MESABA ENERGY PROJECT

EXCELSIOR ENERGY INC.

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PROJECT BRIEFING

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Efficiently Meeting Minnesota's Growing Energy Needs & Reducing Environmental Impacts

Briefing Prepared by Excelsior Energy

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I. Introduction and Overview of Mesaba Energy Project

Minnesota faces three monumental policy challenges:

- **Fill an immediate need for new electric generation and transmission resources**
- **Meet Minnesota's stated goal to materially reduce environmental pollutants by 2010**
- **Avert the impending economic crisis on the Iron Range**

The Mesaba Energy Project is part of the solution:

- **2000 megawatts (MW) of integrated gasification combined cycle ("IGCC" or "coal gasification") generating capacity located on a brownfield site in Northeastern Minnesota.**
- **1000 MW of wind generation to be supplied by turbines and equipment manufactured on the Iron Range and deployed in Minnesota's most significant wind resource areas.**
- **3000 MW of bulk power transmission capacity from the site to load centers utilizing existing transportation corridors.**

II. Minnesota's Needs for New Generation & Transmission Capacity

Minnesota's projected energy shortage is real:

- 715 MW of new capacity are required in immediate 4-6 year horizon

- 3300-6200 MW of additional new baseload capacity need is projected by Xcel Energy, Minnesota municipalities and cooperatives in the 6-15 year planning horizon

- Additional capacity will most likely be required beyond projected baseload needs to replace
  - energy supply shifted out of region to higher rate deregulated regions
  - 90,000 MW of aging capacity in the Midwestern region
  - reduced production/eventual closure of Prairie Island Nuclear Plant
  - existing coal plants unable to efficiently meet NOx, SO2, Hg and/or CO2 emission requirements

- Existing electrical transmission lines are at/near capacity and will be unable to carry new generating capacity, according to MAPP's latest Regional Plan

- New transmission capacity cannot be sited until decisions regarding the location of new power plants are made, creating a planning Catch-22

Continued.....

Minnesota's Needs for New Generation & Transmission Capacity....*continued*

The time to act is now:

- Large baseload capacity additions require 4-7 years from development to operation
- Without State involvement, baseload additions will be driven by minimizing short-term incremental capital costs, will not consider technologies that have more long-term consumer price certainty and environmental benefits and will not develop a diversified fuel portfolio for Minnesotans
- Creation of a large energy park is a positive first step the State can take toward planning new transmission to increase the capacity, reliability & competitiveness of Minnesota's power generation assets and to minimize environmental impacts

III. Power Generation Technology Options

Primary technology options for meeting Minnesota's baseload power generation needs include:

Natural gas combined cycle plant

- Utilizes natural gas which is combusted and employs both combustion and steam turbines to produce electricity
- Generally has lowest capital costs and highest fuel costs
- Traditionally used more for intermediate and peaking load supply

Pulverized coal plant

- Utilizes pulverized coal that is combusted and the resulting heat is used to generate steam to drive a steam turbine and produce electricity
- Generally has high capital costs and lower fuel costs
- Traditionally used for baseload supply
- Older conventional pulverized coal plants are significant sources of air pollutants

Integrated gasification combined cycle ("IGCC" or "coal gasification") plant – the most advanced clean coal technology

- Utilizes fuel gas generated from coal reacting with high temperature steam and oxygen and employs both combustion and steam turbines to produce electricity
- Generally has high capital costs and lower fuel costs
- Favored technology of U.S. Department of Energy
- Performance resembles gas plants, with higher efficiencies and superior environmental performance

IV. Emissions: State-of-the-Art Power Plant Comparisons

Plant Emissions are in pounds per megawatt hour	State-of-the-Art Pulverized Coal Plant	State-of-the-Art Integrated Gasification Combined Cycle Plant	State-of-the-Art Natural Gas Combined Cycle Plant
HHV Efficiency (1)	39 – 41%	42 – 45%	50 – 53%
SO_2, lb/10^6 Btu (lb/MWh)	0.025-0.05 (0.2-0.5)	0.017 (0.13)	N/A
NOx, lb/10^6 Btu (lb/MWh)	0.03-0.15 (0.3-1.3)	0.024 (0.17 - 0.18)	0.028 (0.19- 0.20)
Particulate, lb/10^6 Btu (lb/MWh)	0.01 (0.08)	0.002 (0.015)	N/A
Capital Cost, $/kW (2)	1000-1200	1100-1200	500-560

(1) Efficiency is measured by the amount of fuel (in BTUs) needed to make a unit of electricity.

(2) Capital costs for coal and IGCC plants are much higher than for gas plants, but fuel costs are much higher for gas plants, resulting in lower overall cost for coal-fired generation at current fuel prices.

State-of-the-Art IGCC Plants vs. Minnesota Plants: Environmental Performance

Emissions in lbs/mwh Plants	Sulfur Dioxides SO2	Nitrous Oxides NOx	Carbon Dioxide CO2	Carbon Monoxide CO	Particulate Matter (PM)	Volatile Organic Compounds (VOCs)
Integrated Gasification Combined Cycle	.13	.17	1250-1700	.05	.015	.003 (1)
Mesaba IGCC + Wind (2)	.11	.15	1088-1479	.0435	.013	.00261
XCEL A. S. King Plant (1999 data)	16.5	11.1	2103	.278	.3	.0057
XCEL Sherburne County Plant (Sherco) (1999data)	2.984	3.168	2291	.296	.5169	.03604

(1) Wabash plant data
(2) Assumes 2000 MW IGCC at 85% capacity and 1000MW wind at 25% capacity

V. Emissions and Environmental Benefits of IGCC Generation

Nitrous Oxide (NOx) emissions are lower in coal gasification than for a state-of the art gas plant. NOx emissions from an IGCC plant are 90% less than a state of the art pulverized coal plant. NOx emissions from 65 megawatt hours of output from the Mesaba IGCC plant will equal NOx emissions from 1 megawatt hour of output from the Xcel King Plant.

Sulfur dioxide (SO2) emissions are reduced by more than 90% from conventional coal plants and 34% from a state-of-the-art pulverized coal plant with scrubbers. S02 emissions from 127 megawatt hours of output from the Mesaba IGCC plant will equal S02 emissions from 1 megawatt hour of output from the Xcel King Plant.

Greenhouse gas (CO2) emissions are reduced up to 34% depending on thermal efficiency of comparable plant.

Particulate Matter emissions are reduced by 80% from emissions of a state-of-the-art pulverized coal plant. Particulate matter from 34 megawatt hours of output from the Mesaba IGCC plant will equal particulate matter emissions from 1 megawatt hour of output from the Xcel Sherco Plant.

Mercury removal technology R&D is currently receiving significant U.S. DOE attention

Waste byproducts are eliminated in the gasification process, as waste forms a marketable glasslike product instead of ash, eliminating the need for ash disposal, and sulfur is reduced to marketable pure sulfur.

Water usage is reduced by 40% from that of a state of the art pulverized coal plant.

Visual impact of the plant is minimized by the smaller "footprint" required for an IGCC facility.

VI. Action Plan

The Mesaba Energy Project is scheduled to break ground in 2002 to add to the State's electric capacity by 2006 and to bring immediate relief to the Iron Range. To meet this goal, Mesaba is at present focusing on these critical actions:

Securing suitable sites on the Iron Range: Site selection, engineering, permitting and environmental assessment are on the critical path for the development of the Project

Negotiating arrangements with key project participants, including technology partners, fuel and transportation suppliers, wind generation manufacturers and likely equity investors: Painstaking selection of the best and most cost-effective partners and vendors ensures that the Project will provide the lowest cost generation to consumers in Minnesota

Preparing to seek U.S. Department of Energy funding and additional Federal funding support in the current Federal Energy Bill: Opportunities for Federal investment in Minnesota that won't wait

Drafting enabling legislation for Minnesota and securing support of IRRRB for the project: Iron Range and other key legislators will provide necessary support and leadership in the upcoming legislative session

VII. Benefits to Minnesota of the Mesaba Energy Project

Secure Electric Energy Future: The Mesaba Energy Project eases tight capacity reserve margins and provides a holistic solution to the State's need for baseload generating capacity and related transmission capability

***Environmental Policy Options*:** Mesaba will give Minnesota policy makers better flexibility to meet the smog and air toxic emission reduction targets set by MPCA's 10 Point Plan to Cut Air Pollution

***Low Cost*:** The long-term cost of output from IGCC technology will be lower than for natural gas plants at current fuel price levels. With the scale economies associated with the Mesaba Energy Project, ratepayers will benefit from lower fuel costs and equipment costs. Funding from U.S. DOE for a portion of the project costs will further reduce the cost of output from the Mesaba IGCC plant.

Environmental Leadership: Deploying state-of-the-art IGCC technology on a broad scale will make Minnesota a worldwide leader in environmental innovation, using plentiful domestic coal supplies to generate electricity in an environmentally responsible manner.

Reduced Fossil Fuel Consumption: The high thermal efficiency of the IGCC plant combined with the fuel use reduction made possible by the wind installations make the Mesaba Project the most energy efficient thermal plant achievable.

Hedge of Fuel Cost: Coal can be purchased under long-term, fixed-price contracts, which will provide a hedge of fuel costs that is unavailable from gas suppliers.

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Minnesota Benefits *continued*.....

Diversified State Energy Portfolio: Minnesota will be adding coal-fired generation to its mix for the first time in decades, diversifying the State's energy portfolio, decreasing Minnesota consumers' exposure to natural gas prices and reducing pressure on the State's gas pipeline and delivery systems.

Fuel Flexibility: IGCC technology permits fuel switching between coal, gas, oil and biomass, offering maximum flexibility to the Mesaba Energy Project. Further, the location of the project site and IGCC technology permit coal to be sourced from all major coal producing regions.

Job Creation and Economic Transformation of the Iron Range: The chronic and worsening unemployment and urgent economic crisis of the Iron Range will be permanently reversed by the thousands of direct and indirect jobs created by the $2-3 billion investment in the Mesaba Energy Project, transforming the economic future of the Range and providing non-cyclical, long-term employment opportunities.

Use of Brownfield Site and Existing Infrastructure and Transportation Corridors: The Mesaba Energy Project has committed to use a brownfield site on an existing industrial site on the Iron Range if possible, reducing the environmental impact of the project and providing the opportunity to bring net environmental benefits to the site. Siting transmission on an existing transportation path minimizes cost and environmental impacts and expedites the construction timeline.

***Attract Federal Funding to Minnesota*:** Funds are available from DOE to invest in further environmental improvements to IGCC technology and to reduce the cost consumers will pay for the plant's output.