Measure: Non-residential Water Conservation (G23)

The measure calls for Tucson Water to create water conservation rates for non-residential customers and take other actions to reduce non-residential water use 10% per capita by 2020. A secondary strategy to consider is a partnership to reduce the carbon-emissions intensity of Tucson's water system 10% by 2020 (not analyzed).

Emission reduction potential by 2020:	4,056 tCO_2e / yr.
Percentage of goal (2012):	NA
Percentage of goal (2020):	0.18%
Total annual average implementation costs:	$0
Entity that bears the costs of implementation:	City of Tucson businesses
Cost/Savings per tCO_2e:	Savings $ / tCO2e are not estimated
Net annual savings:	Not estimated
Entity that realizes the financial return:	Tucson businesses
Equitability (progressive/regressive, income/revenue neutral, etc):	Progressive because overall City water rates likely to be less than otherwise
Potential unintended consequences:	Possible diminishment of Tucson commercial site and overall attractiveness

Background information:

Potable water treatment and distribution requires energy and generates GHG emissions. The Pima County GHG Inventory for 2008 reported that the City's GHGs associated with providing potable water to its residents caused ~115,000 tCO_2e in 2008 (23% from natural gas consumption and 77% from electricity) – a 10% increase from 2000 though a 3% drop from 2007. Water reclamation added 15,000 tCO_2e, bringing the water-related total to ~129,000 tCO_2e.[1]

Water demand is 56% residential, 19% multi-family and 25% commercial / industrial.[2]

The City's single-family / duplex / triplex residential water rates (adopted 2010) are designed to discourage excessive consumption by the use of an increasing block rates. Water consumption per month greater than 30 Ccf (748 gallons) at $8.14/Ccf is more than five times the $1.54/Ccf rate of the first 15 Ccf ($1.54), and consumption above 45 Ccf at the rate of $11.13/Ccf is more than seven times the rate of the first 15 Ccf.

More than 80% of Tucson's residential customers use less than 15 Ccf/month. The rate structure is designed to send a conservation message: "Use more water, pay more; use less water, pay less."[3]

Water users also pay a flat "Conservation charge" of $0.05 per Ccf to support the City's water conservation programs.

However, the increasing block rate has not been applied to non-residential users, who pay less than all residential blocks but the first 15 Ccf:

Mobile home parks with submeters:	$1.80
Industrial:	2.02
Commercial:	2.20
Multi-family:	2.29
Construction water:	2.47

These categories of water users pay a summer surcharge of $0.95/Ccf in Tier 1 and $0.25/Ccf in Tier 2.[4]

Tucson Water's "WaterSmart" program for businesses encourages water conservation with educational materials, tools, incentives, public recognition, case studies and direct customer support. The program recognizes levels of conservation performance via four award levels of Copper through Platinum, which is achieved by a 30% reduction in water use. Participants create a water management plan and budget.

In 2008, the City adopted its "Water Harvesting and Graywater" ordinances that require new commercial development to (1) utilize water harvesting practices to meet 50% of site landscape water requirements.[5]

Indicators and Goals

The Livable Tucson vision program of 1998 recommended an indicator regarding Natural Resources Conservation of reduced water use per capita.

In 2010 the City adopted its "2011-2015 Action Plan for Water Sustainability," a cooperative project with Pima County. Though no specific water intensity or water volume reduction performance goals were adopted, a number of process goals were adopted to reduce water consumption in both residential and non-residential situations:

- Comprehensive, Integrated Planning
  - Encourage sustainable urban forms
  - Direct growth to suitable growth areas
  - Integrate land-use and water resources planning
  - Growth should pay for itself over time and be financially sustainable

- Demand Management
  - Increase the effectiveness of conservation programming through coordinated planning and evaluation.
  - Establish common water conservation goals and targeted methods.
  - Manage demand through design of the built environment.
  - Manage demand through changing behaviors.
  - Increase the use of rainwater and stormwater to reduce demands on potable supplies.

The Plan notes that "Establishing measurable water conservation goals was identified as a regional item. The City and the County have identified a benchmark study as an initial step to gather background information on measurable goals."[6] The Plan does not mention water rates.

Status Quo / Business as Usual:

The flat non-residential water rates will continue to send a signal to non-residential water users that conservation is not a priority. Given the residential conservation rates that employees of commercial enterprises experience at home, the lack of conservation rates for their workplaces will be a noticeable contradiction that could undermine the desired effect of the conservation rates for residences (i.e. people may take the need for conservation less seriously if conservation rates don't apply to all customers).

Regarding the reduction of carbon intensity of water operations, Tucson water would presumably participate in broad City-based carbon intensity reduction programs adopted. Reductions in carbon intensity would occur otherwise if:

(1) TEP becomes less carbon intensive;

(2) energy-using equipment like pumps or vehicles are upgraded to more energy efficient devices when replaced at end of their life;

(3) the business case for replacing energy-using devices with a more efficient device/system becomes compelling before the end-of-life; or

(4) the development and/or use of Tucson Water's own less-carbon-intensive energy supplies or generally less carbon-intensive energy sources become economically compelling (e.g. Tucson Water partners to own wind turbines to power its operations).

Description of Measure and Implementation Scenario:

The measure is designed to foster City actions that will reduce commercial sector water usage, starting with application of "conservation" water rates to commercial accounts, but including other measures necessary to achieve the goal of a 10% per capita reduction in commercial water use by 2020. The other measures could be the adoption of the Climate Wise business program that would foster business energy and water efficiency investments, or City business license/tax changes that would foster greater investment by businesses in water conservation, either using their own capital or energy-service performance contracts.

Establishment of conservation rates for non-residential water sources

Water saving investments typically have a strong return-on-investment because they save both energy and water. For example, water efficient washing machines generate strong savings of both energy and water costs (though energy savings are mostly dependent upon using cold water instead of warm or hot water, regardless of water efficiency). Water-using chillers are increasingly common as an energy-efficient way to cool buildings, and can be designed/installed with moderate, or maximum energy and water efficiency.

This measure assumes that City and NGO education programs, combined with marketing by energy/water savings businesses to business customers (including ESCOs) will help businesses maximize water savings, but that adoption of conservation-based water rates for commercial accounts is required to achieve the measure' goal.

Recommendation: Reduction of the carbon-intensity of Tucson Water's operations.

Westmoreland Associates recommends that the City investigate options for Tucson Water to reduce the carbon-intensity of its operations as a separate initiative. This is based on the PAG GHG inventory of the very energy intensive operations of Tucson Water (primarily due to Central Arizona project pumping energy).

Has the Measure been implemented elsewhere and with what results:

Municipal water utilities typically charge flat rates for water consumed by the commercial sector, but charge higher rates for higher water service capacities. For example, the City of Portland OR Water Bureau and the East Bay Municipal Utility District of the San Francisco Bay area both use extensive programs to support business water conservation, but rely on graduated service level charges to support efforts since water usage fees are flat.

Energy/Emission analysis:

Tucson Water's GHG footprint was ~129,000 tCO_2e in 2008. Their water services for non-residential customers were 25% of their total – meaning that if conservation rates reduced water use by non-residential customers 10% (roughly equivalent to a 10% per capita reduction at present levels of water consumption by the non-residential sector), a corresponding 2.5% reduction in carbon emissions could be expected.

We assume that non-residential water consumption will grow with Tucson's population, which is projected to grow 1.9%/year by PAG. The actual non-residential use is not likely to precisely track population growth, since the water intensity of Tucson future developments (such as industries or tourist/recreation attractions) could make a major difference.

Based upon a 1.9%/yr population growth rate to 2020, the commercial sector's share of water-based GHG savings at 10% per capita is projected to be 4,056 tCO_2e.

Climate Change Impact Summary in tCO_2e:

COT 1990 Citywide GHG emissions (baseline):	5,461,020 tCO_2e
MCPA 7% reduction target for COT:	5,078,749
2012 BAU GHG emissions projection:	7,000,000
2020 BAU GHG emissions projection:	7,343,141
GHG emissions reduction to meet 7% goal (2012):	1,921,251
GHG emissions reduction to meet 7% goal (2020):	2,264,392
Contribution of this Measure:	4,056 tCO_2e

Economic analysis:

Westmoreland Associates recommends that the City collaborate with Tucson Water to accurately estimate the potential average return on investment from water conservation efforts made by businesses in response to conservation-based commercial water rates. This analysis assumes that the conservation rates cause businesses to invest and save water costs such that businesses achieve a breakeven point of no net increases in their water costs.

In other words, businesses invest in water conservation devices and/or behaviors that prevent paying more than their water charges are today, and no net savings or costs accrue to the businesses.

Co-benefits:

An important co-benefit could be extension of the City's cost-effective water supply to greater numbers of people and businesses, keeping rates lower for all customers.

Equitability:

If overall water rate increases are diminished by the reduced commercial water consumption, the measure is likely to have a progressive impact since lower income households likely pay more of their available income for water utilities than higher income households.

Potential unintended consequences:

If businesses respond to conservation water rates with behaviors that diminish Tucson's attractiveness to employers or visitors, an adverse economic impact could result. Westmoreland Associates projects that the measure's goal of a 10% reduction per capita in commercial water use does not require a diminishment of Tucson's attractiveness since examples of cost-effective water conservation exist throughout the country, including at golf courses and other heavily landscaped areas. Xeriscaping typically saves businesses on maintenance costs.

Endnotes

[1] Pima Association of Governments, "Regional Greenhouse Gas Inventory," 2010, p. 35.

[2] City of Tucson and Pima County, "2011-2015 Action Plan for Water Sustainability," p. 28.

[3] Tucson Water website, "Current Water Rate Schedules."

[4] Tucson Water website, "Current Water Rate Schedules."

[5] City of Tucson and Pima County, "2011-2015 Action Plan for Water Sustainability," p. 29.

[6] City of Tucson and Pima County, "2011-2015 Action Plan for Water Sustainability," p. 7.