Municipal Electric Utility Conservation and Load Management
A Report to the Minnesota Legislature

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EXECUTIVE SUMMARY

The purpose of this report is to inform the chairs of the house and senate committees having jurisdiction over energy issues of the progress made by municipally owned utilities in complying with changes to state law governing conservation improvement programs (CIP) as required by the "Minnesota Energy Security and Reliability Act" of 2001. The Minnesota Municipal Utilities Association (MMUA) is filing this report, as required by article 8, section 6 of the Act, on behalf of its 126 municipal electric utility members. Individual members' program and performance goals for 2002-2003 are being submitted to the Department of Commerce (DOC) through their biennial CIP filings due June 1.

The "Omnibus Energy Bill" (the Energy Security and Reliability Act) passed in 2001 establishes new requirements for conservation programs operated by municipal utilities. These requirements significantly increase the amount that municipal electric utilities must spend on energy conservation improvements while reducing the proportion of CIP expenditures that can be spent on load management. The legislation also increases the amount of detail required in municipal utilities' filings with DOC.

MMUA and its membership have made a substantial effort to comply with the 2001 legislation as evidenced by their extensive planning and organizational efforts, which includes meetings of a special committee of representatives of the membership, the expenditure of funds, the hiring of a consultant and the development of municipal CIP project templates and opt-in projects. This effort will help municipal utilities meet their statutory CIP obligations as well as fulfill legislative expectations.

The components of the MMUA's CIP activities include:

- a CIP primer
- an online question and answer service for members
- a suite of several project templates from which municipal utilities can draw in developing conservation programs
- two opt-in projects that MMUA will operate on a turnkey basis on behalf of participating members that should meet or exceed participating municipals' spending requirements for the conservation portion of their CIP programs
- recommended procedures for members to evaluate their CIP programs.
- a long-term plan for supporting municipal electric utilities in their CIP efforts (based on feedback from members and the DOC).

This report also provides an update of municipal electric CIP activity with regard to concerns identified in the 2001 legislation—the implementation of cost-effective conservation programs, the availability of conservation services to customers, the use of methodologies that best quantify savings, the role of capacity conservation in meeting utility planning needs and state energy goals and the ability of energy conservation programs to avoid the need for new generation and transmission facilities.

<u>The Implementation of Cost-Effective Conservation Programs</u>

Municipal electric utilities currently operate a variety of conservation and load management programs for their residential, commercial, industrial, and government customers. The most common load-management programs for each sector, such as air conditioner and water heater load control and peak

controlled rates, are offered by about one-fifth to one-half of municipal electric utilities. The most common direct impact conservation programs, such as rebates for compact fluorescent lamps, and efficient air conditioners and water heaters in the residential sector, and rebates for lighting, motors and cooling in the commercial sector, are offered by about one-tenth to one-quarter of municipal electric utilities. Educational (indirect impact) programs of one type or another are offered by up to about half of municipal electric utilities.

The Availability of Conservation and Load Management Services

Larger municipal utilities offer more conservation and load management programs than smaller utilities. As a result, the availability of conservation and load management programs and services to municipal utility customers is higher than it might appear to be based only on the percentage of utilities offering these services. For example, residential air conditioning load control is offered by 40% of utilities responding to the survey, but these utilities serve 60% of all responding municipal utilities' customers. Commercial lighting rebates are offered by 28% of responding utilities, but these utilities serve 55% of all responding utilities' customers. In general, the most common load management programs are variously available to about one third to almost two thirds of municipal electric customers. The most common conservation programs are variously available to one-fifth to more than one-half of municipal electric customers. As indicated in this report, MMUA and its members are in the process of improving the availability of conservation and load management programs through the development of new CIP offerings.

The Use of Methodologies that Best Quantify Savings, Cost-Effectiveness and Conservation Potential

For many basic electric conservation measures, savings can be quantified with adequate precision through careful engineering calculations. MMUA is currently providing extensive assistance to its members in estimating energy savings from basic conservation measures.

In its recent guidance to municipal utilities, DOC has asked them to compute the cost of CIP programs per kW of demand reduction, and per kWh of energy savings, as part of their CIP filings. These are reasonably simple computations which, when compared with the cost of generating capacity and electricity production, provide a good indication of the cost-effectiveness of these programs. However, due to the limited size and resources of municipal electric utilities, it is not realistic for many of them to identify appropriate calculation procedures and assumptions on their own. Therefore, MMUA is currently providing assistance to its members in making these calculations.

The level of effort that goes into determination of conservation potential can vary greatly. For the largest municipal utilities, surveys of customer appliance saturations, surveys of vendors regarding sales by efficiency level, and cost and payback analysis of various measures may be feasible and worthwhile. For smaller utilities, a common sense prioritization of program options, informed by the wealth of demand-side management experience nationwide, will provide sufficient program guidance for the near future.

The Role of Capacity Conservation in Meeting Utility Planning Needs and State Energy Goals

The DOC projects that, under current conditions, Minnesota will experience a shortfall in generating capacity of 2000 Megawatts (MW) by 2010. Without the conservation and load management efforts currently being undertaken, the shortfall would be 2400 MW, or 20% greater. Load management and conservation will play a vital role in meeting utility planning needs and state energy goals.

The Capability To Reduce the Need for New Electric Facilities

The 36 municipal utilities who reported on the peak reductions they have achieved through conservation and load management reported that their peak demand would have been about 8% higher without these programs, demonstrating their significance in reducing the need for construction of new generation facilities and transmission lines. The 54 municipal electric utilities that reported a five-year history of peak demand through the survey experienced an average growth in demand of 3.1% per year, substantially higher than the projected growth rate for the state of 1.9%. This indicates a greater potential to reduce demand growth among municipal utilities.

Performance Goals

As required by the new legislation, MMUA and its members have developed CIP programs for municipally owned electric utilities that will include conservation program and performance goals that recognize customer class, utility service area demographics, cost of program delivery, regional economic indicators, and utility load shape. As municipal utilities address the requirements under the new statute through their CIP programs, the demand and energy reductions they will achieve through conservation and load management can be expected to increase.

BACKGROUND

Municipal utilities in Minnesota serve approximately 320,000 customers, or about 14% of the total electric customers in the state, who also consume about 14% of the electricity used in the state as shown in Table 1 (page 21). Municipal utilities are non-profit entities governed by their local city councils or appointed utility commissions. The municipal electric utilities in Minnesota range widely in size. By far the largest is Rochester, which serves a city of over 85,000 people. The next largest municipal, Moorhead, is less than half the size, with a population of 32,200. While only five of Minnesota's municipal electric utilities have more than 10,000 customers, about 85% have fewer than 5,000 customers; about 45% have fewer than 1,000 customers, and about 20% have fewer than 500 customers. The average municipal electric utility operates in a city of 5,104 people and has 2,560 customers. The median municipal electric utility operates in a city of approximately 2,340 and has approximately 1,218 customers.

Since the early 1990s, most municipal electric utilities have been required to spend 1% of gross operating revenues on conservation and load management. The legislation passed in 2001 increased total spending requirements to 1.5% of gross operating revenues, effective in 2002.

2001 OMNIBUS ENERGY BILL

The 2001 "omnibus energy" bill, officially known as the "Minnesota Energy Security and Reliability Act" brings about significant changes in the CIP programs of municipally owned electric utilities.

The Act increases municipal CIP expenditures from 1 % to 1.5 % of gross operating revenues and eliminates the exemption on revenue produced from the resale of electricity purchased from investor owned utilities and cooperatives. Based on 2000 revenues (the latest year available), this would require that approximately 20 municipal utilities spend $100,000 or more per year on CIP. Another15 municipals would be required to spend $50,000 to $99,999 per year. Fifty-three municipals would be required to spend $10,000 to $49,999 per year. The remaining 38 utilities would be required to spend less than $10,000, with the smallest having an annual CIP budget of $375. Municipal CIP program goals, design, implementation and evaluation must be viewed in the context of their scale of operation.

The allowable percentage of CIP spending that can be met with expenditures on load management will be significantly reduced—to 90% in 2002, 80% in 2003, 65% in 2004 and 50% in 2005 and thereafter.

While preserving local control over the conservation improvement programs of municipals, the new language establishes tighter parameters for CIP spending.

ORGANIZATIONAL AND PLANNING ACTIVITIES

The passage of the new CIP legislation prompted the MMUA Board of Directors to ask the MMUA Energy Services Committee, made up of representatives from 15 member municipally owned utilities, to

review the legislative changes in the CIP program and to recommend strategies for implementing the new CIP requirements under the law.

Acting on proposals developed by the committee over the course of three meetings in September and October, 2001, the Board recommended to the general membership the approval of a special assessment for the purpose of hiring an energy consultant and implementing new CIP programs. The membership approved the recommendation on February 22, 2002, at the MMUA annual meeting.

In March and April, 2002, the Energy Services Committee held two meetings to develop a "request for proposal" (RFP) for the hiring of an energy services consultant. The RFP was sent out and several consulting firms responded with proposals. On April 30, 2002 the committee selected the Center for Energy and Environment (CEE), a private, non-profit organization with over 20 years' experience in the design, development, implementation and evaluation of effective demand-side management programs. The committee also had a lengthy and constructive discussion with representatives of DOC about the expectations of the Department concerning the CIP effort of municipally owned electric utilities.

At the suggestion of the committee, a CIP Strategic Planning Retreat was held at the Sheraton Minneapolis West Hotel on May 10, 2002. 23 municipal utility representatives representing a cross-section of the MMUA membership attended the session, which gave further clarification and direction to municipal utility CIP efforts. The process included a review of CIP requirements as well as strengths and weaknesses of municipal utilities with regard to CIP.

A CIP workshop for the MMUA membership was held in Shakopee on May 21, 2002. The workshop, attended by representatives from 37 municipally owned electric utilities, was designed to familiarize municipals with the CIP requirements and aid in their preparation of CIP filings due to DOC on June 1.

MMUA has developed a suite of simple model programs that address the key end uses in each customer segment. Additional innovative programs, and programs appropriate to small subsets of utilities, can be developed at a later date, once all 126 municipal electric utilities have basic programs in place and operating under the new statute.

These model programs are designed to meet the changes to the CIP requirements that were adopted in the 2001 legislation, which includes a greater focus on conservation on the customer side of the meter. With CEE support, MMUA has developed:

- a CIP "Primer" that has been distributed to all MMUA members. The primer will provide basic information about CIP and the new statute and identifies and provides answers from DOC to key questions that affect municipal CIP filings, including a list of CIP programs that are acceptable to DOC.

- an e-mail question and answer service through CEE's website for MMUA members. All members will be able to review all questions and answers.

- filing templates for a suite of seven basic conservation programs. These sample filings define programs addressing the most important residential, commercial and industrial end uses.

- filings for two opt-in conservation programs that will be operated by MMUA (or a contractor) for members. Many of the smaller utilities may have difficulty developing and operating even the most basic CIP programs. MMUA has filed these programs with the Department on behalf of participating members.

The Primer and the filing templates will be provided with this report.

MMUA (with support from CEE) will undertake a number of additional tasks that include:

- identifying a limited number of more creative programs that may be of interest to mid-sized and larger municipal utilities and that are acceptable to DOC.

- implementing two opt-in programs which will only require participating municipally owned utilities to mail pre-prepared materials to customers, to provide marketing materials and packets of rebate forms to trade allies at times specified by MMUA, and to undertake other very limited activities.

- developing sample marketing materials, rebate forms, tracking spreadsheets, etc., for the six or seven basic DSM conservation programs for which filing templates were developed, and identifying and explaining resources such as Motor Master and ARI cooling equipment directories that can help utilities operate these programs.

- developing standardized savings assumptions that should be adequate to address the needs of DOC as well as those of the municipal utilities and their customers. (engineering calculations will be used to determine energy and demand savings for specific measures).

- developing meaningful low-income electric conservation programs. (DOC has traditionally looked for 11 to 15 percent of residential CIP expenditures to target low-income and rental households.) Three model contracts will be developed to achieve this goal.

LEGISLATIVE CONCERNS

The new statute requires this report to include an evaluation of municipal CIP programs that addresses a number of specific issues. MMUA surveyed its membership to obtain the information necessary to inform legislators about current municipal CIP activities and to respond to the specific issues sited in the new CIP legislation. A total of 78 utilities responded. This represents 62% of municipal electric utilities but, because larger utilities were more likely to respond, represents utilities serving 83% of municipal utility customers. The responses thus provide a quite comprehensive view of municipal CIP activity. A list of responding utilities is shown in Table 2 (page 22). Individual utilities' responses are available on request. Additional information is available in the CIP reports submitted by municipal utilities to the Commissioner of DOC.

The 36 municipal utilities that are all-requirements customers[1] of investor-owned utilities or generating and transmission coops (which are required to conduct CIP programs) have not been required to conduct their own conservation and load management programs in the past, although quite a few have done so. These previously exempt utilities will be required to implement their own CIP programs beginning June 1, 2003. Of the 36 exempt utilities, 16 completed surveys as shown in Table 2 (page 22).

The Implementation of Cost-Effective Conservation Programs

"[The evaluation]… shall address 1) whether the utility or association has implemented and is implementing cost-effective energy conservation programs;

The following are the types of CIP programs offered by municipally owned electric utilities.

Load Management

The generation, transmission and distribution capacity required by electric utilities is directly related to the peak demand for electricity, since electricity cannot be stored and must be produced and delivered instantaneously as needed. Roughly two thirds of Minnesota's municipal utilities experience their highest peak demand during the summer, when air conditioning loads are at their highest. The other third experience their highest peak demand in the winter, when space heating loads are at their highest. End uses which impose heavy loads on the system at the time of the system peak and little or no load at other times require utilities that generate their own electricity to make investments in capacity without returning commensurate revenues. Similarly, utilities that purchase rather than generate their power have to buy power at high prices to meet their peak demand, and these expensive purchases must be recovered through rates. Load management seeks to improve utilities' load shape by reducing peak loads (peak clipping), increasing loads at low load times (valley filling) or moving load from peak to off-peak periods (load shifting). Efficiently-operated peak clipping and load shifting programs are generally cost-effective for society (societal test, total resource cost test) and ratepayers as a whole (utility test or revenue requirements test) because they make more effective use of capital equipment. They are generally cost-effective for non-participant ratepayers (rate impact test) because they improve the ratio of revenue to capital investment. Valley filling programs may or may not be cost-effective for society, ratepayers as a whole and non-participant ratepayers, depending on their impact on total energy consumption and average rates.

Conservation

Efficiently operated conservation programs targeted at significant end uses are generally cost-effective for society and ratepayers as a whole because they reduce consumption of energy resources and the resulting environmental impacts. They may or may not be cost-effective for non-participant ratepayers, depending on the relationship between the average cost of production (which typically determines rates) and the marginal cost of production (which determines what costs are avoided through conservation).

[1] Municipally owned electric utilities that purchase all of the electricity they sell from an IOU or a G&T co-op.

Direct Impact Programs. Direct-impact programs produce energy conservation as a direct result of their operation. The most common type of direct impact program provides rebates or other incentives to induce customers to purchase more efficient products than they otherwise would have, or to improve their building envelope or process/mechanical system design and operation in ways that will reduce energy use.

Low-Income Programs. The cost of energy imposes a significant economic burden on low-income households. Minnesota's CIP legislation requires the Commissioner of the DOC to review each municipal utility's CIP filing to determine "whether a portion of the money spent on residential conservation improvement programs is devoted to programs that directly address the needs of renters and low-income persons unless an insufficient number of appropriate programs are available" (Mn. Stat. 216B.241 Subd. 1b. (h)).

Indirect Impact Programs. The DOC considers programs that provide information on energy conservation be "indirect impact" programs. They do not directly result in energy conservation, but provide customers with the information they need to take actions, which do reduce energy use. The Department's position has long been that the focus of CIP should be on direct impact programs rather than indirect impact programs. With investor-owned utilities, their rule of thumb is that indirect impact programs should be held to a level that allows the overall CIP plan to remain cost-effective. In other words, the savings achieved by direct impact programs must offset the costs of both those programs and the indirect impact programs.

Distributed Generation and Renewable Energy

Renewable resources and distributed generation (DG) technologies are options for meeting energy needs not typically employed under the historical utility approach towards energy generation.

DG is an entirely different strategy from the traditional utility model in that it places the generation next to the electrical load. The primary benefit to the utility is the lower investment needed for transmission and distribution lines and the electrical savings associated with avoiding line losses over long distances. DG is especially beneficial when the waste heat can also be used. This is referred to as co-generation or combined heat and power (CHP).

The use of renewable resources such as wind, biomass, and solar energy is beneficial in that the energy generated does not result in the environmental impacts associated with fossil fuel emissions. Renewable resources also diversify a utility's energy generation portfolio, helping to protect the utility and its customers from fuel shortages and price shocks. However, renewables have limitations such as intermittency and often have a higher cost to generate and manage.

The new energy legislation includes several provisions intended to promote the use of DG and renewable resources:

1. Each utility is required to implement a green pricing program that offers customers the option to purchase electricity from renewables/DG for an added premium (Minnesota Statute 216B.169 Subd. 2(a)). Twenty-three percent of the respondents to MMUA's member survey indicated that they already have such a program in place.

2. Each utility must also make a good faith effort to generate or procure 10% of their energy needs from renewable/DG technologies by 2015. Beginning in 2005, 1% of the electricity provided should be generated by such eligible technologies, increasing by 1% per year until 2015. Of this renewable energy, biomass must constitute 0.5% of the energy in 2010 and 1% in 2015.

3. Each utility may spend up to 5% of its CIP funds on renewable/DG technologies that are cost-effective within its service territories through 2006. Municipals are currently investigating various options.

Many municipal utilities had already taken the initiative to develop renewable/DG resources before the new legislation was enacted. Examples include Moorhead's Capture the Wind program and the wind purchasing program implemented by Southern Minnesota Municipal Power Agency together with its members.

Supply Side Measures

Electric utilities can implement a variety of measures to improve energy efficiency on the utility side of the meter rather than the customer side of the meter. For example, operating power lines at higher voltages typically reduces resistive losses as a percentage of total power transmitted or distributed. Installing low loss transformers reduces the losses in converting power from one voltage to another. Adding system capacitor banks improves system power factor.

The Availability of Conservation and Load Management Programs and Services

"[The evaluation]… shall address 2) the availability of basic conservation services and programs to customers;"

Residential Sector

The residential sector accounts for 86% of municipal electric customers, but only 28% of electricity consumption. For the typical residential customer in Minnesota, the largest end uses of electricity are refrigerators, lighting, and air conditioners. Electric space heat is a very large end use if a customer has it, but in 1998 (the latest data available), only 8% of residential customers of municipal electric utilities in Minnesota did.[2] Based on available data, a roughly similar percentage have electric water heating, which is also a large end use when present. Freezers, electric clothes dryers, electric ranges and dehumidifiers, when present, are also significant contributors to residential electric use. Other items such as furnace fan motors, dishwashers, microwave ovens, televisions and computers generally play a lesser role in residential energy consumption.

Table 3 (pages 23 & 24) shows the conservation and load management programs operated by municipal electric utilities in the residential sector in 2001.

[2] Minnesota Utility Data Book 1965-1998, Minnesota Department of Commerce.

Load Management

The most common load management programs offered in the residential sector are load control programs, which turn off certain equipment at fixed intervals during periods of peak demand; load management rates, which reward customers who have better load shapes; and rebates for equipment with storage capacity that reduces power draw at peak times. In 2001, 29% to 47% of responding municipal utilities offered various residential load control programs using electric CIP funds. The percent of municipal customers to whom these programs are available is larger than these figures might suggest, because the larger municipal utilities are more likely to offer these programs than the smaller municipal utilities. The 40% of responding municipal utilities who offer AC load control, for example, represent 60% of the customers of responding utilities.

Various residential load management rate programs were operated using CIP electric funds. The most common were rates for dual fuel space heating (offered by 24% of responding municipal utilities, and available through them to 36% of responding municipal utilities' customers), which switches the customer from electricity to another fuel at peak heating times; and rates for electric space heating (offered by 15% of responding municipal utilities and available through them to 27% of customers). Rebates for heating and water heating equipment with storage capacity to reduce peak power requirements were each offered by 4% of responding municipal utilities.

Conservation

Direct Impact Programs. Eighteen percent of responding municipal utilities offered rebates to residential customers for compact fluorescent lamps (CFLs) in 2001 using electric CIP funds. These utilities serve 41% of the responding utilities' customers. CFLs are the single best target for conservation in the residential sector, because of the large difference in energy use between CFLs and incandescent lamps, and the very low investment required to switch to CFL lighting. It is therefore appropriate that this was the single most commonly offered conservation program for municipal residential customers and is available to many municipal utility customers.

Residential appliances also offer opportunities for energy conservation, but they are somewhat more limited. The National Appliance Energy Conservation Act and resulting regulations have significantly raised the floor for the efficiency of most major residential appliances. Efficiency gains have been made at the high end of the efficiency spectrum as well, but they have not been as large as the statutory/regulatory gains required at the low end, so the spread of efficiencies has narrowed. It is not usually cost-effective for residential customers to upgrade to higher-efficiency appliances except when they are replacing them due to failure or for other reasons. Rebates are being offered for efficient air conditioners (10% of responding municipal utilities, serving 35% of responding municipal utilities' customers), efficient electric water heaters (14% of municipal utilities, serving 17% of municipal customers), ground source heat pumps (6% of municipal utilities, serving 27% of customers), efficient clothes washers (6% of utilities, serving 17% of customers), Energy Star appliances in general (4% of municipal utilities, serving 6% of customers) and efficient refrigerators (1% of municipal utilities, serving 4% of customers). Rebates for insulation of electrically heated homes are also being offered by 1% of municipals. One municipal offers market-rate financing for residential efficiency measures.

Low Income Programs. Ten percent of municipal electric utilities responding to MMUA's survey gave CIP funds to weatherization agencies, Habitat for Humanity or similar entities for electric conservation measures in 2001. These utilities serve 30% of the responding utilities' customers. Six percent of

responding municipal utilities (serving 12% of customers) gave funds to these agencies for non-electric measures. It can be difficult for utilities to find cost-effective opportunities to reduce the electric use of low-income households, because it is spread over so many end uses and appliances, and because low-income households seldom are in a position to upgrade appliances. For a utility to pay the entire cost of a new appliance simply for the energy savings is very rarely cost-effective. Therefore, the most cost-effective opportunities for low-income electric measures are typically to provide compact fluorescent lamps and customer energy education at no cost through agencies that work with low-income households. Weatherization and water heating measures can be cost-effective if customers have electric space or water heating. Rebates to pay the incremental cost of high efficiency appliances can be a cost-effective use of CIP funds when an entity like Habitat for Humanity is paying the base cost of new appliances for a new home or when a landlord is paying the base cost of new or replacement appliances for a rental property. If low-income customers have central air conditioning or electric water heaters, installing load control devices is cost-effective and also reduces these customers' bills.

A number of municipals have expressed the view that the societal benefits of allowing municipally owned electric utilities to extend CIP program support to low-income customers beyond what might be normally justified by the amount of reduced electric usage far outweighs simple energy reduction considerations. This is a particularly important issue for small municipally owned utilities with little growth and with significant low-income populations. Allowing additional flexibility in the use of CIP expenditures for helping low-income customers of these municipally owned utilities seems to be an issue worthy of legislative and/or administrative review.

Thirty-five percent of responding municipal utilities reported that they offered budget billing to low-income and rental customers in 2001 using electric CIP funds. Twenty-three percent wrote off uncollectable debt from low income and rental customers and 3% subsidized bills for these customers using electric CIP funds.[3]

Indirect Impact Programs. In 2001, 44% of municipal utilities responding to the survey provided information to residential customers on energy conservation through their newsletters. These utilities serve 58% of the customers of responding utilities. Twenty-nine percent of responding municipal utilities (serving 49% of customers) provided education to residential customers through presentations or other education, 22% (serving 40% of customers) did so through on-site energy audits, 18% (serving 26% of customers) did so through an information hotline, and 4% (serving 23% of customers) did so through on-line energy audits.

Renewable Energy

In 2001, 23% of municipal electric utilities responding to the survey offered residential customers an option to purchase wind energy or other renewable energy for a higher price. These utilities serve 42% of all responding utilities' customers. One percent of responding utilities offered rebates for photovoltaic or other renewable electric generation installations by residential customers.

[3] The percent of respondents writing off uncollectable debt or providing subsidies to low income and rental customers may be underestimated, since these programs were inadvertently listed under the commercial rather than the residential sector on the survey.

Commercial and Industrial Sectors

The commercial and industrial sectors account for only 14% of municipal electric utility customers, but 72% of electricity consumption. For these sectors in Minnesota, the largest end uses of electricity are process loads (primarily industrial and commercial motors, process heating, and electrochemical processes) and lighting, which together account for about 55% of C&I electricity use. Cooling and refrigeration are a distant third and fourth at less than 10% each. Process loads are the largest contributor to C&I summer peak demand, with cooling second and lighting third. These three together account for about 90% of summer peak demand.

Table 4 (page 25) shows the conservation and load management programs operated by municipal electric utilities in the C&I sectors in 2001.

Load Management

The most common load management programs offered in the commercial and industrial sectors are load control programs and load management rates. In 2001, 32% of responding municipal utilities offered commercial air conditioner load control using electric CIP funds. Forty-eight percent of responding municipal utilities' customers had access to an AC load control program.

Various load management rate programs were operated using electric CIP funds. The most common was peak-controlled rates, offered by 21% of responding municipal utilities (serving 45% of customers). Peak-controlled rates are lower rates offered to customers who agree to control their electric demand to a predetermined level or to shed a predetermined amount of demand at peak times when required by the utility. Ten percent of responding municipal utilities (serving 32% of customers) offered time of day rates, and 3% offered peak-controlled time of day rates. None offered real time pricing.

Ten percent of responding municipal utilities offered rebates for customers to install electric generators. These would typically be used either for emergency power in the event of a power failure, or to allow the customer to shift some load from the utility system to its own generator at the time of utility system peak demand.

Conservation

Direct Impact Programs. Twenty-eight percent of responding municipal utilities offered rebates to C&I customers for efficient lighting equipment in 2001 using electric CIP funds. Those utilities serve 55% of the responding utilities' customers. Lighting is one of the best targets for conservation in the C&I sector, because it is one of the few end uses where upgrades of existing functional equipment can often meet customers' payback criteria with the help of utility rebates. Other items such as motors, cooling equipment and refrigeration equipment typically can only be upgraded cost-effectively when replacement is required for other reasons It is therefore very appropriate that this was the single most commonly offered conservation program for municipal C&I customers, and that it is available to many municipal utility customers.

Fifteen percent of responding municipal utilities, serving 40% of all responding municipal utilities' customers offered rebates for efficient motors, and 13% of utilities (serving 21% of customers) offered rebates for variable speed drives. These rebates are important since motors and drives are the dominant component of "process" energy use. Eighteen percent of responding municipal utilities, serving 41% of

all responding municipal utilities' customers, offered rebates for custom measures. This is typically the most effective way to provide rebates for other electrically-powered processes, since they are too diverse and customer-specific to be amenable to standardized rebates. It is also an effective way for small municipal utilities to offer rebates for various measures without having to conduct extensive up-front research and program development.

Twelve percent of responding municipal utilities, serving 34% of municipal customers, offered rebates for efficient small commercial cooling equipment, such as rooftop units and packaged terminal air conditioners. Twelve percent of utilities, serving 31% of customers, offered rebates for efficient chillers, used in larger C&I cooling applications. Ten percent of municipal utilities, serving 19% of municipal customers, offered rebates for commercial refrigeration measures. Nine percent of municipal utilities, serving 27% of municipal customers, offered rebates for ground source heat pumps. Six percent of municipal utilities offered rebates for engineering studies to investigate or design efficient systems, processes or buildings. Eight percent offered rebates for power factor correction. One percent offered market rate financing for efficiency measures and 1% offered reduced rate financing.

Indirect Impact Programs. In 2001, 41% of municipal utilities (serving 58% of customers) responding to the survey provided information to C&I customers on energy conservation through their newsletters, 32% (serving 50% of customers) did so through presentations or other education, 27% (serving 49% of customers) did so through on-site energy audits, 27% (serving 44% of customers) did so through an information hotline, and 4% did so through on-line energy audits.

Renewable Energy

In 2001, 21% of municipal electric utilities (serving 37% of customers) responding to the survey offered C&I customers the option to purchase wind energy or other renewable energy for a higher price.

Government Sector

Some municipal utilities include sales to their municipality in their calculation of gross operating revenues, and their municipality is therefore eligible to participate in the utility's CIP programs. Other municipal utilities do not include sales to their municipality in GOR, and their municipality is therefore not eligible to participate. In general, if a municipality is eligible to participate, it is eligible for all the programs made available to other C&I customers. It may also be eligible for assistance provided only to government facilities. We asked about government sector programs only in a fairly general way.

Table 5 (page 26) summarizes the government sector programs offered. Rebates or grants for energy conservation in government-owned buildings were offered by 18% of responding utilities. Rebates or grants for standby generation in government-owned buildings were offered by 15% of responding utilities. Twenty-one percent offered rebates for streetlight replacement, and 13% for efficient traffic signals (typically these would be LED signals).

Supply Side Measures—All Sectors

Table 6 (page 26) summarizes the supply side measures implemented by municipal electric utilities through CIP. Eighteen percent of responding municipal utilities upgraded or rebuilt power lines with CIP

funds in 2001. Ten percent installed lower loss transformers. Four percent each installed system capacitor banks, upgraded substations, or added standby generators for utility use.

The Use of Methodologies That Best Quantify Savings, Cost Effectiveness and Conservation Potential

"[The evaluation]… shall address 3) methodologies that best quantify energy savings, cost-effectiveness, and the potential for cost-effective conservation improvements;"

Methodologies to quantify energy savings, cost-effectiveness and conservation potential must be considered in the context of the size and resources of municipal utilities.

Methods to Quantify Energy Savings

To determine the impact of prospective and completed conservation efforts, utilities need to be able to quantify the resulting energy and demand savings. Fortunately, for many basic electric conservation measures, savings can be quantified with adequate precision for programmatic purposes through engineering calculations. For example, published data are available on the power draw of various commercial lighting systems. Standard 4-foot fluorescent lamps installed in a 4-lamp fixture consume 161 Watts per fixture. High efficiency 4-foot lamps in the same fixture consume 107 Watts. While there may be minor variations due to various factors, these figures are more than sufficiently accurate for programmatic purposes. The actual customer demand savings in a given installation can be estimated by estimating the number of fixtures that are typically on at the time of the customer's peak electric consumption. The customer energy savings can be estimated by estimating the number of hours per year that the fixtures are on. Demand and energy savings at the generator are different from those experienced by the customer. For both, the transmission and distribution losses between the generator and the customer must be considered. These losses can be readily estimated through engineering calculations and through comparisons of production measurements at the generator with metered sales to all customers. For demand savings at the generator, the coincidence of the customer's demand savings with the system peak must be estimated. However, sufficient data are available from analysis conducted by investor-owned utilities in completing their CIPs and from other sources to provide adequate estimates of peak coincidence for various savings measures.

For many other basic conservation measures as well, energy and demand savings can be estimated with adequate accuracy for programmatic purposes through engineering calculations. Major energy-using equipment (motors, air conditioners, residential appliances, etc.) is tested and rated for efficiency using standardized procedures. Some variables that enter into the energy use calculations are more difficult to estimate than others. For example, motor power draw and commercial air conditioning power draw at full load are quite accurately determined from efficiency ratings, but the actual percentage loading in typical applications and the annual operating hours are more variable and less accurately known. On a program-wide basis, though, they can be estimated with sufficient accuracy for utility planning purposes.

For more complex conservation measures, energy and demand savings will be harder for municipal utilities to quantify. For example, the energy savings from re-engineering an industrial process system through a custom rebate program are site-specific and estimating them can be quite involved. For large customer investments of this type, utilities can and routinely do ask customers to provide engineering

estimates produced by a registered professional engineer. This approach can readily be used by municipal utilities. Other system-oriented conservation measures, such as recommissioning or design assistance for new commercial buildings, can also pose challenges for municipal utilities in estimating savings. In order to offer and accurately analyze programs of this type, municipal utilities will need to work together to develop aggregated services that draw on consulting expertise.

In the immediate future, municipal utilities' main focus will be on providing basic conservation and load management services and providing custom services to large customers. Even though it is fairly straightforward to estimate savings from most measures, it is not realistic to expect most municipal utilities to identify appropriate calculation procedures and assumptions on their own, simply because of their limited staff resources and CIP budgets. MMUA is providing extensive assistance to its members in estimating savings from basic efficiency measures. Practical means for small municipal utilities to estimate savings from more complex, system-oriented programs can be developed at a later date.

Methods to Quantify Cost-Effectiveness

Conservation and load management projects should be encouraged through public policy only if they are cost-effective. In microeconomic policy analysis, cost-effectiveness is usually determined by means of benefit-cost analysis that compares the discounted lifetime stream of benefits from an activity to its discounted lifetime stream of costs. The benefit-cost analysis tools for energy conservation and load management are well developed. They look at the cost-effectiveness of programs from the perspective of society (the societal test, which includes environmental externalities, or the total resource cost test, which does not), all ratepayers as a whole (the revenue requirements test, also known as the utility test), ratepayers who do not participate in the programs (rate impact test) and participants (participant test). DOC has a spreadsheet tool that allows simplified benefit-cost analysis. It its review of CIP programs for investor-owned utilities, the Department focuses heavily on the results of the societal test, which are the most appropriate measure in consideration of government-driven policies.

It is not practical for individual municipal utilities to conduct this kind of benefit-cost analysis, even in a simplified manner. The amount of information required about marginal and average demand and energy costs over the lifetime of the measure, as well as about the load shape of the measure, go beyond a reasonable level of effort for the staff resources and CIP budgets available.

In its recent suggestion to municipal utilities, DOC has asked them to compute the cost of CIP programs per kW of demand reduction, and per kWh of energy savings, as part of their CIP filings. These are simpler computations which, when compared with the cost of generating capacity and of electricity production, provide a good indication of the cost-effectiveness of municipal utility CIP programs. Generating these values is a more achievable and appropriate level of effort for municipal utilities. The most appropriate simple indicator for load management programs is cost per kW of demand reduction at the generator (not at the customer). The most appropriate simple indicator for conservation programs is cost per kWh of energy savings at the generator over the lifetime of the measure (not at the customer, and not per first year kWh). MMUA is providing assistance to its members in completing these calculations, since even these simple computations are generally unfamiliar to municipal utility staff and can be somewhat difficult to understand and carry out.

Methods to Quantify the Potential for Cost-Effective Conservation

In order to plan and prioritize conservation programs and estimate their potential impact on load growth and consumption, utilities need to be able to quantify the potential for cost-effective conservation. The level of effort that goes into determining conservation potential can vary greatly. Investor-owned utilities may look at the technical potential (what is technically possible), the economic potential (what is economically justifiable) and the market potential (what is achievable in real world markets with a given level of programmatic effort). This is well beyond the capability of municipal utilities, and would cost substantially more than would be justified by the CIP budgets of most such utilities.

For the larger municipal utilities, it is realistic to assess conservation potential through some simplified approaches. Key factors in conservation potential are the market saturation of various energy-using equipment and systems, the current market share of efficient models and the difference in energy use between base models and efficient models, the relative cost of efficient models, and the lifetime of the equipment.

Market saturation is important because, all other things being equal, more conservation potential exists for appliances and equipment that nearly all customers have than for items that only a few customers have. For many of the most important equipment types, the market saturation can be estimated based on common knowledge. Virtually all commercial customers have lighting, for example, and virtually all residential customers have refrigerators. The market saturation of measures such as residential electric space heat and air conditioning can often be estimated through analysis of customer billing data. For other equipment types, larger municipal utilities may want to estimate market saturation through customer surveys or site visits of a sample of customers, while smaller municipal utilities would need to rely on estimates available from other sources.

As mentioned previously, most electric energy conservation investments are made at the time that new equipment is purchased for a new facility, or existing equipment in existing facilities is replaced due to failure or for other reasons. Where this is the case, a key factor in market potential is the current market share of efficient equipment. If almost everyone is buying the efficient models anyway, providing utility rebates will not be a good use of CIP dollars, while if few people are buying the efficient models, rebates can be a key element in moving the market. Generally market share information can most readily be obtained through surveys of vendors. For instance, a municipal utility can fairly readily identify the small number of outlets through which their customers are likely to purchase residential appliances. Telephone or face to face contact with these vendors generally provides adequate information for programmatic purposes on the market share of Energy Star appliances, for example, and can usually provide other useful information such as which high efficiency products are inventoried by the vendor, typical incremental costs, marketing strategies that are likely to be effective and so on. It also allows the utility to develop relationships with key trade allies.

Some electric energy conservation investments can be made cost-effectively simply for energy savings. Commercial lighting upgrades are a good example. Where this is the case, the saturation of high efficiency vs. standard equipment in customers' facilities is a more important factor in conservation potential than the market share in current sales. This information is more costly to obtain since it typically necessitates site visits of a sample of customer facilities. In those cases where the market share or market penetration of efficient equipment is too costly for individual municipal utilities to estimate,

they may need to work together to generate this information more economically, or draw on information available from other sources.

The savings and relative costs from efficient equipment and the lifetime of the equipment are also important factors in conservation potential. For example, the National Appliance Energy Conservation Act standards have raised the minimum efficiency for residential refrigerators to such an extent that DOC currently estimates the savings from an Energy Star refrigerator at 56 kWh/year (about $4/year at 7 cents per kWh). The incremental cost, according to Xcel Energy estimates, is $51, resulting in a payback to the customer of about 13 years, while the equipment lifetime is also about 13 years, making the economics for the customer rather marginal. The small savings, long payback relative to equipment life, and long intervals between refrigerator purchases limit the market potential. By contrast, replacing a 100 Watt incandescent lamp that burns four hours per day with a 32 Watt compact fluorescent lamp (CFL) saves about 100 kWh per year (almost twice as much as an Energy Star refrigerator) at a cost of $10 or less, resulting in a payback of about 1½ years. The CFL lasts about 7 years. The lower investment and quicker payback, as well as the fairly frequent replacement of household lamps, makes the conservation potential better for CFLs than refrigerators, although the ability of CFLs to fit in all residential fixtures and to meet customers' criteria for start time and color rendering are also factors in conservation potential. MMUA is working to provide its members with energy savings estimates, incremental cost estimates and typical lifetime data for a broad range of basic conservation measures.

A qualitative evaluation of market saturation, market share, savings from efficient models, incremental costs and so on is sufficient for prioritization of various program options at this time, when many municipal utilities are still in the process of developing basic conservation program offerings. MMUA has already provided guidance to its members regarding a suite of basic programs that address major areas of conservation potential for municipal electric utilities.

The Role of Capacity Conservation in Meeting Utility Planning Needs and State Energy Goals

"[The evaluation]… shall address 4) the role of capacity conservation in meeting utility planning needs and state energy goals;"

The 2001energy legislation was intended to address a general concern regarding the adequate supply of electricity over the next decade. If current growth projections are not reduced or met with new generation facilities and increased transmission capabilities, Minnesota utilities will experience an electric capacity deficit during the next decade. Minnesota municipals are experiencing faster growth on average than investor owned utilities (but less than electric cooperatives). Over the past 5 years, municipals have experience an annual average growth rate of 3.1%. The statewide projected growth rate is 1.9%.[4] Growth rates for municipals are not uniform throughout the state. Municipally owned utilities in fast growing areas of the state are experiencing significant growth, while those in areas of the state with declining populations are experiencing relatively little growth.

Future energy needs can be met in two ways. The mix of strategies that is chosen can have very different implications for the utility and for society because each takes a different perspective on the delivery and consumption of energy.

[4] Minnesota Department of Commerce, Energy Planning Report, pg. 27.

The first method is to address future energy needs by increasing investments in generation and transmission facilities (i.e., supply side activities).

The second method is to address future energy needs by increasing investments involving the efficient consumption of energy by the customer. Theses activities include using such utility tools as load control and interruptible service, promoting higher efficiency equipment and procedures, and increasing awareness of energy usage.

Utilities are very adept at providing efficient supply-side services, especially in Minnesota where average electrical rates remain below the national average. However, there is a concern that utilities do not place enough focus on demand-side activities. For this reason, the State has mandated that a small percentage of a utility's gross operating revenue must be allocated to these types of activities. The result is that from 1992 to 2000, Minnesota's investor-owned utilities saved 1200 megawatts (MW) and 3200 gigawatt-hours (GWhs) of electricity through CIP, according to analysis by DOC (Note: 1 MW = 1000 kilowatts and 1 GWh = 1,000,000 kilowatt-hours). Minnesota's municipal utilities and cooperatives were not included in this analysis.

Reducing the Need for New Electric Facilities

"[The evaluation]… shall address 5) the ability of energy conservation programs to avoid the need for construction of generation facilities and transmission lines."

As part of MMUA's survey, municipals were asked to quantify the reduction in peak demand due to their load management and conservation activities that were done under CIP.

Thirty-six of the respondents reported reductions in peak demand due to load management/conservation activities. It is unclear whether the remainder of the respondents did not achieve any capacity savings or simply were unable to quantify their savings. Of the 36 who did report reductions, the average peak reduction was 7.8% of total peak demand as shown in Table 7 (page 26). These utilities' demand grew from 68 MWs in 1998 to 93 MWs in 2001, an average annual load growth of 4.0%. However had they not implemented load management/conservation programs, their average annual load growth would have been 4.3%.

DOC projects that under current conditions Minnesota will experience a shortfall of approximately 2,000 MWs by 2010. The 2001 energy legislation is projected to reduce the shortfall by approximately 380 MWs.[5] Municipal utilities responding to the survey report saving on average an additional 6 MWs each year. At that rate, Minnesota municipals can reduce demand by another 54 MWs from 2002 and 2010, or 14% of the state's need (the same as Minnesota municipals' share of total state energy consumption). Should all municipals participate in this effort, the projected capacity shortfall could diminish even more.

Minnesota municipal utilities play an important role in meeting the energy needs of the state, and as the municipals incorporate the new requirements under statute, the amount of demand and energy saved will

[5] 2001 Energy Planning Report, pg. 75. Minnesota Department of Commerce.

increase. Minnesota's municipal utilities will continue to work hard to meet the future energy needs of their customers by addressing both supply-side and demand-side activities.

Performance Goals

"b) The evaluation must develop program and performance goals that recognize customer class, utility service area demographics, cost of program delivery, regional economic indicators, and utility load shape."

Funding

At their winter meeting, MMUA members voted to contribute funds to enable MMUA to provide support in preparation and delivery of CIP programs. MMUA's Energy Services Committee has defined and is overseeing the support provided to members through consultants.

CIP Primer

MMUA has developed a CIP primer that describes the changes in Minnesota statutes relative to municipal CIP activities. It also provides answers to common questions, developed in close coordination with DOC.

CIP Strategic Planning Process

MMUA held a Conservation Improvement Program (CIP) strategic planning session Friday, May 10 at the Sheraton Minneapolis West Hotel. The group of 23 discussed various approaches the CIP compliance, and looked at the scope of work to be completed by CEE as well as possible roles for MMUA and various funding sources and scenarios. After that, the group consolidated the approaches to CIP compliance, and ranked and prioritized approaches.

Four broad CIP topic categories were identified.

- State and Local Legislative, Regulatory and Political Activity
- Customer Contact/Public Relations/Marketing Benefits
- Methods/Mechanics
- MMUA Role

Once the group successfully identified these categories, it went through a process of identifying, consolidating or eliminating and ranking goals under each broad topic category. MMUA staff will be compiling an entire record of the ideas given, however, for further guidance and review. Staff will also develop mechanisms to insure that progress is being made to complete the goals in a timely manner, among other duties.

CIP Program Templates

MMUA developed a suite of seven program templates from which municipal utilities can draw in developing conservation programs to include in their own CIP filings. These templates define programs addressing the major C&I and residential end uses, including C&I lighting, motors and drives, cooling and custom measures and residential lighting, Energy Star appliances and low income programs. In addition, MMUA has provided a template for filing AC and water heater load control program using the templates to follow the new format required by DOC. The program descriptions include eligible measures,

qualifying criteria, incentive amounts, proposed marketing plans and tracking and evaluation plans. The project support explains why the particular end use is important, why significant savings are achievable, and why the particular program strategy is a good way to achieve them. The templates also provide strategies for estimation of program budgets, participation rates, kW and kWh savings, and costs per kW. Step by step worksheets have also been provided to facilitate calculation of these items. Utilities that have not delivered programs of these types in the past will be able to download these sample filings, customize them with their own expected participation levels and budgets, make changes if desired to incentive levels, marketing plans, etc., and submit them to DOC. Utilities that have operated these types of programs in the past can use the templates to quickly understand how their existing programs should be submitted to the Department under the new statute and filing guidelines. In the near future, MMUA will be providing templates of marketing materials, rebate forms and tracking forms, etc. that members will also be able to download and customize. MMUA will also develop model contracts for working with low income weatherization agencies to provide electricity conservation services to low-income customers. The development of template materials by MMUA will very substantially reduce the level of effort required of individual utilities to research, design and implement programs addressing the most important end uses, while allowing them to tailor the programs as needed to their specific demographics, economy and load shape.

CIP "Turnkey" Programs

MMUA has developed two turnkey opt-in projects that it will operate on behalf of participating members. These programs are open to all members but were specifically designed to meet the needs of small utilities that do not have the staff resources and CIP budgets to develop and implement their own conservation programs. The turnkey programs address the most cost-effective electricity conservation opportunities in their respective sectors, C&I lighting and residential Energy Star lighting (CFLs) and appliances. They are intended to meet or exceed CIP requirements for conservation spending in 2002 (10% of spending) and 2003 (20% of spending). MMUA will file the programs with DOC and will develop all the marketing plans, marketing materials, rebate forms, administrative processes, tracking processes, reporting procedures and so on. MMUA will manage and administer the programs, execute the marketing plan, process all rebate applications and track participation. The participating utilities will only need to mail marketing materials prepared by MMUA to their customers and identify key trade allies and provide that information to MMUA. If they are able to do so, they can provide further support by calling or visiting these trade allies, meeting with key account customers to promote the lighting program, and spot checking some of the installations, but this will not be required.

Participating utilities will be responsible for the cost of rebates and related administrative and program delivery costs for their participants.

MMUA recently held a well-attended half-day workshop to explain the new statutory requirements, CIP program templates, opt-in programs and other matters to its members. An electronic question and answer service has been developed to provide answers to members' questions and to post the questions and answers to make them available to other members who may need the same information. We have checked the acceptability of various past CIP activities with DOC.

In the next few months, MMUA will develop recommended procedures for members to evaluate their CIP programs and will advise members of the information they need to track and how to use it to calculate savings and cost-effectiveness.

Building on the experience gained in this CIP biennium (2002-2003), MMUA will develop a long-term plan for CIP support to municipal electric utilities.

CLOSING REMARKS

MMUA and its members have made a determined effort to develop programs that will help municipally owned utilities comply with the CIP standards adopted in the "Minnesota Energy Security and Reliability Act" of 2001. In addition, the programs have been developed in consultation with DOC and it is our intent to continue to work with the Department on the future CIP activities of municipally owned utilities. MMUA and its members present this report to show legislative leaders that municipally owned utilities are making and will continue to make a good faith effort to follow not only the letter of the law, but the spirit of the law as well. Toward that end, we look forward to working with the Legislature and DOC.

Table 1. Electric Customers in Minnesota by Type of Utility

number of customers	farm	residential	commercial	industrial	total
municipal	1,542	265,412	40,853	2,567	310,374
cooperative	166,291	397,550	37,329	771	601,941
investor-owned	6,058	1,151,585	143,660	8,529	1,309,832
total	173,891	1,814,547	221,842	11,867	2,222,147
column pct	**farm**	**residential**	**commercial**	**industrial**	**total**
municipal	1%	15%	18%	22%	14%
cooperative	96%	22%	17%	6%	27%
investor-owned	3%	63%	65%	72%	59%
total	100%	100%	100%	100%	100%
row pct	**farm**	**residential**	**commercial**	**industrial**	**total**
municipal	0%	86%	13%	1%	100%
cooperative	28%	66%	6%	0%	100%
investor-owned	0%	88%	11%	1%	100%
total	8%	82%	10%	1%	100%

Source: Minnesota Utility Data Book 1965-1998. Minnesota Department of Commerce.

Table 2. Municipal Electric Utilities Responding to the Survey

	Yr 2000 Sales, thousands	Yr 2000 Customers	Exempt
Ada	$1,179	1023	
Aitkin	$2,082	1760	X
Alexandria	$11,604	8141	
Alvarado	$208	240	X
Anoka	$16,326	11115	
Arlington	$1,136	974	
Austin	$19,740	11710	
Bagley	$1,142	704	
Baudette	$1,218	678	
Benson	$1,572	1749	
Blooming Prairie	$1,369	981	
Blue Earth	$3,546	2061	
Brownton	$320	393	
Buffalo	$5,989	3632	X
Chaska	$12,742	6390	
Delano	$2,421	1719	
Detroit Lakes	$6,532	5692	
Dunnell	$77	123	
East Grand Forks	$6,881	3672	
Elbow Lake	$850	760	
Elk River	$9,036	6722	X
Fairfax	$611	721	
Fairmont	$9,247	5996	
Glencoe	$4,246	2672	X
Grand Rapids	$8,569	6048	X
Granite Falls	$1,721	1744	
Grove City	$525	405	
Halstad	$497	338	
Hawley	$990	944	
Hibbing	$8,468	7009	
Hutchinson	$18,017	6440	
Jackson	$2,403	1900	
Janesville	$869	1049	X
Keewatin	$380	567	X
Kenyon	$996	879	X
Lake Crystal	$1,140	1163	
Lakefield	$632	955	
Lanesboro	$364	573	X
LeSueur	$5,138	1866	

	Yr 2000 Sales, thousands	Yr 2000 Customers	Exempt
Litchfield	$4,537	3011	
Luverne	$3,561	2039	
Madelia	$1,586	1218	
Madison	$993	1052	
Marshall	$20,092	6088	
Melrose	$3,577	1455	
Moorhead	$15,659	13579	
Moose Lake	$1,672	909	X
Mora	$3,980	1871	
Mountain Lake	$949	1055	
Nashwauk	$410	531	X
New Ulm	$13,874	6913	
Nielsville	$44	51	
North Branch	$1,864	1537	
North St. Paul	$5,391	6074	
Olivia	$1,458	1393	
Owatonna	$20,186	9842	
Preston	$869	848	
Proctor	$1,367	1232	X
Randall	$249	279	X
Redwood Falls	$3,080	2811	
Rochester	$73,487	39356	
Roseau	$1,871	1406	
Sauk Center	$2,418	2165	
Shakopee	$15,838	10876	
Spring Valley	$1,322	1391	
St. Charles	$1,462	1518	X
St. James	$2,867	2267	
Staples	$1,288	1342	
Thief River Falls	$5,700	4247	
Truman	$917	665	
Two Harbors	$1,854	2199	X
Wadena	$2,926	2557	
Warren	$1,027	830	
Wells	$1,771	1405	
Willmar	$15,752	8585	
Windom	$2,650	2365	
Winthrop	$818	793	
Worthington	$9,412	5255	

Table 3. Municipal Electric Utilities' Residential Conservation, Load Management and Renewable Energy Programs

Program	Type	Number of responding utilities offering in 2001	Pct of responding utilities	Pct of all municipal utilities (1)	Pct of responding utilities' customers having access (2)	Pct of all municipal utilities' customers having access (1, 2)
air conditioner load control	LM	31	40%	25%	60%	50%
water heater load control	LM	37	47%	29%	55%	46%
dual fuel heating load control	LM	23	29%	18%	29%	24%
electric space heating rates	LM	12	15%	10%	27%	22%
dual fuel heating rates	LM	19	24%	15%	36%	30%
time of day rates	LM	2	3%	2%	4%	3%
rebate program for electric water heater with extra storage capacity	LM	3	4%	2%	9%	7%
rebate program for electric furnace with storage capacity	LM	3	4%	2%	7%	6%
rebate program for compact fluorescent lamps	CONS	14	18%	11%	41%	34%
rebate program for Energy Star appliances	CONS	3	4%	2%	6%	5%
rebate program for efficient air conditioners	CONS	8	10%	6%	35%	29%
rebate program for efficient clothes washers	CONS	5	6%	4%	17%	14%
rebate program for efficient water heaters	CONS	11	14%	9%	17%	14%
rebate program for efficient refrigerators	CONS	1	1%	1%	4%	3%
rebate program for insulation on electrically heated homes	CONS	1	1%	1%	1%	0%
rebate program for ground source heat pumps	CONS, LM	5	6%	4%	27%	22%
market rate financing for energy measures	CONS	1	1%	1%	0%	0%
reduced rate financing for energy measures	CONS	0	0%	0%	0%	0%
funds given to low income weatherization agency (CAP), Habitat for Humanity, etc., for electric measures	LI	8	10%	6%	30%	25%
funds given to low income weatherization agency (CAP), Habitat for Humanity, etc., for non-electric measures	LI	5	6%	4%	12%	10%
budget billing for low income and rental customers	LI	27	35%	21%	32%	26%
subsidize bills or reduce rates for low income and rental customers	LI	2	3%	2%	1%	1%
Write off uncollectable debt from low income and rental customers	LI	18	23%	14%	36%	29%

on-site energy audits	INFO	17	22%	13%	40%	33%
on-line energy audits	INFO	3	4%	2%	23%	19%
information hotline	INFO	14	18%	11%	26%	21%
newsletter addressing conservation or efficiency	INFO	34	44%	27%	58%	48%
Presentations or other education about conservation or efficiency	INFO	23	29%	18%	49%	40%
option to purchase wind energy or other renewables for higher price	REN	18	23%	14%	42%	35%
Rebate program for photovoltaics or other renewable installations by residential customer	REN	1	1%	1%	0%	0%

LM = load management. CONS = conservation. LI = low income. INFO = information or indirect impact. REN = renewables.

1, 2 – See notes under Table 4.

Table 4. Municipal Electric Utilities' Commercial & Industrial Conservation, Load Management and Renewable Energy Programs

Program	Type	Number of responding utilities offering in 2001	Pct of responding utilities	Pct of all municipal utilities (1)	Pct of responding utilities' customers having access (2)	h
air conditioner load control	LM	25	32%	20%	48%	
time of day rates	LM	8	10%	6%	32%	
peak controlled rates (customer controls demand to predetermined demand level when required)	LM	16	21%	13%	45%	
peak controlled time of day rates	LM	2	3%	2%	6%	
Real time pricing rates	LM	0	0%	0%	0%	
rebate program for generators for customers	LM	8	10%	6%	10%	
rebate program for efficient commercial lighting	CONS	22	28%	17%	55%	
rebate program for efficient commercial unitary cooling equipment (rooftop units, PTACs, etc.)	CONS	9	12%	7%	34%	
rebate program for efficient chillers	CONS	9	12%	7%	31%	
rebate program for efficient motors	CONS	12	15%	10%	40%	
rebate program for variable speed drives	CONS	10	13%	8%	21%	
rebate program for commercial refrigeration measures	CONS	8	10%	6%	19%	
rebate program for custom measures (miscellaneous measures selected by customer)	CONS	14	18%	11%	41%	
rebate program for ground source heat pumps	CONS, LM	7	9%	6%	27%	
rebates for engineering assistance (to investigate or design efficient systems, processes, buildings)	CONS	5	6%	4%	11%	
market rate financing for energy measures	CONS	1	1%	1%	1%	
reduced rate financing for energy measures	CONS	1	1%	1%	2%	
rebate program for power factor correction	OTHER	6	8%	5%	9%	
on-site energy audits	INFO	21	27%	17%	49%	
on-line energy audits	INFO	3	4%	2%	4%	
information hotline	INFO	21	27%	17%	44%	
newsletter addressing conservation or efficiency	INFO	32	41%	25%	58%	
presentations or other education about conservation or efficiency	INFO	25	32%	20%	50%	
option to purchase wind energy or other renewables for higher price	REN	16	21%	13%	37%	

LM = load management. CONS = conservation. INFO = information or indirect impact. REN = renewables.

1. Conservatively assumes that utilities that did not respond offered no programs.

2.Pct of customers having access is calculated by taking the number of customers served by utilities offering the program and dividing by either the number of customers served by all responding utilities, or the number of customers served by all municipal electric utilities.

Table 5. Municipal Electric Utilities' Government Conservation, Load Management and Renewable Energy Programs

Program	Type	Number of responding utilities offering in 2001	Pct of responding utilities	Pct of all municipal utilities (1)
rebates or grants to city, school or other government buildings for standby generation	LM	12	15%	10%
rebates or grants to city, school or other government buildings for energy efficiency measures	CONS	14	18%	11%
rebates for street light replacement	CONS	16	21%	13%
rebates for efficient traffic signals	CONS	10	13%	8%

LM = load management. CONS = conservation.

1. See note under Table 4.

Table 6. Municipal Electric Utilities' Supply-Side CIP Programs

Program	Type	Number of responding utilities offering in 2001	Pct of responding utilities	Pct of all municipal utilities (1)
install system capacitor banks	SUPPLY	3	4%	2%
upgrade substation	SUPPLY	3	4%	2%
add standby generators for utility use	SUPPLY	3	4%	2%
install lower loss transformers	SUPPLY	8	10%	6%
upgrade or rebuild power lines	SUPPLY	14	18%	11%

1. See Note under Table 4.

Table 7: Municipal Electric Utility Peak Demand (MWs)*

Year	Peak Demand	Demand Avoided	Peak Demand without reductions	Percentage of Demand Savings (Demand Reduction / Peak Demand)	Actual Annual Percent Load Growth	Annual Percent Load Growth w/o reductions
2001	1,103	93	1,196	8.4%	6.6%	7.1%
2000	1,035	82	1,116	7.9%	-0.6%	-0.4%
1999	1,041	80	1,121	7.7%	6.8%	6.9%
1998	975	74	1,049	7.6%	3.4%	3.7%
1997	943	68	1,011	7.2%		
Annual Average				7.8%	4.0%	4.3%

*36 utilities reporting peak demand and demand reductions for each year