years.

North Dakota Public Service Commission ("Commission") has authority to consider local workforce impacts, including utilization of local construction labor, when evaluating the suitability of proposed wind energy project for a site permit under Chapter 69-06-08 of the North Dakota Administrative Code. But ultimately it is developers such as Ørsted that have the power to maximize the local benefits of wind energy projects by committing to greater efforts to prioritize employment of local workers.

Economic Impact of Local versus Non-local Hiring on Construction of the Proposed Badger Wind project

Wages and Benefits

The creation of construction jobs is not the only local benefit of wind energy development, but it is among the most significant in terms of economic impacts, alongside the lease and tax revenues

³ Lucas Franco, "The High Cost of Labor Outsourcing: A Case Study of Two North Dakota Wind Projects," Local Jobs North Dakota and Minnesota, January 2021.

⁴ State Historical Society of North Dakota, "How Coal Production Affects the People of North Dakota," North Dakota Studies, module available here:

<https://www.ndstudies.gov/energy/level2/module-3-coal/how-coal-production-affects-people-north-dakota>.

⁵ Karin Rives, "ND plant sale a rare win for coal-fired generation boosters," S&P Global Market Intelligence, July 1, 2021.

that wind energy projects typically deliver to area residents and host communities. Wind energy construction jobs can provide middle-class wages and high-quality health and retirement benefits. These benefits are all-too-scarce for blue-collar workers in many of the rural areas where wind farms are typically built.

Construction job opportunities are frequently cited as a benefit of wind energy development in both media coverage and permitting processes. But until recently, little attention has been paid to the impact of decisions by developers and contractors to build projects with a largely local or non-local construction workforce. In 2018, North Star Policy Institute, a policy think tank based in St. Paul, Minnesota, undertook a study of wind energy construction in Minnesota and found that tens of millions of dollars in anticipated local economic benefits were at risk due to use of non-local labor. The findings are published in *Catching the Wind: The impact of local vs. non-local hiring practices on construction of Minnesota wind farms*, a report that was published in June of 2018.⁶

In this brief, the authors have employed the methodology used in *Catching the Wind* to estimate the local economic impact of the use of local and non-local labor on the construction of a wind energy facility, such as the proposed Badger Wind project. Our analysis begins by estimating the wages and benefits that would be paid to construction workers. Ørsted has not yet announced the selection of an Engineering Procurement & Construction (EPC) contractor to build the project, so it is impossible to know with certainty the wages that would be paid to workers employed on the project. We can, however, estimate pay and benefit rates based on the prevailing wage rates established by the U.S. Department of Labor for heavy industrial construction projects in North Dakota. These prevailing wage rates are calculated based on wage surveys submitted by local construction employers and trade unions, and industry sources affirm that these rates are consistent with the rates commonly paid to North Dakota workers employed on wind energy projects.

Wind farm construction requires the skills of construction laborers, ironworkers, millwrights, operating engineers, and electricians. Workers in these trades often earn between \$25 and \$35 per hour in wages and \$15 to \$25 in hourly fringe benefit contributions (e.g. health care, pension and vacation payments) depending on their trade. We estimate the average wage of a wind energy construction worker based on an average of the rates for each craft.

⁶ Katie Hatt and Lucas Franco, “Catching the Wind: The impact of local vs. non-local hiring practices on construction of Minnesota wind farms,” North Star Policy Institute, June 2018, available here: <https://northstarpolicy.org/catching-the-wind-the-impact-of-local-vs-non-local-hiring-practices-on-construction-of-minnesota-wind-farms>

TABLE 1: Estimated Wind Construction Wages⁷		
North Dakota Prevailing Wage		
Craft	Wage	Fringe Rate
Laborer	\$25.45	\$18.67
Millwrights/Ironworker	\$33.44	\$25.16
Operator	\$29.23	\$16.49
Electrician	\$34.92	\$15.31
AVERAGE (standard)	\$30.76	\$18.91
Overtime	\$46.14	

Based on interviews with wind construction workers and contractors, we found that overtime work is common as wind energy construction workers typically work long hours. In northern climates where the construction season is limited, our research indicates that the typical wind energy project may last six months, during which time workers average 60 hours per week, for a total of roughly 1,500 hours -- 1,000 hours of straight time and 500 hours of overtime.

Spending Patterns of Local and Non-Local Workers

Local and non-local workers are assumed to perform similar work and earn similar wages on a wind farm construction project. Non-local workers are defined as workers that do not maintain a permanent residence within a daily commuting distance of the project. Non-local workers secure temporary lodgings and generally receive per-diem payments from employers to offset lodging and food costs.

Workers on wind energy projects in North Dakota typically receive per diem payments of roughly \$100 according to interviews with workers and other industry professionals.⁸ Per diems are generally provided on working days, so non-local workers on a North Dakota wind project could be expected to receive per-diem payments six days per week over the six-month duration of a project. Thus, we estimate the total value of per-diem payments to a non-local worker employed on a North Dakota wind project to be \$15,600 (\$100 x six days a week x 26 weeks).

We expect local workers on a North Dakota wind project to earn approximately \$54,000 in pay, excluding benefits, while non-local workers should receive gross pay totaling \$70,000, excluding benefits. These estimates are calculated based on 1,000 hours of work at the standard pay level plus 500 hours of overtime. For non-local workers, we add per-diem to their total pay..

⁷ Wage and fringe benefit rates are estimated based on a review of published federal prevailing wage rates that reflect comparable civil infrastructure projects, supplemented by interviews with construction workers who have knowledge of area energy projects. In this case, we have employed the same estimated wage and benefit amounts used in our analysis of the proposed Bowman Wind project. Further detail on the methodology can be found here: <https://psc.nd.gov/database/documents/21-0121/046-010.pdf>.

⁸ Per diem rates are based on interview and survey data from past and current wind farm construction workers.

TABLE 2: Gross Pay for Local and Non-Local Workers		
	Local Worker at 1500 hours	Non-Local Worker
Wages	\$53,830.00	\$53,830.00
Per Diem	\$0.00	\$15,600.00
Gross Earnings	\$53,830.00	\$69,430.00

We can estimate the amount the average local worker spends in their local area by deducting taxes and savings, and by applying an estimated share of income that will be spent in a local area based on the work of economists that have studied the economic impact of local payrolls. The following table presents expected tax payments and savings for each worker:

TABLE 3: Deductions		
Deductions	Local Worker	Non-Local Worker
Effective Federal (9.38%)	\$5,158.00	\$5,158.00
Effective FICA (7.65%)	\$4,206.00	\$4,206.00
Effective State (.89%)	\$491.00	\$491.00
Total Tax (18.15%)	\$9,855.00	\$9,855.00
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After Tax Income	\$43,975.00	\$43,975.00
Savings (7.1%)	\$3,122.23	\$3,122.23
After Savings	\$42,611.78	\$42,611.78
Current Fringe Benefits	\$14,180.82	\$14,180.82
Deferred Fringe Benefits	\$14,180.82	\$14,180.82
Total Local Spending Per Worker	\$53,952.97	\$15,600.00
Difference in Local vs. Non-Local Spending		\$38,352.97

These calculations are based on standard tax rates for North Dakota. The “effective” tax rate is based on an analysis of the income bracket in which workers in this income bracket are situated. Per diems are generally not treated as taxable income.⁹

⁹ Tax estimates corroborated by Smart Asset’s online tax estimator. The full estimator is available at: <https://smartasset.com/taxes/income-taxes#SROvOjkXhc>.

The average American currently saves approximately 7.1% of their income.¹⁰ If we assume this trend holds, the average after-tax and after-savings income of both local and non-local workers would be about \$43,000. On top of this income, non-local workers are expected to receive \$15,600 in per-diem payments.

The economic contribution of local workers to local economies is not limited to their paychecks. Fringe benefits, which for construction workers typically include health care coverage, retirement, training, and vacation benefits can also contribute to local economic activity. Among these benefits, health care and retirement benefits account for the lion's share.

Health care contributions are usually spent in the short-term in local economies as workers and their families patronize local clinics, hospitals, and pharmacies. Retirement funds, on the other hand, are deferred and will only contribute to local economies once a worker retires and begins to draw on pension payments or retirement savings.

For this reason, we conclude that half of fringe benefit contributions (\$28,361/2 or \$14,180) have a similar impact to post-tax, post-savings income, and the other half are treated as income that is deferred to be spent after retirement.

In past efforts to measure the local economic impact of local employment, economists have estimated that, on average, local workers spend 95% of their income within the region in which they live.¹¹ Thus, we would expect a construction job on a North Dakota wind energy project that is filled by a local worker to directly contribute \$54,000 in the regional economy (95% of after tax/after savings income + 50% of fringe benefits) in the near term, and an additional \$14,180 over the long term.

Our research indicates that non-local workers, on the other hand, seek to restrict their local spending to the amount of their per diem and can be expected to spend the remainder of their wages and benefits in their primary place of residence.¹² Thus, we expect that a non-local worker employed on a North Dakota wind energy project will spend \$15,600 locally over the duration of the project.

The near-term difference in local spending patterns between a local and a non-local worker employed on a North Dakota wind energy project is \$38,350. This is \$38,350 less per worker than non-local workers can be expected to spend at neighborhood grocery stores, car dealerships, restaurants and clothing stores. This amount is the economic stimulus gained or lost by decisions

¹⁰ Statista Research, "Personal saving rate in the United States from June 2015 to June 2021," Statista, July 2021, available here:

<https://www.statista.com/statistics/246268/personal-savings-rate-in-the-united-states-by-month/#statisticContainer>.

¹¹ Bruce Nissen and Yue Zhang, "Hiring Our Own? The impact of local vs. non-local hiring practices in two county GOB projects," August 16, 2006, Research Institute on Social and Economic Policy at Florida International University.

¹² This assumption is based on survey analysis and interviews with current and past wind energy construction and other sectors that typically employ traveling workforce.

to hire local or non-local workers. The gap grows to approximately \$52,000 when deferred spending associated with retirement benefits are taken into account.

The potential gain or loss in local spending is considerable when we consider total anticipated employment on a large wind energy development such as the proposed Badger Wind Farm project. Based on past projects of a similar size, we expect the Badger Wind project will create approximately 400 construction jobs. The local economic impact of the project could differ greatly depending on how many of the workers come from the local area or hundreds or even thousands of miles away.

It is rare for a wind energy project to employ an entirely local workforce. The leading U.S. wind energy EPCs pursue national business models and employ a national workforce that includes key personnel who are essential to the safe and successful execution of the company’s wind energy projects. There can be significant differences, however, between projects built by EPCs that partner with local workforce providers and deliver projects where a large majority (50% to 70%) of hours worked on the project are performed by local workers, and projects that rely largely on out-of-state crews where local workers account for a small share of hours worked (10% to 30%).

The following table lays out estimates of total payroll and total local spending for a project similar to Badger Wind project at different hypothetical levels of local and non-local construction hiring:

TABLE 4: Total Spending		
Percent Local Workers	Total Payroll	Total Local Spending
100%	\$32,876,656.00	\$21,581,186.10
70%	\$34,748,656.00	\$16,978,830.27
50%	\$35,996,656.00	\$13,910,593.05
30%	\$37,244,656.00	\$10,842,355.83
10%	\$38,492,656.00	\$7,774,118.61
0%	\$39,116,656.00	\$6,240,000.00

The projected difference in cumulative local spending between a project that relies on a 70% local workforce and a 30% local workforce would be roughly \$6 million dollars in direct spending. When spending associated with deferred retirement benefits is included, the projected difference grows to approximately \$8.2 million.

The differences in local impacts continue to grow when we account for multiplier effects of local spending. Wages earned by local construction workers are re-circulated within local economies through secondary purchases and other economic transactions. This spending creates additional jobs via multiplier effects that have been well-documented by economists.¹³

¹³ The following is an example of using multiplier effects on a major pipeline project in Minnesota: Bureau of Business and Economic Research (BBER) at the University of Minnesota Duluth (UMD) Labovitz School, “

In this report, we focus on the earnings multiplier. In Nissen and Zhang’s 2006 study of the economic impact of local hiring on two major construction projects in Florida, they provide an earnings multiplier of 1.7377 for new construction work. This means that every dollar spent in a local economy will result in an additional 73.77% in economic activity, beyond the earnings of those employed on the project.¹⁴

If we replicate the multiplier used by Nissen and Zhang (2006), total local spending would be as follows:

TABLE 5: Total Local Spending with Multiplier	
Percent Local	Total Economic Impact with Multiplier
100%	\$37,501,627.09
70%	\$29,504,113.36
50%	\$24,172,437.54
30%	\$18,840,761.73
10%	\$13,509,085.91
0%	\$10,843,248.00

When we include economic multipliers, the present value difference in total economic impact of using 70% local workers versus 30% rises to \$10.7 million. When deferred retirement benefits are included, the total difference in economic impact between 70% and 30% local increases to \$14.4 million. For rural areas of North Dakota, these differences in local economic impacts could amount to meaningful boosts to local household and business incomes and tax base for local schools and governments.

The Availability of Local Workers

Prioritizing local hiring on the Badger Wind project can not only create good, family-supporting jobs for local workers and millions of dollars in local economic activity, but can also provide a pathway into a career in the construction industry for many regional workers. Throughout North Dakota there are thousands of workers employed in low wage jobs that might welcome an

Enbridge Pipeline Construction: Economic Impact Study,” prepared for Area Partnership for Economic Expansion (APEX), April 18, 2017.

¹⁴ Bruce Nissen and Yue Zhang, “Hiring Our Own? The impact of local vs. non-local hiring practices in two county GOB projects,” August 16, 2006, Research Institute on Social and Economic Policy at Florida International University, pg. 8. Nissen and Zhang use an earnings multiplier specific to their region of analysis – Miami-Dade County, Florida. We do not have a regionally specific RIM II earnings multiplier for Southern Minnesota. However, we expect only minor variation from the regionally specific earnings multiplier used by Nissen and Zhang. Additional research is needed to determine the exact earnings multiplier for North Dakota.

opportunity for a well-paid, 40+ hour per week job with benefits.¹⁵ This group includes current construction workers for whom the project could be an opportunity to earn better pay and benefits, and new skills that would make them more productive and marketable to construction employers.

TABLE 6: Total Employment and Wages in North Dakota 2021				
Industry	Average Employment	Average Hourly Wage	Average Weekly Wage (40 hrs)	Mean Annual Wage
Office and Administrative Support	47,110	\$21	\$827	\$43,000
Transportation and Material Moving	39,500	\$22	\$899	\$46,770
Sales and Related	35,600	\$21	\$853	\$44,360
Food Preparation and Serving Related	31,370	\$14	\$567	\$29,490
Healthcare Practitioners and Technical	29,690	\$37	\$1,496	\$77,770

We estimate that the average construction worker on a North Dakota wind energy project would earn approximately \$2,200 per week (40 hours at straight time rate of \$30.76 per hour and 20 hours at an overtime rate of \$46.14 per hour) excluding fringe benefit payments. This is three to four times the average weekly earnings of a worker in sales, food preparation and serving.

There are jobs on a project like the Badger Wind project that require little construction experience. Some workers who are new to construction could perform such jobs with minimal training. Those employed by contractors that participate in registered apprenticeship programs would also benefit from classroom, hands-on, and on-the-job training to improve their skills and career prospects. Further, Badger Wind will create jobs that could be filled by workers who currently hold lower-paid positions with building and civil contractors, which would in turn create openings for new workers.

¹⁵ Occupational Employment and Wage Statistics data for North Dakota is available through the North Dakota Job Service Labor Market Information portal. All data is available here: <https://www.ndlmi.com/vosnet/analyzer/resultsNew.aspx?session=oeswage>.

We expect, based on past experience with large energy construction projects, that many of the workers employed in industries that pay substantially less than wind energy project jobs would be eager to seize an opportunity to earn higher wages in the construction industry. Regional building and construction trades unions are ready and willing to work with wind developers and contractors to help dispatch the existing skilled workforce, and to recruit and train a new workforce.

Conclusion

The Badger Wind Farm project has the potential to create hundreds of family-supporting jobs for North Dakota residents and to inject millions of dollars into the region's economy. Ørsted can maximize the benefit of the project to North Dakota by working with the EPC contractor selected to build the project to prioritize local hiring and ensure that the majority of construction work on the project is performed by local workers.

Minnesota wind energy developers and policymakers recently began taking steps to maximize the local benefits of wind energy development. The Minnesota Public Utilities Commission ("MPUC") has made the submission of quarterly reports on the employment of local and non-local construction workforce a standard feature of site permits for wind energy facilities. MPUC has also expressed a strong preference for wind energy projects that maximize employment opportunities for local construction workers, including a recent case where an application for a site permit was referred to a contested case hearing over local hiring concerns.

In June 2021, MPUC Chair Katie Sieben testified before a U.S. Senate Subcommittee on Rural Development and Energy on the success of these efforts, observing that local participation in utility-scale wind and solar installation had jumped "from 20 to upwards of 70 percent".¹⁶ We see no reason to believe that similar results could not be achieved in North Dakota.

¹⁶ Sieben, Katie. Testimony before the U.S. Senate Subcommittee on Rural Development and Energy. June 22, 2021. https://www.agriculture.senate.gov/hearings/renewable-energy_-_growth-and-opportunities-for-our-rural-economies

About the Authors

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