Greenhouse Gas Mitigation Initiatives

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Introduction

In February 2008, water utilities serving eight of the country's large metropolitan regions joined together to form the Water Utility Climate Alliance (WUCA). The goals of the alliance include fostering research on climate change issues affecting water utilities, working together to develop adaptation approaches and communicating progress on GHG mitigation efforts. This document has been compiled pursuant to this third goal.

The summary statements for Denver Water, Metropolitan Water District of Southern California, San Diego County Water Authority and Southern Nevada Water Authority were compiled from telephone interviews conducted in October 2008. The statements for New York City Department of Environmental Protection, Portland Water Bureau, Seattle Public Utilities and San Francisco Public Utilities Commission were authored directly by staff working on energy efficiency improvements at each of these organizations. The contributions of all respondents are gratefully acknowledged.

Denver Water

Acknowledging the need for greater attention to climate change as an emergent water resource challenge, Denver Water is working to include climate change as a key uncertainty in its long range water planning. Denver Water is also working to reduce its GHG emissions. To lend increased weight to this effort, Denver Water joined the Climate Registry in May 2008. It is currently collecting data to support the required inventory of its greenhouse gas emissions and looks forward to comparing its emissions profile to that of other utilities.

The Climate Registry inventory protocols are informed by inventory standards adopted by the World Resources Institute (WRI), the World Sustainability Council, the California Climate Action Registry (CCAR) and the International Organization for Standardization (ISO). Denver Water joined the Climate Registry in anticipation that it will become the standard emissions reporting platform when federal legislation on GHG emissions is enacted.

Denver Water has a long tradition of operating a highly efficient water delivery system. Seven hydroelectric generating plants with a combined capacity of 25 MW are employed as water is collected in the mountains and conveyed to the city. In most years, Denver Water adds enough clean, renewable hydropower to the local power grid to equal or exceed electricity needs for operating its potable water distribution system. This generation averages about 50,000 MWH per year.

Denver Water also has an extensive recycling program that has been in place for over 13 years. In 2008, over 70 tons of materials were recycled. Most of this bulk is office paper and cardboard, but aluminum, plastic, glass, batteries, and used motor oil is also included. Denver Water also employs several hybrid vehicles in its fleet and looks to expand its inventory and biodiesel is a significant part of its truck fuel supply.

Denver Water has also formed a greenhouse gas mitigation advisory, or "Green" team, using a group of representatives from across its organization. The Green Team is oriented around six workstreams (water, energy, site planning, transportation, materials, and communications), The Green Team's initiatives include heading up Denver Water's GHG inventory, pursuing small-scale energy efficiency projects, educating its workforce on green practices, advancing the recycling program, and enhancing water use efficiency on its properties to name a few. Already, an engineering team is conducting preliminary investigations on the potential implementation of renewable energy sources for utility operations.

Metropolitan Water District of Southern California (MWD)

MWD operates 16 hydroelectric plants with a combined dependable capacity of 122 MW. A recently completed capacity expansion assessment indicates that an additional 7 to 9 MW of capacity may be possible; a more detailed analysis will consider site footprint conditions, environmental requirements and other permitting issues, but the cost of construction and the contraction of the bond market are anticipated to be the most significant drivers of future efforts.

A 1 MW solar energy facility is currently under construction at the Skinner treatment plant in Riverside County. When complete, the facility will meet 20% of the Skinner plant's energy requirements (though energy requirements are expected to increase with the completion of a new ozone treatment plant). A second 1 MW solar facility is slated to be built at the Weymouth treatment plant in the city of La Verne, and additional solar projects are under consideration.

The assessment of wind power potential at the Hinds pumping plant revealed that the site experiences insufficient wind flow to support a wind power facility. Additional funds have been requested to assess wind energy at two other potential locations.

Energy audits completed at all five water treatment facilities yielded recommendations such as retrofitting motors with variable frequency drives, implementing improvements to HVAC systems and installing occupancy sensors to control facility lighting. Together these efforts may yield savings of 4 to 6%. However, the major uses of energy remain pumping and ozone generation. MWD is looking at ways to operate this equipment more efficiently, but significant returns are not expected. Rather, it is hoped that more significant returns may result from the roll out of a new public education initiative encouraging water conservation.

A retrofit of plumbing fixtures and landscaping at a number of MWD facilities is also currently underway. Retrofits include swapping in low-use water fixtures and removing lawns in favor of drought resistant plantings.

MWD currently sells all of the energy it generates to regional electric utilities. However, it is investigating the option to renegotiate its sale price and retain associated renewable energy credits in order to offset its energy purchases. Going forward, MWD will also assess the impact of California Assembly Bill 32 requirements on energy costs.

New York City Department of Environmental Protection (DEP)

In 2007, New York City Mayor Michael Bloomberg released PlaNYC 2030, a 127-point sustainability initiative. The PlaNYC goals include a mandate that the municipal contribution to the overall City's greenhouse gas emissions be reduced to a level 30% below the 2006 fiscal year (July 1 to June 30) emissions baseline by 2017. While DEP has been allocated 17% of the total municipal contribution we intend to pursue a 30% reduction from our baseline. Pursuant to this goal, DEP has formed an energy task force to develop a strategy for reducing greenhouse gas emissions resulting from departmental operations, maintenance, and construction activities.

DEP has been a pioneer in several areas of renewable energy and greenhouse gas emissions reductions, specifically in capturing anaerobic digester gas (ADG) from its water pollution control plants (WPCPs) for beneficial use in operating equipment (boilers, engines, etc), beginning in the early 1900s. However, beginning in the late 1970s local economic conditions and the cheap cost of electricity moved the department away from ADG use toward electricity as its main fuel source. The department is now reinvigorating its traditional culture of environmental stewardship by employing proven methods and exploring novel ideas for reducing its carbon footprint.

In order to accurately measure our progress toward meeting a 30% reduction goal the task force is working on filling in gaps for its baseline emissions and compiling inventories for the 2007 and 2008 fiscal year departmental energy consumption. Some of the leading measures of greenhouse gas emissions, namely energy consumption data, will be worked into monthly metric reports and will be made available to departmental employees. In this way employees at all levels of the organization will be able to track progress and internalize actions that have both negative and positive effects on greenhouse gas emissions.

DEP's emission reduction target is complicated by a number of new, large, and energy intensive treatment plants and water quality processes that will be coming on-line over the next 10 years and will significantly challenge the department in meeting its intended goal. Careful consideration must be given to how growth is measured in terms of emission factors and the impact to our stated goals. Creative methods will need to be employed to reach our goal. Some first steps toward meeting the 30% reduction target include:

- the task force will be drafting a Commissioner's statement on energy policy for department wide distribution.
- incorporation of energy efficiency and greenhouse gas emission considerations into all new design and construction specifications.
- integration of lighting efficiency improvements into our 10-year water supply shaft maintenance program.
- conversion of our passenger sedan fleet to hybrid vehicles. Of the 508 sedans in the fleet, 428 (84%) have been replaced by hybrid vehicles, placing DEP among the country's largest hybrid vehicle fleet operators. DEP is moving toward a 100% hybrid passenger sedan fleet in the near future. Additionally, 69 of the departments 691 light trucks are hybrids and hybrid vehicles are being piloted in

the heavy truck class; DEP will be seeking to increase these ratios in the years ahead.

- five percent biofuel (B5) has been instituted at all DEP fueling stations. DEP will be working toward B20 implementation by beginning to introduce this fuel on a pilot project. level and incorporating an engine warranty requirement for B20 use into new vehicle specifications.
- introduction of fuel cell technology for power supply purposes; DEP is currently piloting. this technology at four of it's WPCPs.
- specifying LEED certification for new and significantly renovated buildings.

Recognizing that a departmental 30% reduction in greenhouse gas emissions in light of significant growth in energy demand poses a significant challenge DEP has begun to give conceptual consideration to other areas of greenhouse gas emissions. These include:

- beneficial use of landfill based methane gas by supplying to a direct user or by introduction into the natural gas distribution system.
- use of watershed lands to site wind turbines
- installation of solar panels at certain water pollution control plants
- greater implementation of variable frequency drives
- production of energy crops on watershed lands (e.g., switchgrass – a warm weather grass that helps protect against erosion, shrub willow, etc)
- forest management of watershed lands with consideration to greenhouse gas sinks
- advanced engine optimization technology to provide for seamless transition between ADG and natural gas supplies
- sludge preheating through sludge-to-sludge heat recovery
- micro turbine installation in WPCP effluent streams

Through proven technologies, pilot studies, and a constant eye on contemporary mechanisms to reduce greenhouse gas emissions DEP will build a diverse portfolio of control mechanisms that can be applied across its operations.

Portland Water Bureau

The Portland Water Bureau works to reduce the carbon emissions impact of the water system, both by taking action within our own bureau and by participating in citywide efforts. (Not all of Portland's sustainability-related actions are listed below; see http://www.portlandonline.com/water/index.cfm?c=31525 for more information). In 2007, the bureau adopted a Sustainability Action Plan. The September 2008 update of the action plan summarizes our initial calculation of the bureau's GHG emissions and defines a set of mitigation strategies. Strategies for carbon footprint mitigation at the Portland Water Bureau include:

Reducing Fuel Emissions

- Purchases more than 60,000 gallons of biodiesel annually. The WB operates 135 vehicles that use B99 (99% biodiesel) during the warmer months (April 1-November 1). These vehicles include backhoes, dump trucks, graders, excavators, and water service trucks.
- Owns 6 Toyota Prius Hybrids - Hybrid vehicles have improved fuel efficiency and reduced emissions over traditional combustion engines.
- Owns two electric-powered Segues for security patrols at in-town reservoirs
- Video surveillance at remote facilities reduces vehicle miles driven responding to reported incidents

Using/Encouraging Alternative Modes of Transportation

- City sponsors cash incentives ("Bike/Walk to Work Bucks") to encourage employees to bike or walk to and from work
- City sponsors discounted Tri-met bus passes to employees
- Bureau provides bicycles for commuting between the downtown and Interstate facilities and for collecting water quality samples in water supply operations.

Renewable Power

- Generates approx 86 million kilowatts of hydroelectric power per year from two dams in the Bull Run Watershed
- Generates approx 1 million kilowatts of micro-hydroelectric power per year using hydraulic head within the distribution system. The bureau is evaluating additional micro-hydro power opportunities, and has a project planned for a neighborhood pump station (replacing a pressure reduction valve with a microhydro unit).
- Currently designing a 250 kW capacity photovoltaic project. Plan to work with a third party equity partner who will own, operate and sell power back to the bureau for an initial period. Power generated from this facility will partially offset the power used at the bureau's groundwater pump station. Excess power will be fed into the local power grid under a net-metering agreement.
- The City, as a whole, is evaluating options for purchasing 100% renewable power by 2010.

Reducing Paper Use

- Uses 100% post consumer waste paper for all 20 lb print and copy paper. More than 80% of the bureau's annual paper use falls in this category. FY 07-08 per employee paper use is 26% less than during FY 03-04.

Maximizing Energy Efficiency

- Operates system to minimize peak power loading
- Performed energy audits, replaced lighting, and made HVAC performance improvements
- Installed Variable Frequency Drives and refined operating procedures at several pump stations

Next Steps

The September 2008 action plan update highlights the following carbon mitigation actions: purchasing offsets for employee airline travel, adopting an engine idling reduction policy, adopting vehicle purchase criteria that include fuel efficiency objectives, and improving vehicle pooling and scheduling.

San Diego County Water Authority (SDCWA)

SDCWA has initiated a brand-new four-year climate change and sustainability program. Under the program, SDCWA will be continuing its periodic energy audits of its facilities, particularly its San Diego Headquarters and its Escondido office buildings. A preliminary GHG emissions inventory was completed in early 2007, pursuant to the local government protocol under California Assembly Bill 32. (The same set of protocols is also used by the Western Climate Initiative and the Western Governor's Association, which is developing a carbon trading scheme similar to the Northeast's Regional Greenhouse Gas Initiative, with a projected go-live in 2012). SDCWA has already begun tracking data, and the inventory is scheduled for completion in spring 2010. It is also currently seeking approval from the Public Utilities Commission to on-board an engineer provided by the San Diego Gas & Electric company (SDG&E), who will be dedicated to continued energy efficiency analyses. SDCWA received recognition from SDG&E last year for its energy efficiency efforts.

This year, SDCWA replaced three of its passenger vehicles with hybrids, and it will continue to work toward replacing its entire fleet in the coming years. An analysis of SDCWA fleet operations will commence in the spring, and is scheduled for completion in 2010.

With the renewal of federal solar investment tax credit, SDCWA will be issuing a request for proposals to build a solar energy plant in the next several months. SDCWA seeks to avail of the energy service provider incentive mechanism, with the 30% federal tax credit to be sold to investors, and the proceeds being used to fund the facility.

San Francisco Public Utilities Commission

SFPUC's Energy Efficiency program has implemented several projects throughout City departments and facilities. Since the inception of the program in 2003, our energy efficiency projects are saving over 27,000 megawatt-hours of electricity and 1,200 therms of natural gas per year, resulting in 8,942 tons (17,884,496 pounds) of CO_2 emissions reduced per year. Projects completed in 2007/08 include a compact fluorescent lamp program at in SFPUC facilities, a recommissioning project at Moscone Convention Center, and lighting retrofit projects at a SFPUC powerhouse, and at San Francisco International Airport (implemented by the Airport).

SFPUC's Renewable program has implemented several solar photovoltaic projects throughout City departments and facilities. Since the inception of the program in 2003, our solar PV installations are saving over 2,400 megawatt-hours of electricity per year, resulting in 805 tons (1,610,403 pounds) of CO_2 emissions reduced per year. Projects completed in 2007/08 include San Francisco International Airport United Terminal 3, Maxine Hall medical facility, and Chinatown Library.

Total estimated annual GHG emissions reduction from these programs is 9,747 tons CO_2 (19,494,899 pounds) per year.

Seattle Public Utilities (SPU)

The City of Seattle has a Climate Action Plan (http://www.seattle.gov/climate/) that guides city's activities related to GHG emissions reductions.

- The City of Seattle government has reduced its GHG emissions by 60% since 1990.
- As part of this Climate Action Plan, SPU will complete an inventory of its GHG emissions in early 2009.
- SPU is a member of the CA Climate Action Registry and will use the registry's process to complete an inventory, certify and report it. SPU has also formed a department-wide, cross utility GHG Mitigation Team to carry out the development of the inventory.
- SPU will identify strategies to manage and reduce the inventory and examine how GHG reduction strategies can be incorporated into our asset management framework.
- As part of this Climate Action Plan, SPU is increasing the promotion of some of our resource conservation programs, such as low flow showerheads (energy reduction through reduced hot water use) that would help the community reduce its GHG emissions.

Southern Nevada Water Authority (SNWA)

SNWA is actively working toward full implementation of the following six recommendations issued by its sustainability task force:

1. **20% of energy needs to be met by renewable sources by 2015 (parallels Nevada's renewable energy portfolio standard)**
   SNWA completed a 240 KW solar energy carport in March 2007. The installation of six solar-tracking units for a total of 222 kW at the River Mountains treatment facilities is scheduled to be completed by April 2009. SNWA is also currently in negotiation to build a solar energy farm that will supply between 10 and 25 MW of power. A 25 MW wind power project is also currently under consideration.

   SNWA has hired a consulting team to investigate geothermal energy potential to include in its portfolio, and expects to conclude an assessment of geothermal energy potential in the near future. It is also looking at biomass potential at treatment plants and at ranches it has acquired.
   It is estimated that pumping requirements in the proposed 230 mile water pipeline in eastern Nevada will total 70 MW; however, in-line hydro turbines will recapture 40 MW. Hydroturbines installed in existing flow controls stations currently supply a combined total of 3 MW.

2. **A 20% reduction in energy consumption by 2011**
   To aid in the assessment process, SNWA has developed an enterprise wide carbon management tool designed to assess the greenhouse gas footprint from all aspects of authority operations, viz energy consumption, transportation, and procurement of both operating and capital program matériel. Analysis of 2007 data indicates that, with energy use constituting 90 to 95% of SNWA's carbon footprint, the biggest emissions reductions will likely be seen realized from improved energy efficiency and reductions in fossil fuel consumption.

   SNWA's energy needs are met largely by its natural gas power plant, supplemented by energy purchases. SNWA also receives an energy allocation from the Hoover/Parker system. It is hoped that new energy needs will be met entirely by renewable energy.

   SNWA will be seeking to build new facilities to USGBC LEED specifications (though it may opt not to seek certification). The installation of light colored, singly-ply membrane roofing systems at authority facilities is currently under review.

   SNWA is implementing energy use trending at all of its facilities, and is beginning the process of submetering its equipment in order to better assess efficiency opportunities. The implementation of an energy use reduction strategy at treatment facilities is currently in the scoping stage.

3. **Reduce landfill waste 25% by 2010**
   To reduce paper consumption, SNWA aims for 75% of internal documentation to electronically administered by next year.

4. **100% conversion of vehicle fleet to hybrid or alternative fuel vehicles by 2012**
   SNWA is on-track for 100% conversion as older vehicles are replaced. An employee rideshare program is also now in-place. The implementation of logistics tracking and in-vehicle navigation systems to best gauge vehicle miles driven is currently pending.

5. **100% conversion to 'green' cleaning products by 2009**
   SNWA currently anticipates that only a 99% conversion may be feasible at this time, as there are currently no 'green' disinfection products available.

6. **Implementation of Pilot Environmental Management System by 2010**
   The EMS is currently in the piloting stage in two of SNWA's operating divisions.