

Socioeconomic Impacts of Developing Wind Energy: The Langdon Wind Energy Center

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the Langdon Wind
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Concerns about the long-term environmental effects of consuming fossil fuels, together with the rising costs of oil and natural gas, have led to rising interest in renewable energy sources. Wind power in particular has been experiencing rapid growth.

Wind generally is considered the lowest cost renewable energy source for the Great Plains region, and both a federal production tax credit (PTC) and state renewable portfolio standards (RPS) have favored expansion in recent years.

Together, 11 states that lie within the Great Plains region account for 63 percent of total national wind generating capacity. The Plains region is rated as having the highest project capacity factor and lowest costs for wind generation in the country.

In addition to their role as a source of renewable energy, wind energy installations also may offer economic development opportunities for rural areas.

The purpose of this publication is to summarize the socioeconomic effects of the recent development of a wind energy center on nearby communities.

The project chosen for analysis, the Langdon Wind Energy Center, consists of 106 turbines, each with a generating capacity of 1.5 megawatts (MW), for a total nameplate capacity of 159 MW, mounted on towers 262 feet tall. It is near the town of Langdon in northeastern North Dakota. At the time of its completion, the project was the largest wind farm built in North Dakota (*Figure 1, page 2*).

NDSU
Extension Service

North Dakota State University
Fargo, North Dakota 58108

August 2009

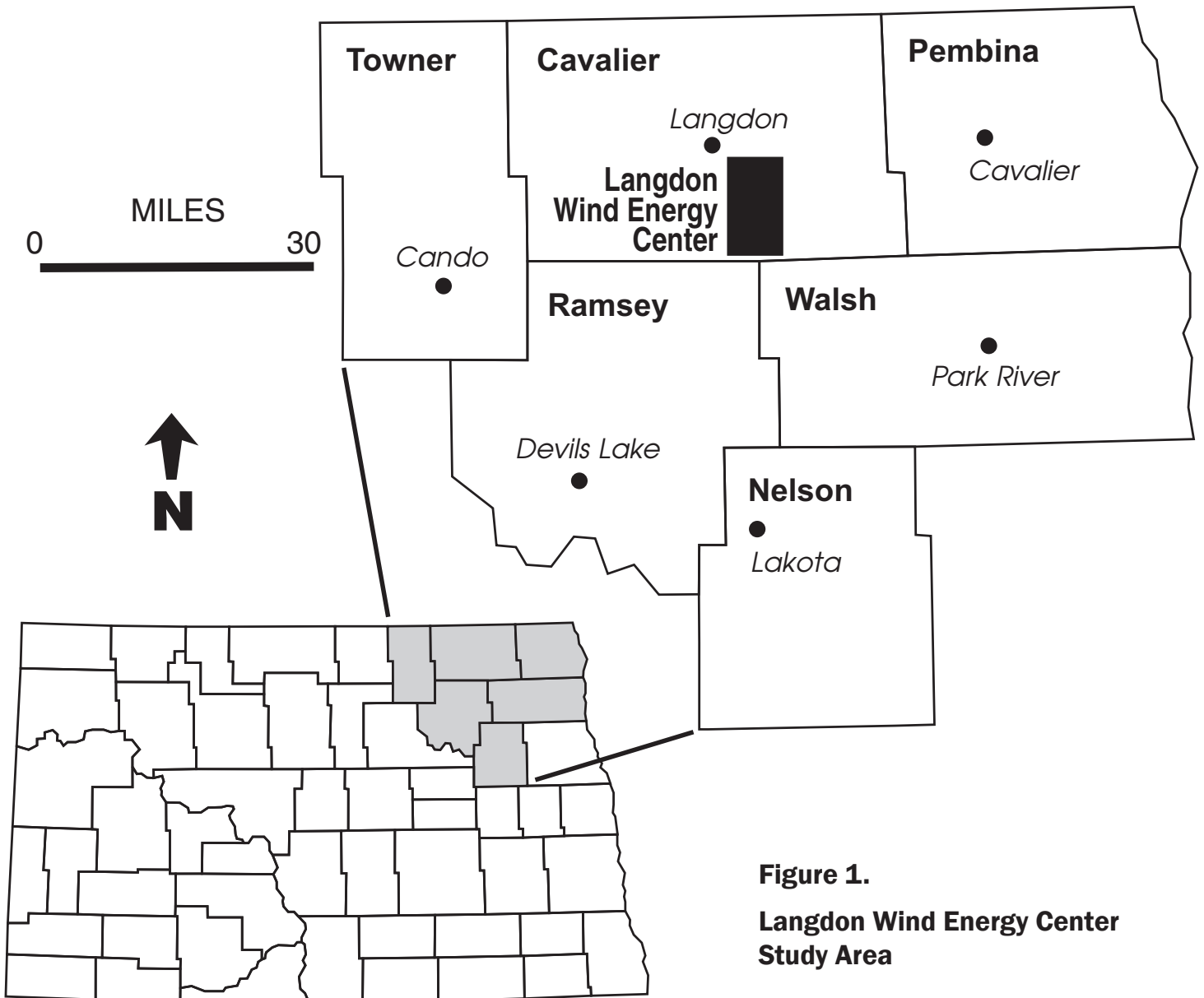


Figure 1.
Langdon Wind Energy Center
Study Area

Langdon Wind Energy Center – Project Background

The Langdon Wind Energy Center is owned by FPL Energy and Ottertail Power Co.; FPL Energy was the project developer.

The wind-generated electricity is purchased by Ottertail Power and Minnkota Power Cooperative Inc. FPL Energy, with headquarters in Juno Beach, Fla., has been a leader in wind power development both in the North Dakota and nationally.

Construction of the Langdon Wind Energy Center began in July 2007 and was completed on Jan. 12, 2008. The peak construction work force was 269 workers. A force of 10 permanent employees will operate and maintain the energy center. All but two of these permanent employees were hired from the local area.

As the construction labor force grew, the market for temporary housing and accommodations became tight. The workers used all available local housing. The motels were full and all rental housing was

taken. The trailer court also was full and RVs were parked in the city park. The city and the Chamber of Commerce helped workers find temporary housing. Local leaders have indicated that local businesses did well during construction.

Construction of the Langdon Wind Energy Center is estimated to have resulted in direct payments of \$9.4 million to entities in the Langdon area (Cavalier County and adjacent counties) and an additional \$47 million to entities elsewhere in North Dakota (Table 1). The major items

purchased elsewhere in North Dakota were wind towers and blades, which represented a total of \$42 million. During operation, the facility will make payments of about \$1.4 million annually to North Dakota entities, including payroll and employee benefits and landowner payments. Although not shown in Table 1, another significant economic contribution will be local property taxes, which are estimated to total \$456,000 annually for all entities, with \$191,000 to the county and \$265,000 to the school district.

The secondary economic impacts (multiplier effects) of the wind energy center were estimated using an input-output model whose coefficients simulate the linkages among sectors of the state economy. The \$56.4 million in statewide direct impacts during the construction period resulted in an additional \$169 million in secondary (indirect and induced) impacts for a total, one-time construction impact of \$225.7 million (Table 2).

Sectors receiving substantial impacts during construction included *manufacturing* (\$73.6 million), *households* (\$44.6 million) and *retail trade* (\$35.2 million). The \$1.4 million in annual direct impacts associated with project operation led to an additional \$3 million in secondary impacts for a total annual impact of \$4.4 million. This includes \$2.1 million of additional *household* sector gross receipts, which indicates that personal incomes of area residents would be increased by about \$2.1 million each year during project operation (roughly \$520 per county resident).

Project construction was estimated to create 1,656 secondary jobs statewide in addition to the 269 peak construction jobs (Table 2).

Table 1. Estimated direct expenditures by the Langdon Wind LLC Project in the Langdon area, elsewhere in North Dakota and total for construction and operational phases, 2007-08.

Input-Output Sector	Construction Phase			Operational Phase
	Langdon	Elsewhere in N.D.	Total N.D.	
	\$000			
Community and public utilities	85	—	85	40
Manufacturing (towers and blades)	—	42,000	42,000	—
Retail	2,055	635	2,690	15
Finance, insurance and real estate	320	250	570	100
Business and personal service	4,985	3,775	8,760	50
Professional and social service	100	75	175	—
Households	1,853	250	2,103	1,208
TOTAL	9,398	46,985	56,383	1,413

Table 2. Direct, secondary and total economic impact of Langdon Wind Energy Center.

	Direct	Secondary	Total	Employment	
				Direct	Secondary
	\$000				
Wind farm construction					
Langdon area total	9,358	15,876	25,274	269	223
Statewide total	56,383	169,342	225,725	0	1,656
Wind farm operation total	1,413	2,952	4,365	10	21

Given the relatively brief duration of the construction phase, some of this secondary employment may have been reflected in longer hours and associated overtime pay for present employees, as opposed to new job creation. During the operation of the project, an estimated 21 secondary jobs are created in addition to the 10 workers employed by the project.

The public service effects of the project appear to be negligible because during the construction phase, very few workers brought families to the area and most of the permanent operations and maintenance positions were filled by local workers. The housing needs of the construction work force were for temporary accommodations, which were met by motels, RV parks and

rental housing available in the area. School enrollment effects amounted to just a few students during construction and should be negligible during operation.

Given the minimal effects on public service needs, the fiscal effects for various governmental units primarily reflect the increased tax revenues associated with the project. During operation, the county is expected to receive \$191,000 in direct property tax payments while having negligible increases in costs. The same pattern is repeated for the Langdon School District, where an estimated \$265,000 in property tax revenues will be received annually from the project during the operations period. This represents an approximately 13 percent increase to the district's local revenue.

Discussion and Conclusions

As communities examine the prospect of a commercial wind farm in their area, having a realistic understanding of the likely effects of a wind project is helpful. The case study presented in this publication documents the socioeconomic effects of the development of a wind energy center.

The findings indicate that the primary local economic benefits of a wind project will be payroll and expenditures associated with project operation, easement payments for landowners and local property tax payments.

The project resulted in 10 permanent jobs and local expenditures of \$1.4 million annually, or about \$8,900 per MW. While the number of permanent jobs is not large, these jobs offer pay rates that are attractive to local residents.

The local expenditures included easement payments to landowners of \$413,000 the first year, or about \$2,600 per MW. In addition, the project is expected to make annual local property tax payments totaling \$456,000, or about \$2,900 per MW. Further, these payments represent a net gain to local budgets because few

local government costs seem to be associated with wind farm operation. A possible exception might be damage to local roads during construction. Local officials felt that road impacts had been minimal but planned to survey their roads in the spring. In any event, the developer had agreed to be responsible for any needed road repairs.

The project also made a substantial, albeit one-time, contribution to the state economy through purchases of towers and blades manufactured in North Dakota.

For more information on this and other topics, see: www.ag.ndsu.edu

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