

FINAL REPORT

AUG 13 2001

1999 Project Abstract

For the Period Ending June 30, 2001

TITLE: Promoting High Efficiency Cogeneration
PROJECT MANAGER: Suzanne Steinhauer
ORGANIZATION: Minnesota Environmental Quality Board
ADDRESS: 3rd Floor Centennial Bldg.
658 Cedar Street
St. Paul, MN 55155
651-296-2878

WEB SITE ADDRESS: <http://www.mnplan.state.mn.us/eqb/index.html>

FUND: Minnesota Future Resources Fund

LEGAL CITATION: ML 1999, Ch. 231, Sec. 16, Subd. 009(b).

APPROPRIATION AMOUNT: \$ 100,000

Overall Project Outcome and Results

The project produced two products: (1) an inventory of potential cogeneration sites with key screening factors for assessing cogeneration potential, information on 142 large energy users and 32 survey respondents, initial site assessments of three facilities, and a description of major cogeneration technologies; and (2) a handbook that briefly describes the major regulatory processes necessary for cogeneration projects and provides links to more detailed information. The survey estimates a technical potential of between 1600 and 2100 megawatts of cogeneration in Minnesota

Project Results Use and Dissemination

The results of the project are useful for project developers, policymakers and citizens interested in enhancing Minnesota's cogeneration potential. Copies of the reports are available on the Minnesota Planning website or may be obtained by contacting the project manager.

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LCMR WORK PROGRAM UPDATE: 009(b)

Date of Report: ~~January 2, 2001~~ August 10, 2001
 Date of Next Status Report: ~~June 30, 2001~~ Final
 Date of Work Program Approval: September 20, 2000
 Project Completion Date: June 30, 2001

LCMR Work Program 1999

I. Project Title: Promoting High Efficiency Cogeneration

Project Manager: Suzanne Lamb Steinhauer
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Total Biennial Project Budget: \$100,000

\$ LCMR:	\$100,000	\$ Match: Classified State Project Manager Salary	N/A
\$ LCMR Amount Spent: (as of December 27, <u>2000 July 31, 2001</u>)	<u>\$17,550,299</u>	\$ Match Spent	N/A
\$ LCMR Balance: (as of December 27, <u>2000 July 31, 2001</u>)	<u>\$82,450,701</u>		N/A

**A. Legal Citation: ML 1999, Chap.231, Sec.16, Subd.009(b).
 Promoting High Efficiency Cogeneration**

B. \$100,000 is from the future resources fund to the office of strategic and long-range planning and the Minnesota environmental quality board to develop a statewide inventory of potential cogeneration sites and a regulatory guidance manual.

II. PROJECT SUMMARY AND RESULTS:

This project encourages the efficient cogeneration of electric and thermal energy in Minnesota through the following two products:

1. A comprehensive, state-wide inventory and description of promising cogeneration sites; and
2. A brief, plain-language manual describing the government approvals necessary to implement small or large scale cogeneration projects, and suggestions on how to navigate these processes successfully.

Both the inventory and the guidance manual are intended primarily to provide valuable information to power developers, but both products will be useful to other interested groups.

Inventory

The cogeneration site inventory will identify and describe as many of the state's existing large thermal energy users as possible. For each potential site, the inventory is intended to provide enough information on thermal energy load and peak demand, electricity use, temperature requirements, land use, existing electricity production, and other data to allow preliminary assessment of cogeneration viability. A prioritization of these potential sites would be provided. If there are funds remaining after inventory of existing sites is complete, the project would be expanded to include an examination of the potential for linking existing smaller heating/cooling systems together to develop *new* district energy systems or other thermal energy users for future cogeneration.

Guidance Manual

The regulatory guidance manual would be developed cooperatively with the state agencies with direct regulatory authority over new and existing power projects. The numerous (and sometimes confusing) regulatory processes and agencies governing new power plants would be described—from the Certificate of Need at the PUC—to the major final approvals required such as the air quality permit from the MPCA. Changing laws and regulations would require that the manual be updated periodically throughout the next decade—possibly through the state World Wide Web site. Future updates could be completed as needed by EQB staff with cooperation by other permitting agencies.

III. PROGRESS SUMMARY:

Project Result: Inventory

A request for proposals for an inventory of high potential cogeneration sites in Minnesota was issued in November, 1999. Eight proposals were received by the deadline. Because of scheduling difficulties with the inter-agency review panel, the

selection of a contractor was delayed. The state is currently in negotiations with a preferred contractor and the contract is expected to be finalized by mid- to late-March. Work on the inventory is expected to begin immediately after the contract is signed.

September 12, 2000 update

Kattner/FVB Inc. was selected from eight proposals to assist in the inventory portion of the project. Analysis of data from the Minnesota Pollution Control Agency's boiler permits and information from Kattner/FVB identified approximately 150 firms and institutions as potential cogeneration sites. A draft survey was administered in July, no revisions were needed and copies of the survey were sent to the remainder of potential sites at the end of August.

January 2, 2001 update

Kattner/FVB Inc. analyzed survey responses and identified seven sites as having "reasonable" potential for cogeneration, and three sites as having "marginal" potential. Further analysis of two potential sites determined that project economics limit the attractiveness of combined heat and power. The relatively low price for electricity and rising prices for natural gas, the typical fuel choice, result in long payback periods (18 to more than 20 years in these two examples). Should electric rates rise appreciably, or issues of power reliability and quality become more important considerations for facilities managers in Minnesota, as they have elsewhere, combined heat and power may become a more attractive option.

August 9, 2001 update

The final inventory report showed a technical potential of between 1600 and 2100 MW of cogeneration in Minnesota. The economic potential will be less than that, although the specifics of each sites economics make it impossible to estimate an economically viable potential for the state. The report provides key screening factors for assessing cogeneration potential, information on 142 large energy users and 32 survey respondents, initial site assessments of three high potential facilities, and a description of major cogeneration technologies

Project Result: Handbook

Staff from MEQB, Pollution Control Agency and Department of Commerce have begun compiling statutes, rules and other material necessary for a handbook on navigating through Minnesota's regulatory system. An interagency group has also been formed to determine the appropriate audience for such a guidebook and discuss opportunities to overlap agency missions.

September 12, 2000 update

Progress on the Handbook portion of the project has been delayed to review preliminary survey results in order to get a better idea of the intended audience, and issues that audience may have, for such a handbook.

January 2, 2001 update

MEQB and MPCA staff has begun to draft the guidebook. Contract negotiations are underway with a technical writer to ensure that the final version of the handbook is accessible to a lay reader.

August 9, 2001 update

The project produced a handbook that briefly describes the major regulatory processes necessary for cogeneration projects and provides links to more detailed information. The handbook is available on the Minnesota Planning website.

IV. OUTLINE OF PROJECT RESULTS:

No outside matching funds are currently available for this project, but the classified state project manager's salary would be funded from within the regular agency budget. There is also growing federal research and development funding in this field, so supplemental and/or matching federal funds will be pursued whenever possible.

Project Result: Inventory

Project components:

Convene advisory group. October 1999 – June 2001

1. Issue RFP. November 1999
2. Select technical contractor. March 2000
3. Identify survey respondents. May-June 2000
4. Draft pilot survey. June 2000
5. Mail pilot survey. June 2000
6. Revise survey in response to feedback from pilot survey. July-August 2000
7. Mail revised survey. August 2000
8. Follow-up with survey respondents to achieve more detailed information. September – October 2000
9. Assess and characterize survey responses. September – October 2000
10. Prepare database inventory. September - November 2000
11. Draft final report. November 2000 – ~~January~~ May 2001
12. Review & revise draft report. ~~January~~ May – ~~February~~ July 2001
13. Issue final report. ~~March~~ August 2001

Project Result: Guidance manual

Project components:

1. convene advisory group. October 1999 – June 2001
2. assemble information on permitting process. May - October 2000
3. select professional/technical contractor to write guide. November 2000
4. draft guidebook. November 2000 – January 2001
5. review & revise draft guidebook. January – ~~March~~ June 2001

	Result 1: Inventory	Result 2: Guidance Manual
LCMR Budget	\$83,000	\$17,000
LCMR Balance (as of December 27, <u>2000 July 31, 2001</u>)	<u>\$67,1506,134</u>	<u>\$15,3003,567</u>
Completion Date	July 1, 2001	July 1, 2001

V. DISSEMINATION:

MEQB staff will assemble an informal technical review group consisting of state agency staff, private industry, and other interested parties to review plans and provide feedback on results. While the review group would not meet on a regular basis, they would be available for individual consultation and would meet as a whole on an as-needed basis. Project status, results, and contact information would be added to the Minnesota Planning web site and updated regularly.

VI. CONTEXT

A. Significance:

Up to 70% of the energy used at a conventional power plant is wasted up smokestacks or in cooling towers or ponds. Nationwide, this unrecovered energy is equal to one-quarter of total U.S. energy consumption. Cogeneration, also referred to as combined heat and power (CHP), recovers this waste energy from power plants and uses it for heating, cooling, or industrial processes. This not only improves overall energy efficiency, it can lead to direct, significant reductions of regional emissions of greenhouse gases and other air pollutants because producing electricity and steam or hot water in one process can lower overall air emissions compared to producing electricity and thermal energy separately.

Minnesota's comparatively large heating and cooling needs result in a significant cogeneration potential that has not been comprehensively examined since the early 1980's—a period dominated by construction of large coal-fired or nuclear powered generating plants. New technologies using natural gas and other fuels are increasingly available that are both small enough and clean enough to be built close to population areas, where the power generation waste heat can be more easily recovered for distribution to an industry or community.

The proposed LCMR project, therefore, can play an important role in encouraging new, highly efficient, low-emissions, jobs-producing energy infrastructure projects in Minnesota.

B. Time

The project will be completed within two years.

C. Budget Context

The LCMR has not recommended funding for previous cogeneration projects, but the federal government and private industry has been investing in both research and implementation of new technologies that could lead to increased use of cogeneration in Minnesota and throughout the country. Supplemental and/or matching federal or private funds will be pursued whenever possible during the next year.

1. BUDGET:

Personnel and Expenses* (Agency Staff)	MEQB	\$31,000
	Total	\$31,000
Equipment		\$ 0
Acquisition		\$ 0
Development		\$ 0
Technical Consultant*		\$69,000
Other:		
Total		\$ 100,000

Additional Budget Explanation*

Agency Staff Salary

MEQB salary will be used to fund a temporary unclassified planner/research position to manage the project. The person occupying this position will also be that would be primary responsible for collecting and compiling data on potential cogeneration sites and for day to day coordination with other agency staff, and outside parties.

MEQB Travel Budget (See Attachment A)

Instate travel is for limited staff meetings or site visits where such visits would be productive for evaluation of state potential cogeneration sites.

Technical Consultant Scope of Work

To be most useful, the site inventory requires the use of technical expertise that is not available within state government to help review and evaluate collected data on potential sites. Technical expertise will be needed to evaluate the quality and accuracy of the wide

range of data needed to assess cogeneration viability at particular sites, such as thermal energy load, peak thermal demand, electricity use, steam and hot water quality and temperature requirements, land use, transmission grid reliability, and other technical characteristics.

Perhaps more importantly, the cogeneration site inventory is not intended to simply catalog sites and site data, but also to evaluate and organize the information to maximize its use by potential power developers. Extensive outside technical expertise will be required to provide data quality assurance as well as evaluate and make sense of the collected data and to prioritize the sites by cogeneration potential. Technical assistance will also be needed to review and assist in drafting the guidance manual. Additional expertise is necessary to accurately assess the cost effectiveness of linking together any potential future district energy systems in the state.

2. Budget Detail Contained in Attachment A

VII. COOPERATION:

Minnesota Pollution Control Agency
Minnesota Department of Commerce, Energy Division

VIII. LOCATION:

The work will largely be completed in the Twin Cities, either by agency staff or local technical consultants. Potential cogeneration sites, however, are located throughout the state, so staff may gather information at these sites if necessary and cost effective.

IX. REPORTING REQUIREMENTS:

Periodic work program progress reports will be submitted not later than March 2000, September 2000, and January 2001. A final work program report and associated products will be completed by June 30, 2001, or by the completion date as set in the appropriation.

**Attachment A:
Deliverable Products and Budget**

Budget Item	Result 1 Site Inventory	Result 2 Guidance Manual	Row Total
Wages, salaries, benefits:			
EQB	\$20,000	\$7,800	\$27,800
Wages Subtotal	\$20,000	\$7,800	\$27,800
Space Rental, maintenance			
Printing	\$200	\$1,000	\$1,200
Communications, telephone, mail, etc.	\$1,200	\$200	\$1,400
Contracts:	\$60,000	\$9,000	\$69,000
Professional/Technical			
Other			
Local auto mileage paid			
Other Travel in Minnesota	\$800		\$800
Travel Outside Minnesota	\$0		\$0
Office Supplies			
Tools and Equipment			
Office equipment and computers			
Other Capital equipment			
Other direct opert. costs			
Land rights acquisition			
Legal Fees			
Column Total	\$81,200	\$17,800	\$100,000

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