

A CASE FOR LARGE WIND POWER IN MICHIGAN

By Jim MacInnes
September 25, 2011

Michigan has a vast wealth of wind energy resources, both onshore and offshore. It is also home to one of the largest energy storage batteries in the world, the Ludington Pumped Storage facility, which will be up-rated to nearly 2200 Megawatts with an efficiency of nearly 80%.

A good case can be made that up to 20%, or more, of Michigan's electrical energy portfolio could be supplied by wind power. Large onshore wind has a high Energy Return on Energy Invested (EROI), a competitive cost, low environmental impacts and it presents a low risk to society. Large wind turbines are also much superior to small home style wind turbines because they are located where most of the wind energy is... hundreds of feet in the air.

So, what are the benefits of large wind power?

Let's begin with jobs. Wind projects create five categories of jobs including: 1) construction jobs; 2) operating and maintenance jobs; 3) farm jobs supported by lease income to farmers; 4) important community services jobs such as schools, police and fire protection, etc. which are funded through project tax revenues; and, 5) other small business jobs created through the "job multiplier effect" of one to one, or greater. The job creating benefits of investing hundreds of millions of dollars into a small community can be substantial.

Large onshore wind power in Michigan also provides competitively priced electricity.... at 7 cents per Kilowatt-hour (kwh) or less. (Offshore wind is double that price, or more, but huge amounts of wind energy are potentially available on the great lakes) Compare that with the price of electricity from a new coal plant, which generates electricity at 13 cents per kwh according to a recent report by the Michigan Public Service Commission. Coal costs have also been escalating at 10% per year for the past seven years due to the law of diminishing returns (decreasing EROI) and China's insatiable coal demands.

While natural gas fueled power generation is currently inexpensive, Michigan has a long history of boom and bust in natural gas prices and related electricity prices. Natural gas is finite and must also be conserved as a critical feedstock for chemical processes such as the Haber-Bosch process used to make fertilizer, which is needed to help feed the world's seven billion people. Natural gas fueled power generation already represents 22% of America's portfolio of electricity supplies. Many seasoned energy professionals (including the IEEE-USA national energy policy committee) are reluctant to recommend adding more natural gas fueled power generation for these reasons.

The intermittent nature of wind power can be accommodated using a combination of: 1) advanced wind forecasting techniques, 2) power grid “operating reserves,” 3) energy storage systems like the Ludington plant , 4) demand side management, and, 5) energy balancing with other geographic regions via the transmission infrastructure. Most of the time the cost to provide back up for wind power by marginally increasing operating reserves is about 0.5 cents per kwh. During a limited number of peak demand hours, however, back up supply costs may be considerably higher.

Wind power has virtually zero direct fuel costs so fuel price escalation is not an issue. Its use also conserves our remaining fossil fuel resources and reduces green house gases by about 95% on a per kwh generated basis.

Jim MacInnes worked as a power engineer for the company that designed and construction managed the Ludington Pumped Storage facility, in addition to coal-fired and nuclear power plants. He is a licensed professional engineer in Michigan, a member of the IEEE Power and Energy Society and the International Society for Ecological Economics. He served on the Great Lakes Offshore Wind Council and was named as a Michigan Green Leader by the Detroit Free Press. He holds BSEE and MBA degrees from the University of California.