

DEVELOPING A ROADMAP FOR GREENING WATER INFRASTRUCTURE

On July 22, 2009, the MAG Regional Council accepted stimulus funding from the American Recovery and Reinvestment Act of 2009 from the Arizona Department of Environmental Quality (ADEQ) for water quality management planning. The ADEQ received the stimulus funds from the Environmental Protection Agency (EPA) Region IX. The scope for the project included conducting a workshop on greening infrastructure for water and wastewater treatment plants focusing on Arizona issues and preparing a roadmap for greening water infrastructure.

MAG Greening Water and Wastewater Infrastructure Workshop

On January 12, 2010, MAG conducted the Greening Water and Wastewater Infrastructure Workshop. The workshop highlighted strategies for integrating green technologies into water and wastewater treatment and funding opportunities that are available. With approximately 80 percent of municipal water and wastewater processing and distribution costs being for electricity, many of the presentations focused on the water/energy nexus and methods for eliminating energy waste. In addition, there was discussion on opportunities for capturing energy from water and wastewater infrastructure using solar, methane, biofuel, hydroturbines, and other technologies. Approximately 150 people attended the workshop, representing public and private utilities, consulting firms, academia, state and federal agencies, and others.

The workshop provided water and wastewater professionals with valuable resources and contacts. In addition, agencies such as EPA and the U.S. Department of Energy were provided the opportunity to become more acquainted with some of the challenges and also progress in Arizona. Workshop participants found the event to be very informative and beneficial for incorporating green infrastructure for water and wastewater treatment plants into short-term and long-term planning. Many attendees stated that the information learned will be shared with others and that they will be evaluating opportunities for making water and wastewater treatment plants more environmentally friendly. This workshop served as an important step to a more sustainable future. To encourage continued dialogue, the workshop participants were provided with the names and email addresses of those in attendance and a link to the workshop presentations that are posted to the MAG website at <http://www.mag.maricopa.gov/detail.cms?item=11400>.

Roadmap for Greening Water and Wastewater Infrastructure

A roadmap for greening water and wastewater infrastructure may assist utilities with assessing options for reducing energy consumption and chemical use, conserving water, and saving critical financial resources. Jurisdictions are currently facing decreased revenues due to the economy and need to push capital improvement projects further into the future. A roadmap could provide utilities with opportunities to reduce energy waste and lower costs. In addition, utilities would be doing something good for the environment by reducing their carbon footprint and exploring the use of alternative energy sources.

Following the workshop, a menu of ideas was developed for making water and wastewater treatment plants more sustainable. To assist utilities with implementing the ideas, links to resources and contacts were also provided. In addition, potential next steps for greening water and wastewater infrastructure in the region have been included. As we continue to move forward, it is important that we recognize and utilize sustainable approaches available in water and wastewater treatment.



MAG GREENING WATER AND WASTEWATER INFRASTRUCTURE WORKSHOP

FIRST STEPS TODAY, STANDARD OPERATING PROCEDURE TOMORROW

JANUARY 12, 2010 AGENDA

- 8:00 a.m. - 8:30 a.m. **Registration**
- 8:30 a.m. - 8:35 a.m. **Welcome:** Councilwoman Peggy Neely, *City of Phoenix*, Chair, *Maricopa Association of Governments*
- 8:35 a.m. - 9:00 a.m. **Sustainability and the Water/Energy Nexus:** Benjamin H. Grumbles, Director, *Arizona Department of Environmental Quality*
- 9:00 a.m. - 10:15 a.m. **Session 1: Doing the Audit**
Moderator: Lindy Bauer, *Maricopa Association of Governments*
1. The How and What of Audits for Sustainable Infrastructure: Donald King, P.E., *Tetra Tech*
2. Benchmarking: Metrics for Success: Cheryl McGovern, *U.S. Environmental Protection Agency, Region IX*
3. Lessons from the Small Fry: Robert Casavant, Ph.D., *Arizona State Parks*
- 10:15 a.m. - 10:30 a.m. **Morning Break**
- 10:30 a.m. - 12:10 p.m. **Session 2: How to Fund the Fixes**
Moderator: David McNeil, *City of Tempe*
1. Energy Audits and Financial Assistance: Melanie Ford, *Arizona Water Infrastructure Finance Authority*
2. Grants and Other Funding Opportunities: Cheryl McGovern, *U.S. Environmental Protection Agency, Region IX*
3. Power Purchase Agreements and Other Innovative Approaches: Guy Carpenter, P.E., *HDR*
4. U.S. Department of Energy Assistance Opportunities: Patti Case, P.E., *U.S. DOE, Intermountain Clean Energy Center*
- 12:10 p.m. - 1:10 p.m. **Lunch and Keynote Speaker**
Cashing In on Energy Management Initiatives for Sustainable Infrastructure:
Shonnie Cline, *Water Research Foundation*
- 1:10 p.m. - 2:30 p.m. **Session 3: Stepping Toward Sustainability**
Moderator: Greg Ramon, *City of Phoenix*
1. Cogeneration, Demand Management Program, and Chemical Reduction: Ronny Lopez, *City of Mesa*
2. Innovations in Nitrate Treatment and Water Reclamation: Rick Scott and Larry Brotman, *City of Glendale*
3. Conserving Water with a Rebate Threshold Rate Structure: Graham Symmonds, P.E., *Global Water*
4. Water Smart Grids: Demand and Leak Control Using Intelligent Monitoring Systems: Eric Williams, Ph.D., *Arizona State University*
- 2:30 p.m. - 2:45 p.m. **Afternoon Break**
- 2:45 p.m. - 4:20 p.m. **Session 4: Opportunities for New Energy: Ready-to-Use Technologies**
Moderator: Cathy Arthur, *Maricopa Association of Governments*
1. Hydroturbines: It's All Downhill from Here: Maureen Hymel, *City of Phoenix*
2. Not Hazy: Energy from FOG: Karri Ving, *San Francisco Public Utilities Commission*
3. Pima County Opportunities and Initiatives: Ed Curley and Eric Wiedulwilt, P.E., *Pima County Regional Wastewater Reclamation Department*
4. Improved Therapy for Wastewater Treatment Plant Digester Gas: David Mahaffay, P.E., *Black & Veatch*
- 4:20 p.m. - 4:40 p.m. **Closing: Greening Water and Wastewater Infrastructure - The Path Forward:**
Cheryl McGovern, *U.S. Environmental Protection Agency, Region IX*

Contact Julie Hoffman
at (602) 254-6300 for
more information.



A special thanks to the League of Arizona Cities and Towns for promoting the workshop.

IDEAS FOR GREENING WATER AND WASTEWATER INFRASTRUCTURE

INTRODUCTION

On July 22, 2009, the MAG Regional Council accepted stimulus funding from the American Recovery and Reinvestment Act of 2009 from the Arizona Department of Environmental Quality (ADEQ) for water quality management planning. The ADEQ received the stimulus funds from the Environmental Protection Agency Region IX. The scope for the project included conducting a workshop on greening infrastructure for water and wastewater treatment plants focusing on Arizona issues and preparing a roadmap for greening water infrastructure. On January 12, 2010, MAG conducted the Greening Water and Wastewater Infrastructure Workshop. The MAG Greening Water and Wastewater Infrastructure Planning Group assisted MAG in identifying topics and speakers that would provide the most benefit to water and wastewater utilities in the region. Approximately 150 people attended the workshop, representing public and private utilities, consulting firms, academia, state and federal agencies, and others. The workshop highlighted strategies for integrating green technologies into water and wastewater treatment and funding opportunities that are available. Presentations from the event have been posted to the MAG website at www.mag.maricopa.gov/detail.cms?item=11400.

IDEAS FOR GREENING WATER AND WASTEWATER INFRASTRUCTURE

Now that the workshop has been completed, the next step involves developing a roadmap for greening water and wastewater infrastructure. A roadmap may assist utilities in evaluating opportunities to reduce energy consumption and chemical use, conserve water, and save critical financial resources. On February 18, 2010, the MAG Greening Water and Wastewater Infrastructure Planning Group met to discuss a wide variety of ideas for making water and wastewater infrastructure more environmentally friendly, recognizing the importance of working toward a more sustainable future.

In general, the ideas from the Planning Group are designed to provide utilities with opportunities for reducing energy consumption and plant costs. Due to the economic downturn, jurisdictions are facing decreased revenues and having to push capital improvement projects further into the future. These ideas generated by the Planning Group could result in cost savings by identifying energy waste at current facilities. It is important to note that greening water and wastewater infrastructure today may pave the way for significant cost savings in the future. Not only will these ideas save financial resources, they will also improve our environment as we work toward a more sustainable State. The ideas from the Planning Group are discussed below.

Energy Audits

Energy audits for water and wastewater treatment plants assist utilities in determining energy consumption as well as discovering opportunities for improving efficiency and reducing operating costs. Funding alternatives for improvements may also be identified through the audit process. In addition, audits bring awareness to the issues a utility may be facing. At the end of the audit process, plant staff will have a better understanding of the energy used by the various processes in the facility and associated costs. The utility will be able to recognize successes and develop goals for the future. Furthermore, audits are a tool for

benchmarking against other facilities, as discussed in the next section. For all these reasons, audits are a useful exercise regardless of location and size of a plant.

Audits may be conducted at various levels of detail. Once the audit level has been determined, an audit team is assembled. The audit team works to collect as much information as possible prior to the site visit. Open discussion among the audit team, plant managers and staff is critical for a successful audit. The team then visits the site and assesses the energy usage. Audits typically break down energy usage by unit processes. The audit team is then able to review each process, determine opportunities for energy conservation, and estimate energy savings. A list of operation and maintenance and capital improvement recommendations is prepared. The utility reviews the list and selects the viable alternatives based on its needs, budget, and future growth. The audit team may also determine available funding opportunities. The plant then begins implementation and monitoring.

Utilities could also benefit by comparing their audit results with the results from other facilities. A comparative analysis may reveal additional possibilities for energy conservation, cost savings and partnerships. Several utilities working together could result in easier access to funding. In addition, rural communities may not be able to afford consultants to conduct the audits; therefore, audits performed at another facility by a contractor could guide treatment plant staff in conducting an in-house audit. The audit process serves as a valuable training and learning experience for plant staff. Staff will gain a greater understanding of how the plant runs and its impact on energy and resource use.

A first step in conducting audits of rural treatment facilities was completed in 2009. Faculty and students from the Northern Arizona University and University of Arizona assisted rural Arizona communities with assessing their water and wastewater treatment plants. The report prepared on the study, "A Water/Energy Best Practices Guide for Rural Arizona's Water and Wastewater Systems," could be used to assist utilities with beginning an audit. Funding may also be available for energy audits from the Water Infrastructure Finance Authority of Arizona (WIFA) and Arizona Department of Environmental Quality.

An alternative to a comprehensive energy audit that includes field visitation would be a desk audit. Desk audits are not as detailed; however, they still provide valuable information for a utility. They may also be a first step in efficiently performing a more comprehensive field audit. An idea mentioned by the Planning Group included conducting desk audits for many or all of the wastewater treatment plants in Arizona. The information could be inputted into the U.S. Environmental Protection Agency (EPA) ENERGY STAR Program and each facility would be provided a rating. These ratings could be publicized and propel utilities to continually evaluate potential green projects in order to better their rating. Agencies that could assist in promoting the effort include EPA, WIFA, Arizona Public Service (APS), and Salt River Project (SRP). In addition to assisting utilities with energy audits, APS and SRP also offer rebate programs.

Another suggestion by the Planning Group was to have the Arizona Department of Environmental Quality encourage and spearhead audits for smaller wastewater treatment plants in the State. The ADEQ could select a plant to audit which would serve as an example for small facilities (reality audit). The various steps of the process would be posted and provided to other interested utilities for guidance. This idea could prompt many other plants to initiate audits to become more sustainable, thus leveraging the power of the facility audit performed by ADEQ. Information sharing would also be encouraged so that utilities could gain from the experiences of others.

Resources:

- Water Infrastructure Finance Authority of Arizona Planning and Design Grant Program (targets smaller systems that lack technical staff to complete design and planning phases of projects)
<http://www.azwifa.gov/?pageid=pdgrant>
- Melanie Ford, WIFA
mford@azwifa.gov
(602) 364-1321
- Sara Konrad, WIFA (Green Projects)
skonrad@azwifa.gov
(602) 364-1319
- ADEQ Capacity Development Program (free technical assistance for small drinking water systems serving 10,000 people or less)
<http://www.azdeq.gov/environ/water/dw/capdev.html>
- Kathy Stevens, ADEQ
stevens.kathryn@azdeq.gov
(602) 771-4653
- A Water/Energy Best Practices Guide for Rural Arizona's Water and Wastewater Systems
<http://www.waterenergy.nau.edu/>
- EPA ENERGY STAR Program
<http://www.energystar.gov>
- Cheryl McGovern, EPA Region IX
mcgovern.cheryl@epa.gov
(415) 972-3415
- Salt River Project
<http://www.srpnet.com>
- Arizona Public Service
<http://www.aps.com>

Benchmarking

Benchmarking facilities relative to performance metrics provides the opportunity for utilities to track and evaluate their energy and water consumption. The EPA ENERGY STAR Portfolio Manager is a readily-available assessment tool to measure a facility's current energy efficiency and track progress over time. The Portfolio Manager provides benchmark metrics that allow comparison of operational efficiencies of wastewater treatment facilities with similar facilities across the country. The program may

be used to facilitate the dissemination of information since it creates reports and offers utilities the ability to share data. The Portfolio Manager also estimates a facility's greenhouse gas emissions using the international standard. There are 70 different values that could be tracked in the program. For wastewater treatment plants, EPA claims a 90 percent confidence level; however, beta testing is still being conducted.

Enrolling in the ENERGY STAR Portfolio Manager is easy, consisting of a one-hour phone call with an EPA specialist to establish the facility's account, baseline, and benchmark. The utility will then be able to determine its baseline energy use, target energy use, energy cost savings, and target reduction required. The Portfolio Manager rates the energy performance of the facility on a scale of 1 to 100 with 100 being the most efficient. A score of 75 or greater is considered energy efficient. If the facility has a score below 69, the Portfolio Manager could be used to set a percentage energy reduction target.

The ENERGY STAR Portfolio Manager is an interactive online energy management tool that is free, available 24 hours per day, and requires no special computers or software. It assists utilities in identifying ways to eliminate energy waste and lower operating costs of water and wastewater systems. Both drinking water systems and wastewater treatment plants are able to track energy use, energy costs, and associated carbon emissions using Portfolio Manager. However, only wastewater treatment plants may be compared with similar plants in a national database using the EPA energy performance rating system. The Planning Group members indicated that it would be beneficial to utilities if the comparison component of the Portfolio Manager would also become available for drinking water systems in the future.

The EPA recommends that in addition to using the Portfolio Manager, utilities should also perform energy audits. The Portfolio Manager provides only the energy consumption per year; however, an energy audit provides more detailed information. The Environmental Protection Agency has also published its 2008 Guidebook, "Ensuring a Sustainable Future: An Energy Management Guidebook for Wastewater and Water Utilities" to assist utilities. The guidebook is based on a Plan-Do-Check-Act management system approach to reduce energy consumption and costs.

In addition to the efforts by EPA, the Water Research Foundation conducted a research project to benchmark water and wastewater utilities. The document was published in 2007 and is available to Water Research Foundation subscribers as "Energy Index Development for Benchmarking Water and Wastewater Utilities." The project established metrics for utilities to evaluate the effectiveness of new energy efficiency practices. The metrics also enable utilities to measure their performance relative to their peers, establish targets and budgets, and assess progress over time. The Water Research Foundation has a mission of advancing the science of water to improve the quality of life. As part of this mission, the Foundation coordinates an extensive research program.

Resources:

- EPA ENERGY STAR Portfolio Manager
www.energystar.gov/benchmark
- EPA's 2008 Guidebook "Ensuring a Sustainable Future: An Energy Management Guidebook for Wastewater and Water Utilities"
www.epa.gov/waterinfrastructure/bettermanagement.html

- Cheryl McGovern, EPA Region IX
mcgovern.cheryl@epa.gov
(415) 972-3415
- Water Research Foundation, Energy Index Development for Benchmarking Water and Wastewater Utilities
<http://www.waterresearchfoundation.org/research/TopicsAndProjects/projectSnapshot.aspx?pn=3009>

Energy Performance Contracts and Loans

The Arizona Department of Commerce Energy Office offers technical and program assistance to support energy efficiency programs including Energy Savings Performance Contracting. As part of this assistance, the State Procurement Office issued a request for qualifications from companies that provide energy savings performance contract services. A pre-qualified list of companies was created so that a governmental entity would not be required to conduct this step, therefore reducing the time necessary for securing a contract. The pre-qualified list of companies may be used by all governmental entities. State agencies are required to use the list; however, other entities are not required. They may use the established state contract or establish contracts on their own. Using the list does require an entity to follow all of the procedures in the State Procurement Office's initial solicitation. These services may greatly assist local governments with reducing energy consumption and saving money. While the pre-qualified companies may be able to provide some assistance in the area of water and wastewater treatment, they may not have the specific expertise some jurisdictions need. Since water and wastewater treatment are often some of the biggest energy users for municipalities, cities and towns would benefit from ensuring that their contract specifies access to water and wastewater experts.

Energy performance contracts are effective ways to green water and wastewater infrastructure. To finance projects, it was suggested that potentially the Water Infrastructure Finance Authority of Arizona could provide energy performance loans that would be paid back using the energy savings. Currently, WIFA is required to direct at least 20 percent of its drinking water and clean water federal funding toward green projects. Green projects are divided into two categories: energy efficiency and water efficiency. The project criteria set by WIFA is based on EPA's Clean Water and Drinking Water State Revolving Fund Green Project Reserve criteria. The projects may include planning, design, and/or construction activities. The whole project or just a component of the project may be identified as green. If WIFA were to offer energy performance loans to municipalities, this may increase the ability to make water and wastewater treatment processes more sustainable.

Resources

- Arizona Department of Commerce
<http://www.azcommerce.com/Energy/ESPC.htm>
- Water Infrastructure Finance Authority of Arizona
<http://www.azwifa.gov>

Technology Specifications

Additional efforts to green water and wastewater infrastructure may include incorporating energy-efficient specifications for areas such as lighting, motor pumps, and HVAC (heating, ventilating, and air conditioning) into standard practices. The specifications would likely vary by jurisdiction due to different plant sizes, processes and goals. The rebate programs at SRP and APS may provide assistance with incorporating energy-saving technologies. The Sustainable Cities Network, which was formed by the Arizona State University Global Institute of Sustainability, could also assist municipalities by sharing information on specifications that have already been developed.

Efficiency from Solar

Solar, especially photovoltaic solar, is one way for water and wastewater utilities to capture energy. The large footprint of many treatment facilities may allow for the installation of arrays of solar panels. While solar has been a great success in some areas, additional research and studies could be conducted to provide additional guidance on return on investment and pay back periods, particularly in light of changing rebate structures and regulations. Guidance would also be helpful for municipalities interested in reducing their carbon footprint at their treatment facilities by using solar.

The cities of Peoria and Glendale have implemented solar projects at their wastewater treatment facilities. Recently, the City of Peoria completed a solar project at the Beardsley Water Reclamation Facility that provides a portion of the power that is necessary for the facility's operations building. The City of Glendale uses solar energy at the West Area Water Reclamation Facility to provide all the hot water needs for the plant. In addition, the facility utilizes solar energy for the administration building. These solar projects have resulted in an approximately 40 percent cut in facility costs for the City of Glendale.

Hydroturbines

Hydroturbines harness the power of water to produce electricity. They are not traditionally used in water distribution systems; however, they are a clean and renewable source of energy. Hydroturbines are potentially usable in water distribution systems having significant elevation changes or multiple pressure zones. Hydroturbine technology has been in existence for a long time and continues to evolve. Additional guidance on generating electricity from hydroturbines would assist utilities in incorporating hydrogeneration into their processes. The City of Phoenix discussed hydroturbines at the MAG Greening Water and Wastewater Infrastructure Workshop. The link to the presentation is provided below.

Resource

- Hydroturbines: It's All Downhill From Here
<http://www.mag.maricopa.gov/detail.cms?item=11400>

Arizona Corporation Commission

The Arizona Corporation Commission could work with utilities on sustainability initiatives. Areas of specific interest include the permitting process and third-party providers.

319H Nonpoint Source Grant Funds for Urban Sustainability Projects

The Arizona Department of Environmental Quality Nonpoint Source Program promotes and facilitates statewide efforts to manage the impact that nonpoint source pollution has on surface and groundwater. The majority of the work performed by the Program is funded by Clean Water Act Section 319(h) grant funding that is awarded to ADEQ by the U.S. Environmental Protection Agency. The Program focuses on land use activities that potentially have negative impacts on surface and groundwater quality including: agriculture, forestry, urban runoff, hydromodification, onsite/septic waste treatment systems, mining, and recreation.

The EPA estimates that approximately 30 percent of the known pollution to the nation's waters is due to stormwater runoff. One suggestion for the Planning Group was for ADEQ to potentially allocate a portion of the Section 319(h) grant funding for urban sustainability projects related to stormwater. The Environmental Protection Agency considers stormwater a point source once it reaches a municipal storm drain; therefore qualifying projects would need to address stormwater at sites prior to reaching the storm drain.

- Arizona Department of Environmental Quality Nonpoint Source Pollution Program
<http://www.azdeq.gov/environ/water/watershed/nonpoint.html>
- Krista Osterberg, ADEQ
kol@azdeq.gov
(602) 771-4635

WIFA Reclaimed Water Rate Study

The Water Infrastructure Finance Authority provides three types of technical assistance for drinking water and wastewater facilities: project, operational, and policy. Project technical assistance involves assisting individual systems to conceive, plan, design, and develop infrastructure. For operational technical assistance, WIFA provides funding through the ADEQ Capacity Development Program to assist individual systems with improving day-to-day operations. The policy technical assistance includes developing and distributing guidance and performing related activities to benefit a wide range of drinking water and wastewater systems. Policy technical assistance provided by WIFA in the past has included guidance on arsenic treatment, how to hire an engineer, and funding of a water and wastewater residential rate study. This study was conducted by WIFA to provide unit rates and total monthly charges assessed by utilities for water consumed and wastewater generated. Since reclaimed water continues to be a valuable resource, WIFA could consider funding a reclaimed water rate study. Utilities would then have a base for comparison of rates and methodologies for establishing rates.

Sustainability in General Plans/Master Plans

In 1998, Arizona adopted the Growing Smarter Act which establishes roles of local and state government in the planning and management of new development. The Growing Smarter Plus Act of 2000 is an extension to the 1998 Growing Smarter Act. Together, these acts initiated requirements for extensive growth planning by municipal agencies. One of the components of the legislation requires municipalities

and counties to adopt general and comprehensive plans to serve as guides to future development. As municipalities prepare updates to their general plans, as required by the legislation, the Planning Group suggested that sustainability components could be incorporated into the discussions about water and wastewater treatment. There may also be the opportunity to include sustainability as the overriding goal of a general plan. Possibilities for including sustainability components into general plans may vary by jurisdiction.

Sustainability and 208 Water Quality Management Plans

The 208 Water Quality Management Plans are prepared by the designated Regional Water Quality Management Planning Agencies in accordance with Section 208 of the Clean Water Act. These plans include the desired wastewater treatment configuration for their regions. Currently, the SouthEastern Arizona Governments Organization (SEAGO) and Central Arizona Association of Governments (CAAG) are updating their 208 Plans. As part of the updates, the Arizona Department of Environmental Quality has indicated that sustainability/infrastructure greening issues must be addressed. As the Regional Water Quality Management Planning Agencies update their 208 Plans in the future, it may be beneficial for them to review the sustainability components included in the SEAGO and CAAG plans. While 208 Plans are prepared in accordance with Section 208 of the Clean Water Act, they are specific to each region. Therefore, differences among the plans are common. For example, processes and goals for rural areas may be different in comparison to urban regions.

Information Exchange

A forum for Arizona utilities to meet and discuss sustainable aspects of water and wastewater infrastructure could provide local governments the opportunity to share ideas and best practices. There have been efforts to initiate forums to discuss these ideas. For example, the Arizona State University Global Institute of Sustainability formed the Sustainable Cities Network as a place where professionals may discuss sustainability ideas, challenges, and best practices. In March 2010, the Network held the inaugural meeting of the new Water and Wastewater Workgroup. This group, which will include municipal and tribal representatives, will work to identify, discuss, and take action on sustainability challenges and move toward a more sustainable region. Potentially, the Sustainable Cities Network could also host a clearinghouse for green projects related to water and wastewater treatment systems.

There are many possible collaborative opportunities for making water and wastewater plants more environmentally friendly. Sustainability/energy partnerships could be formed with Arizona State University, for example. Local governments such as the City of Phoenix have already formed data exchange programs with the ASU School of Sustainability.

Resource

- Sustainable Cities Network
<http://sustainablecities.asu.edu>
- Anne Reichman, Sustainable Cities Network
anne.reichman@asu.edu
(480) 965-2168

Specialized Workshops

The MAG Greening Water and Wastewater Infrastructure Workshop included sessions that covered a variety of topics for making water and wastewater systems more sustainable. Additional workshops could be conducted to expand on the ideas discussed at the MAG workshop. Additional workshops could involve collaborations with the U.S. Department of Energy Intermountain Clean Energy Center and ASU Global Institute of Sustainability. In addition to workshops, it was suggested that a community college, such as Gateway Community College which already has similar programs, could offer a class for owners/operators of drinking water and wastewater treatment plants dedicated to sustainability opportunities.

Resources

- U.S. Department of Energy Clean Energy Center, Intermountain Region
<http://www.intermountainchp.org>
- ASU Global Institute of Sustainability
<http://sustainability.asu.edu>

Financial Resource Guide

A compendium resource that lists the funding opportunities for green projects such as audits and retrofits would aid utilities in improving the environment and lowering their costs. This resource could include descriptions of eligibility, grant ceilings or minimums, applicability, and cost shares. Utilities are very interested in making water and wastewater infrastructure more sustainable; however, the current economic climate has made funding these projects challenging.

At the January 12, 2010 MAG Greening Water and Wastewater Infrastructure Workshop, several speakers discussed funding opportunities for green projects. The presentations have been posted to the MAG website.

Resource

- MAG Greening Water and Wastewater Infrastructure Workshop Presentations
<http://www.mag.maricopa.gov/detail.cms?item=11400>

Funding Agency Contacts

One of the challenges of working with large agencies is finding the appropriate contact within the agency. A list of contacts at agencies such as WIFA, ADEQ, EPA, and the U.S. Department of Energy (DOE) would be helpful for those with questions on available funding. There is also potential for local governments to partner with these agencies. Representatives from several funding agencies were in attendance and presented at the MAG Greening Water and Wastewater Infrastructure Workshop. Contact information is provided below.

Resources

- Water Infrastructure Finance Authority of Arizona
 - Melanie Ford
mford@azwifa.gov
(602) 364-1321
- ADEQ Capacity Development Program (free technical assistance for small drinking water systems serving 10,000 people or less)
 - Kathy Stevens
stevens.kathryn@azdeq.gov
(602) 771-4653
- U.S. Environmental Protection Agency Region IX
 - Cheryl McGovern
mcgovern.cheryl@epa.gov
(415) 972-3415
- U.S. Department of Energy Clean Energy Center, Intermountain Region
 - Patti Case
plcase@etcgrp.com
(801) 278-1927

THE NEXT STEPS TO GREENING WATER AND WASTEWATER INFRASTRUCTURE

Introduction

On January 12, 2010, the Maricopa Association of Governments conducted the Greening Water and Wastewater Infrastructure Workshop in Phoenix, Arizona. The workshop was highly successful with approximately 150 people in attendance, representing public and private utilities, consulting firms, academia, state and federal agencies, and others. To assist with the planning of the workshop, MAG had formed the Greening Water and Wastewater Infrastructure Planning Group. The Planning Group, comprised primarily of utility representatives from MAG member agencies, discussed topic ideas for the workshop and guided development of the workshop agenda. The agenda is posted on the MAG website at http://www.mag.maricopa.gov/pdf/cms.agendas/WQAC_2009-12-10_Greening-Water-Infrastructure_AGD-2_12777.pdf.

Following the workshop, the Planning Group met again to discuss ideas for next steps, including the development of a roadmap for incorporating green technologies into water and wastewater treatment plants. The Planning Group drew on both the information presented at the workshop as well as current and contemplated sustainability initiatives within their jurisdictions. These ideas include water conservation, energy conservation and capture, and chemical use reduction measures. These measures focus on saving financial resources in both the short-term and long-term. This document summarizes the next steps suggested by the Planning Group. For further information, resources, and contacts, please refer to the companion MAG document, "Ideas for Greening Water and Wastewater Infrastructure."

Energy Audits

Energy audits (in conjunction with water use audits as applicable) were considered by the Planning Group as a first step in understanding the current "green" status of water and wastewater infrastructure and developing appropriate responses to enhance sustainability.

- Faculty and students from the Northern Arizona University and University of Arizona assisted several rural Arizona communities with assessing the status of their water and wastewater treatment plants. The report prepared on the study, "A Water/Energy Best Practices Guide for Rural Arizona's Water and Wastewater Systems," could be used as a first step by a utility in preparing to conduct an in-house audit or procuring outside audit services.
- Desk audits could be conducted for wastewater treatment plants throughout Arizona. The information could be inputted into the U.S. Environmental Protection Agency (EPA) ENERGY STAR Program and each facility would be provided a rating from 1 to 100, based on the ENERGY STAR formula. These ratings could be publicized and propel utilities to continually evaluate potential green projects in order to better their rating.
- The Arizona Department of Environmental Quality (ADEQ) could encourage and spearhead audits for smaller wastewater treatment plants in the State. The ADEQ could select a plant to audit which would serve as a model for conducting audits for other small facilities (a "reality" audit).

Benchmarking

The Planning Group considered benchmarking and associated metrics critical for gaging the effectiveness of implementing sustainability measures and for comparison with similar facilities in the State.

- The Water Research Foundation conducted a research project to benchmark water and wastewater utilities. The document was published in 2007 and is available to Water Research Foundation subscribers as “Energy Index Development for Benchmarking Water and Wastewater Utilities.”
- The EPA ENERGY STAR Portfolio Manager is an assessment tool for facilities to measure current energy efficiency and track progress. There is also a component that compares operational efficiencies of wastewater treatment plants with similar facilities across the country. This is a free, online tool to assist utilities in eliminating energy waste and lowering operating costs for water and wastewater systems.
- The EPA published a 2008 Guidebook, “Ensuring a Sustainable Future: An Energy Management Guidebook for Wastewater and Water Utilities” to assist utilities. The guidebook is based on a Plan-Do-Check-Act management system approach to reduce energy consumption and costs.
- At the January 12, 2010 MAG Greening Water and Wastewater Infrastructure Workshop, EPA offered assistance to utilities interested in benchmarking their facilities and/or applying the Plan-Do-Check-Act management system discussed in the EPA guidebook.

Energy Performance Contracts and Loans

- The Arizona Department of Commerce Energy Office offers technical and program assistance to support energy efficiency programs including Energy Savings Performance Contracting. As part of this assistance, the Energy Office created a pre-qualified list of companies to assist governmental entities. With water and wastewater treatment often being some of the biggest energy users for municipalities, cities and towns would benefit from ensuring that their energy performance contract specifies access to water and wastewater experts.
- Potentially, the Water Infrastructure Finance Authority of Arizona (WIFA) could provide energy performance loans that would be paid back using the energy saved by implementing sustainability measures at water and wastewater treatment plants. This type of program could promote faster adoption of energy saving or enhancement technologies by utilities. Currently, WIFA is required to direct at least 20 percent of its drinking water and clean water federal funding toward green projects.

Technology Specifications

- Energy-efficient specifications for areas such as lighting, motor pumps, and HVAC (heating, ventilating, and air conditioning) could be incorporated into standard practices for water and wastewater infrastructure procurement. The rebate programs at Salt River Project (SRP) and Arizona Public Service (APS) may provide assistance with incorporating energy-saving technologies.

- The Sustainable Cities Network, which was formed by the Arizona State University Global Institute of Sustainability, could also assist municipalities by compiling and sharing information on specifications that have already been developed.

Efficiency from Solar

- Cities are beginning to implement solar projects at their wastewater treatment facilities; however, additional research could be conducted to provide guidance on return on investment and pay back periods, particularly in light of changing rebate structures and regulations.

Hydroturbines

- Since hydroturbines are not traditionally used in water distribution systems, additional guidance on generating electricity from hydroturbines would assist utilities in incorporating hydrogeneration into their processes to capture energy that is currently wasted. Hydroturbines are a clean and renewable source of energy and have been implemented in the City of Phoenix water system.

Arizona Corporation Commission

- The Arizona Corporation Commission could play a role in assisting utilities in sustainability efforts. Areas of specific interest include the permitting process and third-party providers.

319H Nonpoint Source Grant Funds for Urban Sustainability Projects

- The Arizona Department of Environmental Quality could potentially allocate a portion of its Section 319(h) nonpoint source grant funding for urban sustainability projects related to stormwater.

WIFA Reclaimed Water Study

- Since reclaimed water continues to be a valuable resource, the Water Infrastructure Finance Authority of Arizona could consider funding a reclaimed water rate study. In the past, WIFA has funded water and wastewater residential rate studies to provide unit rates and the total monthly charges assessed by utilities for water consumed and wastewater generated. There is a need for a similar study for reclaimed water to compile both rates as well as methodologies for establishing rates.

Sustainability in General Plans/Master Plans

- As municipalities prepare updates to their general plans, sustainability components could potentially be incorporated into the discussions involving water and wastewater infrastructure. There may also be opportunities for including sustainability as the overriding goal of a general plan.

Sustainability and 208 Water Quality Management Plans

- As the Regional Water Quality Management Planning Agencies update their 208 Water Quality Management Plans, it may be beneficial for them to review the sustainability components being

included in the updates to the SouthEastern Arizona Governments Organization (SEAGO) and Central Arizona Association of Governments (CAAG) plans. The Arizona Department of Environmental Quality has indicated that sustainability/infrastructure greening issues must be addressed as part of these updates.

Information Exchange

The Planning Group considered information exchange to be a critical element in advancing sustainability in water and wastewater infrastructure.

- The Arizona State University Global Institute of Sustainability formed the Sustainable Cities Network as a forum where professionals may discuss sustainability ideas, challenges, and best practices. In March 2010, the Network held the inaugural meeting of the new Water and Wastewater Workgroup. Potentially, the Sustainable Cities Network could also host a clearinghouse for green projects related to water and wastewater infrastructure.
- There are many possible collaborative opportunities for making water and wastewater plants more environmentally friendly. Sustainability/energy partnerships could be formed with Arizona State University, for example. Local governments such as the City of Phoenix have already formed data exchange programs with the ASU School of Sustainability.

Specialized Workshops

- The success of the Greening Water and Wastewater Infrastructure Workshop conducted by MAG on January 12, 2010, in cooperation with ADEQ and EPA, spawned ideas for further workshops. These could involve collaborations with the U.S. Department of Energy Intermountain Clean Energy Center, EPA, the ASU Global Institute of Sustainability, and others.
- In addition to workshops, a community college such as Gateway Community College, which already has similar/related classes, could offer a class for owners/operators of drinking water and wastewater treatment plants dedicated to sustainability opportunities.

Financial Resource Guide

- A compendium resource that lists the funding opportunities for green projects such as audits and retrofits would aid utilities in improving the environment and lowering their costs. This resource could include descriptions of eligibility, grant ceilings or minimums, applicability, and cost shares.

Funding Agency Contacts

- A list of contacts at agencies such as WIFA, ADEQ, EPA, and the U.S. Department of Energy would be helpful for those with questions on available funding. Representatives from several funding agencies were in attendance and presented at the MAG Greening Water and Wastewater Infrastructure Workshop. Contact information is provided in the MAG document "Ideas for Greening Water and Wastewater Infrastructure."