

Escanaba Energy Supply Plan Update

Electric Advisory Committee

June 11, 2008

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Electrical Superintendent



Escanaba Energy



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Options

1. Continue to Operate the plant “as is”
2. New Generation
3. Improve Plant Efficiency
4. Wind
5. Gasification
6. Biomass-wood chips
7. Biomass-processed wood
8. PRB Conversion
9. Purchase full requirements energy

Continue as is

- **Benefits**

- reliable power from local source

- continuation of existing jobs

- plant maintenance and upgrade contracts

- typically awarded to local business

- local control

- **Disadvantages**

- limited to 25Mw base load capacity

- Higher costs

New Generation

- This option is not cost effective for the City of Escanaba
- Too Expensive ~\$95/MWh
- Partner(s) needed for economies of scale

Construction costs:

60Mw CFB	150MwCFB	300MwCFB
\$293M	\$514M	\$785M
\$4883/kw	\$3427/kw	\$2617/kw

Improve Plant Efficiency

- **Benefits**

- Local source of power

- Lower generation costs as compared to “as is” option

- Continuation of existing plant jobs

- Maintain local control

- **Disadvantages**

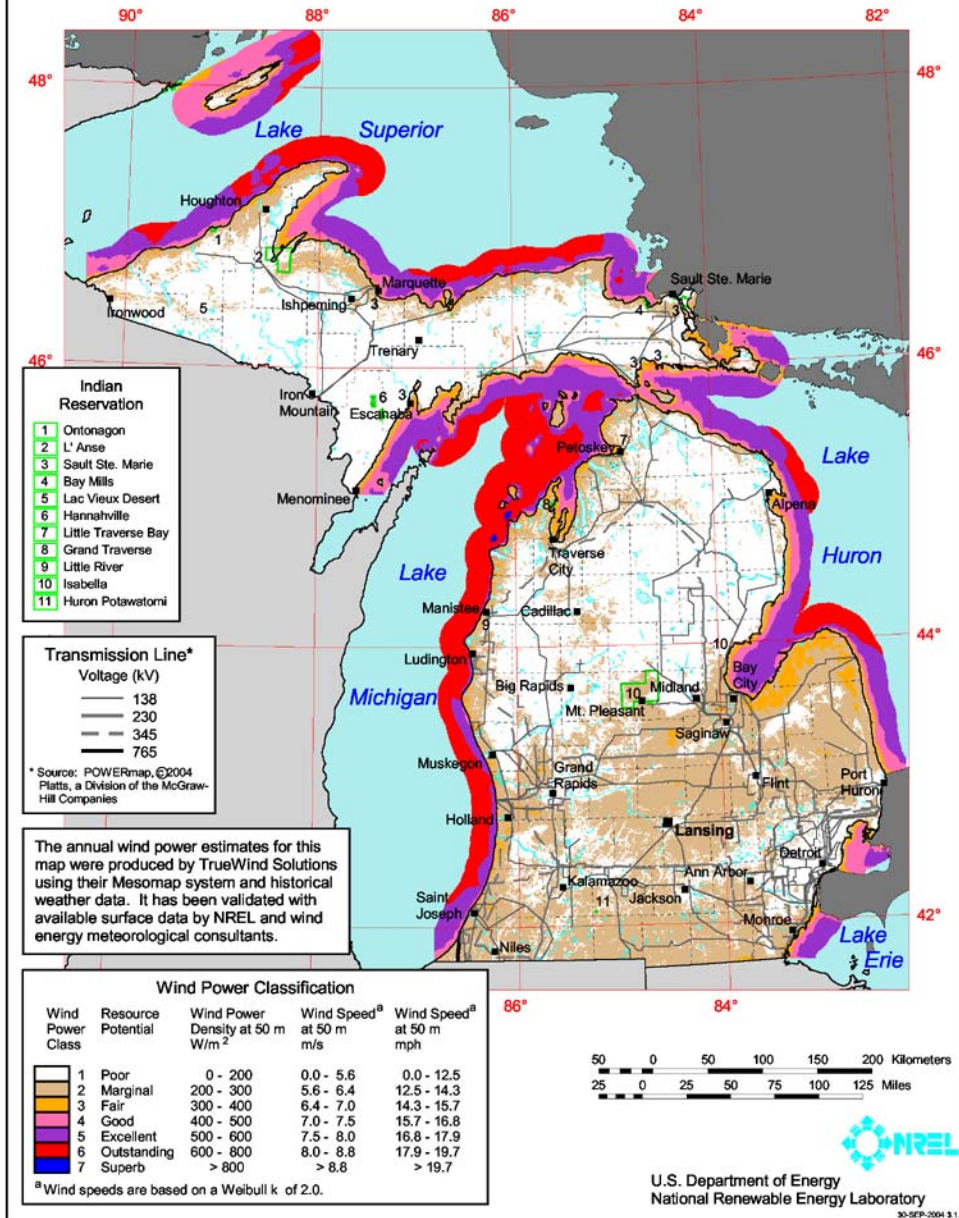
- Limited to 25Mw base load capacity

- Higher costs than could be obtained through wholesale purchase

Wind

- Cost range ~ \$55 - \$95/Mwh
- Escanaba is not a good candidate for wind power; believed we would be at higher end of the range ~ \$80 - \$95/MWh
- Would need multiple wind turbines to realize economies of scale
- A 2.5MW wind turbine has an installed cost of \$5.2M

Michigan - 50 m Wind Power



Gasification

- Start up costs expensive ~ \$10-\$15M
- Believed to be limited to 2-3Mw with identified fuel supply

Biomass-Wood Chips

- Cost of study: \$148,000
- Estimated cost of conversion: \$20M - \$30M
- Not cost competitive with wind generation from good wind areas
- Estimated Energy Cost: \$93 - \$99/MWh
- Limited interest from regional utilities due to cost
- Recent Renewafuel announcement will have an impact on availability of biomass wood chips

Biomass-Processed Wood

- Generation costs expected to be in the range of \$86-\$118/Mw
- Information not complete at this time, more information is needed to fully assess this option
- Little capital expenses expected
- Limited interest from regional utilities due to cost
- Renewafuel recently announced plans to site a production facility at the former K.I. Sawyer airbase

PRB Conversion

- Cost of study: \$125,000
- Estimated cost of conversion: \$20M - \$30M
- Estimated cost of PRB delivered to Escanaba: upper \$40's – low \$50's/ton
- Estimated generation cost: \$66 - \$78/MWh*
 - * does not include debt repayment
- Estimated total costs with debt repayment included: \$76 - \$103/MWh

Purchase full requirements energy, discontinue plant operations

- 3 regional suppliers submitted proposals in July 2007 with a range of demand and energy costs
- Power System Engineering (PSE) analyzed these offers and compared them to Escanaba's load curves for the past 3 years
- PSE presented results in Dec, 2007
- Results showed all 3 were less expensive than self generation
- 1 of the 3 regional suppliers was dropped due to being the highest cost of the 3 and lack of interest in partnering with Escanaba in converting the plant to biomass
- The 2 remaining suppliers have an "all-in" cost of \$64.42 and \$68.10 respectively based on Escanaba's most recent 3 years load curves and their 2007 proposal
- Disadvantages include: loss of local generation, loss of plant jobs

Purchase full requirements energy, sell/lease plant to private entity

- Escanaba would realize lower costs of energy through full requirements purchase
- Reliability of local generation
- Plant jobs
- Private entity could be eligible for production tax credits if plant is converted to biomass

Sample Power Charges

These represent **approximate** charges. Variations could exist depending on actual usage patterns.

This chart shows Escanaba's rates as they are today

	Marquette	Manistique	Sturgeon Bay	Escanaba	Menominee	Kingsford	Gladstone	Ishpeming	Alger-Delta
Residential 500 kWh/mo	\$40.50	\$46.57	\$50.15	\$50.88	\$51.43	\$58.32	\$65.50	\$73.97	\$80.38
Commercial 4000 kWh/mo	\$321.60	\$404.76	\$368.20	\$378.97	\$379.00	\$428.04	\$462.80	\$592.56	\$549.08
Large Power 200,000 kWh/mo	\$13,009.50	\$18,046.70	\$14,158.05	\$15,627.49	\$15,329.12	\$17,025.12	\$18,365.00	\$18,507.50	\$25,191.40

Sample Power Charges

These represent **approximate** charges. Variations could exist depending on actual usage patterns.

This chart shows what Escanaba's rates would be with a 13% increase to cover the recent coal cost increase.

	Marquette	Manistique	Sturgeon Bay	Menominee	Kingsford	Escanaba	Gladstone	Ishpeming	Alger-Delta
Residential 500 kWh/mo	\$40.50	\$46.57	\$50.15	\$51.43	\$58.32	\$57.49	\$65.50	\$73.97	\$80.38
Commercial 4000 kWh/mo	\$321.60	\$404.76	\$368.20	\$379.00	\$428.04	\$428.24	\$462.80	\$592.56	\$549.08
Large Power 200,000 kWh/mo	\$13,009.50	\$18,046.70	\$14,158.05	\$15,329.12	\$17,025.12	\$17,659.06	\$18,365.00	\$18,507.50	\$25,191.40

Sample Power Charges

These represent **approximate** charges. Variations could exist depending on actual usage patterns.

This chart shows what Escanaba's rates could be by buying full requirements energy.

	Marquette	Escanaba	Manistique	Sturgeon Bay	Menominee	Kingsford	Gladstone	Ishpeming	Alger-Delta
Residential 500 kWh/mo	\$40.50	\$44.77	\$46.57	\$50.15	\$51.43	\$58.32	\$65.50	\$73.97	\$80.38
Commercial 4000 kWh/mo	\$321.60	\$333.49	\$404.76	\$368.20	\$379.00	\$428.04	\$462.80	\$592.56	\$549.08
Large Power 200,000 kWh/mo	\$13,009.50	\$13,752.19	\$18,046.70	\$14,158.05	\$15,329.12	\$17,025.12	\$18,365.00	\$18,507.50	\$25,191.40

Sample Power Charges

These represent **approximate** charges. Variations could exist depending on actual usage patterns.

This chart shows what Escanaba's rates could be under the "Best-Case" PRB conversion scenario

	Marquette	Manistique	Sturgeon Bay	Escanaba	Menominee	Kingsford	Gladstone	Ishpeming	Alger-Delta
Residential 500 kWh/mo	\$40.50	\$46.57	\$50.15	\$50.12	\$51.43	\$58.32	\$65.50	\$73.97	\$80.38
Commercial 4000 kWh/mo	\$321.60	\$404.76	\$368.20	\$373.29	\$379.00	\$428.04	\$462.80	\$592.56	\$549.08
Large Power 200,000 kWh/mo	\$13,009.50	\$18,046.70	\$14,158.05	\$15,393.08	\$15,329.12	\$17,025.12	\$18,365.00	\$18,507.50	\$25,191.40

Additional Information

Please visit the City of Escanaba Energy
Website at:

www.escanabaenergy.com

or

www.escanaba.org