

MONTANA MEANS BUSINESS



MONTANA IS

WIND COUNTRY

Harnessing the Wind for Today's Power
and Tomorrow's Energy Solutions





Judith Gap Wind Farm photos courtesy John Bacon/Invenergy, LLC.



Montana is Wind Country

Montana leads the nation in wind power potential and the state is at the center of North America's wind heartland. Wind energy is clean and renewable and provides the green energy complement to Montana's world class reserves of coal as well as oil and natural gas. Much of Montana's wind has yet to be tapped and represents a great investment opportunity.



Montana's Wind Energy Objectives

Combining wind energy with natural gas, pumped hydro, compressed air, or other advanced firming sources offers a stable green energy package that meets the growing demand for cleaner energy while advancing the national goal of energy independence.

Montana is supportive of all types of wind development, from industrial scale wind farms to locally owned community wind projects serving individual farms, businesses and homes, as well as the construction of electric transmission lines that deliver Montana's wind power to high demand markets.

Wind Energy Assets

Montana is the fourth largest state, but #1 in wind power potential in the western United States, available on a wide expanse of federal, state and private lands. The majority of wind sites are located in areas of low population and near rural communities that are supportive of wind energy development, minimizing objections to visual impacts. Some counties, such as Cascade County, offer developers GIS based maps providing information on wind resource classification, roads, transmission lines, property ownership and topography. County officials stand ready to introduce potential developers to land owners and turn prospects into projects.

AT-A-GLANCE: MONTANA DEMOGRAPHICS

Land area: 147,138 square miles

Population (2009): 974,989

Urban: 54%

Rural: 46%

Persons per square mile: 6.2

Major Cities:

Billings 96,977

Missoula 68,876

Great Falls..... 59,366

Bozeman 39,282

Butte 32,268

Helena..... 29,939

Gross state income (2009): \$35,954,000

Total State Tax (2009): \$2,407,400,000 Rank: 48

Total Tax Per Capita: \$2,469.16

Total Montana Exports: \$1.477 billion

Wheat (2009) \$447.4 million

Industrial Machinery (2009) \$156.0 million

Inorganic Chemicals (2009)..... \$305.0 million

Paper and paperboard (2009)..... \$33.0 million

Wood and Wood Products (2009) \$20.0 million

Live Animals (2009) \$4.0 million

Civilian labor force: 498,907

Employed: 468,045

Total households: 373,287

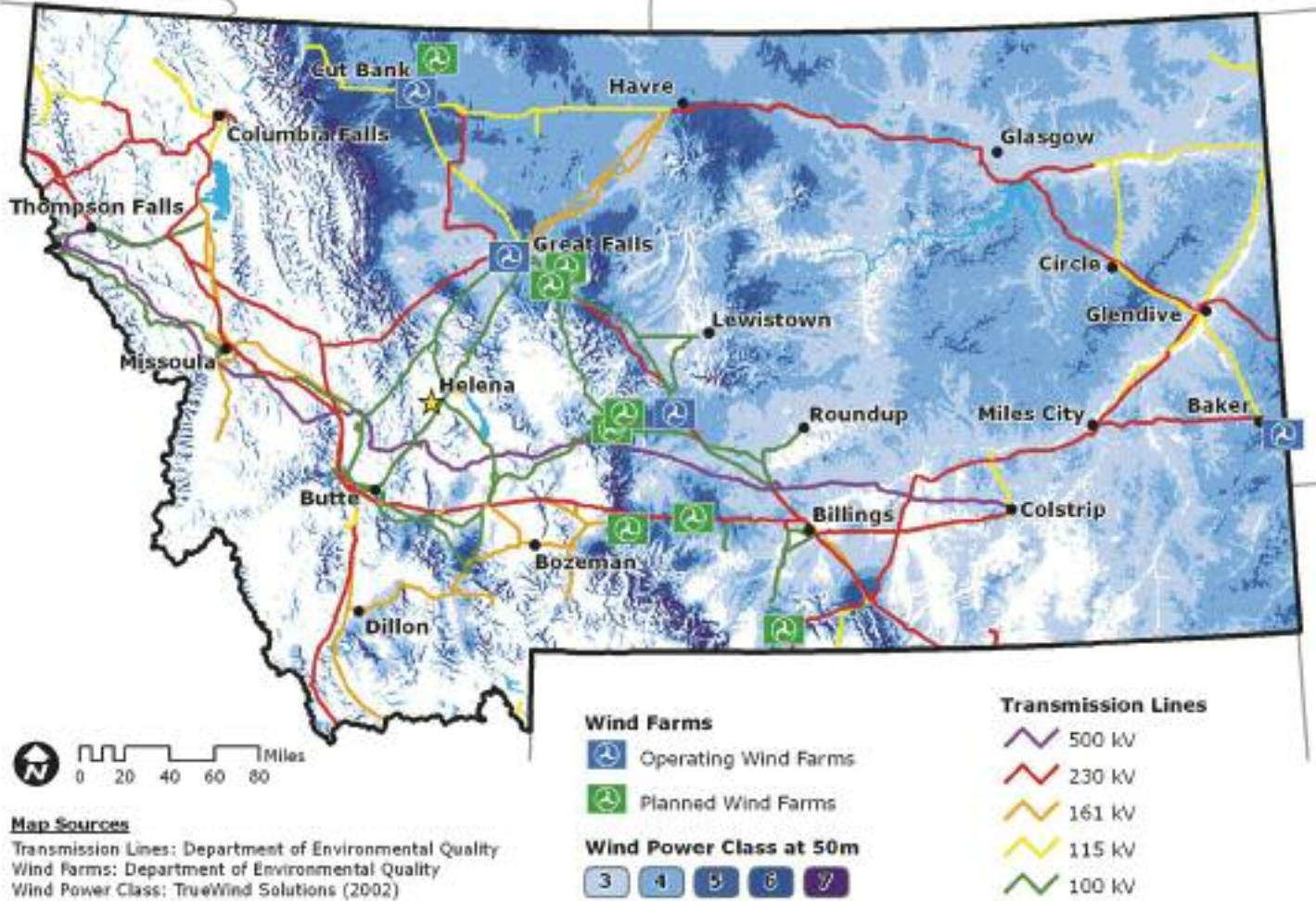
Persons per household: 2.53

Per capita personal income (2009): \$34,794

Median household income (2009): \$42,322

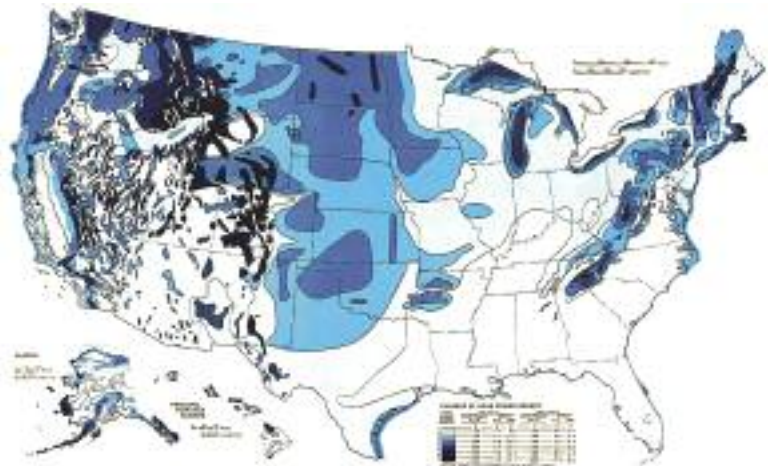
Average wage per job: \$33,919

Wind Power and Resources



National Wind Map

Montana is the wind energy capital of the United States. The national map (right) shows that Montana has one of the highest concentrations of wind power potential in the nation. The Montana map shows the best wind power locations the state has to offer while showing the proximity of electric transmission lines.

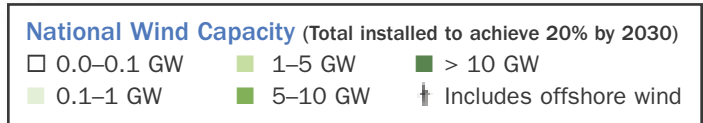


Wind speeds estimated by TrueWind Solutions (<http://www.windpowermaps.org>), 2002. Montana State Library: map #07deq0049, September 6, 2006

Department of Energy Report: 20% Wind Energy by 2030

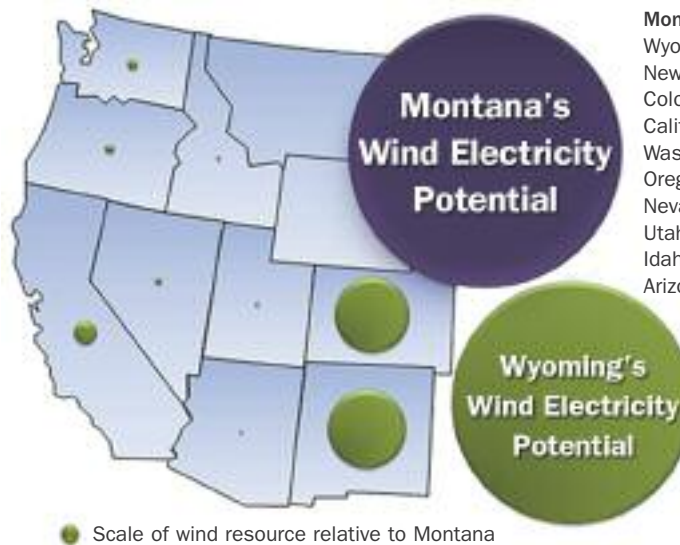
Released in 2008, the DOE report entitled *20% Wind Energy by 2030* takes an in-depth look at the technical feasibility of producing 20% of the nation's electricity needs through wind power by the year 2030. The report identifies a number of requirements necessary to achieve this goal such as reducing the cost of wind technologies, building new transmission infrastructure, developing domestic manufacturing capability, and streamlining permitting and siting regulations. Some highlights of the report include:

- Domestic wind turbines could generate 300 gigawatts of electricity by 2030, up from 35 GW of installed wind capacity in 2009.
- The costs of integrating 20% wind onto the grid are relatively small at less than .5 cents per kWh.
- Transmission challenges must be addressed to achieve 20% wind by 2030.
- 20% wind production by 2030 would result in 7.6 cumulative gigatons of CO2 avoided by 2030 and provide increased domestic energy security.
- Assumes 5,261 MW of wind capacity in Montana in 2030 resulting in 2800 permanent jobs, \$14 million a year in landowner payments, and over \$78 million per year in local property tax revenue.



Montana's Wind: Best in the West

(GWh/yr) Class 4-7



Total Potential (GWh/yr)

Montana	830,504
Wyoming	733,350
New Mexico	208,090
Colorado	198,197
California	60,068
Washington	27,172
Oregon	20,572
Nevada	17,589
Utah	9,908
Idaho	9,748
Arizona	7,268

ENERGY STRATEGIES, LLC

Wind Projects in Montana

Four industrial scale wind projects have gone online in Montana since 2005, moving Montana from a ranking of 50th to 21st in the nation in wind energy production. As of January 1, 2011, Montana's electrical generation from wind power totals 386 MW. Many proposals for further investment and development of Montana's wind resources are moving forward within the state. The most significant of these proposals is the 309 MW Rimrock Wind Farm near Shelby, proposed by Glacier Wind Farm developer, NaturEner USA.

1 Judith Gap Wind Farm: October 2005

Near Judith Gap: 135 MW with a proposed 52.5 MW expansion.

2 Glacier Wind Farm: July 2008

Near Shelby: 210 MW

3 Diamond Willow Wind Farm: January 2008

Near Baker: 19.5 MW. A recent expansion completed in June 2010 of 10.5 MW for a total of 30 MW.

4 Horseshoe Bend Wind Park: January 2006

Near Great Falls: 9 MW

5 Rimrock Wind Farm: Set to commence in 2011

Near Shelby: 309 MW

Future Projects:

Montana is projected to add an additional 5000 MW of wind generated electricity to its energy portfolio through the future development of over 50 proposed wind projects. Montana's vast wind resources have attracted developers to the state, while local governments have become motivated to issue permits for wind farms due to the capital and tax revenues infused into local economies.



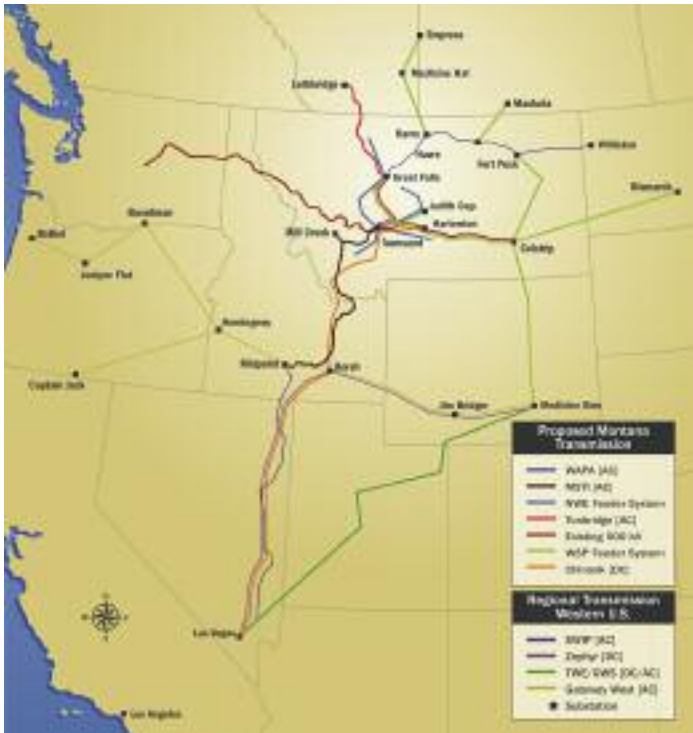
Economic Impacts of Operational Wind Projects in Montana

Wind farm	Mega Watts	Property taxes (2010)	Annual property taxes after credit expiration	Direct jobs
Horseshoe Bend	9	\$211,888	\$350,000 (exp. 2018)	21
Diamond Willow	30	\$81,369	\$110,000 (exp. 2017)	83
Judith Gap	135	\$1,441,874	\$2,300,000 (exp. 2015)	162
Glacier	210	\$3,708,734	\$6,200,000 (exp. 2018)	371



Transmission to Market

Further development of Montana wind generation hinges upon the ability to deliver that energy to market. Montana already exports about 60% of its electrical generation out-of-state, but that is limited by our transmission line capacity and the interconnectivity of the regional transmission grid. Recent transmission project proposals have the potential to greatly increase Montana's access to much larger energy markets near the Pacific Coast and the Southwest. Significant investment in the western transmission grid is necessary to achieve substantial growth in this vital energy sector.



Developing New Market Delivery Paths

Montana Alberta Tie, Ltd. (MATL)

300 MW, 230 kV, 215 mile merchant (private) transmission line connecting Great Falls, Montana and Lethbridge, Alberta.

Chinook

3000 MW, 500 kV, 1000 mile high voltage direct current (HVDC) transmission line connecting eastern Montana through Townsend to Las Vegas, Nevada, with target markets in Las Vegas, Southern California and Phoenix.

Mountain States Transmission Intertie (MSTI)

1500 MW of new transmission capacity on a 500 kV line connecting Townsend, Montana to Jerome, Idaho.

BPA/Colstrip 500 kV Transmission Line Upgrades

NorthWestern Energy project to increase the capacity of the existing high voltage transmission line from Colstrip to the west coast by up to 750 MW.

Grasslands Renewable Energy, LLC, Wind Spirit Project

3000 MW, three separate 230 kV AC lines that will connect Montana with markets in Alberta, Saskatchewan and Wyoming. A high voltage 500 kV DC line will connect Montana and North Dakota.

For more detailed information please read the *Montana Transmission for America* brochure.

Wind programs

These programs were initiated to build support infrastructure for renewable energy now and in the future.

Wind for Schools in Montana and the Wind Application Center at MSU

The U.S. Department of Energy selected Montana as one of five states to participate in the inaugural year of the Wind for Schools Program in 2008. The objective of Wind for Schools is to engage rural America in a discussion of wind energy while encouraging the growth of a knowledge and skill base for development of the wind industry. A 1.8 kW wind turbine was erected in the fall of 2008 at Montana State University to educate students, teachers and community members in wind energy through curriculum development and integration.

Starting in mid-May 2010, interns from the Wind Application Center set out to assemble and set up six Skystream 3.7 wind turbines across the state. This program is part of the same Wind for Schools program that enabled five schools in 2008 to have turbines assembled at their locations in Livingston, Stanford, Cascade, and Fairfield. The 2010 installations are in Lewistown, Townsend, Valier, Glasgow, Wolf Point, and Forsyth.



Montana University System – Sustainable Energy Program

With strong support from Governor Schweitzer, the Montana Board of Regents approved sustainable energy programs for the Billings College of Technology, MSU Great Falls College of Technology, MSU-Northern, and Montana Tech of The University of Montana in 2010. Each school offers a Certificate Program and an Associate of Applied Science degree with an initial focus on wind technologies. The program is the result of collaboration between the four colleges with funding coming from a Community Based Job Training Partnership grant from the U.S. Department of Labor. Some successes of the program to date include the installation of a 50 kW wind turbine on the MSU-Great Falls campus in 2010 and installation of an innovative vertical-axis turbine on the campus of MSU-Billings.

Environmental Considerations

Under Governor Schweitzer's leadership, the Montana Legislature passed a bill requiring a 15% renewable energy portfolio standard by 2015. Governor Schweitzer was also the first governor to endorse the national "25 x '25 Initiative", a grass-roots effort gaining bipartisan support to pass federal legislation requiring 25% of U.S. energy demand be supplied by renewable energy



sources by 2025. Since 2005, he has gained national attention for developing an energy plan in Montana that promotes conservation and development of our abundant energy resources in a responsible manner.

Wind energy is renewable, uses no water and produces zero green house gasses . Avian studies show impacts to birds can be mitigated and low

population wind sites minimize visual impact objections. Market demand for clean energy is continuing to grow with western states renewable portfolio standards increasing demand by approximately



40,000 MW by 2033.



Quick Reference

FAST FACTS

- Montana has the best potential for wind generated electricity in the western United States (Energy Strategies)
- Montana’s leveled busbar cost for wind generated electricity is the lowest in the west. (Wyoming E3 Study)
- As of 2010, wind development has brought over \$800 million in capital investment to Montana. (MT EPDD)
- As of 2010, Montana wind projects contributed nearly \$5.5 million in property taxes. (MT Dept. of Revenue)
- Montana currently produces 386 MW of wind generated electricity and has 5000+ MW under development. (MT EPDD)
- Due to the fact that there are no fuel costs, the price of electricity generated from wind energy is stable and predictable once in operation.
- DOE’s 2008 technical report, *20% Wind Energy by 2030*, found that obtaining 20% of the nation’s electricity from wind energy would reduce carbon dioxide emissions by 25%.

As Montana continues to develop its vast wind energy potential, Montanans can expect to see an increase in high paying jobs and additional revenues generated from state and local taxes. The following numbers are based on National Renewable Energy Laboratory research:



Montana Economic Impacts of 1000 MW & 6000 MW of Wind Development

Direct impacts	1000 MW	6000 MW
Payments to landowners	\$2.7 million/yr	\$16.2 million/yr
Local property tax revenue	\$14.9 million/yr	\$89.4 million/yr
Construction phase	1,706 jobs	10,236 jobs
Local Economic Impact	\$188.5 million	\$1.13 billion
Operational phase	271 long-term jobs	1,626 long-term jobs
Local Economic Impact	\$21.2 million/yr	\$127.2 million/yr
Indirect and induced impacts	1000 MW	6000 MW
Construction phase	1,505 jobs	9,030 jobs
Local Economic Impact	\$118.1 million	\$708.6 million
Operational phase	276 long-term jobs	1,656 long-term jobs
Local Economic Impact	\$22.6 million/yr	\$135.6 million/yr
Totals (construction +20 years)	1000 MW	6000 MW
Total economic benefit	\$1.2 billion	\$7.2 billion
New local jobs during construction	3,211 jobs	19,266 jobs
New local long-term jobs	547 jobs	3,282 jobs



MONTANA MEANS BUSINESS



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