



East Side Water Supply Project CAP Advisory

Title: Water Conservation on the East Side of Madison

Author(s): Various CAP members

Introduction

The Madison Water Utility is developing a system evaluation, capital project development, and water quality project for the east side of the Utility's main pressure zone (Zone 6-East.) The Water Utility has established a Citizens Advisory Panel (CAP) to advise the Utility and the Water Utility Board and to facilitate the public review on this project. The CAP operates by the direction provided in the Madison Water Utility's Standard Operation Manual, ENG-001, entitled Public Participation Process for Water Utility Facilities.

Purpose of the Advisory

We commend MWU for the development of its Conservation and Sustainability Plan and urge the Board to make its goals high priorities and to adopt an aggressive timeline for achieving them. We strongly support the leadership shown by the staff of the Water Utility and the Board to undertake the installation of an advanced metering infrastructure (AMI) that will allow for the issuance of monthly utility bills. Automated metering should prove helpful in informing customers of their consumption of water and better relate consumption to the activities of households, businesses, and public entities. Also, we commend MWU for the plans contained in the Stipulation of Madison Water Utility and Clean Wisconsin filed with the Public Service Commission in April 2011, and look forward to their implementation.

Why Water Conservation Is Important in Madison

Maintaining an adequate supply of high quality water is essential for ensuring the City of Madison's continued success and prosperity. Efficient water use/water conservation is often called the 'Hidden Reservoir,' and has been shown to be an important component of water supply planning. The Madison Water Utility drafted a Water Conservation and Sustainability Report in 2008, and has been encouraged by the Public Service Commission (PSC) to continue to improve its water conservation efforts.

Future Supply

While the members of the East Side Water Supply (ESWS) CAP applaud the Utility's efforts thus far, we also recognize that it is important to explore conservation strategies as an additional, unutilized water supply resource. While Madison's water supplies are not overly threatened at this time, recent history has shown that even seemingly water-rich communities can find themselves in situations of water shortage (see Atlanta, GA; Waukesha, WI; etc.). The previous effort to site a replacement for the now-abandoned Unit Well 3 highlighted the difficulty Madison now faces when seeking new well sites. It is unlikely that the process of locating well sites will get any easier in the future, especially on the east side where past commercial and industrial activity and the associated risk of contamination provide numerous obstacles. Employing a pro-active approach to water conservation right now will ensure adequate water supply and decrease the likelihood of water crises in the future.



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Cost reductions

For many communities, water conservation has been shown to be a cost-effective alternative to the development of new sources and new treatment facilities. In Madison, planning for of new water-supply wells is now done with the assumption that treatment facilities will be required. This raises the capital and maintenance costs of the development of new water supplies, and increases the potential cost effectiveness of conservation as an alternate supply. In the future, we recommend the Madison Water Utility evaluate the potential avoided costs that may result from more focused conservation efforts.

Water/Energy Nexus

ESWS CAP members acknowledge the important intersection between water distribution and energy consumption. Pumping groundwater several hundred feet up out of the ground and maintaining sufficient pressure in the city's piping system requires a great deal of energy. The approximately 24 million kWh/year consumed by the Madison Water Utility, far exceeds that of any other city department (the second highest city department is Traffic Engineering, including street lighting, which consumes approximately 8 million kWh/year).¹ Power purchased for pumping costs the Utility \$2.1 M per year and represents 14.9% of the Utility's total operating and maintenance expenses. Water conservation is also an important step in reducing energy consumption and air pollution associated with the production of that energy.

Summary:

- Water conservation can be viewed as a 'hidden reservoir' or additional water resource.
- Aggressive water conservation now decreases the likelihood of future water crises
- Water conservation programs can delay, reduce, or avoid some capital costs.
- Pumping water uses more electricity than any other city service.

RECOMMENDATIONS

We recommend that the Madison Water Utility continue and improve upon its current water conservation efforts. We have developed specific recommendations related to ten current Madison Water Utility policies. These detailed recommendations are attached as an appendix to this advisory and summarized below.

The CAP recommends that the Water Utility Board:

1. Develop more ambitious conservation targets that relate water consumption to the renewable water resource and future population and community development to ensure long-term sustainability.
2. Continue with implementation of Advanced Metering Infrastructure (AMI), and implement a public education plan enabling residents to use their meter to help reduce water use.

1 City of Madison Sustainability Plan



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3. Evaluate the costs and benefits of additional high-efficiency appliance rebate programs and develop an explicit implementation schedule if justified.
4. Develop explicit implementation plans for providing and promoting a voluntary, “on-demand” water audit service.
5. Ask for changes in the city’s landscaping and property maintenance ordinances to require climate-appropriate plantings for large residential and non-residential uses, and to eliminate any penalties for substituting native and non-noxious alternatives for turf.
6. Investigate an inclining outdoor irrigation rate structure that parallels recommendations for treated water rates for both residential and non-residential customers.
7. Initiate a public dialogue regarding irrigation.
8. Further evaluate an inclining rate structure that would charge less for basic water use and more for use above the basic level, and that would equalize rates for residential and non-residential customers.
9. Eliminate the “residential penalty” for initial volume charges.
10. Consider additional voluntary water conservation measures to future educational literature and programs (i.e. educational programs for schools, industry, etc.).
11. Emphasize short-term conservation efforts as a bridge between current practices and completion of expanded filtration and new wells.
12. Expand outreach to commercial and industrial customers to facilitate water conservation.
13. Support the city's efforts to encourage or require new and rehabilitated structures to meet LEED or other accepted standards for resource efficient buildings.
14. Implement outreach program to high-use business and industrial customers that includes evaluation and adoption of firm-specific water conservation plans.
15. Initiate public dialogues on grey water use.
16. Investigate the costs and benefits associated with “Grey Water” infrastructure and use, and if determined to be beneficial, ask electoral and regulatory bodies to enact necessary changes.
17. Recognize and plan for the affect on MWU finances of implementing conservation rate structures and other conservation strategies to ensure that resulting revenues are adequate for the MWU to meet its long-term financial responsibilities, including the maintenance and replacement of existing infrastructure.



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ESWS PROJECT

SUMMARY TABLE OF CITIZEN ADVISORY PANEL’S WATER CONSERVATION ADVISORY

KEY TOPICS, CONCERNS, AND RECOMMENDATIONS

The following table is a summary of key topics relating to water conservation that evolved from the EAST SIDE WATER SUPPLY PROJECT CITIZEN ADVISORY PANEL (ESWS CAP) discussions on the water conservation as it relates to the provision of water infrastructure and the protection of local water resources. This table is intended as a supplement to the ESWS CAP’s Water Conservation Advisory.

Many of the topics listed below have been raised and/or addressed in some manner in the City of Madison Water Utility’s 2008 Water Conservation and Sustainability Plan (hereafter referred to as MWU Conservation Plan). This table is an attempt to summarize the ESWS CAP’s concerns and recommendations for the future in relation to this Plan, Stipulation of MWU and Clean Wisconsin (Docket No. 3280-WR-112), the City of Madison Water Utility’s current or pending policies, and other City applicable plans and policies (such as the 2011 Madison Sustainability Plan).

	Topic	MWU Conservation Plan¹ Recommendations / MWU—Clean Wisconsin Stipulations² / Madison Sustainability Plan³	ESWS CAP COMMENTS	ESWS CAP RECOMMENDATIONS
1	Conservation Goal	¹ Reduce per capita residential water consumption by 20% by the year 2020 (from 73 gallons/day to 58 gallons/day). ³ “Ensure that groundwater withdrawal rate does not exceed replenishment rate, including anticipated new population growth within region.”	<p>The CAP supports current MWU Conservation Plan conservation goal, seeks to strengthen implementation policies to ensure effective and equitable achievement of goal by 2020;</p> <p>The CAP supports conservation policies that encourage customers to voluntarily reduce water consumption even further.</p>	<p>Continue development and implementation of strategies to achieve 20% reduction in residential water use by 2020.</p> <p>1. Develop of more ambitious conservation targets that relate the amount of renewable water in the watershed to other factors affecting consumption (projected population, community development, goals, policies affecting groundwater recharge, and other sustainability objectives) to ensure long-term water sustainability.</p>



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2	Metering	¹ “Provide customers with current consumption data” ¹ Currently converting to metering system that will allow monthly billing ² Transition from semi-annual to monthly billing as each AMI installation is completed per city section, and offer option for electronic billing upon transition	<p>The CAP supports Advanced Metering Infrastructure (AMI) to satisfy PSC precondition for “conservation rates” (see below) and provide customers with timely feedback that encourages individual conservation</p> <p>The CAP supports AMI because it allows the utility to maintain a better cash flow, and more quickly experience the benefits of rates increases. This is important because MWU indicated during the 2011 rate case that monthly billings would be delayed until AMI installation was completed citywide.</p>	<ol style="list-style-type: none"> 2. Continue implementation of AMI; and develop and implement a public education plan to enable residents to use information to improve personal conservation habits.
3	Water Efficient Appliances and Homes	¹ Identify largest indoor water uses (in descending order: toilets, clothes washers, showers, faucets, leaks, etc.) ¹ MWU currently implementing Toilet Rebate Program for High Efficiency Toilets, and recommends investigation of additional rebate programs for washing machines and dishwashers. ¹ Provides audits to high consumption customers and recommends expanding audit to on demand optional service to other customers to identify leaks, other inefficiencies.	<p>The CAP supports current Toilet Rebate Programs and audits.</p> <p>Supports extension of water efficiency programs to non-residential customers.</p>	<ol style="list-style-type: none"> 3. Evaluate the costs and benefits of additional high-efficiency appliance rebate programs (clothes washers, low flow shower heads, leaky piping, etc.) which results in water use efficiency, and, if shown to be effective, setting an explicit implementation schedule. 4. Develop explicit implementation plan for providing and promoting a voluntary, “on-demand” water audit service.



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4	Irrigation/ Outdoor Water Use	<p>Current policy allows for separate water meters that eliminate billing for sanitary sewer treatment. Rates are not inclining and do not encourage conservation.</p> <p>Current City of Madison Ordinance provides for voluntary and mandatory restrictions on outdoor water usage (primarily grass/turf) during periods of peak usage (hot summers).</p> <p>¹ Possible automatic bans tied to specific thresholds</p> <p>¹ Recommends landscape ordinances that require large residential and non-residential lawns/landscape areas to develop and implement landscaping plans that reduce need for irrigation.</p>	<p>Seeks to balance water and energy conservation goals associated with outdoor water use with the competing benefits of efficient outdoor irrigation (e.g. domestic food production/gardening, growing urban agriculture movement, aesthetics, and other quality of life measures.</p> <p>Most CAP members do not view out-right bans on outdoor irrigation as an immediate priority and/or feasible, but support voluntary and mandatory ban thresholds as recommended by MWU and allowed by City of Madison ordinance.</p>	<p>5. Ask for changes in City’s landscaping and property maintenance ordinances to require climate appropriate plantings, rain gardens, etc. for large residential and non-residential uses, and to eliminate any penalties for those who substitute native and non-noxious alternatives for turf.</p> <p>6. Investigate an inclining outdoor irrigation rate structure that parallels recommendations for treated water rates for both residential and non-residential customers.</p> <p>7. Initiate a public dialogue regarding irrigation.</p>



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5	“Conservation” Rate Structure	<p>Currently, the ‘Water Volume’ rate structure is flat, per gallon charge for water for residential uses.</p> <p>¹ For residential customers, adoption of four-tiered inclining rate structure to encourage water conservation. The lowest rate would apply to the first 61 gallons per day, with progressively steeper rates starting at 148, 184, and 225 gallons per day. MWU is currently reviewing alternative conservation rate structures that would reduce fixed portion of residential water bill (the “Water Base Charge”) to approximately 25% of the “Water” portion of the MWU bill, with the remainder to be paid through Water Consumption charges.</p> <p>² MWU will propose seasonal “summer” rates in its 2013 rate application.</p>	<p>CAP members discussed the potential merits of an improved conservation rate structure that would be implemented within a more holistic, well developed water conservation goal, that reflects and balances the following considerations:</p> <ul style="list-style-type: none"> • Subsistence amounts of water as a basic human need and minimizes impact on low income customers; • Households vary in size, and rate structure should not penalize families or those who reduce water and other resource use by cohabitating or living in commercial/institutional housing; • MWU must maintain a consistent revenue stream and many of the benefits of provided by the fixed portion of the water bill accrue to all customers regardless of water volumes consumed. • Some level of water usage beyond subsistence contributes to a high quality of life and makes Madison an attractive place to live and work versus competing locations. <p>Some members of the CAP also identified a potential additional benefit of harmonizing conservation rate structures with other communities in the watershed as a means of facilitating a more regional approach to water resource management over the long term.</p>	<p>8. Further evaluate an inclining (aka progressive) rate structure (perhaps drawing from examples elsewhere) that is effective at promoting conservation and reflective of the values enumerated in the column to the left.</p>



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6	Residential vs. Non-Residential Rates	<p>Under current structure, the base residential water consumption charge (i.e. the rate from the first gallon of usage and up) is 20% more per gallon than non-residential uses.</p> <p>For very large volume customers, the 'Water Volume' rate actually decreases, providing a potential disincentive to conserve. (NOTE: This is due in part to PSC rules)</p> <p>² Gather information about multi-tenant residences and consider whether to expand conservation program to include options for such residences, including conservation education and water use audits.</p> <p>² MWU will evaluate different rates for multi-tenant residences as part of its 2013 rate case application.</p>	<p>Given that residential customers – single family and duplex – use only 33% of the water sold, the premium paid by residential customers (at least for subsistence use) appears to be both regressive and less effective at promoting water conservation than adopting a common base or entry level rate. Therefore, the CAP recommends that any new rate structure investigate “leveling the playing field.”</p> <p>At the same time, the CAP recognizes that large commercial and institutional customers include apartments and other collective housing (a relatively high percentage of the total in Madison) with single meters; that many of these tenants are low income; and that such housing is relatively resource efficient with regard to per capita fixed infrastructure and energy cost.</p> <p>The CAP also recognizes that water demand varies greatly by type of business and industry and that a “one size fits all” inclining conservation rate structure may not be appropriate in terms of economic development and community development goals.</p>	9. Eliminate the “residential penalty” for initial volume charges, provided other equity considerations are addressed.



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7	Public Education/ Voluntary Conservation	¹ Highlights five main areas in which residents can improve water conservation: fix leaks, replace toilets, replace clothes washers, climate appropriate landscaping, and efficient irrigation. MWU conducts outreach to plumbers and other contractors on best practices. MWU includes tips on improving water conservation in newsletters, PSA's etc. MWU conducts audits for high use customers, and ¹ Recommends expansion to this service. ² Further develop the Madison water quality program to address emerging toxins, including their mention in the annual water quality report.	The CAP supports MWU efforts in these areas and has provided a list of additional voluntary measures.	10. Consider additional voluntary water conservation measures to future educational literature and programs (Note: The CAP recognizes that some measures may be subject to legal, public health, system maintenance constraints). 11. Emphasize short-term conservation efforts as a bridge between current practices and completion of expanded filtration and new wells.



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8	Outreach to Commercial, Industrial, and Institutional Water Customers	¹ Provide high-use customers with education/ outreach to promote water conservation. Long term strategies include appliance upgrade programs, car wash reclamation ordinance, and certification program for energy efficient buildings. ¹ Water audits for individual industrial customers. ¹ Conduct a survey of commercial and industrial customers to identify types of conservation measures most in demand and likely most effective. MWU will evaluate water conservation education measures, and consider expanding its conservation programs to these users.	<p>Supports MWU Conservation Plan goals and recommends additional proactive outreach to high use commercial, industrial, and institutional customers to perform audits and create effective conservation plans specific to industry or firm.</p> <p>Supports LEED and/or other widely adopted standards for new, resource efficient building construction and rehabilitation.</p>	<p>12. Expand outreach to commercial and industrial customers to facilitate water conservation.</p> <p>13. Support the city’s efforts to encourage or require new and rehabilitated structures to meet LEED or other accepted standards for resource efficient buildings.</p> <p>14. Implement outreach program to high use business and industrial customers that includes evaluation and adoption of firm-specific water conservation plans.</p>
9	Grey Water	<p>Current Wisconsin Building Codes prohibit implementation of household grey water systems. (Not mentioned in MWU Conservation Plan.)</p> ³ “Investigate and implement through policy/zoning the use of grey water systems.” ³ “Assess the viability of dual water systems to enhance water conservation efforts in buildings. Create large common water catchment cisterns that would replace deep-well drinking water for watering lawns/gardens, washing cars, cooling tower spray, etc.” (p. 11).”	<p>“Grey Water” is wastewater from sources that do not contain fecal matter such as bathwater, laundry water, that nonetheless may be of high enough quality for non-consumption reuse in toilets. Water captured and reused in this manner has the potential for reducing the amount of pure groundwater for domestic uses. Water –scarce regions (such as California) and countries have adopted legislation allowing and/ or requiring use of gray water to reduce demand for pure fresh water. However, without proper rules and infrastructure, large scale gray water use may pose risks to public health.</p>	<p>15. Initiate public dialogues on grey water use.</p> <p>16. Investigate the costs and benefits associated with “Grey Water” infrastructure and use, and if found beneficial, ask regulatory bodies to make the necessary regulatory changes necessary to allow for its use.</p>



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10	Financial Planning		<p>The CAP acknowledges that many of the water conservation strategies recommended above cost money, and will place an additional demand on MWU revenues. ESWS also acknowledges that many of the operating costs of the MWU involve fixed infrastructure that are funded by conventional bonding and loans that require steady repayment streams. At the same time, any shift to rate structure that relies more on water volume rather than the fixed service charge will likely introduce a degree of volatility in MWU revenue streams.</p> <p>The ESWS CAP further acknowledges volume-based water charges may not be the only or even the most cost effective approach to achieving measurable, long-term reductions in per capita water use. For example, some water conservation rates used elsewhere do not achieve per capita usage rates appreciably different than Madison's. More direct (e.g. requirements for efficient appliances and fixtures) or combined strategies (e.g. funding rebate programs from the increment paid by high-use customers) may prove more cost/effective means of achieving greater conservation and providing a more predictable revenue stream.</p>	<p>17. Invest in improved financial planning that can raise and maintain a consistent revenue stream necessary to:</p> <ul style="list-style-type: none"> • Pay for maintenance of existing water infrastructure. • Evaluate and fund cost effective water conservation programs (educational programs, audit services, rebates, etc.) . • Evaluate and fund future water infrastructure in the context of broader costs and benefits to the City and its residents. • Evaluate and implement conservation rate structures that balance the above considerations with equity considerations.