Comments on the August 2009 "Water Efficiency in the Commercial and Institutional Sector: Considerations for a WaterSense® Program" White Paper

November 19, 2009

Commenter: Thomas Riggs
Affiliation: Not Disclosed
Comment Date: August 21, 2009

I don't know if you are aware of the amount of water that is wasted by owners of ultra high pressure waterjet cutting equipment.

A typical fabrication shop with just one waterjet in use rated at 50hp and 60,000 lbs of cutting pressure will use on an annual basis approx 512,939.52 gallons of water. The bulk of the water is used for the cooling cycle for the hydraulics of the equipment, (384,704.64) just for cooling. The balance of the water is used in the cutting process. These stats are based on a customer using the equipment 8 hours per day, five days a week and 50 weeks per year.

The standard method of installation of the waterjet is for raw water to be used for the cutting and the cooling circuits. Equipment exists that can cut the water usage to **zero** for this equipment. The equipment captures the entire effluent table run off and the water used in the hydraulic circuit for cooling, then the water is then cleaned, filtered, chilled and then reused. This equipment is very effective in this process and treats and removes material from the water to .35 microns. Water stored in the clean storage tank for reuse is treated with an ozone generator to treat for any biological contaminates. After the water is cleaned and treated it is ready to be used again.

Shop owners I have found have not really cared how much water is used in the process unless the building lease payment does not include water in the lease rate. The numbers stated here are facts on water usage on the equipment. I have been in the industrial machine tool business for 20 plus years and have sold, serviced and installed hundreds of waterjets.

I have attached a spread sheet for your review. It clearly illustrates how much water is used in a waterjet cutting operation. The last column on the right represents the amount of water that could be saved if the customer will only close the hydraulic cooling loop to drain. The potential savings in water is astronomical.

This is a serious problem with our most precious resource, water. It must be addressed.

Tom

TYPICAL WATERJET USAGE IN GPM AT 60k PSI & 55K PSI

COOLING FLOW CHART - ORFACE VS PRESSURE AND EFFECTS ON GALLONS PER MINUTE

Based on 60k pressure									Water usage in Gallons Per Minute						Inline Chiller
Pump HP	Pump	cutting 1	cutting 2	GPM 1	GPM 2	Cutting	Cooling		Total	1 hr	8 hr	1 wks	1 mo	1 yr	1 yr 75% avg
	Max Int	Orface	Orface			Water	Min GPM		Flow gpm	60	480	2400	9600	120000	Gal Saved
	GPM					GPM									
30	0.520	0.010	n/a	0.5217	0	0.5217	2.5	S	3.022	181.30	1450.42	7252.08	29008.32	348099.84	261074.88
50	0.900	0.090	0.090	0.4226	0.4226	0.8452	4.0	D	4.845	290.71	2325.70	11628.48	46513.92	558167.04	418625.28
50	0.900	0.013	0	0.8817	0	0.8817	4.0	S	4.882	292.90	2343.22	11716.08	46864.32	585804.00	439353.00
60	1.200	0.010	0.010	0.5217	0.5217	1.0434	4.5	D	5.543	332.60	2660.83	13304.16	53216.64	638599.68	478949.76
60	1.200	0.014	0	1.0226	0.0	1.0226	4.5	S	5.523	331.36	2650.85	13254.24	53016.96	662712.00	497034.00
75	1.340	0.011	0.011	0.6313	0.6313	1.2626	6.0	D	7.263	435.76	3486.05	17430.24	69720.96	836651.52	627488.64
75	1.340	0.015	0	1.1739	0	1.1739	6.0	S	7.174	430.43	3443.47	17217.36	68869.44	860868.00	645651.00
100	1.880	0.013	0.013	0.8817	0.8817	1.7634	8.0	D	9.763	585.80	4686.43	23432.16	93728.64	1124743.68	843557.76
100	1.880	0.018	0	1.6904	0	1.6904	8.0	S	9.690	581.42	4651.39	23256.96	93027.84	1162848.00	872136.00
150*	3.200	0.017	0.017	1.5078	1.5078	3.0156	9.0	D	12.016	720.94	5767.49	28837.44	115349.76	1384197.12	1038147.84
150*	3.200	0.024	0	3.0052	0	3.0052	9.0	S	12.005	720.31	5762.50	28812.48	115249.92	1440624.00	1080468.00
200*	3.600	0.018	0.018	1.6904	1.6900	3.3804	10.0	D	13.380	802.82	6422.59	32112.96	128451.84	1541422.08	1156066.56
200*	3.600	0.026	0	3.5269	0	3.5269	10.0	S	13.527	811.61	6492.91	32464.56	129858.24	1623228.00	1217421.00

* Dual Intensifiers

Based on 55k pressure									Water usage in Gallons Per Minute						Inline Chiller
Pump HP	Pump	cutting 1	cutting 2	GPM 1	GPM 2	Cutting	Cooling		Total	1 hr	8 hr	1 wk	1 mo	1 yr	1 yr 75% avg
	Max Int	Orface	Orface			Water	Min GPM		Flow gpm	60	480	2400	9600	120000	Gal Saved
	GPM														
30	0.600	0.100	n/a	0.5217	0	0.5217	2.5	S	3.022	181.30	1450.42	7252.08	29008.32	348099.84	261074.88
50	1.000	0.010	0.010	0.4995	0.4995	0.9990	4.0	D	4.999	299.94	2399.52	11997.60	47990.40	575884.80	431913.60
50	1.000	0.014	0	0.9791	0	0.9791	4.0	S	4.979	298.75	2389.97	11949.84	47799.36	597492.00	448119.00
60	1.220	0.011	0.011	0.6044	0.6044	1.2088	4.5	D	5.709	342.53	2740.22	13701.12	54804.48	657653.76	493240.32
60	1.220	0.014	0	0.9791	0	0.9791	4.5	S	5.479	328.75	2629.97	13149.84	52599.36	657492.00	493119.00
75	1.440	0.012	0.012	0.7193	0.7193	1.4386	6.0	D	7.439	446.32	3570.53	17852.64	71410.56	856926.72	642695.04
75	1.440	0.016	0	1.2788	0	1.2788	6.0	S	7.279	436.73	3493.82	17469.12	69876.48	873456.00	655092.00
100	2.000	0.014	0.014	0.9791	0.9791	1.9582	8.0	D	9.958	597.49	4779.94	23899.68	95598.72	1147184.64	860388.48
100	2.000	0.019	0	0.1803	0	0.1803	8.0	S	8.180	490.82	3926.56	19632.79	78531.17	981639.60	736229.70
150*	3.200	0.015	0.015	1.1239	1.1239	2.2478	9.0	D	11.248	674.87	5398.94	26994.72	107978.88	1295746.56	971809.92
150*	3.200	0.021	0	2.2029	0	2.2029	9.0	S	11.203	672.17	5377.39	26886.96	107547.84	1344348.00	1008261.00
200*	3.600	0.018	0.018	1.6185	1.6185	3.2370	10.0	D	13.237	794.22	6353.76	31768.80	127075.20	1524902.40	1143676.80
200*	3.600	0.026	0	3.3768	0	3.3768	10.0	S	13.377	802.61	6420.86	32104.32	128417.28	1605216.00	1203912.00

* Dual Intensifiers

Commenter: Edward Balon
Affiliation: Atlantic Irrigation
Comment Date: August 23, 2009

Hello,

The one thing I never hear anyone talking about is using chiller water to supplement irrigation water. The amount of water that chiller units deposit into the sewer is more than enough to irrigate most landscapes. This should be added to the roof run off cistern systems LEEDS seem to be trying to perfect.

Ed Balon
Atlantic Irrigation
914-882-5244

Commenter: Bill Zachmann
Affiliation: Shorelands and Environmental Assistance Program, Department of Ecology
Comment Date: August 24, 2009

Hi,

In brief, include the above sector in Water Sense program for the obvious reasons of our nation needing to do much more for water conservation than we are already doing. This would help water resources management programs and actions in Washington State.

Thanks

Bill Zachmann
Watershed Planning and Policy Lead
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Olympia, WA 98504-7600
Desk: (360) 407-6548 Cell: (360) 280-9149

Commenter: Phoenix McKinney
Affiliation: City of Tampa, FL
Comment Date: August 26, 2009

I have a question regarding Figure 3 in the document "Water Efficiency in the Commercial and Institutional Section: Considerations for a WaterSense Program."

In reviewing the data, I see that there is a fairly large portion of end use attributed to hospitals in the illustrating pie chart that is unlabeled. I was unable to match the data in the chart to that in the appendices provided as a part of the document.

Would you please tell me what category of end use for hospitals is illustrated at 15%.

Thank you.

For water conservation tips, visit TampaGov.net/savewater

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Commenter: René Fleming
Affiliation: City of St. George, UT
Comment Date: August 26, 2009

I would like to see some sort of program geared towards the CI sector. The difficulties cited in the paper are accurate. It seems the approach from a subsector view would be most effective. This is primarily due to the differences in the amount and use of water in various users within the sector. Utilities would then be able to target the subsector most prevalent in their service territory, increasing the opportunities for effective water conservation.

Some subsectors would be easy to delineate, such as seen in the table 1. Third party verification at least in spot checks would be helpful in giving the program creditability. I would favor a multi-tiered program that would allow CI customers to work towards the tier they could afford. A single tiered system may eliminate those customers that do not have funds or expertise to meet the single tier.

René Fleming
Conservation Coordinator
City of St. George, UT
Phone 435-627-4848
Fax 435-627-4814

Commenter: Charlotte Ely
Affiliation: U.S. Environmental Protection Agency
Comment Date: August 31, 2009

This is all I had time for. I hope it's helpful.

- What research needs to be done or data collected on the CI sector? What information gaps exist?

  In order for ENERGY STAR Portfolio Manager to benchmark Waste Water Treatment Facilities, a survey was conducted to get an idea of how much energy facilities across the country used based on treatment capacity and technologies. This is what enabled ENERGY STAR to score them from 1-100. A score of 50 indicates an average facility, based on this national survey. It would be useful I think to have similar information for high water using sectors. That way, we have an idea about the range of water use and perhaps use this information to create a water-centric benchmarking tool.

- Are you aware of any reliable data that is not cited in this paper and could add substantially to our understanding of water use in the CI sector?

  Check out our website. You may find something useful:
  http://www.epa.gov/region/waterinfrastructure/waterconservation.html

- If EPA were to set a water use percent reduction target for the CI sector as a whole or for specific subsectors, what should EPA use as the water use baseline and what percent reduction should be targeted?

  A good start would be to rely on what percent reductions are possible based on the Pacific Institute Report.

- What impact could a national sector water-efficiency program have on the revenue and rate structure of drinking water utilities?

  Water Efficiency in the Commercial and Institutional Sector: Considerations for a WaterSense Program

- What issues and barriers stand in the way of a national CI sector water-efficiency program? How can EPA overcome them?

  Program Design Options

- Should EPA address all subsectors together or separately?

  Separately.

- Are the factors for choosing a subsector appropriate?

- What are the pros and cons of each program structure presented?

- What program structure do you think EPA should adopt and why?
- Is it important to have WaterSense labeled CI sector facilities?
- If a certification and labeling scheme is preferred, should EPA have a single-tiered or multi-tiered program? Should certification be third-party or self declaration? Should a specification include percentage reduction requirements, best management practices (BMP) implementation requirements, or both?
- If EPA chose a partnership-commitment program structure, what should the commitment be? What reporting should be required?
- If EPA offered technical assistance, what should it be and in what form should it be offered?

  I like the idea of the massive recourse database. I also think it would be useful to EPA to hire contractors to provide water audits to facilities when local water utilities do not support such a program.
- If a subsector-specific approach is chosen, should EPA's efforts focus on the largest overall users of water, or on the largest individual accounts?

  Does it really have to be one or the other?
- If a subsector-specific approach is chosen, what factors should be considered in prioritizing different subsectors?

  Greatest water use and greatest potential for efficiency.
- Should EPA offer an awards program?

  YES! I also think it would be great for winners to act as mentors.
- What other incentives should EPA offer for participating in the program?

  I like the idea of making money available for retrofits.

Commenter: Dan Duke
Affiliation: Water Conservation Technology International
Comment Date: September 7, 2009

White Paper Authors,

WCTI is an R&D company, and I would be interested in making a presentation and contributing to the CI sector at the Nevada meeting. I have technology and data that demonstrate significant quantities of water can be saved in cooling water applications, and how recycled water can be used without consequence. You can download a pdf of a recent presentation by WCTI to the California Congresswoman (Grace Napolitano, Water & Energy Resources Committee) related to this sector, a technology brochure and recycled water use paper at the following web page link (www.water-cti.net/Napolitano<http://www.water-cti.net/Napolitano>).

The research information I have developed varies from some in your White paper, but that may depend on the area of the country and variables related cooling season loads. WCTI has found in areas like California that significantly higher ratios of water consumed by CI are from cooling tower applications. One of the major limitations to recycled use is available access to recycled supply when the volume for irrigation or lavatories can not justify the expense for pipeline installation by the utility or CI end user. We have found that cooling tower use can increase recycled water use volume by 2X to 3X to help justify the recycled pipeline install cost for smaller CI accounts. Additionally, new zero discharge technology eliminates the performance issues with recycled water or potable water use, and increases the volume of waste water that can be eliminated to provide excellent ROI for the end user.

Dan Duke
President, WCTI

Commenter: Walter J. Bishop
Affiliation: Contra Costa Water District
Comment Date: September 15, 2009

Attached please find comments from the Contra Costa Water District on the white paper titled "Water Efficiency in the Commercial and Institutional Sector: Considerations for a WaterSense Program." If you have any questions, please contact Chris Dundon at 925-688-8136.

Thank you
Mona Rowan

September 15, 2009

WaterSense CI Sector Program
Environmental Protection Agency (EPA)
watersense-ci@erg.com

Subject: Comments on proposed WaterSense Commercial and Institutional Sector Program

To Whom It May Concern:

Thank you for the opportunity to comment on the U.S. Environmental Protection Agency's (EPA) proposed WaterSense CI Sector Program. The document "*Water Efficiency in the Commercial and Institutional Sector: Considerations for a WaterSense Program*" provides a very comprehensive review of the current state of knowledge regarding water use in the CI Sector.

The Contra Costa Water District (CCWD) agrees with the EPA that a WaterSense CI Sector Program would be extremely beneficial and will result in long-term water use efficiency improvements.

Below is a list of comments on the proposed Program.

Data Gaps and Research Needs

What research needs to be done or data collected on the CI sector? What information gaps exist?

- A considerable amount of data is available on water and energy use for fixtures and appliances used in the CI sector. However, the data is not easily accessible to commercial end users, nor is it provided in a format that allows for comparison of water and energy efficiency. The proposed EPA Program could fill this gap.

Are you aware of any reliable data that is not cited in this paper and could add substantially to our understanding of water use in the CI sector?

- The Food Service Technology Center is funded by the California energy utility customers and administered by Pacific Gas & Electric (PG&E). They develop standard test methods for evaluating commercial kitchen appliance performance. Their website is www.fishnick.com.

If EPA were to set a water use percent reduction target for the CI sector as a whole or for specific subsectors, what should EPA use as the water use baseline and what percent reduction should be targeted?

- CCWD recommends focusing on specific subsectors. The range of water use between commercial subsectors can vary dramatically. CCWD also recommends creating a certification program similar to the LEED certification program utilizing a point system based on efficiency standards set for individual water using fixtures, appliances and landscape.

Program Design Options

Should EPA address all subsectors together or separately?

- CCWD recommends focusing on specific subsectors separately. The range of water use between commercial subsectors can vary dramatically.

What program structure do you think EPA should adopt and why?

- CCWD recommends creating a certification and labeling program similar to the LEED certification program utilizing a point system based on efficiency standards set for individual water using fixtures, appliances and landscape. CCWD recommends implementing a phased subsector-by-subsector approach. This would allow the EPA to focus on high water and energy using subsectors first and fine-tune the program before moving on to other subsectors. CCWD recommends using a multi-tiered program similar to the LEED certification program.

If EPA offered technical assistance, what should it be and in what form should it be offered?

- If the program was organized as recommended above, commercial and institutional customers will need access to a comprehensive list of "certified" fixtures and appliances, including information on their water use. The easier it is for a customer to determine the efficient fixture or appliance, the more successful the program will be. Secondly, the EPA could create a list of qualified technical experts in the various fields to assist customers.

Thank you again for the opportunity to comment on the proposed WaterSense CI Sector Program.

Sincerely,

Walter J. Bishop
General Manager
WJB/CD/fm

Commenter: Mike Meagher
Affiliation: The City of Calgary
Comment Date: September 15, 2009

Hello

Thank you for providing an opportunity to provide comments and feedback. It is great to see an increasing focus on ICI water conservation. The work you do will directly impact the work I am doing. Please find my comments below.

Data Gaps and Research Needs:

ICI humidification. I cannot find information on humidification systems even though in talking with the School board similar buildings one without humidification and one with the water use increase 50%. Office buildings have had similar comments plus performance issues.

ICI performance standard for toilets. The residential sector has been using Maximum Performance Testing of Low flow toilets with great success. However similar testing does not exist for ICI toilets. Because of the improvements in testing and design we are seeing tank type toilets out performing flush valve toilets. We are also seeing performance issues in some new construction and renovations.

Aerator change outs. We often see the calculations but it is hard to find the true water savings verified in the field with the simple act of changing out aerators. We are working on one project that will take a year to complete has this not been tracked in other projects? With the move by many groups to require 0.5 gallon per minute aerators in public washrooms I am surprised I cannot find examples.

Trap Primers. There is a little bit of information here and there but there are concerns that these may contribute to leakage issues when they fail open. Fails are hard to detect unless they fail closed and the trap dries out.

Tracking incentive program results: I have been tracking results from many incentive programs and it is great to be able to verify real world water savings change this fixture and save X amount of water per year. However in some programs the only thing being tracked is the number of rebates provided, or number of fixtures changed with no water savings being tracked or justified. There are several studies that have looked at this or offer data sharing but it would be nice to see the EPA stand behind the water savings requirement in incentive programs.

Water Cooled woks. There is some information about these please see links but would like to see a big move to air cooled woks.
http://www.allianceforwaterefficiency.org/1Column.aspx?id=700
http://www.sydneywater.com.au/Publications/FactSheets/Wok_stove_fact_sheet.pdf

Other information here some reports and information The City of Calgary has produced.

Calgary hotel toilet replacement pilot study:
http://www.calgary.ca/docgallery/bu/water_services/conservation/business_customers/hotel_toilet_pilot_final_report.pdf

Calgary Pre rinse Spray Valve Study:
http://www.calgary.ca/docgallery/bu/water_services/conservation/indoor/calgary_pre_rinse_report.pdf

City of Calgary Water Efficiency Plan
http://www.calgary.ca/docgallery/bu/water_services/conservation/planning/water_efficiency_plan.pdf
www.calgary.ca/waterservices/ici

Other web sites of interest.
http://www.poliswaterproject.org/
http://www.allianceforwaterefficiency.org/1Column.aspx?id=700

Across the board percent reduction targets have two flaws. One they penalize the early adopters while rewarding the water wasters as they are able to meet or exceed the target. They are easy to set high level but hard to get buy in because of the number of assumptions used and lack of respect to the businesses that have to meet them. The City of Calgary has struggled with this question and have moved toward focusing on best practices, best fixtures and looking at each customer group independently.

What impact could a national sector water efficiency program have on revenue and rates?

I find this question about revenue impacts with water conservation a bit strange based on how our municipal water supply works.

As a municipally owned utility we provide water and sewer service on a cost of service bases. Our Rates are designed to cover the costs of operations, treatment and distribution of water and wastewater. Looking at it from the cost side if we sell less water we also have less costs (chemicals and energy) we will still cover our costs. We are also in a growing municipality so the water savings are being used to accommodate growth in new population and new businesses.

Using less water per customer has improved our system efficiency and postponed capacity upgrades on water and waste water treatment plants. We have significantly reduced non revenue water through leak detection, metering and system audits as non revenue water is what really has a negative impact on the bottom line.

What issues and barriers stand in the way?

- Proof to the end user or building operator that the fixtures/equipment using less water will perform as well or better than existing fixtures/equipment.
- GREEN MARK UP- The additional cost that some retailers are adding to the price of water efficient fixtures/equipment is a major barrier to some products.
- Retail cost vs. manufacturer cost – Some plumbing fixtures leave the manufacturer at a reasonable price but by the time it goes through all the shipping and handling and distributors to the plumbers the end price is so high. The higher the price the longer the payback when all else is the same. Examples Pre rinse spray valves $35-$75 each from

manufacturer $150 to $270 end user, aerators $ 0.50 to $1 from the manufacturer end user cost $4-$8

- Water conservation does not rank as highly as energy conservation. Water is always the thing to look at as something you do after you have conserved energy. This needs to change to recognize how limited water is and how important water is to life and business. Water only gets attention when there is a problem, boil water order, main break, drought, it is hard to raise awareness when these are the only times water matters. However, Energy gets attention daily with the ties it has to: National Security, climate change, Spot market prices, Peak oil, the stock market, Business earning reports, and the Economy.

- Although we are talking about water we cannot forget about sewage and sewer flows. I have found a couple water conservation projects that did not go well because the sewer pipes needed cleaning and repair. The reduced water flows only highlighted the existing problem which the property owner did not want to repair. When talking to many building owners most have not had their sewer lines scoped, most do not do preventative maintenance. The problems of root intrusions, collapsed pipes and fats/oils builds come to light when it all backs out and floods the building causing a costly clean up.

- What goes in our sewers affect the downstream user. What happens upstream affects our drinking water. However, it is not often water and sewer is talked about together. There needs to be a better connection on the water conservation /wastewater source control issues.

What can the EPA do?

- Make the link between the importance of water and our lives at work and home.

- Include a water component to all EPA Energy initiatives and incentives.

- Promote the energy benefits of savings water

- Greenhouse Gas and Energy Co0Benefits of Water Conservation http://www.poliswaterproject.org/publication/91

- Energy and water nexus http://policyresearch.gc.ca/doclib/Thirlwell_energy_water_nexus.pdf

- Collect success stories of where a low flow fixtures have been used and how they worked.

- Continue the EPA's work on performance standards and third part testing.

- Connect wastewater and water as on issue.

- Water use is not just about the water that comes from the tap after going through the treatment process. It is also about where the water came from and the value of the water in the natural state. What is that water worth in the future? What is the benefit to leave

the ground water in place or keep the surface water in place to accommodate aquatic life? Tourism and recreation?

There have been several studies on social marketing, the Water Soft Path http://www.poliswaterproject.org/ that should be explored to look at how to change the public view of water and find solutions.

KEEP UP YOUR GREAT WORK!! KEEP ASKING QUESTIONS!!!

Program Design Options

Key stakeholders please add these groups as keep stakeholders: Include the Financial industries as stake holders. My best success is when we can get the people controlling the money to see the savings. Accountants, Business owners, economic development groups and Venture capital companies they need to look at the capital cost and the operation cost when making decisions on retro fits and new construction. If you want true change you need these groups on side.

The trade schools plumbers, engineers, Building Operations they are not being engaged and end up being some of the barriers to water conservation.

Should the EPA Address all subsectors together or separately? Definitely separately. The water use and need by various business are so different and, as is, the way information and messaging needs to be done that separately is the only way it can be don affectively. There are also various regulatory and contractual agreements that affect different industries. When you look at the number of groups who have tried to do it all at once with a high level approach they have ended up going back and breaking things out sector by sector.

Are the factors for choosing subsector appropriate? Yes there will always be variation within the sectors but by allot of these grouping have been done already and many of these industries already have Associations, environmental program or certifications like Green Label, BOMA, Green KEY, LEED, …

What are the pros and cons of each program structure presented? One there are so many groups trying each of the options that we have to question do we need a new program? No. Do we need options from all the proposed programs YES to be flexible and bale to meet the individual and regional issues we face. We need research in areas where there is missing information or technology gaps. Where we have technology and information we need action. In regions where water there is not enough water to supply the population and businesses action needs to be acting with proven technology and behavioural change. Currently we have a real problem in that these areas are desperate to save water and they become the testing ground for low flow technologies that may or may not work, when something fails like programmable irrigation controllers or sensor activated fixtures and water demand increases they have no room to accommodate the problem they created. Yes the learning from these issues have moved toward better technologies and mechanisms that do what they are designed to do but the testing was done in the wrong place with resources that could have been used on proven technology. Critics of labelling and certification programs are that the right decisions stop getting made in place of point/check mark chasing. There is also a problem in that everyone seems to be creating their own green check lists and certification bodies with very expensive fees for certification.

What program structure do you think the EPS should adopt and why?
Sector by sector phased in approach, with a regional comment to recognize who is in urgent need and who has room left in their water supply.

First focus on "true" buy in that water conservation saves water, money and that products will meet or exceed the performance of existing water using fixtures/equipment.

Rate or work with the existing certification, labelling programs that have momentum to ensure they have the correct standards and fees and can keep doing the work they are doing.

The EPA should be helping those that are interested and willing to move ahead, help the municipal programs, state programs and international where there is a benefit and efforts under way. Nothing worse than working for years to get things going to have a new group come claim the success and steel the momentum.

High light success and share the information.

Help or let things go where there is momentum (New Construction, restaurants, schools, irrigation) and progress toward goals and targets for water conservation. Look at the areas where there is no action or limited action like renovations and like small business that are being over looked. These small business individual do not use a lot of water when looked at individually but they are not being targeted by water conservation programs and as a group there total water use is very significant.

Is it important to have Water Sense Labelled CI sector facilities? There are many labelling and certification programs in place. It would be best for the EPA to work with existing programs to reduce cost, unify requirements and improve auditing requirements. Then target the CI segments that do not have label and certification options.

Currently many of the certification and labelling issues can be improved by: Updating standards and point systems, reducing cost of certification, having a site visit component, focusing on the performance over the certification.

If a certification and labelling single tiered or multi tiered? Multi tired to have the flexibility to deal with unique situations and the differences that exist in water use.

Self declared or third party? Has to be third party or have an audit component to ensure that things are being done and that information can be confirmed and shared.

BMPs? BMP's are very important because they allow for behavioural controls, ensure proper maintenance and ensure ongoing water savings. We have seen many buildings built to save water only to lose the savings when the building went to building operations and not information was provided to Building ops on the how's and whys or because they cut the irrigation budget and it was built following no standards or BMP's.

Thank you

Mike Meagher
Industrial Commercial Institutional Customer Coordinator

Strategic Services
Water Resources
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P.O. Box 2100, Station M, Calgary, AB Canada T2P 2M5

Commenter: Gary Weil
Affiliation: EnTech Engineering, Inc.
Comment Date: September 16, 2009

The White paper entitled Water Efficiency in the Commercial and Institutional Sector: Considerations for a WaterSense Program is very good at suggestions for what industry and individuals can do to save water but it ignores one avenue that our company's research has found to have a much more significant effect on the total loss of water to society, that being locating and repairing the leaks in the potable water distribution systems and in the sewer & waste water collection systems that transports the water back to its rehabilitation source.

Reputable sources around the world have estimated that water & waste water distribution & collection systems can lose 50% or more of the contents (Ontario Canada, Naples Italy).

Techniques have been developed by us and others (http: www.entechworld.com) that use remote sensing sensors mounted on vans and helicopters that can locate and prioritize these leaks. Additional non-invasive technologies can be used to permanently repair these pipeline defects without digging up streets, working within the pipelines, or inconveniencing the public during the repair process. Independent studies by corporations such as British Petroleum and Pavimental of Italy have also shown that these non-invasive techniques can save over 80% of the typical pipeline investigation and repair trenching costs. (URS)

The most useful part of the technology is that large areas can be investigation with super efficiency. Van mounted systems can investigate 10-20 miles of pipeline per day while helicopter mounted sensors can investigate 100 to 200 miles of pipeline per day. Entire small cities can be completely investigated for pipeline leaks in just a few weeks. Rehabilitation can be performed immediately and savings can start immediately and be maintained at modest costs, typically at less that a few pennies per foot of pipeline.

GARY J WEIL, P.E., C.P.I.M.
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Commenter: Keith Bancroft
Affiliation: Marin Municipal Water District
Comment Date: September 17, 2009

To Whom It May Concern,

Please find attached comments from the Marin Municipal Water District regarding a WaterSense CI program. Thank you for the opportunity to provide feedback on this important program.

Sincerely,
Keith Bancroft
Water Conservation Specialist Supervisor
Marin Municipal Water District
220 Nellan Ave
Corte Madera CA 94925
415-945-1526 (7 am – 4:30 pm)
fax: 415-945-1403

www.marinwater.org

MARIN MUNICIPAL
WATER DISTRICT

220 Nellen Avenue Corte Madera CA 94925-1169
www.marinwater.org

WaterSense CI Sector Program
Environmental Protection Agency (EPA)
watersense-ci@erg.com

Subject: Comments on proposed WaterSense Commercial and Institutional Sector Program

To Whom It May Concern:

Thank you for the opportunity to comment on the U.S. Environmental Protection Agency's (EPA) proposed WaterSense CI Sector Program. The document "*Water Efficiency in the Commercial and Institutional Sector: Considerations for a WaterSense Program*" provides a very comprehensive review of the current state of knowledge regarding water use in the CI Sector.

The Marin Municipal Water District (MMWD) agrees with the EPA that a WaterSense CI Sector Program would be extremely beneficial and will result in long-term water use efficiency improvements.

The following is a list of comments on the proposed Program.

Data Gaps and Research Needs

What research needs to be done or data collected on the CI sector? What information gaps exist?

- A considerable amount of data is available on water and energy use for fixtures and appliances used in the CI sector. However, the data is not easily obtained from a central source, not easily accessible to commercial end users, and not provided in a format that allows for easy comparison of water and energy efficiency. Depending on its ultimate design, the proposed EPA Program could fill this need.

Are you aware of any reliable data that is not cited in this paper and could add substantially to our understanding of water use in the CI sector?

- The Food Service Technology Center is funded by the California energy utility customers and administered by Pacific Gas & Electric

(PG&E). They develop standard test methods for evaluating commercial kitchen appliance performance. Their website is www.fishnick.com.

If EPA were to set a water use percent reduction target for the CI sector as a whole or for specific subsectors, what should EPA use as the water use baseline and what percent reduction should be targeted*?*

- The range of water use between commercial subsectors can vary dramatically, so a subsector-based target would be a more feasible approach. However, there could be drastic differences in efficiency within a sector due to factors such as the age of the facility. For example, a newly constructed hotel compared to a 1980's era hotel would likely have more efficient toilets and showerheads due to changes in the plumbing code, and would have a more difficult time meeting a prescribed percentage cutback.

  For the reason described above, MMWD recommends creating a certification program similar to LEED that utilizes a point system based on efficiency standards set for individual water using fixtures, appliances and landscape. Because LEED certified buildings have recently been found vulnerable to poor performance, MMWD also recommends following the LEED example of requiring submittal of information about water use from all applicants.

Program Design Options

Should EPA address all subsectors together or separately?

- MMWD recommends focusing on specific subsectors separately.

What program structure do you think EPA should adopt and why?

- MMWD recommends creating a certification and labeling program similar to the LEED certification program utilizing a point system based on efficiency standards set for individual water using fixtures, appliances and landscape.

  MMWD recommends implementing a phased subsector-by-subsector approach and a multi-tiered program similar to the LEED certification program.

If EPA offered technical assistance, what should it be and in what form should it be offered?

- If the program was organized as recommended above, commercial and institutional customers will need access to a comprehensive list of "certified" fixtures and appliances, including information on their water use. The easier it is for a customer to determine the efficient fixture or appliance, the more successful the program will be.

  A good example of what is necessary can be found on the CEE web site (www.CEE1.org) under the "Commercial Kitchens Initiative". Here, customers can access information on specific products, outreach program design and program evaluation. Although links to other sites (www.energystar.gov) that provide savings calculators are provided, it would be best to have the savings calculators available directly on the main site.

  In addition, the EPA could create a list of qualified technical experts in the various fields to assist customers. The California Urban Water Conservation Council (CUWCC) maintains a list of pre-qualified consultants for use by its member agencies. Consultants must submit a Statement of Qualifications and pass a committee review.

Thank you again for the opportunity to comment on the proposed WaterSense CI Sector Program.

Sincerely,

Keith Bancroft
Water Conservation Specialist Supervisor
Marin Municipal Water District
(415) 945-1526
kbancroft@marinwater.org

Commenter: Todd C. Quarterman
Affiliation: WaterWatch Corporation
Comment Date: September 18, 2009

Hello,

In regards to water efficiency for the commercial market, water submetering in multifamily, commercial, and industrial properties is a proven method of reducing water usage. Upon installing water sub-meters in an existing property, average water consumption drops by 15%-30%. The multifamily is estimated to have 35 million apartment units in USA. It's possible that 4 million are currently sub-metered. Estimated water saving for the remaining 31 million apartment units per month is 930,000,000,000 gallons or a total savings of 1,116,000,000,000,000 gallons per year. Tax credits for water sub-meters would surely help property owners justify installing sub-meters.

Regards,

Todd C. Quarterman
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www.waterwatchcorp.com

Commenter: Jackie Jackson Teel
Affiliation: Chatham County – Savannah Metropolitan Planning Commission
Comment Date: September 18, 2009

Please find attached the Chatham County- Savannah Metropolitan Planning Commission's (MPC) comments to the draft EPA document "Water Efficiency in the Commercial and Institutional Sector: Considerations for a WaterSense Program". The comments were placed directly in the document for ease of reading. Please call Tom Thomson at 912-651-1446 or myself at 912-651-1454 if you have any questions or comments.

Thank you-

Jackie Jackson Teel

Jackie Jackson Teel, LEED - AP
Natural Resources Administrator
Chatham County - Savannah
Metropolitan Planning Commission

www.MPCNaturalResources.org<http://www.MPCNaturalResources.org>

Phone: (912) 651-1454/1440
Fax: (912) 651-1480

Note: The referenced attachment is rather large and is included as Attachment 1.

Commenter: Jennifer Cisneros
Affiliation: Bio-Microbics, Inc.
Comment Date: September 18, 2009

I recently came across a call to action with regard to water efficiency for commercial Buildings:

EPA Seeks Input on WaterSense for Commercial Buildings
What should a WaterSense program for commercial buildings look like? How could we encourage water efficiency in universities and hotels? Or in golf courses and car washes?... (http://www.iapmo.org/Green%20Issues/2009-09%20Green%20Newsletter%20September.pdf)

I have attached an article that I'd like to submit for consideration for the Commercial Building WaterSense program. This article focuses on options available for large onsite wastewater systems – which is an industry ideal for our product lines. Bio-Microbics developed this article to help educate Builders/Developers on the benefits of using advanced wastewater systems for decentralized systems and water reuse – especially when it comes to LEED certification.

It covers ideas that Builders/Developers have more options today and explains that the decentralized/distributed options are, in fact, a great method for properties to treat their wastewater and reuse the water for landscaping, etc. It is also a great cost-effective method for a small community to pretreat wastewater prior to sending to an overloaded municipal plant – a common occurrence due to a wastewater plant not equip or sized to handle urban sprawl.

Let me know if you require additional information.

Thanks!

Jennifer Cisneros
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Press Release

FOR IMMEDIATE RELEASE

Bio-Microbics Contact: Jennifer Cisneros
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For Immediate Release in January 2009
For more information, contact Paul Adams,
Associate Publisher, Commercial News USA
800-581-8533

Bio-Microbics in Shawnee, Kansas Wins Exporter of the Year Award

Bio-Microbics, Inc. from Shawnee, KS, a suburb of greater Kansas City, has received a 2009 Exporter of the Year award in the Environmental Category from ThinkGlobal Inc., publisher of Commercial News USA, the official export promotion magazine of the U.S. Commerce Department.

The Kansas-based company manufactures economical and ecological wastewater and storm water treatment systems for light commercial and residential onsite markets, including homes, commercial properties, and communities in the U.S. and abroad. Bio-Microbics is a subsidiary of RLR, Inc., a wastewater treatment company headquartered in Kansas City, Missouri.

"We are pleased to have been recognized with an Exporter of the Year Award," said Bob Rebori, President of Bio-Microbics, Inc. "Our Company began export sales immediately after our launched in 1996, and since then export sales have been an important and growing base of revenue. Our mission is to bring superior products to emerging markets using proven, existing technologies in new and innovative ways. We are truly grateful to all who support us, and we eagerly look forward to the company's continued success."

Bio-Microbics has focused its export activities on improving water quality in single-family homes, clustered subdivisions, and high-strength commercial applications. The company also provides systems for the renovation and revitalization of failed septic systems. Currently, exports represent approximately 30 percent of the company's total revenue.

The technology behind Bio-Microbics systems is based on a process called Fixed Activated Sludge Treatment (FAST®), developed by Smith & Loveless, another RLR affiliate and a world leader in the design and manufacture of wastewater equipment since 1946. The FAST process employs a combination of attached and suspended bio-growth in an aerobic, packed bed bioreactor and used successfully in municipal, industrial, marine, commercial, and residential settings for the past 35 years.

"The Bio-Microbics' Treatment Systems are easy to install," said Rebori, "and the simple, pre-engineered, modular design of our popular FAST wastewater treatment systems delivers consistently high performance."

Commercial News USA is a catalog-style magazine with an estimated 400,000 readers in 176 countries worldwide. Awards are given to one U.S. company in each of 15 industry categories. Privately held Bio-Microbics, Inc. was named Exporter of the Year in the Environmental category. All *Exporter of the Year* award winners will be profiled in the May-June 2009 issue of the magazine. More information is available at www.thinkglobal.us.

Exporter of the Year winners were chosen on the total number of documented export transactions completed in 2008, the total percentage increase in sales in 2008 compared to 2007, exports as percentage of total sales, the company's commitment to exporting, the company's commitment to customer service, and the company's innovation and originality in marketing products or services. To be eligible for the award, a company must currently be exporting from the United States.

Gregory Sandler, publisher of Commercial News USA, said that the success of Bio-Microbics, Inc. is indicative of how American companies can benefit from exporting. "American companies looking for growth need to be considering opportunities outside of the U.S.," said Sandler. "World markets offer considerable potential for U.S. exporters."

-End-

Information about the Exporter of the Year awards, including profiles of all the winning companies, is available online at www.exporteroftheyear.com. The current issue of Commercial News USA is available online at www.thinkglobal.us.

Title: Attractive, Advanced, Alternative…Triple AAA for the Environment

Subtitle: Onsite treatment systems benefit homeowners, developers and the environment.

Written By: *Robert K. Rebori, Staff Writer*
Jennifer Cisneros, Communications Coordinator

Reviewed By: *Robert J. Rebori, President*
Allison Blodig, REHS, Manager of Regulatory Affairs & Special Projects

A city's wastewater treatment infrastructure is part of the groundwork for the organization of an entire community. This is one of the most costly endeavors for the community and using a centralized system is often not an environmental benefit. There is conclusive evidence centralized sewer collection systems are leaking and causing treatment plant overflows during strong wet weather events. Leakage into streams and ground water are a common occurrence in many places and a significant problem in many communities across the U.S. A study in Albuquerque, New Mexico concluded that leakage of wastewater from sewer pipes amounted to 10 percent of average daily wastewater flow at their treatment plant, or five million gallons per day. Due to cost and these types of overflow issues, alternative ways of providing wastewater service in suburban areas are gaining increasing attention.

In many situations, a decentralized/distributed system is the better way to go. Often seen as suitable only in low-density, rural situations and then only as temporary solutions, decentralized wastewater treatment systems are not usually thought of as an option for more than one home. However, with proper design, installation and operation, the advantages of decentralized systems are many. By collecting, treating, and reusing or disposing of wastewater from individual homes, buildings, and/or cluster systems near the point of generation, decentralized/distributed systems can reduce the time, amount of water, and energy involved with treating wastewater with a higher pollutant removal rate.

Benefits for Developers

Developers who look into alternatives to sewer or center-collection systems actually see plenty of reasons to choose decentralized/distributed systems for their homes. For example, a developer who is looking to build 50 suburban homes can have his project delayed up to five years while the city to extend the existing sewer lines to the homes. Plus, the developer is likely going to pay significant sewer tap fees and substantial fees for the cost of extending sewer lines so that current sewer customers will not have to see their rates increase. If the developer is charged more, chances are the developer will charge the residents more. Additionally, especially in places like coastal areas, small lots and heavy regulation can tie the developer's hands if the developer is trying to put in a sewer. The 5-year (or whatever was given) time line is likely to stretch even further.

Because these decentralized/distributed systems are typically composed of modular, interconnected, and easily replaceable parts, installation and maintenance is simple. It only takes a matter of days or weeks to install and start-up a decentralized system. The savvy developer does not have to plan as extensively in comparison to building a neighborhood with a sewer. The developer may also decide to use these systems instead of building out from the central infrastructure because they require less time and money to obtain permits. But one of the major benefits of these systems is the developer can build out slowly and add to the treatment system as needed to maintain treatment meaning the upfront costs are significantly lower.

As an example, when the developer looks into onsite wastewater treatment he or she will likely find a small, quick-to-install, MicroFAST® wastewater treatment unit from Bio-Microbics, Inc., based in Shawnee, KS. These modular units can treat 500 gallons per day or significantly more using a cluster system treating from 3,000 up to 160,000+ gallons/day enough to accommodate an entire community. More good news exists in the fact that these advanced treatment systems treat the water to considerably higher standards for subsurface irrigation or any other reuse method. These units are easily upgradable, scalable, and take up considerably less space than centralized treatment options. Moreover, these advanced treatment systems offer a water reuse opportunity for community parks, schools, golf courses to upkeep common areas and reduce potable water consumption for these non-potable uses. The developer also has more options in terms of the topography and/or type of land available, which not only increases property value but can lead to a decrease in Urban Sprawl.

Benefits for Residents

Homeowners generally do not like to think about sewage treatment. Quite frequently, a neighborhood near a large treatment plant will be irritated by its smell, noise or appearance. Residents will be happy to know that odor is usually less of a concern with decentralized/distributed systems and they are typically almost unseen because they can be installed below ground.

Since the size of land normally reserved for the drain field on a given property can be reduced by using individual onsite systems or eliminated by using cluster systems, the residual land can be used for other structures like a pool or common areas like parks or just green space. The other added benefit these systems have is that the treated water can be reused for drip tube irrigation of the lawn or other landscaped areas.

Whenever a community has a centralized wastewater system and developments are proposed, questions are likely to arise over how the costs and benefits of the system are to be distributed, which can be avoided when all the costs and benefits go to single homes or clustered developments. Also important to consider is the fact that property near large centralized systems decreases in value, understandably. Houses with individual or distributed systems have a more equal distribution of value. In addition distributed/decentralized systems are often much more economical for smaller communities than sewers. Columbus, New Mexico's situation in 1995 serves as an excellent example. It had a choice between paying $4.21 million for sewers with aerated wetlands and ponds, or paying $1.19 million for new single home treatment systems.

Septic Systems Have Had a Lousy Reputation

Frequent system failures are associated with the various types of conventional septic systems. When developers contract with a company or individual to install onsite systems, they are looking to minimize costs by adhering to the minimum standards instead of looking to protect the environment. Sometimes they are simply unaware that other options exist. Usually the failures are characterized by very unpleasant events affecting an entire development of homes where the systems were not designed or installed properly. These events are things like untreated wastewater surfacing on the ground or backing up into the houses. Thus, many have assumed that onsite systems simply cannot be reliable. However, looking deeper into the situation, the problems of onsite systems diminish considerably when a system utilizing proven technology (such as the FAST® systems), is designed, installed, and maintained correctly, and given no harsh chemicals to treat.

Homeowners also can help to take care of their system and extend its life. Reading the owner's manual of any treatment system is a must. In it, homeowners are reminded that things like paint thinners, medicines, and even liquid fabric softeners can be harmful to a septic system. Regular inspection and pump out of septic tanks also goes a long way in reducing failures. A professional should always do any maintenance to a system. The good news is that decentralized systems require less operation and maintenance than centralized wastewater treatment plants, and therefore can be less costly to maintain overall.

Environmentally Conscious

Properly designed, installed, and operated decentralized/distributed wastewater systems have significantly cleaner effluent than centralized systems do. Unbelievably, untreated water sometimes gets disposed to the environment with centralized systems whether due to aging infrastructure, water main breaks, flooding, or poor operation. Often, minimal energy is needed to create

this superior effluent. Using again the example of the FAST® unit from Bio-Microbics with the SFR® (Sequencing Fixed Reactor) feature that comes integral on every FAST® system control panel, the blower can be cycled on and off for two reasons: reduced energy operating cost (up to 45%) and improved nitrogen reduction performance (in specific situations).

A great concern of the EPA is the amount of nitrates a system releases into the environment. These nitrates can enter groundwater and under the right conditions are implicit in causing certain birth defects and are thought to cause other disorders like hyperthyroidism. If too many nitrates enter a pond or lake, they create algae, which destroy oxygen in the water and subsequently kill fish. Many centralized systems remove hardly any nitrates, while some distributed/decentralized systems remove an impressive amount of nitrates.

Water table levels and stream base flows can be harmed by the use of centralized systems and are improved or preserved by the use of decentralized/distributed systems. In the case of centralized systems, they do not discharge their effluent anywhere near where the homes or businesses use and/or obtain their water. Thus, many streams lose their water to these systems, but in the case of decentralized systems, the water goes to the nearby leach field and possibly back into the stream. Also important to note is that riparian zones (the area between land and a stream) are less frequently disturbed by the installation and operation of onsite systems than they are by sewer systems.

Conclusions

It is very important for developers and residents to decide what type of wastewater system is most feasible to implement, economically, politically and environmentally. It is not always a clear choice, but there is substantial evidence that decentralized systems are very frequently the answer. They are less of a hassle for responsible builders and homeowners, and they are a friendly gesture to the environment at a time when such gestures are greatly sought after.

Summary: Distributed/decentralized/alternative and clustered onsite wastewater treatment systems are in many ways preferable to centralized/sewer/conventional systems because of their economic, political and environmental advantages.

Company Description:

Since its founding in 1996, Bio-Microbics manufactures innovative ecological wastewater and stormwater treatment systems for decentralized homes, commercial properties, and communities located around the globe.

The FAST® (Fixed Activated Sludge Treatment) Wastewater System is based on environmentally sound and simple scientific principles. Developed by Smith & Loveless (a Bio-Microbics affiliate and a world leader in the design and manufacture of water and wastewater equipment since 1946), the advanced technology behind the FAST® process employs a unique hybrid combination of attached and suspended bio-growth in an aerobic, packed bed bioreactor; and used successfully in municipal, industrial, marine, commercial, and residential type applications.

With a worldwide emphasis on improving water quality, Bio-Microbics advanced wastewater and stormwater treatment products help to make better water…for a better world.

Keywords: wastewater, centralized, distributed, decentralized, onsite, alternative, sewering, nitrates, nitrogen removal, single-family, clustered subdivisions, developments, septic system, drain field revitalization

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Robert K. Rebori is a Staff Writer for Bio-Microbics, Inc.
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Web: www.biomicrobics.com

# # # # #

Installations of FAST® wastewater treatment units ideal for concrete, fiberglass, and steel tanks for large communities, clustered subdivisions, and commercial properties located around the globe.

Temporary Community FAST® System in Louisiana, USA

Community FAST® Units with drainfield In Virgina, USA

Commerical FAST® Unit in steel tank in Mexico

Residential FAST® System in Latvia

Multiple FAST® units to accommodate any project

Commenter: Cindy Moe
Affiliation: Denver Water
Comment Date: September 18, 2009

Data Gaps and Research Needs

- What research needs to be done or data collected on the CI sector? What information gaps exist? Each utility's own customer information may be lacking enough detail for data collection. For example, we don't know which accounts are for "restaurant" or "hotel", just simply that it is classified as "Commercial". In addition, we define multi-family housing as commercial, which is not included in this program.

- Are you aware of any reliable data that is not cited in this paper and could add substantially to our understanding of water use in the CI sector? I didn't see this one listed: BMP Costs & Savings Study, A Guide to Data and Methods for Cost-Effectiveness Analysis of Urban Water Conservation Best Management Practices, march 2005, CUWCC. (I only have what's labeled as a "Draft" so I'm not sure there was ever a "Final"?)

- If EPA were to set a water use percent reduction target for the CI sector as a whole or for specific subsectors, what should EPA use as the water use baseline and what percent reduction should be targeted? Too difficult to set a baseline/reduction, even for specific subsectors. If you required a fixed "20% reduction", for example, a company who has been severely wasting could reach it easily while a company who was already conserving would have a difficult time reducing further.

- What impact could a national sector water-efficiency program have on the revenue and rate structure of drinking water utilities? Conservation is a big part of our future water supply planning, so rates would be adjusted accordingly to make up for "lost revenue"

- What issues and barriers stand in the way of a national CI sector water-efficiency program? How can EPA overcome them? Reaching the right people who care enough to get this recognition. Luckily, it's a good time where companies DO want to "go green", but it's also a bad time for the economy….

Program Design Options

- Should EPA address all subsectors together or separately? To be viewed as a meaningful label, subsectors should be addressed separately. End uses are too different across the board.

- Are the factors for choosing a subsector appropriate? Yes, it's a great start – more can be added later if you find enough outliers

- What are the pros and cons of each program structure presented?

    1. Certification & Labeling: I like this idea the best, especially for buildings that can't achieve LEED but want to be recognized as environmentally responsible. I'm

also fine with self-declaration, and you could partner with local utilities to conduct random inspections! I would make it available to new construction, as well.

2. Partnership Commitment: Not my favorite… but I do like the idea of "technical assistance" for those that don't meet the criteria from the above program! Not enough recognition.
3. Education & Outreach: Also not my favorite, but I would like to see some type of award or incentive for participating businesses. I don't think you'd get much involvement without the actual certification & labeling process.

- What program structure do you think EPA should adopt and why? Certification & Labeling seems like the program that would encourage the most involvement from the CI sector.

- Is it important to have WaterSense labeled CI sector facilities? Yes, we've been trying to come up with criteria for different sectors here in Denver and it's difficult! A nationally recognized label may be more meaningful than a local utility label, too.

- If a certification and labeling scheme is preferred, should EPA have a single-tiered or multi-tiered program? Should certification be third-party or self declaration? Should a specification include percentage reduction requirements, best management practices (BMP) implementation requirements, or both? I think single-tiered is sufficient (you either are or aren't efficient). Certification could be self-declaration, maybe an online check-list, but could be randomly inspected by local utilities. BMPs only.

- If EPA chose a partnership-commitment program structure, what should the commitment be? What reporting should be required?

- If EPA offered technical assistance, what should it be and in what form should it be offered? Assistance choosing appropriate fixture retrofits, water audits (free from our utility), report estimating water (and money) savings achieved from suggested retrofits, links to rebate information,

- If a subsector-specific approach is chosen, should EPA's efforts focus on the largest overall users of water, or on the largest individual accounts? Largest overall users – most impact. If every restaurant was certified, people would start to recognize the program rather than just having the one power plant certified, etc.

- If a subsector-specific approach is chosen, what factors should be considered in prioritizing different subsectors? Largest overall users of water

- Should EPA offer an awards program? It's a good idea to recognize the really proactive businesses

- What other incentives should EPA offer for participating in the program? Maybe an online database of "certified" businesses, discount on WaterSense products,

Cindy Moe, P.E., LEED AP | Industrial Water Conservation Engineer
Denver Water | t: 303.628.6009 | f: 303.628.6238 | c: 303-472-3371 |
cindy.moe@denverwater.org

Commenter: Clark Throssell
Affiliation: Golf Course Superintendents Association of America
Comment Date: September 18, 2009

Greetings:

Please find the attached comments in response to the white paper titled, Water Efficiency in the Commercial and Institutional Sector: Considerations for a WaterSense Program.

I am submitting these comments on behalf of Clark Throssell, Ph.D., Director of Research, GCSAA. Clark may be reached by email at cthrossell@gcsaa.org<mailto:cthrossell@gcsaa.org> or by phone at 406-656-1986.

Please acknowledge receipt of these comments.

Sincerely,

Mark

Mark E. Johnson
Senior Manager, Environmental Programs

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www.eifg.org<http://www.eifg.org>

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September 18, 2009

WaterSense
Environmental Protection Agency
1200 Pennsylvania Ave., NW
Washington, DC 20460-0001

The Golf Course Superintendents Association of America (GCSAA) and The Environmental Institute for Golf (EIFG) submit these comments in response to the white paper *Water Efficiency in the Commercial and Institutional Sector: Considerations for a WaterSense Program* issued on August 20, 2009 by WaterSense at the U.S. EPA.

GCSAA is a leading golf organization, which has as its focus golf course management. Since 1926, GCSAA has been the top professional association for the men and women who manage golf courses in the United States and worldwide. From its headquarters in Lawrence, Kan., the association provides education, information and representation to more than 20,000 members in more than 72 countries. GCSAA's mission is to serve its members, advance their profession and enhance the enjoyment, growth and vitality of the game of golf. The association's philanthropic organization, The Environmental Institute for Golf, works to strengthen the compatibility of golf with the natural environment through research grants, support for education programs and outreach efforts.

GCSAA and the EIFG, along with the rest of the golf industry, recognizes that the availability of water, in sufficient quantities and of quality adequate to sustain turfgrass, is a major issue facing the game and business of golf. In the last 25 years, non-profit organizations, universities, and private industry have funded research, provided education programs, and introduced new products and technologies to the golf industry to advance water use efficiency on golf courses. GCSAA and the EIFG acknowledge the need to use water resources efficiently and supports efforts aligned with this goal.

Data Gaps and Research Needs
GCSAA and the EIFG have conducted a series of five surveys to determine the property features, inputs, and management practices associated with golf courses in the U.S. The water use and conservation survey results were published in the peer-reviewed journal, *Applied Turfgrass Science*. The article is titled "Golf Course Environmental Profile Measures Water Use, Source, Cost, Quality, and Management and Conservation Strategies" and was published in January 2009. The results will help to satisfy the request for data in the white paper and should form the basis to explain the complexity and challenges associated with water use across the golf course industry. The article in Applied Turfgrass Science can be found at: http://www.plantmanagementnetwork.org/sub/ats/research/2009/profile/ and a popular report of the results for the public can be found at: http://www.eifg.org/programs/EIFG_GCEP_Vol_2.pdf

GCSAA and the EIFG appreciate the opportunity to comment on the white paper, the content of which raises several concerns and questions which are outlined below:

- **Golf Course Management as a Segment of Agriculture**

EPA has included golf courses as a subsector of the commercial and institutional sector in the white paper. However, golf turfgrass management is based on agricultural science and golf courses provide a product similar to other agricultural industries. Like other agricultural industries, golf courses rely upon ecosystems to provide a product to the marketplace. We would appreciate the justification of why golf courses have been placed in the commercial and institutional sector.

- **Scope of the Proposed Program**
  It is not clear if a proposed program for golf courses would target indoor water use, swimming pools, or irrigation for the golf course and grounds. It is also not clear whether a golf course program would target all golf facilities or just those with publicly supplied water. Clarification of the scope of a proposed program is necessary. Our comments below are based on the assumption that a program would include irrigation of the golf course and grounds.

- **Goals**
  One of the stated goals of the WaterSense program is to reduce consumption to relieve the strain of expanding water infrastructure. The white paper reports that "By transforming the market for water-efficient products, services and practices, WaterSense is helping to relieve the strain of expanding water supply and wastewater infrastructure." This goal may be a direct conflict with golf course irrigation. In cases where golf courses are part of the potable water system, many are a reliable source of income for the water provider. According to our survey data (referenced below), 14% of golf facilities nationally use potable water as one of their irrigation sources. In addition, 12% utilize recycled water as an irrigation source. The majority of golf courses nationally utilize water from other sources such as wells or surface water. The infrastructure to deliver water to golf courses is likely in the best interest of both parties. GCSAA and the EIFG promotes the use of recycled water, but one of the major reasons it is not used more often is because recycled water is not available or the infrastructure to deliver recycled water does not exist. The WaterSense program should take a position on the use of recycled water for irrigation purposes. The absence of a position conceivably puts the golf industry at odds with the purpose of the WaterSense program. GCSAA and the EIFG consider the use of recycled water for irrigation a significant value to community water treatment facilities. For this use to increase, it will require more infrastructures to deliver recycled water to golf facilities. Ultimately, golf courses provide a final "treatment" of the recycled water, and in many cases, a reliable revenue stream for the treatment facility.

  There are several areas of the white paper that identify a percentage reduction approach to ensure water conservation by the commercial and institutional sector. Setting an arbitrary water use percentage reduction is not appropriate or effective for the golf industry. Golf courses are located in diverse settings across the nation. In the southwest U.S., water conservation is of utmost concern and the golf industry has been active in conserving water used to irrigate golf courses. The golf industry is best served by maximizing the efficient use of water – effective delivery devices, uniform application of water, and technology to guide irrigation decisions. Requiring a standard percentage

reduction in water use at golf courses that have already invested considerable resources to use water efficiently is not equitable and could severely impact those businesses.

- **Program Development Process**
  GCSAA and the EIFG are concerned with the process that will be used to develop a WaterSense program which targets the commercial and institutional sector and possibly golf courses. We have been involved in the development of the WaterSense for New Homes guidelines and have been extremely disappointed in the process used to create them for this area. In our judgment, sound scientific data presented by recognized experts has been routinely dismissed in the creation of the outdoor landscape provisions. The process used for the development of any program that includes golf courses must be collaborative and committed to using sound science as the basis for guidelines. Negative consequences of a poorly structured program could have severe impacts on individual golf businesses. The decision making process must be clearly outlined and follow accepted industry practices for GCSAA to consider future involvement.

- **The Value of Golf**
  Golf facilities contribute to communities by providing economic, environmental, and social benefits. These benefits must be acknowledged and used as a reference point when developing guidelines for a golf course program. Guidelines must be weighed against any possible diminishment of benefits provided by golf facilities.

The intent of our comments is to express our initial concerns with the development of a golf course WaterSense program and ask EPA to provide additional insight. We intentionally did not address the specific questions related to potential program options that were posed in the white paper. With the limited time given to respond, it would be premature to offer detailed answers to the questions without consulting with golf course superintendents, golf facility owners, other golf industry professionals, allied golf associations, university and industry turfgrass scientists, and those that provide irrigation products and services to the golf industry.

We are committed to the efficient use of water at golf courses and are hopeful we can collaborate with the EPA WaterSense Program. We would like to continue discussions with the EPA regarding this project and look forward to exploring options to partner with the WaterSense program that will encourage, promote and recognize progressive water conservation on golf courses.

Thank you for the opportunity to submit these comments. Please forward any questions or comments to me by phone at (406) 656-1986, or by email at cthrossell@gcsaa.org, or direct mail at GCSAA, 1421 Research Park Drive, Lawrence, KS, 66049.

Sincerely,

Clark Throssell, Ph.D.
Director of Research
GCSAA

Commenter: Michael P. Kenna
Affiliation: United States Golf Association
Comment Date: September 18, 2009

Comments were submitted on letterhead and begin on the next page.

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September 18, 2009

Ms. Veronica Blette
Acting Chief, WaterSense Branch
Office of Wastewater Management, Office of Water
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Mail Code 4204 M
Washington, DC 20460

Dear Ms. Blette

The United States Golf Association (USGA) submits these comments in response to the notice given in the white paper Water Efficiency in the Commercial and Industrial Sector: Considerations for a WaterSense Program issued on August 20, 2009 by WaterSense at EPA

The United States Golf Association is the national governing body of golf for the U.S. and Mexico. The USGA's most visible role is played out each season in conducting 13 national championships, including the U.S. Open. The USGA also writes the Rules of Golf, conducts equipment testing, funds research for better turf and a better environment, maintains a Handicap System, celebrates the history of the game and administers an ongoing grants program.

The USGA's vision for turfgrass and environmental research is to "use science as the foundation to benefit golf in the areas of turfgrass and resource management, sustainable development, and environmental protection." Since 1983, the USGA has funded more than 400 projects at land grant universities across the country at a cost of $37 million to improve the playing conditions and enjoyment of the game. There are two primary goals of the research program. The first is to develop turfgrasses and cultural systems with better stress tolerance and reduced water requirements and pesticide use. Projects are conducted on integrated turfgrass management, physiology breeding, genetics, and course construction. The second goal is to investigate the environmental issues and sustainable resource management for golf courses.

The USGA, along with the rest of the golf industry, recognize that availability of water in sufficient quantity and of quality adequate to sustain turfgrass is a major issue facing the game and business of golf. In the last 25 years, non-profit organizations, universities, and private industry have funded research, provided education programs, and introduced new products and technologies to the golf industry to advance water use efficiency on golf courses. Through university research and cooperation with the US Department of Agriculture, the USGA continues to support develop new grasses for golf that use less water or can withstand recycled or brackish irrigation water. Heat tolerant bentgrass, drought and cold-tolerant bermudagrass, or salt-tolerant seashore paspalum grasses are used today on golf courses to help reduce water use.

The USGA acknowledges the need to use water resources efficiently and supports efforts aligned with this goal. The USGA appreciates the opportunity to comment on the white paper on Water Efficiency in the Commercial and Industrial Sector: Considerations for a WaterSense Program distributed by the WaterSense Program at EPA. The content of the white paper raises several major concerns which are outlined below:

Specific research and data needs include:

Subsector specific data, such as:

- Water usage by facility and end use
  - The golf industry has been working on water conservation for 25 years. The recent publication "Water Use and Conservation Practices on U.S. Golf Courses. *Golf Course Environmental Profile, Volume II"* (Source: Golf Course Superintendents Association of America and Environmental Institute for Golf) is a good example about what we know concerning water usage by golf course properties. Surveys like these need to be expanded upon and data need to be collected more frequently to help make progress using water more efficiently.
- Existing benchmarks with which to set targets
  - It will be very difficult to set a general benchmark for the entire golf course industry. The golf industry needs to receive credit for what it has accomplished over the last 25 years. In areas of the U.S. where water is limited, golf courses have reduced turfgrass acreage, planted drought tolerant species, and utilized recycled wastewater. During this time, some golf properties have reduced water use by 40 to 50 percent. Benchmarks will have to be set on a regional and case-by-case basis looking at the golf properties prior efforts to reduce water consumption.
- Capacity and resources available of potentially participating facilities
  - Will golf courses that use surface or groundwater that is not treated by a municipal water treatment plant be included? What about golf courses that use recycled wastewater? What credit do golf courses get for retaining stormwater runoff? Allowing for groundwater recharge?

Economic data, such as:

- Capital versus long-term operating costs
  - A new or retrofitted irrigation system is a major capital expense (>$500K) and can lead to more efficient water use through better control systems and uniformity of distribution.
  - Switching to recycled water requires upfront equipment purchases; long-term monitoring soil salinity and equipment corrosion are problems
  - Switching to a different grass species that uses less water; rebuilding putting greens with better water saving properties.
- Other economic considerations in commercial facilities
  - Golfer expectations play a tremendous role in the management of golf course properties. For example, if a golfer goes to Phoenix, AZ in the winter time to play golf, they expect the golf course to be green. The golfing public actively chooses where to spend their time and money based on the golf course conditions.
- Impacts of commercial rate structures on efficiency
  - Water expenditures are passed along to the golf consumer. Irrigation expenditures can range from more than $100,000 per year in the Southwest to less than $5,000 in the North Central regions of the U.S. Irrigation systems tend to be more efficient in areas of the Southwest where water is more expensive.

- Other potential incentives
  - Grants, rebates or tax incentives would help some golf courses in areas where water is more abundant to install more efficient irrigation systems. Providing inexpensive access to recycled water would be an incentive to use this water source.

Information is also requested on potential partners who may assist WaterSense in distributing information, analyzing sector data and potential participation, and providing technical assistance to facilities.

- Golf Course Superintendents Association (http://www.gcsaa.org)
- US Golf Association – Green Section (http://www.usga.org/Course.aspx?id=7800)
- Irrigation Association (http://www.irrigation.org)
- Golf Course Builders Association of America (http://www.gcbaa.org)
- American Society of Golf Course Architects (http://www.asgca.org)
- Environmental Institute for Golf (http://www.eifg.org)

Feedback on the following areas and questions:

<u>Data Gaps and Research Needs</u>

- What research needs to be done or data collected on the CI sector? What information gaps exist?
  - Irrigation water usage on golf courses is well documented. How much does the club house or other buildings use? How much storm water is captured on golf courses? Do golf courses provide benefits to watershed management? How will golf courses that use non-treated surface or groundwater be included?
- Are you aware of any reliable data that is not cited in this paper and could add substantially to our understanding of water use in the CI sector?
  - Water Use and Conservation Practices on U.S. Golf Courses. *Golf Course Environmental Profile, Volume II.* Source: Golf Course Superintendents Association of America (GCSAA) Environmental Institute for Golf (EFIG).
  - *Water Quality and Quantity Issues for Turfgrasses in Urban Landscapes.* Source: Council for Agricultural Science and Technology (CAST).
  - Water Quality and Conservation, Chapter 9. Source: *Sustainable Golf Courses: A Guide to Environmental Stewardship.* Audubon International, John Wiley & Sons, Inc.
  - *Managing Wetlands for Golf Courses*. John Wiley & Sons, Inc.
  - *Wastewater Reuse for Golf Course Irrigation*. Lewis Publishers, Inc.
- If EPA were to set a water use percent reduction target for the CI sector as a whole or for specific subsectors, what should EPA use as the water use baseline and what percent reduction should be targeted?
  - First, less than 15 percent of golf courses use treated municipal drinking water. Will golf courses that do not use municipal drinking water be included in the WaterSense CI program? The water sources that golf courses use, e.g., open water (lakes, ponds); rivers, streams, creeks; municipal water supply; recycled water; canals; brackish water; and on-site desalinized should be defined.
  - Second, the golf courses that use municipal drinking water should be a subsector of landscape usage.
  - Third, it would be difficult (if not impossible) to set a 'standard' water use percent reduction target for such a vast range of water sources and climates in the U.S.
  - Problems and Questions: Would a golf course that switches from municipal water to recycled water receive a 100 percent reduction? Are golf courses that use brackish water

going to be included in the percent reduction target? Will golf courses that have reduced turfgrass acreage and planted drought tolerant grass species be required to have the same target reduction as a golf course that has not made an effort to reduce water? Will a golf course with a new, state-of-the-art irrigation system be treated the same as one with a 30-year old system? Is a golf course built on a corn field using what was once considered 'agricultural' water now going to be included? Is non-municipal water use by golf courses included or is it an agricultural use of water?

- What impact could a national sector water-efficiency program have on the revenue and rate structure of drinking water utilities?
  - The effect of a national program on revenue and rate structure will vary from region to region of the U.S. Where water is plentiful, it will take more time to increase water use efficiency. Where water is already scarce, water is more expensive and local and state governments have implemented programs and incentives to save water.
- What issues and barriers stand in the way of a national CI sector water-efficiency program? How can EPA overcome them?
  - The EPA is viewed as a regulatory agency that sways in the wind of political agendas imposed by presidents and congress. We need stronger leadership on water conservation; however, the EPA should be working with USDA, USGS, Army Corp of Engineers and other government agencies in order to make a national program work. The EPA should empower industries to develop their own best management practices to conserve water resources. There are many stakeholders who believe an EPA program will only appear to be open and transparent, but the final decisions will be made behind closed doors with disregard for industry suggestions. The EPA has a reputation of basing decisions on public emotion rather than scientific information.

<u>Program Design Options</u>

- Should EPA address all subsectors together or separately?
  - SEPARATELY! There are even sub-subsectors that the EPA has not considered.
- Are the factors for choosing a subsector appropriate?
  - Yes, this is a good start. However, is the program for municipal drinking water only? What about golf course irrigation water that comes from the same watershed or aquifer that supplies municipal drinking water? Is there a need for such a program where agricultural water is used for irrigating golf courses on the fringe of urbanized areas? Are these additional factors that need to be considered?
- What are the pros and cons of each program structure presented?
  - <u>Certification and Labeling Program:</u> This type of program would require the development of specifications for golf course irrigation. It has taken the USGA 50 years to develop specifications for putting green construction and the work continues today. Developing specifications for diverse climates, plant materials and climates would be a daunting task receiving constant criticism from stakeholders.
  - <u>Partnership Commitment</u>**:** The allied golf associations have the membership structure, professional staff, and cooperation of university faculty to develop BMPs or target percent usage reductions for the different regions of the U.S. A program of this nature is more practical to implement in a shorter time frame. There is a vast array of educational opportunities where technical information could be passed along to golf course superintendents. Third party verification could be implemented through the various services the allied golf associations, university extension, or private consultants currently provide.

  - Education and Outreach: In some regards, the golf industry is well on its way with education and outreach programs for golf course superintendents. The GCSAA and the USGA have made a commitment to research and education activities that target the conservation and efficient use of natural resources. The EPA should thoroughly evaluate these efforts and find ways to cooperate with what is already being accomplished in the spirit of environmental stewardship. Programs developed for the golf course industry could eventually be implemented successfully for other turfgrass areas that are being considered for the WaterSense CI program.
- What program structure do you think EPA should adopt and why?
  - The golf industry could adopt its programs currently underway to the Education and Outreach Program. Success at this level could eventually help the golf industry participate in a Partnership Commitment Program; however, individual golf courses should be allowed to participate on a voluntary basis.
- Is it important to have WaterSense labeled CI sector facilities?
  - A WaterSense label could provide positive public relations with a public concerned about wasting valuable resources. Golf is a $60 billion industry and the open, green spaces it provides in a rapidly urbanizing country provide a long list of environmental benefits. Documenting a sincere effort to reduce water use, as well as energy use and other resources would be good for the golf's image among the American public.
- If a certification and labeling scheme is preferred, should EPA have a single-tiered or multi-tiered program? Should certification be third-party or self declaration? Should a specification include percentage reduction requirements, best management practices (BMP) implementation requirements, or both?
  - First, it would be difficult to establish a certification and labeling scheme for the golf course industry. If one could be established, a multi-tiered program with both third-party and self declaration certification would best accommodate the golf industry. There is commercial and non-profit expertise available to provide third party certification, as well as thousands of university educated superintendents that could work with the GCSAA or universities to become certified through self declaration programs. The specification should focus on best management practices that improve water use efficiency. This type of program has reduced water use without setting a percentage reduction requirement; however, accurate records should be kept to demonstrate what the percentage water reduction was for the BMPs implemented.
- If EPA chose a partnership-commitment program structure, what should the commitment be? What reporting should be required?
  - The golf industry would benefit from the development of regional BMPs for water use efficiency. Self-defined commitments would be more readily adopted than those selected by a regulatory agency such as the EPA. The more customization you allow the golf industry, the more readily the goal to conserve water will be adopted. Annual reporting of BMPs implemented, climate information, and water use percentage of an acceptable benchmark would be a reasonable request for those who choose to cooperate in a WaterSense CI partnership-commitment program.
- If EPA offered technical assistance, what should it be and in what form should it be offered?
  - The EPA should discuss the technical aspects of golf course irrigation with a panel of turfgrass scientists, golf course superintendents, professional irrigation engineers, commercial companies, and allied golf associations. State-of-the art golf course irrigation is one of the most advanced, computer-automated, hydraulic systems that the EPA will deal with in the coming years. The golf industry could provide a great deal of technical assistance to the EPA!

- If a subsector-specific approach is chosen, should EPA's efforts focus on the largest overall users of water, or on the largest individual accounts?
  - The EPA's efforts should be focused on the largest overall users of water. Golf courses as a subsector-specific category will not be the largest overall user, or the largest individual account. For this reason, the EPA should recognize the golf industries' existing efforts underway to conserve water rather than re-inventing or duplicating programs.
- If a subsector-specific approach is chosen, what factors should be considered in prioritizing different subsectors?
  - EPA should prioritize efforts on the 'Relative Water Use within a CI Sector' and 'Water Use Intensity' factors.
  - Allow any subsector-specific category that has 'Water-Efficiency Potential' to participate willingly through possible connections to existing efforts and programs.
- Should EPA offer an awards program?
  - Yes, a pat on the back goes a long way.
- What other incentives should EPA offer for participating in the program?
  - Grant funds to the allied golf associations with a proven, long-term track record for the leadership and education of the professionals who are responsible for the care and maintenance of golf courses.

In summary, we ask the EPA to revaluate the purpose of this program as it relates to golf courses. The implications of this program could have severe impacts on individual golf businesses. We are committed to the efficient use of water at golf courses and are hopeful we can collaborate with the EPA WaterSense Program.

Thank you for the opportunity to submit these comments. Please forward any questions or comments to me by phone at (405) 743-3900, or by email at mkenna@usga.org, or direct mail at USGA Green Section, PO Box 2227, Stillwater, OK 74076.

Sincerely,

Michael P. Kenna

Michael P. Kenna, Ph.D.
Director

Commenter: Stephen W. Smith and Deborah H. Hamlin
Affiliation: Irrigation Association
Comment Date: September 18, 2009

Please let me know if you have any questions.

Thanks.

John Farner

John R. Farner, Jr.
Federal Affairs Director
Irrigation Association

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September 18, 2009

Ms. Veronica Blette
Acting Chief, WaterSense Branch
Office of Wastewater Management, Office of Water
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Mail Code 4204 M
Washington, DC 20460

Re: Irrigation Association Comments on the Proposed Concept for the WaterSense Commercial and Institutional Program

Dear Ms. Blette:

On behalf of the more than 2,000 member companies of the Irrigation Association, thank you for the opportunity to comment on the proposed concept for creating a WaterSense program focusing on the commercial and institutional sector. Below are the official comments of the Irrigation Association in response to the commercial and institutional whitepaper dated August 20, 2009.

The EPA and the WaterSense program should first focus on ensuring that the new homes specification is successful and enjoying the support of WaterSense partners before moving any focus to the commercial and institutional sector.

The irrigation industry recognizes that a possibility exists to promote WaterSense labeled partners and products throughout any labeling, incentive or reward program created by WaterSense. With this in mind, we recognize the inherent potential any program focusing on the commercial and institutional sector can bring to our industry's labeled partners and products, but strongly feel that WaterSense must first see the new homes specification process through to fruition. This includes knowing what areas of the new homes specification are successful and the areas that are not successful, along with increasing the support among various stakeholders for the new home specification before moving on to another sector. Even though any program focusing on the commercial and institutional sector may or may not look like the final version of the new homes specification, the irrigation industry is very concerned that the WaterSense program will take what is currently an unworkable and unsustainable outdoor criteria contained in the new homes specification and implement similar criteria in a commercial and institutional sector program.

Guidelines and criteria should be performance or outcome based, rather than prescriptive in nature.

When developing the guidelines and criteria for the commercial and institutional sector program, we highly recommend that the EPA work with WaterSense partners and other stakeholders in defining outcome or performance-based criteria, rather than focusing on criteria that are more prescriptive in nature. We believe that setting any prescriptive-based measures in a market enhancement program, like that of WaterSense, has an unintended consequence of hindering any innovation conducted within the industry, thus slowing the potential for any further water savings that innovation can drive. We would

much rather have goals set through a WaterSense program, with WaterSense partners and stakeholders driving the ways to reach these goals. Professionals in the irrigation industry pride themselves on being stewards of water management. This is true of manufacturers who are endlessly developing new products and tools to make irrigation systems more efficient, designers who are constantly developing new designs that are more efficient, and contractors who understand the science of irrigation and how to provide water from the irrigation system to every part of the living landscape in the most efficient way possible; thus maximizing the eco-system services potential of the cultivated landscape while using the correct amount of water. The irrigation industry believes in setting BMPs and holding our professionals to a high standard, through certification and WaterSense labeling. WaterSense can achieve significant water savings by stating agreed upon water saving goals and allowing irrigation professionals the leeway to achieve those goals in a manner appropriate for the locality and climate of the landscape.

The EPA and the WaterSense program should work with current sustainable programs that are already developed by many corporations throughout the C&I sector.

In addition to meeting EnergyStar, LEED, Green Building Initiative (GBI) and other "green building" standards, many corporations, golf courses, restaurants, hotels and other entities in the commercial and institutional sector have adopted their own sustainability programs that encompass both energy and water efficiency as components of their programs. Many of these programs have been in existence for years and continue to change as we become smarter and more efficient in our practices. The programs set water reduction goals through the adoption of efficiencies and other practices that in turn make office buildings, golf courses, hotels, multi-family residences, etc., more sustainable and environmentally friendly. The irrigation industry currently works with many of these individual programs in implementing efficient irrigation systems throughout these sub-sectors and we urge the EPA to take these existing well-established programs into consideration when developing the goals for a C&I program.

Data Gaps and Research Needs

<u>What research needs to be done or data collected on the CI sector? What information gaps exist?</u>

- A comprehensive environmental impact assessment of the eco-system services associated with existing water use. For example, living plants produce oxygen, sequester carbon, prevent erosion and mitigate urban heat island effect, along with many other attributes. Reducing water use may have significant unintended consequences, particularly if a commercial and institutional program becomes prescriptive and impacts plant and landscape choices in the C&I sector.
- There is little available benchmarking data available for landscape water use on commercial and institutional sites. The only exception is golf course water use, which is very sophisticated and in the majority of cases running at a very efficient level.
- Plant specific water use data, based on regions and climates. Having this data will maximize the eco-system services benefits of a cultivated landscape for a given climate, while maximizing efficiencies for water use within the landscape.

- Information is needed to determine how the C&I sector obtains current water resources. Many in this sector are self-supplied and place no burden or strain on public resources, especially relating to irrigation water use.

Are you aware of any reliable data that is not cited in this paper and could add substantially to our understanding of water use in the CI sector?

- Environmental Institute for Golf's water use analysis.

If EPA were to set a water use percent reduction target for the CI sector as a whole or for specific subsectors, what should EPA use as the water use baseline and what percent reduction should be targeted?

- Conduct baseline research to determine what efficient water use looks like in the commercial and institutional sector so as not to punish early adopters of efficient water use strategies with an arbitrary percent reduction target across the board.
- According to the EPA, the landscape industry is not recognizing as much as half of the net benefit of the seven billion gallons of water used daily to irrigate the landscape, citing losses to evaporation, runoff and deep percolation. As an example of potential savings, using EPA's numbers, if a C&I program would aim for an achievable 100% of ET_o, it would have the potential to yield 3.5 billion gallons of water savings every day. These savings would eclipse the 2008 WaterSense savings of 9.3 billion gallons in one week.
- All targets and goals should be based on an outcome of actual measured savings using WaterSense® labeled products and services.

What impact could a national sector water-efficiency program have on the revenue and rate structure of drinking water utilities?

- Outdoor water use represents a significant source of revenue for many drinking water utilities. The irrigation industry is interested in working with the EPA WaterSense® team, the C&I sector and purveyor communities in determining geographically appropriate water use goals and benchmarks.
- The irrigation industry recommends that through this program, rate structures should reflect the "true cost of water," which may include tiered rates, based upon science-based, equitable and reasonable allocations. This type of structure may provide a strategy for utilities to replace revenue.

What issues and barriers stand in the way of a national CI sector water-efficiency program? How can EPA overcome them?

- The diverse nature of water use throughout the C&I sub-sectors will likely create strife between stakeholders on the issue of equity.
- The irrigation industry recommends that the EPA create a stakeholder panel, comprised of relevant subject matter experts, to deliberate and develop program guidance.

Program Design Options

Should EPA address all subsectors together or separately?

- If a program is created, subsectors should be addressed separately.

Are the factors for choosing a subsector appropriate?

- We recommend an open vetting process. For instance, during our initial read of the whitepaper, we noticed that athletic fields and facilities were missing from any subsector lists. Because of all of the nuances and differences among the subsectors, an open dialogue will alleviate many of the potential problems a C&I program will incur when selecting subsectors.

What are the pros and cons of each program structure presented?

- Regardless of choice (each option has positives and negatives), the irrigation industry believes that a developed program structure should have the following components to ensure success of the program: financial or competitive advantage for making efficient choices; recognition for such choices in served markets; products that enhance workflow and/or productivity.

Is it important to have WaterSense labeled CI sector facilities?

- The irrigation industry believes that this is dependent on subsector. Some facilities are not visible to the served market and therefore would not benefit from such a label. Others are highly visible and would benefit.

If a certification and labeling scheme is preferred, should EPA have a single-tiered or multi-tiered program? Should certification be third-party or self declaration? Should a specification include percentage reduction requirements, best management practices (BMP) implementation requirements, or both?

- A single-tiered system is the best place to start as benchmarking analysis is needed to determine equitable tiers in a multi-tiered system.
- Self certification with oversight or random audits would likely result in greater buy-in from affected industries.
- Targeted, science based, equitable use goals, focused on outcome, is the best methodology that will yield results and buy-in.

If EPA chose a partnership-commitment program structure, what should the commitment be? What reporting should be required?

- This is best answered at a subsector-by-subsector basis.

If EPA offered technical assistance, what should it be and in what form should it be offered?

- For best results, technical assistance should be made available via the endorsement of credible third party subject matter experts.

If a subsector-specific approach is chosen, should EPA's efforts focus on the largest overall users of water, or on the largest individual accounts?

- EPA should focus on the sectors and subsectors that have not adopted proven strategies to improve water use efficiency through the deployment of best practices and technologies. In other words, begin by focusing on water waste, not water use.

Should the EPA offer an awards program?

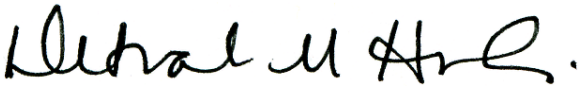
- While the irrigation industry agrees that an awards program would benefit many subsectors within a C&I program, significant thought and research needs to be done to focus on criteria, benchmarks, etc., before an awards program can be introduced.

What other incentives should EPA offer for participating in the program?

- In addition to any incentives for labeled products and people, the irrigation industry recommends that the EPA consider exemptions or leniencies from EPA enforced regulations for those participating in a WaterSense® C&I program.

Again, thank you for the opportunity to comment and we look forward to a continued open dialogue. If you have any questions, comments or would like to discuss any of our comments further, please contact IA's Federal Affairs Director John Farner at 703.536.7080 or john@irrigation.org.

Sincerely,



Stephen W. Smith
Chairman, Aqua Engineering, Inc.
President, Irrigation Association

Deborah M. Hamlin, CAE
Executive Director, Irrigation Association

Commenter: Mary Ann Dickinson
Affiliation: Alliance for Water Efficiency
Comment Date: September 18, 2009

Hello!

Please find a letter on the CI Sector Report, basically requesting an extension of the deadline to a date AFTER the October 5 meeting.

Mary Ann

~~~~~~

Mary Ann Dickinson
Executive Director
Alliance for Water Efficiency
PO Box 804127
Chicago, IL 60680 USA

773-360-5100 Phone
866-730-a4we Toll free
773-345-3636 FAX

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<http://www.allianceforwaterefficiency.org>
~~~~~~

Via Electronic Mail

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September 18, 2009

To the EPA WaterSense Program

The Alliance for Water Efficiency is pleased to see that EPA is now considering expansion of WaterSense to include partnership and participation options for users in the Commercial and Institutional (CI) sector. It is an important sector with opportunities for significant water savings, and a national program will be most welcome.

WaterSense is seeking comments on the white paper *Water Efficiency in the Commercial and Institutional Sector: Considerations for a WaterSense Program*. This paper summarizes the current state of knowledge regarding water use in the CI sector and outlines the basis for a potential national CI program.

Although comments were requested by a deadline of September 20, 2009, it is clear that WaterSense will soon be holding a stakeholder meeting on Monday, October 5, 2009 to discuss potential CI program options, in conjunction with the WaterSmart Innovations Conference and Expo in Las Vegas, NV. There will be a number of interested parties and organizations attending that meeting, including the Alliance for Water Efficiency. We would strongly suggest that the deadline for comments be extended to be AFTER this important stakeholder meeting. The Alliance is very interested in filing comments, especially after hearing the discussions that will take place in Las Vegas. Various stakeholders with significant knowledge of the CI sector will likely be present to enhance the discussion, and comments from all parties will certainly be more useful if filed after this meeting has occurred.

Thank you for your consideration of our request.

Sincerely,

Mary Ann Dickinson
Executive Director

Commenter: Doug Obegi
Affiliation: National Resources Defense Council
Comment Date: September 18, 2009

To Whom It May Concern:

Attached are the initial comments of the Natural Resources Defense Council on the EPA white paper regarding the development of a WaterSense program for the commercial and industrial sector. We hope these comments are helpful, and we look forward to working with you in the development of this program.

Sincerely,
Doug

Doug Obegi
Staff Attorney
Water Program
Natural Resources Defense Council
111 Sutter Street, 20th Floor
San Francisco, CA 94104
415.875.6100 (phone)
415.875.6161 (facsimile)

September 18, 2009

WaterSense
U.S. Environmental Protection Agency
Office of Wastewater Management (4204M)
1200 Pennsylvania Avenue, N.W.
Washington, D.C. 20460

Sent Via Email to: watersense-ci@erg.com

RE: NRDC's Initial Comments on *Water Efficiency in the Commercial and Institutional Sector: Considerations for a WaterSense Program*

To Whom It May Concern:

On behalf of the Natural Resources Defense Council ("NRDC"), which has more than 1.2 million members and activists nationwide, I am writing to encourage EPA to develop a WaterSense program for the Commercial, Industrial, and Institutional sector ("CII"), and to provide initial comments on the structure of such a program. We are pleased that EPA referenced NRDC's 2009 white paper entitled *Making Every Drop Work: Increasing Water Efficiency in California's Commercial, Industrial, and Institutional (CII) Sector* in this white paper, and in addition, we want to draw EPA's attention to one additional resource on CII water use and efficiency that was not identified in the white paper.[1]

NRDC strongly supports EPA's development of a WaterSense program for the CII or commercial and institutional ("CI") sector[2] because of the significant potential for cost-effective water and energy savings. As discussed in the white paper, the CI sector accounts for a significant proportion of urban water use. NRDC's 2009 white paper found that CII water use in California is estimated to be approximately one third of all urban water use, or 2.5 million acre feet per year. Equally important, that report found that by implementing cost-effective efficiency programs, the CII sector could save between 710,000 and 1.3 million acre feet of water per year.

Over the past several decades there have been some efficiency programs targeted to the CII sector. However, in general, water efficiency programs have focused on the residential sector. As a result, there are significant unrealized savings in the CII sector, and WaterSense could play an important role in advancing water efficiency in the CII sector.

[1] U.S. Bureau of Reclamation, *Water and Energy Efficiency Program for Commercial, Industrial, and Institutional Customer Classes in Southern California*, April 2009. This report is available online at: http://www.usbr.gov/lc/socal/planning.html

[2] The WaterSense white paper refers only to a program for commercial and institutional sectors, excluding the industrial sector. We encourage EPA to consider including the industrial sector in this program as well, similar to the existing local efficiency programs discussed in the white paper, and in light of the potential water savings in the industrial sector.

In California, NRDC's 2009 report found that more than 50 percent of all water use in the CII sector is used for outdoor landscaping, kitchens, and bathrooms. EPA's white paper found similar estimates of water use within CII subsectors nationwide. Because residential water efficiency programs have successfully reduced the water used in these uses, EPA's potential CII WaterSense program should consider an initial focus on these types of uses, building on successful efforts in the residential sector. In addition, because heating and cooling (including cooling towers) account for a significant proportion of water use in the CII sector, a WaterSense CII program should also consider these uses as an initial priority.

Therefore, NRDC recommends that the EPA take a multi-pronged approach to developing an effective WaterSense CII program.

First, building on its successes in the residential sector, WaterSense should develop specifications for appliances and fixtures commonly used in the CII sector, particularly: toilets and urinals, commercial dishwashers, commercial clothes washers, and pre-rise spray valves (which are already under development). These uses account for a significant proportion of CII water use, and new fixture specifications could result in significant water savings as they are incorporated in new construction and as existing facilities are remodeled.

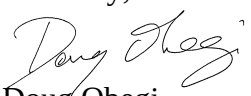
Second, we encourage EPA to consider developing specifications for new construction in the CII sector, similar to the WaterSense New Home specification. EPA should prioritize the development of new construction specifications based on expected water use in such facilities and the potential for new construction of these types of buildings. Using such criteria, office buildings and schools could be likely candidates for initial CII new building specifications. Such specifications should require third party verification to ensure compliance with the standards, and we encourage WaterSense to work with other existing specifications and standards, so as to avoid inconsistent and confusing standards and specifications across various programs.

Third, we tentatively recommend that EPA create partnerships and programs for various CII subsectors, in order to most effectively encourage the adoption of WaterSense specifications and fixtures, and potentially of other water efficiency measures and best management practices, by these businesses and institutions. This effort could ultimately lead to the development of WaterSense specifications for existing schools, office buildings, and other facilities within these subsectors. A WaterSense specification for existing schools is likely to result in greater recognition for the CII customer, greater participation in the WaterSense program, and encourage greater water savings than a WaterSense specification for bathrooms, which would be difficult to advertise. That said, many customers in the various CII subsectors share similar end water uses, such as bathrooms, kitchens, and outdoor landscaping. This broad similarity across subsectors suggests that a broad programmatic approach could be effective, and we are interested in exploring broad programmatic approaches further. We generally encourage use of a single specification, rather than a multi-tiered one, as such an approach is more consistent with WaterSense's existing structure and would be simpler and easier to implement.

Finally, we encourage EPA to develop WaterSense awards for the CII sector. An awards program would help build recognition for the program and encourage more participation by CII customers.

Thank you for consideration of our views. NRDC strongly supports EPA's development of a WaterSense program for commercial and institutional (and possibly industrial) customers, and we look forward to working with you to develop this program. Please feel free to contact us at your convenience if you have any questions or comments.

Sincerely,



Doug Obegi

Commenter: Fernando B. Molina
Affiliation: Tuscon Water
Comment Date: September 19, 2009

To Whom it May Concern:

Attached please find comments to the WaterSense Commercial / Institutional Water Conservation White Paper. These comments are submitted on behalf of the City of Tucson, Tucson Water Department.

As a Water Sense partner, Tucson Water is prepared to assist in working to help address some of the issues and concerns that are addressed in the White Paper. Tucson Water has a long history of implementing water conservation programs that provide equitable benefits across our customer classes. A significant number of audits of our commercial and industrial base have been conducted over time, allowing us to develop a conservation program that encourages businesses to make financial investments in water efficiency. It is this approach, particularly in these tough economic times, that helps to make our programs successful.

Please do not hesitate to contact me if you have any additional questions or comments.

Sincerely,

Fernando B. Molina
Conservation Program Manager
Interim Public Information Officer
Tucson Water

520.791.4331
fernando.molina@tucsonaz.gov

EPA Water Sense
Commercial and Institutional Sector Comments from Tucson Water
DRAFT - September 11, 2009

I. Data Gaps and Research Needs:

A. Research Needs and Data Collection

1. Case study examples of various types of water efficiency improvements and related costs/benefits, return on investment, and payback period data.
2. A better understanding of the impacts of water quality might have on impacts on water use. Water use practices may be affected on the variations found in mineral content (or other factors) within different regions of the country, and even within a single service area.

B. Reliable data

1. Reliable data on water budgets developed for commercial customers, would be useful.
2. The studies cited are mostly large-scale studies. However, consideration should be given to establishing a repository for data that may be collected by individual utilities.

C. Reduction Targets / Baseline
1. Use existing data for each sub sector (another research need for question #1).
2. Target reductions should be based on economic reasonableness to customers, distinguishing between existing and new users. Target reductions must also take into account the long term impacts on revenues and rates for utilities.

D. Impact on Rates/Revenues
1. Could potentially reduce utility revenue and drive up water costs.
2. Cost/benefit analysis must be a critical element for any water utility to assess the potential impacts that implementation of any water efficiency program will have on the revenue stream and future rate requirements.
3. While impact on revenues is inevitable even in a properly designed efficiency program, utilities must be able to distinguish between the impacts of reduced revenues from the implementation on a short-term Financial Plan versus a longer-term Economic Analysis.

E. Issues and Barriers
1. Water and electricity costs variability.
2. In some parts of the country, water costs are significantly lower at this time than other business concerns such as energy costs, property taxes, insurance, etc. Care should be taken to factor in the energy savings that accrue, both on-site and to the overall community resulting from reduced water consumption. This nexus between energy and water should be utilized to make this a priority within the business community.

II. Program Design Options:
A. Sub-sector Design
1. It would be best to have general recommendations that apply to all sub sectors but to include subsections specific to each industry type and their water uses.
2. Commercial facilities likely have the most commonality in uses (domestic, cooling, etc.) and present an opportunity to develop BMP's across the board. This design would facilitate utilities working with the various sub-sectors to improve efficiencies.
3. While many industrial facilities maintain commonality in uses, (domestic, cooling, etc.), some uses/process remain proprietary and much more difficult to analyze or establish standards. Fortunately, since profit motive is the driving factor for industries, efficiency is often more likely to be considered in water intensive settings.

B. Factors for Choosing Sub-sectors
1. They seem appropriate.

C. Pro/Con Program Structures
1. Certification and Labeling – Establishing certification standards is an effective may to provide a minimum guideline for business to strive build into the corporate structure. Care should be taken to separate out interior and exterior uses to accommodate for variability in landscape design and impacts on water use that regional plant water requirements may have.
2. Third–Party Certification versus Self Declaration – This may be a matter of scale. Large volume water users would likely benefit more from third party certification to ensure adequate accounting of water uses. (A side benefit is the creation and support for these skills in the workplace.) Self declaration may be sufficient for small volume users with minimal types of on-site uses.

3. Single tier versus Multi-Tier – A multi tier program may prove to be more effective as it allows for a site to achieve recognition for meeting a minimum requirement, and provide an incentive to plan for improvements over a period of time.
4. Existing Construction versus new Construction – Efficiency upgrades to older faculties may often prove limiting due to obsolete or infrastructure that may be incompatible with new efficient technologies. For example, HET toilet fixtures may not work effectively in some older buildings, but a ULF may work well. Credit should still be available for any upgrades that are made, even if they are not including the most advanced technology. This is the type of situation that would make a multi-tiered system (see II.3) more effective overall.
5. Labeling Criteria – Percent reductions may be more appropriate for large volume users; implementation of BMP's may be more appropriate for small users.

D. Preferred Program Structure

1. A mixed structure that takes into account size of facility, and a multi-tiered approach towards designation would likely have a greater impact.

E. Importance of Designations

1. Yes, it is important to have WaterSense labeled CI Sector facilities.
2. The general public understands very little about the uses of water in the C/I sector, and often views any/many uses of water as wasteful, without understating the economic benefits that accrue to the community from these uses. A designation or recognition program would be useful as an education tool to address this issue.

F. Certification/Labeling Program

1. A single-tiered system is simpler to manage but having multi-tiered gives a business something to work towards from one certification period to the next.
2. Certification should be third party from a local appointed water efficiency professional.
3. Certification for large facilities should be tied to an actual water audit. Certification for small facilities should be sufficient with water use surveys.

G. Partnership/Commitment Structure

1. This type of structure should require that the partner agency should mandate certification requirements to membership, and report on performance on an annual basis.

H. EPA / Technical Assistance

1. Specific industrial processes efficiency recommendations.
2. EPA should provide technical assistance to conduct sufficient water auditing of facilities to allow qualifying water utilities to develop baseline water use data for planning purposes. At a minimum, grants/funding should be made available for utilities that demonstrate a commitment to efficiency programs as part of a long-range water resource plan.

I. Focus

1. Focus should be placed on the largest sector/sub-sector of water users that provide the greatest conservation potential.
2. Single industrial facilities may be a large user, but may already operate at highly efficient levels.

J. Factors

1. Factors to consider include conservation potential within a sub-sector, number of users in that sub-sector, and overall impact on water use.

K. Awards Program

1. Yes, EPA should offer an awards program.

2. Awards programs offer an educational opportunity to the general community, but also provide a social incentive for other C/I users to make the economic investments in efficiency as well.

L. Other incentives

1. Other incentives could include public recognition such as signs, stickers, and promotional advertising.
2. Financial incentives, such as rebates and grants, provide the financial backing to C/I groups to undertake investments.
3. A calculator to inventory and assess water uses, determine impacts on water use from efficiency changes, and financial and economic impacts would be useful.

M. Other Incentives

1. If possible, reductions in water use should be tied to energy use reductions.

Other:

P.7 top graph is missing left pie slice title and %

Commenter: John Hammerstrom
Affiliation: American Rainwater Catchment Systems Association
Comment Date: September 20, 2009

Dear Nancy,

Attached is the EPA WaterSense - Commercial / Industrial White Paper with CORRECTED observations that I hope EPA will find useful.

Please discard the previous version. I'm sorry for any confusion.

My comments are limited to the first six pages of your document, and only those pages are reproduced here.

Sincerely,
John Hammerstrom
(305)852-8722

Director, American Rainwater Catchment Systems Association (ARCSA)
-- www.arcsa.org --
Acting as an individual without specific ARCSA endorsement of my Comments

---

Note: The referenced attachment is rather large and is included as Attachment 2.

Commenter: Robert D. Dobson
Affiliation: Middletown Sprinkler Company
Comment Date: September 20, 2009

Comments: Water Efficiency in the Commercial and Institutional Sector

Submitted by: Robert D. Dobson
Middletown Sprinkler Company
326 Highway 36
Port Monmouth, NJ 07758

My comments relate to outdoor water use in the commercial and institutional sector.

First, I have concerns with the EPA moving forward with any program in the commercial and institutional sector before the Water Efficient Single-Family New Home Specification has been finalized and released. Further, sufficient time should be allotted to "work out the kinks" in the single family new home specification prior to drafting anything for the commercial and institutional sector.

When a specification for the commercial and institutional sector is developed, all sectors should be performance based and founded on sound science. Results must be measurable. The EPA must be transparent with all scientific data used in specification development and the data's sources and share that information with shareholders.

Data Gaps and Research Needs:

A report on water use and conservation on golf courses was released in February 2009. The study was conducted by Dr. Clark Throssell, Director of Research for the Golf Course Superintendents Association of America (GCSAA). The report was published in *Applied Turfgrass Science*. A copy may be obtained by contacting Dr. Throssell at ctrosselle@gcsaa.org.

Water Use Percent Reduction Target:

The EPA should recognize that some users in the commercial institutional sector may have already achieved substantial water use reduction. Any specification should include provisions for recognition of previous conservation efforts and allowances provided so the user is not penalized when applying for WaterSense recognition.

Golf courses are a good example. Where a ten or twenty percent reduction may be achievable based on a national average, many golf course superintendents are very frugal with their water. A golf course that has scheduled irrigation conservatively may be able to reduce water consumption by only a few percent or maybe not at all. They should not be penalized and prevented from WaterSense recognition for their previous conservation efforts.

I believe it is important to have WaterSense labeled CI sector facilities.

I would favor a multi-tiered program. I believe it results in greater participation and conservation.

I favor periodic reporting for a facility to maintain its WaterSense label.

I favor an awards program which I believe increases participation and promotes additional conservation. Awards also provide an excellent public relations opportunity to promote the program.

Commenter: Richard Harris and Richard Bennett
Affiliation: East Bay Municipal Utility District
Comment Date: September 21, 2009

Hello ERG WaterSense Team - please see our comments attached. If you have any questions, please contact Dick Bennett at 510-287-0597 or myself at 510-287-1675.

Regards,

Richard

Richard W. Harris
Manager of Water Conservation
East Bay Municipal Utility District
375 11th Street, Oakland CA 94607
510-287-1675
510-384-8499 mobile
510-287-1883 fax

Comments from East Bay Municipal Utility District
Richard Harris and Richard Bennett

DATA GAPS AND RESEARCH NEEDS

1. What research needs to be done or data collected on the CI sector? What information gaps exist?

   Develop a database of the most water-efficient and cost-effective technology (BMP) for each type of end use. It would be difficult to award certificates based on reductions in water use due to such factors as:
   - ***master metering (i.e. strip malls where individual businesses are not metered))***
   - ***changes in business hours (commercial sector)***
   - ***changes in building occupancy (office buildings)***
   - ***economic conditions impacting level of business (commercial sector)***

2. Are you aware of any reliable data that is not cited in this paper and could add substantially to our understanding of water use in the CI sector? ***Your reference list looks fairly complete.***

3. If EPA were to set a water use percent reduction target for the CI sector as a whole or for specific subsectors, what should EPA use as the water use baseline and what percent reduction should be targeted?

   Recommend the focus be on the end use (and possibly organized by sector or subsector) to address best available technology and practice. General percent reduction factors could be set as general targets and ROI placeholders, particularly for the institutional sector. However, there is too wide a variation in the business sector ;due to process changes, business hours, and non-metered subsectors

(commercial centers) to provide adequate relationships between un measured/metered use and reduction levels (i.e. range between efficient customers and those at 2-3 times above budget would make a 10% reduction target meaningless).

4. What impact could a national sector water-efficiency program have on the revenue and rate structure of drinking water utilities?

   This is not an issue and can be addressed through individual and regional integrated water resources management programs. The cost/benefit should be evaluated in line with other water supply reliability and demand management options.

5. What issues and barriers stand in the way of a national CI sector water-efficiency program? How can EPA overcome them?

   Potential barriers include:
   - ***lack of training***
   - ***lack of technical expertise by program partners***
   - ***lack of resources to implement program***
   - ***question of program cost-effectiveness by partners***
   - ***basing program on percent reductions***

   Possible solutions include:
   - ***adequate training for program partners***
   - ***adequate resources for program implementation***
   - ***focus on end use water saving technology rather than percent reductions in use (Institutional sector uses such as schools, hospitals, and public buildings may lend themselves to more standardization.)***

PROGRAM DESIGN OPTIONS

1. Should EPA address all subsectors together or separately?

   We recommend proceeding separately (or in combination as applicable) across one or more subsectors to promote the market transformation and business community adoption of water use efficiency technology and practices.

   Certain subsectors and technology may be ready for implementation in advance of others and could be perceived as a negative for an ineligible subsector. Many business trade organizations such as National Association of Chemical Engineers (NACE), National Restaurant Association, among others, plus institutional directives under local, state and federal laws will allow alignment with other market drivers and sustainability initiatives.

2. Are the factors for choosing a subsector appropriate?

   Factors should be based on end use technology knowledge and vetting for appropriate application and performance. The approach should not be limited, but rather adaptable to each subsector.

3. What are the pros and cons of each program structure presented?

    a. ***Per the comment above, a strict % reduction target would not work for all sectors/subsectors.***
    b. ***An end use approach based on technology and practice allows for maximum flexibility and grouping of efficiency targets and applications.***

4. What program structure do you think EPA should adopt and why? ***See above.***
    a. ***We recommend having both "new construction" and "retrofit" programs.***

    b. ***We recommend third party over self-certification for the very reasons stated under existing WaterSense-labeled programs. Brand protection.***

    c. ***For end use technology labeling, we recommend a single tier.***

    d. ***For sector, subsector or building labeling (such as LEED) then a multi-tiered approach would provide early adoption, flexibility and phased implementation.***

5. Is it important to have WaterSense labeled CI sector facilities?

    Yes, see above. This would be consistent and collaborative with Energy Star and LEED facilities for example.

6. If a certification and labeling scheme is preferred, should EPA have a single-tiered or multi-tiered program? ***Both*** Should certification be third-party or self declaration? ***Third-party.*** Should a specification include percentage reduction requirements, best management practices (BMP) implementation requirements, or both? ***Both.***

7. If EPA chose a partnership-commitment program structure, what should the commitment be? What reporting should be required?

    Program partners should include water utilities with resources to conduct site audits/inspections for certification. EPA should consider/provide some funding for program partners. Reporting should include a database/tracking program of participants.

8. If EPA offered technical assistance, what should it be and in what form should it be offered?

    Technical assistance should be offered by those with the respected expertise such as the DOE, U.S. Green Building Council, certified third parties, etc. with training offered for program partners.

9. If a subsector-specific approach is chosen, should EPA's efforts focus on the largest overall users of water, or on the largest individual accounts?

    Suggest focusing on the sectors, drivers and market scenarios with the greatest total use for maximum adoption and publicity; under a "low-hanging" fruit concept, may include small to medium water uses that are meaningful in the aggregate.

10. If a subsector-specific approach is chosen, what factors should be considered in prioritizing different subsectors?

    Consider overall sector use and knowledge of end use water saving technology.

11. Should EPA offer an awards program?

    Perhaps, such as is done with WaterSense Partners; suggest concentrating funding for training and program partners to encourage program implementation and minimize resource intensive award programs.

12. What other incentives should EPA offer for participating in the program?

    Consider public recognition (EPA website(?): By region/city? By sector?) for program participants.

Commenter: David A. Hubbard
Affiliation: Scott&Goble Architects
Comment Date: September 23, 2009

Program Design Options

Should EPA address all subsectors together or separately?
Trying to put together a one size fits all approach for such a wide variety of businesses, operations, and consumers will likely be unsuccessful. The needs for a retail facility vs a hospital or a school will vary widely. General criteria could be put together in regards to new construction or retrofit and could be established for end use fixtures outlined in II.C. The EPA should establish new baseline flow rate guidelines for end use fixtures in new commercial and residential construction. The manufacturers have already moved to develop 1.28 gpf toilets, .5 gpm faucets, and Ultra low flow urinals. The industry has also developed numerous other high efficiency fixtures and appliances. A new base line will help to unify the manufacturing industry and drive inefficient devices out of the market. Make it goal oriented and establish a new date of 2012 to phase out inefficient fixture designs.

Are the factors for choosing a subsector appropriately?
Lessons learned from the largest commercial users should apply to smaller consumers. Hospitals, educational facilities or other large consumers should be identified. Sectors that use large amount of heating, cooling, and irrigation should be targeted. BMP's can be developed and interpreted for smaller consumers.

What program structure do you think the EPA should adopt and why?
I personally do not favor new program initiatives. Developing a new fixture baseline will take care of new construction. Consideration of existing buildings and infrastructure needs to be the top priority. Part of the EPAs directive is to protect and preserve national resources. Areas like the Colorado river basin are drying up. Growth and businesses are straining the demand on the water supply and new development is compounding the issue. You should focus efforts in the worst area of the country first like the Southwest. Determine what the embodied energy of water really cost us in terms of GHG production, energy consumption, and damage to the environment. Target the largest users including the residential section and provide them with incentives by ratcheting up their rates unless they begin to do self monitoring and voluntary facility upgrades to curb their demand. Provide them with rebates when they can provide proof of self audits and upgrades that they have complied with new industry standards. CI will only begin to take you seriously when you start getting into their pocket book. The biggest offenders are old facilities like office buildings built 20 to 30 years ago who are still utilizing 3.0 gpf fixtures and 2 to 3 gpm faucets. Most facilities are probably operating outdated HVAC systems that consume enormous amounts of water due to ineffective maintenance and management practices. Once BMPs have been established they should be issued to Utilities to be forwarded to CI consumers utilizing more than a million gallons per year.

Is it important to have WaterSense Labeled CI sector Facilities?
A WaterSense label should go in hand with the one of the major sustainable building systems ratings like LEED or Green Globes. I doubt if a owner who is not interested in pursuing one of these existing ratings systems will be concerned with going after a WaterSense label. I doubt most CI owners would even be aware and would expect their design professional to provide them with the BMP for their new facility. You may want to consider Education and Training

certifications for Architects and Engineers. Team up with the AIA and others to bring greater awareness to design specifications for design professionals.

Should the certification by third party or self declaration?
A third party or design professional should substantiate any claims made by a CI. They should also provide utility data to substantiate any claims.

Should the EPA offer an Awards program?
Probably should be handled at the community level through the local utilities. Local utilities could annually submit their top success stories to the EPA.

Other considerations:

I personally think the EPA and Watersense should be putting together National standards for fixtures, appliances, and BMP's. It should also be cracking down on serious offenders and developing long term conservation practices for drought and desert areas of the country like the Colorado River Basin. Strategies need to not only be developed for BMP's but also for the recycling and alternative reuse of discarded fixtures. If you replace 10 million inefficient fixtures, what is the plan of action to be done with the generated waste. Consideration of BMP for onsite reuse and or harvested rainwater for non potable uses or irrigation by CI. With the exception of Title 22 in California there currently exists no water quality standards to protect owners who would like to use onsite harvested or reuse water. New alternatives need to be developed to utilizing potable drinking water for every use inside a facility. Consideration of pollution in storm water runoff by CI need to be evaluated and BMP's need to be evaluated. The phase out of rotary spray irrigation heads and lieu of more efficient drip irrigation systems and/or better landscape plant selections should be evaluated and provided to the design and installation industry. Better systems controls should be standard with all irrigation systems.

Develop a national standard and definitions to be utilized by Utilities in reporting water consumption among the various potable water consumers. Identify and classify various industry and residential sectors. Require better accounting from various utilities in developing a better cross section of water consumed. Better identify the public use and loss section as it is nearly as large and the entire commercial section.

Require large consumers to do internal audits every two or three years. Require installation of separate or submetering metering for domestic consumption vs. irrigation systems vs. HVAC demands or process water. If consumers are ignorant of what they are spending in these major areas they are less likely to take steps to improve overall BMP's.

Thank you for your consideration.

dave

David A. Hubbard, AIA, NCARB, LEED(r) A.P.
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Comment Date: September 28, 2009

Please see my comments in the attachment.

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WaterSense Comments
Submitted by Cindy McComas, MnTAP

Data Gaps and Research Needs

- What research needs to be done or data collected on the CI sector? What information gaps exist?

  Include water footprints (water use broken down by facility use) and water benchmarks for CI sector. We have found this to be useful for the energy area related to subsector.

- Are you aware of any reliable data that is not cited in this paper and could add substantially to our understanding of water use in the CI sector?

  No, our program works with the industrial sector. But with some research on the energy subsectors, we were able to find quite a bit of information.

- If EPA were to set a water use percent reduction target for the CI sector as a whole or for specific subsectors, what should EPA use as the water use baseline and what percent reduction should be targeted?
  - Reduction target by specific subsectors
  - Baseline or benchmark
  - 5 – 10% reduction adds up to a lot of water

- What impact could a national sector water-efficiency program have on the revenue and rate structure of drinking water utilities?

  Short-med term, cities may have debt service to pay off on water or wastewater treatment plants and this would be a disincentive for utilities to encourage reduction. Long term, it could improve revenues and rate structures.

- What issues and barriers stand in the way of a national CI sector water-efficiency program? How can EPA overcome them?
    - Water is cheap! Not many motivators to conserve water.
    - Push to go green
    - Resource efficiency

Program Design Options

- Should EPA address all subsectors together or separately?

  Together:
    - General marketing

  Separately:
    - specific outreach programs

- Are the factors for choosing a subsector appropriate?

  Yes, looked good to me.

- What are the pros and cons of each program structure presented?
  --
- What program structure do you think EPA should adopt and why?
    - Multi-tiered
    - Self declaration, to be self sustaining if program is not funded in future.
    - Report results through pollution prevention results measurement database, used by NPPR.

- Is it important to have WaterSense labeled CI sector facilities?

  Yes, as leader facilities.

- If a certification and labeling scheme is preferred, should EPA have a single-tiered or multi-tiered program? Should certification be third-party or self declaration? Should a specification include percentage reduction requirements, best management practices (BMP) implementation requirements, or both?

  I feel it should be multi-tiered, self declaration, and include both reductions and BMPs.

- If EPA chose a partnership-commitment program structure, what should the commitment be? What reporting should be required?
    - Use with subsectors that are more likely to implement.
    - Commitment = 5-10%
    - Partnership commitment could be called a "Leaders" program

- If EPA offered technical assistance, what should it be and in what form should it be offered?

States	EPA
Technical assistance	TA in broad sense, much like GSN is run financial assistance recognition program definition, motivators, education, regs

- If a subsector-specific approach is chosen, should EPA's efforts focus on the largest overall users of water, or on the largest individual accounts?
    - Start with largest users and work down
    - Educate all in the meantime

- If a subsector-specific approach is chosen, what factors should be considered in prioritizing different subsectors?
    - water footprint
    - associations
    - available technology
    - available capital
    - environmental program
    - likely to implement

- Should EPA offer any awards program?

  Yes, recognition can be a big motivator.

- What other incentives should EPA offer for participating in the program?
  Grants or loans, or some other form of monetary incentives. What about a design for rebate opportunities for water utilities, much like what energy utilities provide?

- Others:

  Use pollution prevention results database

Attachment 1

Jackie Jackson Teel, Chatham County – Savannah Metropolitan Planning Commission, Attached Comments

Water Efficiency in the Commercial and Institutional Sector: Considerations for a WaterSense Program

August 20, 2009

Statement of Purpose

The U.S. Environmental Protection Agency (EPA) established WaterSense® with the goal of saving water for future generations. By transforming the market for water-efficient products, services, and practices, WaterSense is helping to relieve the strain of expanding water supply and wastewater infrastructure. Since 2006, the WaterSense label has helped consumers identify products and services that meet EPA's criteria for water efficiency and performance.

In an effort to further this mission, EPA is now considering expansion of WaterSense to include partnership and participation options for users in the commercial and institutional (CI) sector. With this in mind, EPA is seeking input from its partners and other stakeholders on the current state of data related to water use in the CI sector as well as potential program options.

The following white paper summarizes the current state of knowledge regarding water use in the CI sector. While there are gaps in the currently available data, this paper attempts to summarize the best available resources that EPA can use as a basis for future decision-making regarding a national CI program. The paper also includes a discussion of the various forms that a CI focused component of WaterSense could take.

EPA is seeking broad input to be used as guidance in developing the WaterSense CI sector program. In particular, EPA is interested in hearing the responses of stakeholders in the following areas and questions:

Data Gaps and Research Needs

- What research needs to be done or data collected on the CI sector? What information gaps exist?
- Are you aware of any reliable data that is not cited in this paper and could add substantially to our understanding of water use in the CI sector?
- If EPA were to set a water use percent reduction target for the CI sector as a whole or for specific subsectors, what should EPA use as the water use baseline and what percent reduction should be targeted?
- What impact could a national sector water-efficiency program have on the revenue and rate structure of drinking water utilities?
- What issues and barriers stand in the way of a national CI sector water-efficiency program? How can EPA overcome them?

Program Design Options

- Should EPA address all subsectors together or separately?
- Are the factors for choosing a subsector appropriate?
- What are the pros and cons of each program structure presented?

- What program structure do you think EPA should adopt and why?
- Is it important to have WaterSense labeled CI sector facilities?
- If a certification and labeling scheme is preferred, should EPA have a single-tiered or multi-tiered program? Should certification be third-party or self declaration? Should a specification include percentage reduction requirements, best management practices (BMP) implementation requirements, or both?
- If EPA chose a partnership-commitment program structure, what should the commitment be? What reporting should be required?
- If EPA offered technical assistance, what should it be and in what form should it be offered?
- If a subsector-specific approach is chosen, should EPA's efforts focus on the largest overall users of water, or on the largest individual accounts?
- If a subsector-specific approach is chosen, what factors should be considered in prioritizing different subsectors?
- Should EPA offer an awards program?
- What other incentives should EPA offer for participating in the program?

EPA is welcoming comments on the above questions and the following white paper. Comments may be submitted to watersense-ci@erg.com through September 20, 2009.

WaterSense will also be holding a meeting to discuss potential CI program options in conjunction with the WaterSmart Innovations conference in Las Vegas, Nevada. If you are interested in attending this meeting please contact the WaterSense Helpline at (866) WTR-SENS (987-7367) or watersense@epa.gov.

CONTENTS

Page

LIST OF TABLES

Page

LIST OF FIGURES

Page

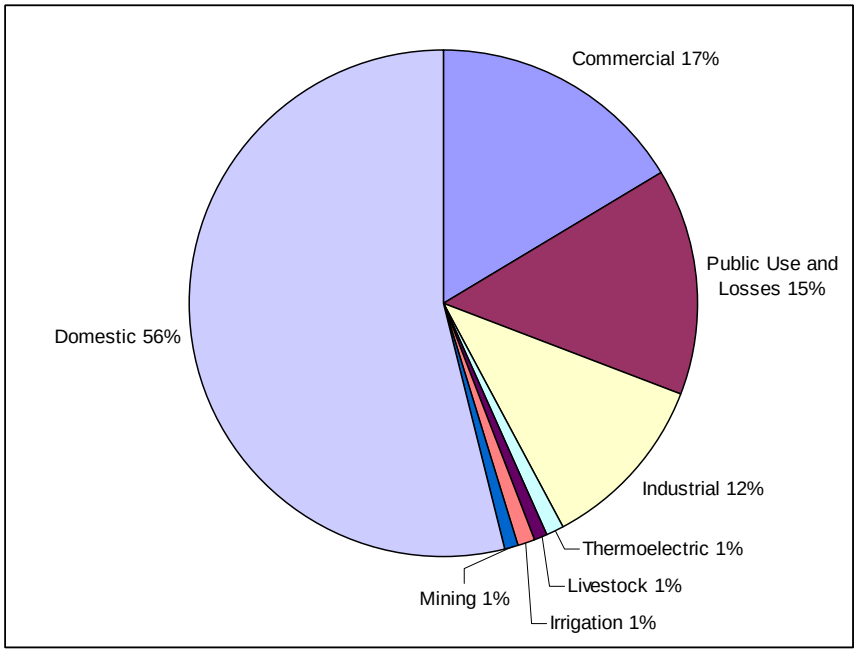
Water Efficiency in the Commercial and Institutional Sector: Considerations for a WaterSense Program

I. Background and Purpose

To help American consumers and businesses use water more efficiently, in 2006, U.S. Environmental Protection Agency (EPA) launched WaterSense, a voluntary partnership program that aims to protect the future of our nation's water supply. While to date WaterSense has focused on the residential sector, EPA is considering adding a program to promote water efficiency in the commercial and institutional (CI) sector as well. As a first step, EPA has written this white paper to summarize information gathered to date on the CI sector and to discuss all potential facets of the program. The purpose of this paper is to solicit input from partners, stakeholders, and the general public that WaterSense can use as a foundation for developing a CI sector program.

The CI sector consumes a significant portion of the publicly supplied fresh water in the United States. The U.S. Geological Survey (USGS) collects data on publicly supplied water as part of its periodic survey of estimated water uses in the United States, and, until 1995, had broken out data on CI uses from publicly supplied water. In those earlier surveys, it defined the CI sector to include hotels, motels, restaurants, office buildings, other commercial facilities, and civilian and military institutions. Public water supplied to golf courses was also included, as were fish hatcheries in some states. In the last water use report containing CI data (compiled in 1995), USGS estimated that the sector utilized 17 percent of water drawn from public water supplies in the United States, as shown in Figure 1. (1)

Figure 1. Estimated Distribution of Water Use From Public Supplies in the United States in 1995



Source: Modified from *USGS Estimated Use of Water in the United States in 1995*

A 2000 report, *Commercial and Institutional End Uses of Water,* estimates that combined water use of all CI customers constitutes approximately 15 to 25 percent of total municipal water demand. That report also describes an American Water Works Association (AWWA) survey of 331 large water agencies, which estimates that nonresidential users account for 44 percent of total metered urban water use. Elsewhere, the report includes information on an independent survey of 28 agencies in Southern California that estimate commercial and public uses account for 18.8 percent and 5.1 percent of metered urban water use, respectively (3). Despite some variability, all studies indicate that the CI sector is a substantial consumer of water in the United States.

One reason why it's difficult to accurately determine how much publicly supplied water the CI sector consumes is because the definition of the sector varies among water utilities and in water use literature. In most cases, the CI sector is defined as any business establishment or institution other than a manufacturing or industrial plant. See Section II for more on the definition and scope of the CI sector.

Regardless of the definition used for CI sector, it's becoming clear that increased efficiency in this sector will be vital as water resources grow scarcer. EPA considers the data presented in this paper to be the best available regarding water use and efficiency in the CI sector.

II. Overview of the Commercial and Institutional Sector

The CI sector consists of a large number of subsectors that vary greatly in how they function and in how they use water. While some water utilities have water efficiency and conservation initiatives targeting the CI sector, as a whole it has received less attention than the residential sector, largely due to a lack of data on water use within CI subsectors. This section presents CI sector definitions, classifies CI subsectors, highlights key end uses of water in CI subsectors, and discusses water-efficient practices and technologies.

II.A Defining the CI Sector

Literature on urban water efficiency shows several definitions of the "nonresidential" sector. The sector containing the industrial, commercial, and institutional users of urban water is designated as the ICI or CII sector. Where significant industrial customers are not present, the term CI is often used. As mentioned earlier, the definitions of the CI sector vary between water utilities and from study to study. For example, some agencies define the CI sector as all business accounts in the commercial sector, which may include manufacturing and governmental facilities, while others may separate industrial and institutional sectors. In addition, residential complexes such as apartment buildings or mobile home parks, for which accounts may be registered in the name of a business entity, are often considered commercial accounts (3).

The California Urban Water Conservation Council (CUWCC) adopts the following definition of commercial water users (7):

> Commercial customers include customers that provide or distribute a product or service, such as hotels, restaurants, office buildings, or commercial business, and other places of commerce. Also included are establishments dedicated to public service, including

schools, courts, churches, hospitals, and government facilities. All facilities serving these functions are included regardless of ownership.

The Pacific Institute report *Waste Not, Want Not* defines the CII sector as follows (4):

- Commercial: Private facilities providing or distributing a product or service, such as hotels, restaurants, or office buildings. This description excludes multi-family residences and agricultural uses.

- Institutional: Public facilities dedicated to public service including schools, courthouses, government buildings, and hospitals.

- Industrial: Facilities that mostly manufacture or process materials as defined by the Standard Industrial Classification (SIC) code numbers 2000 through 3999.[1]

Studies of CI water use often group CI users of water together for analytical purposes, since the distinction between what is considered commercial (e.g., a private school) and what is considered institutional (e.g., a public school) is somewhat arbitrary (4).

For the purposes of this paper, EPA is defining CI users as any use other than residential accounts and those that can be clearly classified as industrial accounts.

II.B CI Subsectors

Within the CI sector, water use varies by customers (or "customer types"), which can be grouped into subsectors. See Section II.C for a discussion of the various end uses of water by subsectors. Using EPA's definition in Section II.A, subsectors that fit into the CI sector include:

- Office Buildings
- Schools/Educational Complexes
- Restaurants and Fast Food Outlets
- Commercial and Retail Centers
- Hotels and Motels
- Grocers/Food Stores
- Hospitals
- Laboratories
- Laundries
- Vehicle Washes
- Bakery/Pastry Shops
- Auto Service and Repair Shops
- Fuel Service Stations and Convenience Stores
- Golf Courses
- Churches/Sanctuaries

[1] Note that the North American Industrial Classification System (NAICS) replaced the SIC system in 1997, and the new NAICS codes do not correspond to the old SIC codes. The water industry has not integrated the new classification system into general practice yet (3).

- Correctional Facilities
- Meeting and Recreation Facilities
- Utilities and Infrastructure
- Other

CI water use varies from region to region, due to climate and economic factors that affect the amount of seasonal water use (e.g., landscape water use and cooling needs in warmer months). CI water use can even vary among water utilities in the same region, depending on the major CI customers and the end uses of water in each service area.

While distribution of water use among these CI subsectors has been studied, there remains some uncertainty since their classification is not uniform across utilities, and this data is not collected and maintained regularly. For example, some utilities classify hotels/motels and restaurants as two separate CI subsectors, while others categorize them together as "hospitality." Though some studies have classified CI water use by subsector for specific states, cities, or water utilities, this type of analysis has not been done at the national level. See Appendix A for a summary of the research available.

To evaluate water usage by subsector and to identify which ones typically demonstrate the highest levels of consumption, EPA analyzed data available from three primary sources on the percent of water use by subsector. (1, 4, 7) Table 1 displays data compiled from all three sources for subsectors where substantial parity exists between subsector definitions. Despite some variation, all available studies indicate that office buildings, schools, hospitality, and healthcare facilities are likely to be the largest water uses when looking at a national breakout.

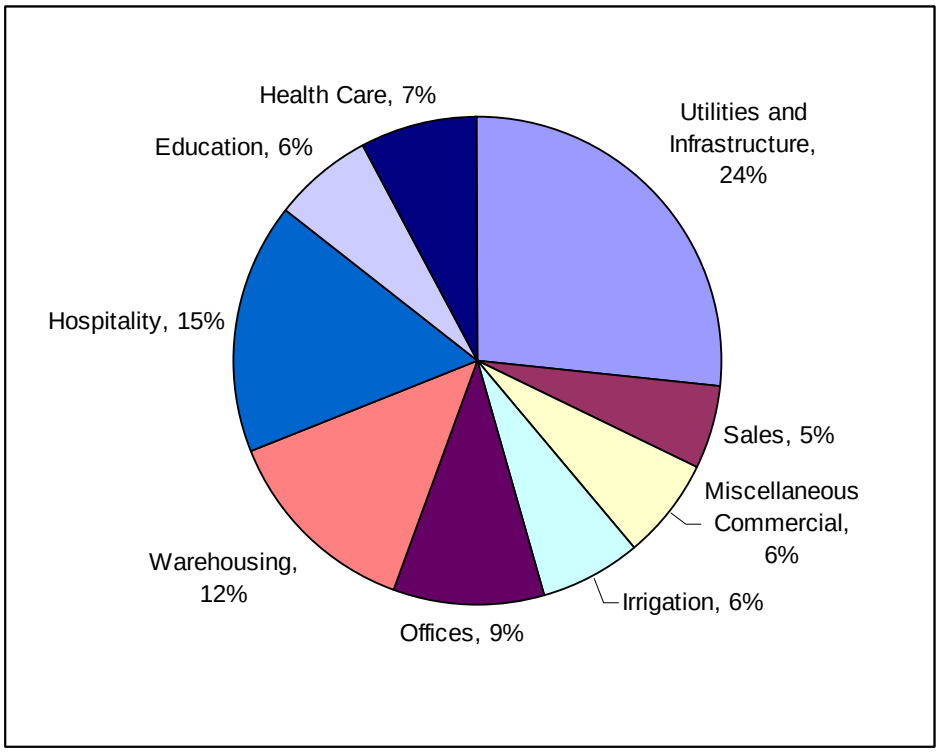
Table 1. Estimated Percent Commercial Water Use in the United States by Subsector

CI Subsector	Range Identified From All Three Primary Sources [a]	Range Reported in 1997 Survey [b]	Weighted Avg. [c]
Hospitals/Healthcare Facilities	2-20	7-12	7.32
Office Buildings	8-17	9-12	9.2
Schools	5-13	5-8	5.88
Hospitality	6-16	9-21	14.8
Laundries	1-4	1-4	1.73
Car Washes	0-2	0-1	0.28

[a] Source: Compiled and summarized from: Peter H. Gleick, et. al., *Waste Not, Want Not: The Potential for Urban Water Conservation in California*, November 2003; Dziegielewski, et. al., *Commercial and Institutional End Uses of Water*, 2000; U.S. EPA, *Study of Potential Water Efficiency Improvements in Commercial Businesses*, Grant CX 823643-01-0 with the State of California Department of Water Resources, April 1997.
[b] Source: Idem.
[c] Source: Dziegielewski, op. cit. (Originally derived from U.S. EPA, op. cit.)

EPA found that the *Study of Potential Water Efficiency Improvements in Commercial Businesses* completed in April 1997 provided the most complete data for comparing water use by subsectors nationwide. (7, 3) This study is based on commercial water use broken down by subsector at a dozen water utilities across the United States. The data presented in Figure 2 also indicates that hospitality (restaurants and overnight lodging), office buildings, healthcare facilities, and educational facilities are likely the largest water users in the CI sector.[2] These results represent the largest national data sample to date, and are consistent with other available studies regarding subsector water usage within the CI sector.

Figure 2. Estimated Distribution of CI Water Use in the United States in 1995 by Subsector



Source: Dziegielewski, et. al., *Commercial and Institutional End Uses of Water*, 2000 (originally derived from U.S. EPA, *Study of Potential Water Efficiency Improvements in Commercial Businesses*, Grant CX 823643-01-0 with the State of California Department of Water Resources, April 1997.)

II.C End Uses of Water

Despite the differences between subsectors and the factors contributing to their water needs, many have similar end uses for water (see Table 2). For example, domestic water use for plumbing fixtures such as toilets, faucets, showerheads, and urinals represents from one-quarter to one-half of all water use within most of these facilities. (3) Many of these facilities also

[2] Although the percent of water use associated with them is high, EPA did not consider water use associated with the categories of "utilities and infrastructure" and "warehousing" because of the inconsistent definitions of these types of facilities from study to study and utility to utility.

utilize a significant portion of their water for irrigation and landscaping. Finally, at least half of the facilities use a significant amount of their water for heating and cooling purposes.

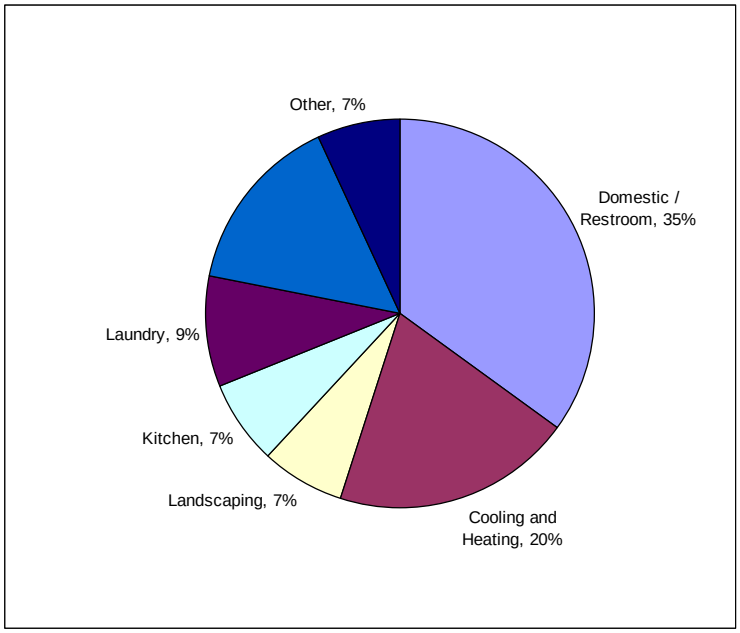
Table 2. Examples of Potential End Uses of Water in CI Facilities

Indoor/Domestic Water	
• Kitchens, Cafeterias, Staff Rooms o Faucets o Distilled/drinking water o Dishwashing machines o Ice machines o Garbage disposals o Food preparation o Frozen yogurt and ice cream machines • Restrooms and showers o Faucets o Toilets and urinals o Showers	• Laundry o Washing machines • Sanitation o Facility cleaning o Sterilizers/autoclaves o Equipment washing o Dust control o Container washing • Process o Photographic and x-ray processing
Cooling and Heating	**Outdoor Water Use**
• Cooling towers • Evaporative coolers • Boilers and steam systems • Once-through cooling o Air conditioners o Air compressors o Hydraulic equipment o Degreasers o Rectifiers o Vacuum pumps	• Irrigation • Pools and spas • Decorative water feature

The *WaterSmart Guidebook: A Water Use Efficiency Plan Review Guide for New Businesses*, developed by East Bay Municipal Utility District (EBMUD) in 2008, details end uses of water for 20 CI and industrial subsectors. The manual also provides information for users to determine the most efficient water practices and equipment for these specific subsector types. Water use in restaurants and fast food chains breaks down as kitchen (47 percent), domestic and restrooms (33 percent), other (13 percent), landscape (5 percent), and cooling and heating (2 percent). Kitchen uses include cooking and serving systems (combination ovens, pasta cookers, steamers), scullery operations (pre-rinse spray valves, dishwashing), ice machines, and more. This example shows how specific end uses of water can be identified within a specific subsector. For some subsectors, EBMUD could not determine the specific distribution in end water uses, but could identify what those uses were. Understanding end uses is crucial for determining water-efficiency and conservation opportunities. (5)

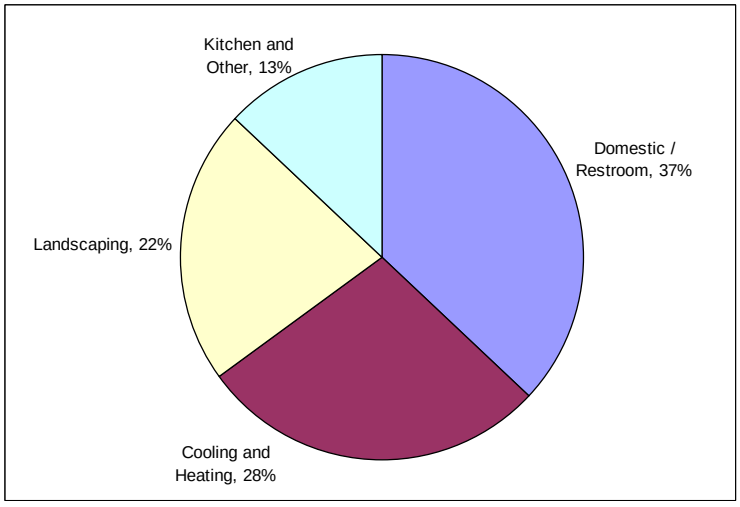
In an effort to better understand the nature of end uses in the CI sector, EPA has summarized the end use data for those subsectors where significant data is available and there is significant parity among various studies to reasonably compare results. The following figures are based on the average results from a number of sources as cited for each individual subsector below. See Appendix B for a more detailed discussion of these data sources.

Figure 3. End Uses of Water in Hospitals



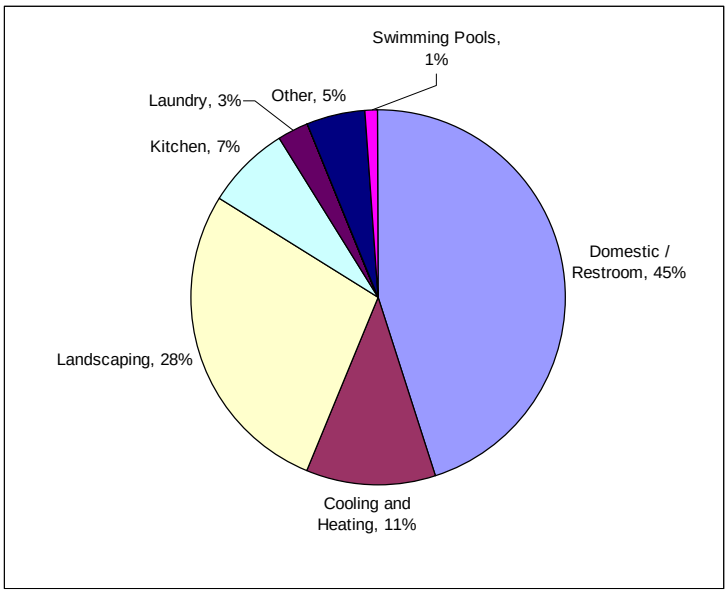
Source: Created from analyzing data in: New Mexico Office of the State Engineer, *Water Conservation Guide for Commercial, Institutional, and Industrial Water Users*, July 1999 (original source: City of San Jose Environmental Services Department); Dziegielewski, et. al., *Commercial and Institutional End Uses of Water*, 2000; East Bay Municipal Utility District, *WaterSmart Guidebook: A Water Use Efficiency Plan Review Guide for New Businesses*, 2008; American Water Works Association, *Helping Businesses Manage Water Use, A Guide for Water Utilities*.

Figure 4. End Uses of Water in Office Buildings



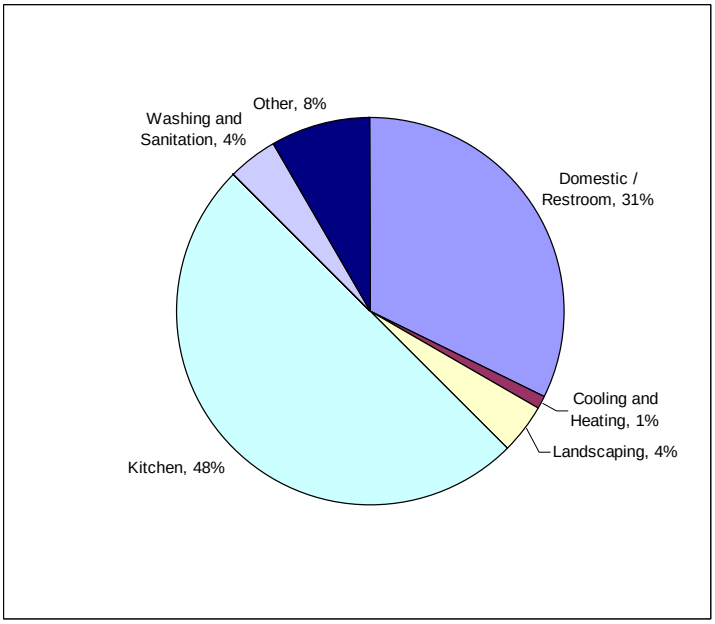
Source: Created from analyzing data in: New Mexico Office of the State Engineer, *Water Conservation Guide for Commercial, Institutional, and Industrial Water Users*, July 1999 (original source: City of San Jose Environmental Services Department); Dziegielewski, et. al., *Commercial and Institutional End Uses of Water*, 2000; East Bay Municipal Utility District, *WaterSmart Guidebook: A Water Use Efficiency Plan Review Guide for New Businesses*, 2008; American Water Works Association, *Helping Businesses Manage Water Use, A Guide for Water Utilities*.

Figure 5. End Uses of Water in Schools



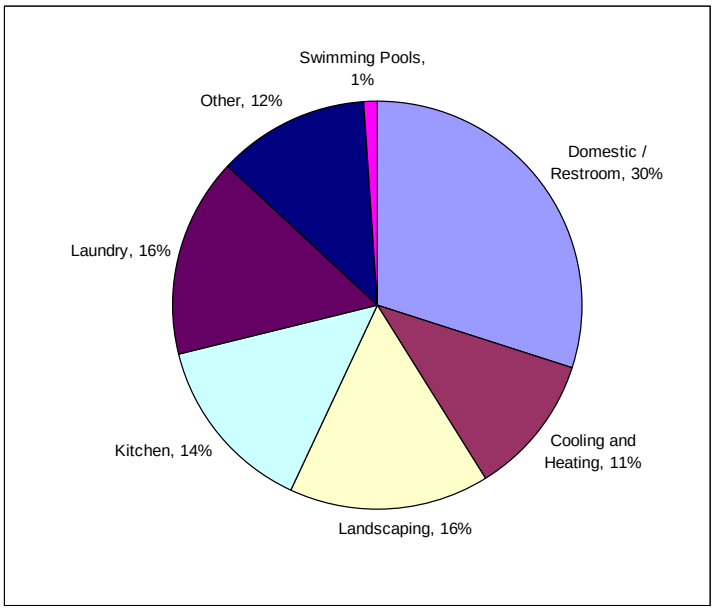
Source: Created from analyzing data in: New Mexico Office of the State Engineer, *Water Conservation Guide for Commercial, Institutional, and Industrial Water Users*, July 1999 (original source: City of San Jose Environmental Services Department); Dziegielewski, et. al., *Commercial and Institutional End Uses of Water*, 2000; East Bay Municipal Utility District, *WaterSmart Guidebook: A Water Use Efficiency Plan Review Guide for New Businesses*, 2008; American Water Works Association, *Helping Businesses Manage Water Use, A Guide for Water Utilities*.

Figure 6. End Uses of Water in Restaurants



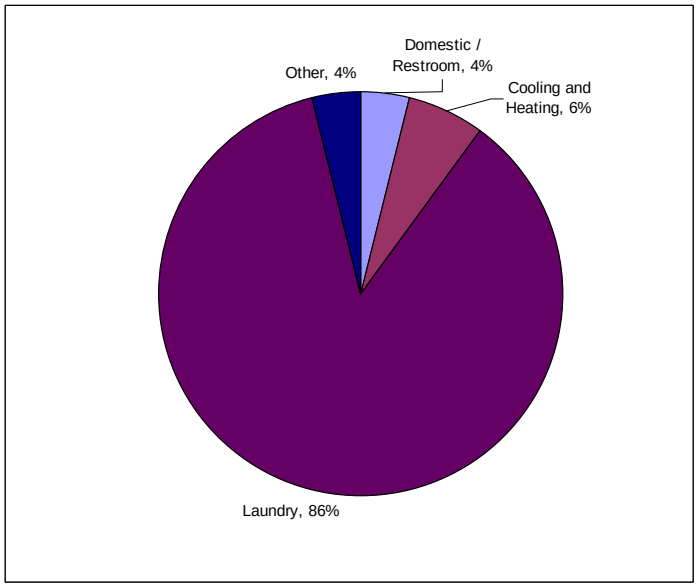
Source: Created from analyzing data in: Dziegielewski, et. al., Commercial and Institutional End Uses of Water, 2000; East Bay Municipal Utility District, WaterSmart Guidebook: A Water Use Efficiency Plan Review Guide for New Businesses, 2008; American Water Works Association, Helping Businesses Manage Water Use, A Guide for Water Utilities.

Figure 7. End Uses of Water in Hotels and Motels



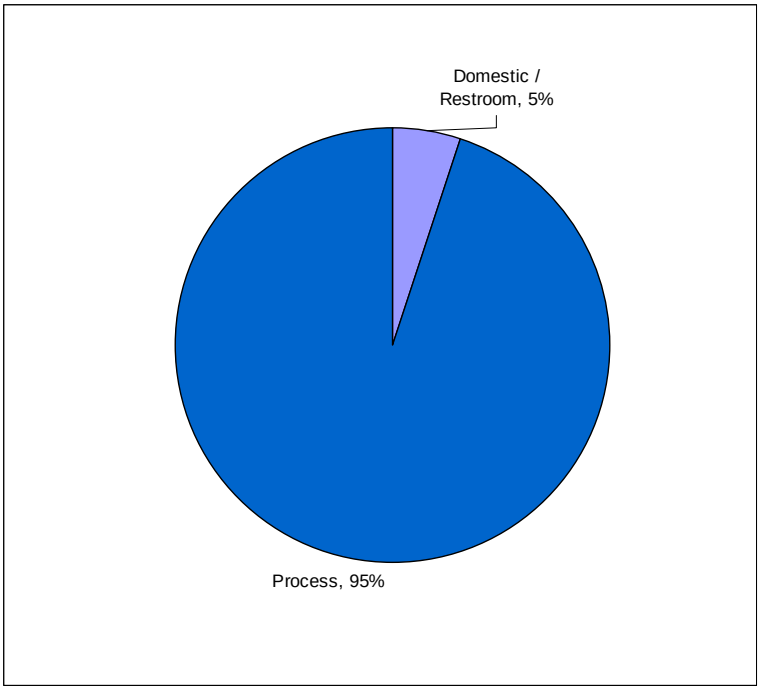
Source: Created from analyzing data in: New Mexico Office of the State Engineer, *Water Conservation Guide for Commercial, Institutional, and Industrial Water Users*, July 1999 (original source: City of San Jose Environmental Services Department); Dziegielewski, et. al., *Commercial and Institutional End Uses of Water*, 2000; East Bay Municipal Utility District, *WaterSmart Guidebook: A Water Use Efficiency Plan Review Guide for New Businesses*, 2008; American Water Works Association, *Helping Businesses Manage Water Use, A Guide for Water Utilities*.

Figure 8. End Uses of Water in Laundries



Source: Created from analyzing data in: Dziegielewski, et. al., *Commercial and Institutional End Uses of Water*, 2000; East Bay Municipal Utility District, *WaterSmart Guidebook: A Water Use Efficiency Plan Review Guide for New Businesses*, 2008; American Water Works Association, *Helping Businesses Manage Water Use, A Guide for Water Utilities*.

Figure 9. End Uses of Water in Car Washes



Source: Modified from East Bay Municipal Utility District, *WaterSmart Guidebook: A Water Use Efficiency Plan Review Guide for New Businesses*, 2008.

II.D Potential Water Savings and Benchmarks

While some information is available regarding water use and end uses within CI facilities, data on potential water savings in the sector is scarce, especially on a national scale. The Pacific Institute's report *Waste Not, Want Not: The Potential for Urban Water Conservation in California* provides some of the only estimates of water savings available. The report used data surveys and sector-level water studies to estimate that water use in the CI sector could be reduced by approximately 40 percent from 2000 levels in the state or 317 billion gallons of water per year. (4) Although these estimates are specific to California, the substantial savings could be achieved in other areas of the country using similar technologies and practices. These significant savings highlight the enormous potential for a national-level program. Additional data is necessary to fully define the potential impact of a national water-efficiency program for the CI sector.

In addition to the overall 40 percent reduction, the potential savings can be broken down into several subsectors as follows:

Table 3. Potential Water Savings in CI Subsectors

CI Subsector	Total Potential Savings (Thousand Acre-Feet)	Total Potential Savings (Gallons)
Hospitals/Healthcare Facilities	15	4,887,771
Offices	133	43,338,240
Schools	116	37,798,766
Restaurants	48	15,640,869
Hospitality	10	3,258,514
Laundries	15	4,887,771
Total Commercial	**714**	**232,657,920**

Source: Modified from the best estimate of practical savings in the CII sector from Peter H. Gleick, et. al., *Waste Not, Want Not: The Potential for Urban Water Conservation in California*, November 2003.

Although the potential savings have been defined in some areas of the country, benchmarks for facility water use are even more difficult to determine. The *Commercial and Institutional End Uses of Water* report attempts to develop efficiency benchmarks for facilities in each of the five subsectors studied–restaurants, hotels and motels, supermarkets, schools, and office buildings–breaking end use into the categories of indoor water use, cooling water use, and irrigation water use. While these efficiency benchmarks are based on a small amount of available data, they suggest water use in various units that could be achieved by efficient facilities. (3)

Additional data and information is needed to create viable benchmarks for CI facilities on a national scale. The development of such metrics is not only difficult due to a lack of data, but it is further complicated by differences in the structure and categorization of facilities that affect the normalization factors (e.g., gallons per square feet, gallons per employee per day) that could be used to compare water use between differently sized facilities. Because facilities contain different components, it is almost impossible to define a subsector-wide benchmark without more specific data than what is currently available. Further information would be necessary to develop these efficiency metrics for each particular subsector under a national CI program.

II.E Water-Efficient Practices and Technologies

Despite the variety of end uses in CI subsector establishments, water savings opportunities have been identified that are applicable across the CI sector and specific subsectors. There is a significant amount of literature detailing water-efficiency and conservation projects applicable to CI facilities, including the documents: *A Water Conservation Guide for Commercial, Institutional and Industrial Users* (6), EBMUD's *WaterSmart Guidebook: A Water-Use Efficiency Plan Review Guide for New Businesses* (5), *Increasing Water Efficiency in California's Commercial, Industrial, and Institutional (CII) Sector* (12), *Waste Not, Want Not* (4), *Water Efficiency Guide for Business Managers and Facility Engineers* (13), and many more resources.

Examples of water savings opportunities by end use include, but are not limited to:

- Indoor/Domestic Water
  - Install high-efficiency dishwashing equipment and run only when full. Install high-efficiency pre-rinse spray valves.
  - Install a garbage strainer instead of a garbage disposal.
  - Use air-cooled flake ice machines.
  - Retrofit restrooms with high-efficiency toilets, urinals, lavatory faucets, and showerheads.
  - Install high-efficiency clothes washing machines in laundry operations and run only when full.
  - Assure that steam sterilizers are equipped with tempering water flow controls.
- Cooling and Heating
  - Optimize cooling tower performance to achieve the maximum cycles of concentration.
  - Consider alternative sources of water for cooling tower makeup.
  - Eliminate the use of single-pass cooling.
  - Return steam condensate to the boiler.
- Outdoor Water Use
  - Use a weather-based irrigation control or soil moisture sensor for automatic irrigation system control.
  - Choose native, drought-resistant plants for landscaping.
  - Audit and optimize irrigation systems to achieve maximum distribution uniformity of water.

According to a McGraw-Hill Construction market report, the most-used water-efficiency practices in the CI sector are automatic irrigation systems, high-efficiency urinals, water-saving bathroom sink faucets, water-saving showerheads, and less water-intensive plant species in landscaping. (14)

Market research conducted by McGraw-Hill Construction on water use in buildings has found that water efficiency is growing in the CI sector. The study found that most building engineers are motivated by the reduction in energy use and utility bills that is coupled with many water-efficient practices. In the next five years, McGraw-Hill Construction estimates that 50 percent of building managers will incorporate water-efficient practices into half of their building portfolio. McGraw-Hill Construction calls for benchmark setting, government drivers, and education to continue to push CI sector water efficiency. (14)

Changes made in the Uniform Plumbing Code and local plumbing codes have mandated reductions in water use in plumbing fixtures such as toilets, faucets, wash basins, and urinals. These codes have significantly reduced water demand in newer buildings or renovations. Additional efforts are needed to incentivize retrofits of older buildings that were grandfathered into these codes. Significant water savings are possible by focusing on replacing the older, inefficient plumbing fixtures in these buildings.

In addition, local governments around the country have enacted restrictions and ordinances to reduce water use throughout the municipality during times of drought. These efforts often

include restrictions on outdoor water use, water efficiency requirements on fixtures, and mandatory use of certain BMPs. Overall, these ordinances have been effective in reducing water demand during times of strained supply. Unfortunately, behavior changes are not often sustained, as many people return to their old water-using behaviors as soon as the restrictions are lifted. Additional efforts are needed to educate consumers on the importance of water use in all situations, not just during drought. Water conservation and efficiency programs should make an effort to create some distance between the programs' efforts and the drought restrictions so that consumers do not automatically associate the two. This education may be easier in traditionally arid regions but will remain important to conduct in water rich areas too.

III. Existing Commercial and Institutional Efficiency Programs

WaterSense intends to learn from the success and challenges faced by historical and existing programs, including national, regional, local, subsector-specific, and international CI sector efficiency programs discussed in this section.

III.A National Programs

A few national-level programs do exist that challenge the CI sector to save water and/or energy. WaterSense can learn from these programs by closely evaluating the program structures that are applicable at a national level.

III.A.i EPA's Water Alliances for Voluntary Efficiency (WAVE) Program

The WAVE program was established by EPA's Office of Water in 1992. Its mission was to encourage commercial businesses and institutions to reduce water consumption while increasing efficiency, profitability, and competitiveness. The program provided education to the hospitality industry, office buildings, schools, and universities on water conservation through water use tracking software and other tools. It also provided some marketing support to its partners while allowing them to use the WAVE program logo.

Over several years, many partners, supporters, and endorsers participated in WAVE and achieved many successes. While the program assisted numerous facilities in reducing their water consumption, unfortunately, the program structure was unsustainable over a longer timeframe. The majority of the program's funding concentrated on developing software for each subsector. While this software was very useful to the participating partners, few resources were left to support implementing the program itself. Eventually, this hindered the program's ability to respond to participants' needs, so while the WAVE software is still distributed by request, the program has been phased out over the last few years.

III.A.ii EPA's Water Efficiency Leaders (WEL) Awards Program

EPA initiated the WEL awards in 2006 to recognize those organizations and individuals who provided leadership and innovation in promoting water-efficient products and practices. WEL's stated goal was to help foster a nationwide ethic of water efficiency, as well as to inspire, motivate, and recognize efforts to improve water efficiency. WEL award recipients were selected from a nomination process and had to be located within the United States and fit into one of four

categories: corporate/industry, organizations/teams/institutions, individuals, and government/military.

The WEL program is currently on hiatus while EPA evaluates the relationship between WEL and the WaterSense program. At a minimum, the awards and recognition efforts of the two programs will be more focused and coordinated.

III.A.iii ENERGY STAR® Buildings and Plants

ENERGY STAR is a joint program of EPA and the U.S. Department of Energy (DOE) that is working to help businesses and consumers save money and protect the environment through energy-efficient products and practices. ENERGY STAR for Buildings and Plants gives organizations of all types the tools to track and improve their energy performance. The program has many components, including a certification and labeling aspect, subsector-specific technical assistance documents and tools, awards, and challenges. (8)

Under the labeling program, ENERGY STAR benchmarks existing commercial facilities using a 1 to 100 point rating system to measure the energy use of a building relative to its peers while accounting for location and climate. Buildings achieving a score of 75 or higher and verified by a professional engineer are eligible to earn the ENERGY STAR label. The facility-specific information is collected through ENERGY STAR's Portfolio Manager tool, which allows organizations to input their information directly online. New construction can be designed to receive the ENERGY STAR label. Architectural firms must submit documentation to ENERGY STAR to receive the label. Once facilities earn the ENERGY STAR label, they are eligible to apply for annual awards and receive other public recognition during media building spotlights. ENERGY STAR's Web site keeps a comprehensive list of labeled facilities, including a list of the top 25 cities with the most ENERGY STAR labeled buildings. (8)

ENERGY STAR's Buildings and Plants program has significant technical resources available for the entire CI sector and specific information by subsector. Tools and resources are available on energy management guidance, assessing building and plant energy efficiency, assessing commercial building designs, improving building performance, and cost-benefit calculators. In addition, facilities can find a list of service providers who can assist them in meeting the ENERGY STAR labeling requirements for buildings. The energy performance of the facility is verified by a professional engineer to ensure that it is accurately measured. The ENERGY STAR Web site also provides a list of energy efficiency programs that offer technical and financial assistance to the CI and industrial sector. In addition, subsector-specific guidance is available to help commercial facilities in many subsectors get started with energy efficiency. (8)

An additional component, the ENERGY STAR Challenge, is an ongoing program to encourage facilities to reduce their energy consumption by 10 percent. More specific challenges are also offered. For example, architects can take the ENERGY STAR Challenge to design a building for the ENERGY STAR label. (8)

III.A.iv Leadership in Energy and Environmental Design (LEED)

LEED, a third-party certification program sponsored by the U.S. Green Building Council, is a rating system for all building types. The LEED program works to reduce a building's

environmental impact throughout its life cycle including its design and construction, operations and maintenance, tenant fitout (or customized interior construction for occupying tenants), and significant retrofits. Separate LEED rating systems address new construction, core and shell, schools, healthcare, retail, commercial interiors, retail interiors, existing buildings, and existing schools. Each type of LEED certification program has its own resources and checklist of actions needed to achieve a LEED rating. LEED takes a multi-faceted approach to recognize performance in five areas of sustainability: sustainable site development, water efficiency, energy efficiency, materials selection, and indoor environmental quality. Every improvement adds a designated number of points, which determine the level of certification the building receives, whether it is simply certified, or achieves silver, gold, or platinum. Water efficiency makes up five of the possible 70 points a building may receive to be certified. Each point can be earned for an overall percent reduction in water usage or the implementation of a best practice such as the use of recycled water for landscape irrigation. Although this model is successful in improving the overall environmental performance of a building, it does not necessarily ensure a reduction in all areas of environmental impact. For example, because architects and/or building owners are able to choose which projects to implement, a building may be certified with no water-efficient practices implemented at all. (9)

III.A.v Federal Facilities Under Executive Order 13423

Nationwide, federal facilities have been working to reduce their water use for many years under a series of executive orders (E.O.s). Most federal facilities are categorized as institutional buildings with some exceptions for military operations and repair facilities. Because of the large number of facilities owned and operated by the federal government, there is enormous potential for water reduction. E.O. 13423, “Strengthening Federal Environmental, Energy, and Transportation Management,” defines specific water conservation requirements for all federal facilities. According to E.O. 13423, beginning in FY 2008, agencies must reduce water consumption intensity (on a gallons per gross square foot basis), relative to the baseline of the agency’s water use intensity in FY 2007, through life cycle cost-effective measures by 2 percent annually or 16 percent total by the end of FY 2015. (10) Several options are available for federal facilities to utilize when implementing this requirement, including water assessments, development of water management plans, and purchase of water-efficient fixtures. The WaterSense program worked with the Federal Energy Management Program (FEMP) to develop BMPs to assist federal facilities in implementing this E.O. (28)

Each federal agency designs its internal water-efficiency program to meet this E.O. requirement. For example, EPA developed a comprehensive water conservation strategy to assure that it meets its goals. (29) EPA’s strategy entails assessing each of its facilities, using the FEMP BMPs as a guideline, to develop a water use baseline and identify facility-specific water savings opportunities. From the assessments, water management plans are developed for each facility that indicate the facility’s benchmark and provide a path for water savings. Facilities are encouraged to complete projects identified during the assessments, which may include installing water-efficient fixtures, optimizing cooling tower performance, collecting air handler condensate and using it as cooling tower makeup water, or discontinuing single-pass cooling and unnecessary tempering water use. In addition, EPA sets facility-specific water reduction targets annually to encourage facilities to practice continual improvement and meet each facility’s own potential.

III.B Regional and Local Programs

CI programs have been operating at the local level for many years. Local utilities and governments have focused their efforts on the CI sector utilizing a combination of water audits and rebates to achieve results with their customers. Prominent programs include those sponsored by Seattle Public Utilities, EBMUD, the Massachusetts Water Resources Authority, the Metropolitan Water District of Southern California, the City of San Jose Environmental Services Department, the City of Austin and Austin Water, the City of Phoenix, and Denver Water. Case studies and presentations by staff from these organizations outline some of the successes achieved by the programs. All significantly reduced the water used by their CI customers. Three prominent programs are discussed in detail below, though many more are offered nationwide.

III.B.i East Bay Municipal Utility District

EBMUD's WaterSmart Non-Residential Conservation Program seeks to reduce CI and industrial sector water use through a variety of program options. EBMUD offers financial incentives in the form of rebates to customers in these sectors for installing high-efficiency clothes washers in multi-family properties and coin laundry stores, high-efficiency water brooms, and high-efficiency toilets. Open rebates are also offered for up to one-half of the installed cost of equipment that improves water efficiency, such as retrofitting cooling towers and replacing single-pass cooling. Several incentives are offered with regards to irrigation. EBMUD offers free irrigation surveys to all commercial customers. It also offers rebates for matched precipitation rate sprinkler heads, rotating nozzles, moisture sensors, weather-based controllers, and sub-meters as long as the site was surveyed and water savings opportunities were identified. Under the Irrigation Reduction Information System, free customized water budgets are printed on customers' water bills. EBMUD also offers free product give-a-ways during water surveys or to be picked up from the utility's office. Free products include 2.0 gallons per minute (gpm) showerheads, 1.0 gpm bathroom faucet aerators, 1.5 kitchen faucet aerators, toilet tank displacement bags, and hose nozzles. EBMUD will replace conventional pre-rinse spray valves in commercial kitchens with high-efficiency models through its direct-install program. It also offers the WaterSmart Guidebook (5), workshops, events, and links to many water-efficiency resources as part of its education and outreach program. (24)

III.B.ii San Antonio Water System

The San Antonio Water System (SAWS) has a Commercial Conservation Rebates and Audits Program to assist commercial customers with water conservation. Ten percent of SAWS customer base are commercial customers, and they account for 40 percent of SAWS annual water sales. The large-scale rebate offered by SAWS will rebate up to 50 percent of the cost of new water-saving equipment. The rebate is determined by the actual water savings, the life of the equipment, and the installed cost. SAWS also has a high-efficiency toilet distribution program, in which high-efficiency toilets are provided to commercial customers for free and installed in nonprofit organizations for free. The program also boasts free cooling tower audits and optimization suggestions.

In addition, SAWS has two certification programs—one for car washes and one for restaurants. The Certified WaterSaver Program for car washes requires interested car washes to meet

certain criteria during an inspection. They are then eligible to receive the signage indicating that they are a "Recognized WaterSaver Partner." They must reapply each year and are subject to random inspection throughout the year. If discrepancies are found, they have 30 days to fix the discrepancy. Partners are eligible to receive a 10 percent discount on their monthly sewer bill and are required to sponsor some charity car washes. The Restaurant Certified WaterSaver Program requires three simple things—pre-rinse spray valves must be 1.6 gpm or less, toilets must be 1.6 gallons per flush (gpf) or less, and all ice machines must be air-cooled. If a restaurant does not meet the requirements, it can receive pre-rinse spray valves and high-efficiency toilets free of charge if it would like to become a Certified WaterSaver. Rebates for air-cooled ice machines are for 50 percent of the product cost.

Finally, SAWS also has a program called "Gold Fore SA." Golf courses are evaluated on water conservation, water quality, wildlife habitat and open spaces, and community outreach. There are four levels of achievement—par, birdie, eagle, and double eagle—and each level has increasingly more difficult program requirements for each of the four evaluation categories. The golf course must pledge to commit to the program, evaluate the course based on program criteria, develop a three-year plan for continuous improvement, and meet schedules and milestones. Golf courses that meet birdie level or better receive the "Good Housekeeping Seal." (25)

III.B.iii City of Austin

Similar to the other programs, the City of Austin provides several rebates to commercial customers, including high-efficiency toilets, high-efficiency urinals, high-efficiency clothes washers, rain barrels, larger capacity rainwater harvesting systems, and pressure-regulating valves. The program offers rebates to commercial laundries for the purchase of ozone and water reuse equipment. The amount of the rebate is equal to the amount of water saved, equal to $1 per gallon saved per day or up to half of the equipment cost, whichever is less. Similar to SAWS, it offers free water evaluations for commercial customers to identify water savings opportunities and eligibility for rebates. The city offers rebates to CI and industrial customers that install new equipment and processes that conserve water in existing facilities. Projects must be approved and customers can receive up to $100,000. The city offers free irrigation audits and rebates for implementing recommendations made during the audit, as well as educational resources, programs, and newsletters. (26)

III.C Subsector-Specific Programs

Different subsectors have developed initiatives focused on improving sustainability, many of which include elements on water efficiency. Examples include the Laboratories for the 21st Century (Labs21) program operated by EPA and DOE (30), Practice Greenhealth (formerly Hospitals for a Healthy Environment) (31), and the new Sustainability Tracking, Assessment & Rating System (STARS) effort (32) managed by the Association for the Advancement of Sustainability in Higher Education.

Several water-efficiency initiatives have been implemented throughout the years in hotels and restaurants. Some of the most successful so far have been the efforts to reduce the environmental impact of hotels. Many hotels have created systems to reduce the number of times the linens are washed during a customer's stay. These efforts have significantly reduced

water use through their laundry and cleaning operations. In some areas of the country, these practices have been required under a city ordinance or plumbing codes, especially during times of drought and water restrictions. Organizations such as the "Green" Hotels Association offer membership opportunities and provide free literature detailing conservation opportunities for those hotels willing to make sustainable choices. (2)

Efforts dedicated to promoting green restaurants have also been on the rise. The nationwide Green Restaurant Association (GRA) provides environmental assessments, environmental consulting, and certification of green restaurants using its Green Restaurant® 4.0 standards. The standards allow restaurants to collect points in the following areas: water efficiency, waste reduction and recycling, sustainable furnishing and building materials, sustainable food, energy, disposables, and chemical and pollution reduction. The program is a tiered structure offering two-, three-, and four-star ratings, but each restaurant must meet minimum points in every category. There are three types of certification options: existing restaurants, new builds, and events. GRA verifies each step with invoices and other documentation to ensure that each restaurant has reached the minimum points for certification. Recertification occurs each year if a restaurant maintains good standing with Green Restaurant® 4.0. (22)

In addition to the GRA at the national level, the Environmental Law and Policy Center of the Midwest developed an organization to recognize green restaurants in Chicago. The Web site (www.greenrestaurants.org/index.php) provides a detailed guide for how to become a green restaurant, calling out specific areas to save water and energy and practice other sustainable business operations in restaurants. Although a list of green restaurants in Chicago is provided, the method for determining how they are green is not clear on the Web site. (23)

III.D International Programs

Internationally, regional or national CI sector water programs have been developed in Canada, Australia, and the United Kingdom (UK).

The province of Ontario, Canada is operating under a June 2009 *Blueprint for a Comprehensive Water Conservation Strategy.* (15) The blueprint describes the need for a comprehensive water conservation plan and outlines the elements of a successful plan that Ontario will follow. The elements include: oversight, targets and plans, measuring progress, water budgets and baseline data, benchmarks, BMPs, financial incentives, social and technical capacity, market transformation, and education.

The City of Toronto has its own CI program called the WaterSaver Program, which offers high-efficiency toilet and clothes washer rebates, in addition to an extensive water buy-back program. Under the buy-back program, the city provides a one-time financial incentive of 30 cents per liter per day (e.g., $1.14 per gallon) to businesses that make permanent and measurable water reducing changes to their operations. City staff works collaboratively with businesses to identify areas where water is wasted and offers solutions that will permanently reduce water use and wastewater discharge. The goal of this program is to help reduce water use citywide by 15 percent by 2011. Businesses reap rewards with lower water bills and utility costs and receive a cash incentive from the city that pays for a portion of their costs to install water-saving fixtures and equipment. (16)

In Australia, the state of New South Wales (NSW) offers a Green Business Program. The NSW Green Business Program provides $30 million throughout five years for projects that will save water and energy in business operations locally. Round one of the Green Business Program allocated $11.7 million to 24 water and energy projects, saving an estimated 164 million liters (e.g., 43 million gallons) of drinking water and 36,000 tonnes (e.g., 39,700 tons) of greenhouse gas emissions a year.

South Australia Water's Business Water Saver Program works with top water users throughout South Australia to identify opportunities to reduce water consumption and minimize wastewater production. For interested businesses that use more than 50 million liters (e.g., 13 million gallons) of water annually, South Australia Water provides water-efficiency audits, water-efficiency reporting, education and training, monitoring, and ongoing support. (18)

The Australian Capital Territory (ACT) has a program called Think Water, Act Water, which offers up to $20,000 for commercial bathroom retrofits. ACT also operates under a water conservation strategy and implementation plan, which sets a goal of reducing water use by 12 percent by 2013 and 25 percent by 2025. The plan calls for a variety of programs, including rebates, subsidies, purchasing labeled products (under the Water Efficiency Labeling and Standards Scheme, 19), education, outreach, and more. (20)

Waterwise is a nonprofit, nongovernmental organization focused on decreasing water consumption in the UK and building the evidence base for large-scale water efficiency. Waterwise set up the Saving Water in Scotland Network, a partnership seeking to identify and implement water-efficiency strategies. Waterwise awards the Marque award annually to water-using products that highlight water efficiency or reduce water waste and work with UK water companies on large-scale water-efficiency projects, ranging from water audits to domestic retrofit schemes. The organization also provides technical information and assistance to businesses and the government, among others. (21)

IV. Key Stakeholder Groups

WaterSense can learn from the experiences of other CI sector programs but also seeks to engage partners and other stakeholders in the CI sector program development process. After reviewing possible stakeholder categories, seven major categories of stakeholders have emerged to potentially participate in program development: managers and implementers of existing CI programs; water, wastewater, and energy utilities; manufacturers and distributors of commercial water-efficient products; commercial builders, developers, specifiers, and architects; experienced CI water auditors; leaders, building owners, facilities managers, and water-efficiency specialists from all CI sector organizations; and federal agency water-efficiency leaders. These groups represent the likely decision-makers and target audiences of a national CI sector program.

- Existing Program Contacts. Managers and implementers with first-hand experience developing and implementing a CI sector program can offer extensive input on potential and real implementation issues, as well as identify ways to overcome barriers.

- Water, Wastewater, and Energy Utilities. Water utilities are likely to serve a critical role in promoting a national program, and their input should be solicited during the development

phase of the program to ensure buy-in. A broad geographic representation of major utilities can help identify regional or local issues of concern. Utilities can be represented individually and/or by organizations such as the Alliance for Water Efficiency and AWWA. In addition to water utilities, wastewater and energy utilities serve as valuable stakeholders because water efficiency, reduced wastewater discharge, and energy efficiency are co-benefits to any CI water-efficiency effort. Energy utilities may also have experience to share about their CI programs.

- Manufacturers and Distributors. Manufacturers (along with members of their distribution chain) of appliances, plumbing fixtures and systems, irrigation systems, etc. can become strong allies for a national water-efficiency program for the CI sector. Their support is critical to program success and early buy-in should be solicited. They can be present as individual companies (e.g., American Standard) and/or be represented by trade associations such as the Plumbing Manufacturers Institute.

- Commercial Builders, Developers, Specifiers, and Architects. Commercial builders and developers are a key target audience and should assist with CI program development. Builders, developers, specifiers and architects can provide EPA with critical input on specifications that they can/would be willing to meet. This audience can be individuals or be represented by a trade association.

- Experienced CI Water Auditors. Not all facilities receive water audits to determine their water balance and identify water-efficiency and conservation opportunities. Water auditors should be engaged in the CI program development process as they understand CI sector water use and end water uses.

- Leaders, Building Owners, Facilities Managers, and Water-Efficiency Specialists From all CI Sector Organizations. Leaders, building owners, facilities managers, and water-efficiency specialists with office corporations, schools, hotels/motels, and all CI sector organizations know the ins and outs of their CI subsectors and facilities and can determine what program components and structures are reasonable and attainable. They can provide EPA with further input on subsector baselines, end uses of water, and potential barriers to implementation. They may be individuals and/or be represented by a larger corporate body or trade association.

- Federal Agency Water-Efficiency Leaders. Federal agencies currently working to optimize their facilities to meet E.O. 13423 requirements may have useful insight for a national CI program structure.

V. WaterSense Commercial and Institutional Program Design Options

In designing a national CI sector water-efficiency program, WaterSense will need to consider the types of organizations to which program would apply and how the program will be structured, e.g., a labeling program versus a voluntary commitment program. This section presents several design options and key issues to consider.

V.A Scope and Eligibility

WaterSense could develop a CI program that would be applicable to the entire CI sector or phase in one subsector at a time.

- Developing a broad CI sector program. Under this approach, all CI organizations would be eligible to participate in this program. EPA could take advantage of subsector-specific strategies to promote end use water efficiency while targeting subsectors through portions of the program, but all subsectors would be included in the program from the outset. Under a broad approach, EPA could structure the program around common end uses that are applicable across most sectors, e.g., domestic water use, landscape water use, and heating and cooling. EPA could link tools and guidance to BMPs for each type of end use. The BMPs could be focused on the highest consumptive end uses to achieve the greatest results; for example, cooling tower optimization and sanitary fixture retrofits. EPA could broadly distribute this information among the different types of organizations and implement the program simultaneously.

  Advantages:
  - Economies of scale gained by working with a large number of organizations on similar issues.
  - Encourages information sharing between different types of participating organizations.
  - Cross-sector applicability—solutions implemented in one area may be applicable to many others who have not considered it.

  Challenges:
  - Target decision-makers, operating procedures, and investment styles vary by sector.
  - Specific technologies or practices may not be transferable to another organization.
  - Other barriers to implementation may exist in particular sectors.

- Phased subsector-by-subsector approach. EPA could initiate a CI water-efficiency program one subsector at a time. This approach would allow EPA to focus initially on subsectors that have a high potential for improvements in water efficiency and to develop tools and resources specific to their needs. As the WaterSense CI program expands, EPA could expand into new subsectors and tailor the program and resources as necessary. By implementing a subsector-based approach, a national-level program will be able to provide specific information targeted to each type of organization in the CI sector. BMPs can be tailored to standard operating styles and procedures to increase implementation rates. Outreach materials and participation incentives can be targeted to the key decision-makers in each type of organization. If the highest water-using organizations are targeted first, large water reductions may be possible, fueling further results.

Advantages:

- Focusing limited resources (i.e., staff and funding) may make implementation more effective.
- Targeted information and resources may increase program adoption rates and improve results.
- Large water reductions may be possible in certain sectors, creating momentum for further results.

Challenges:

- Coordination between types of organizations may be difficult due to differences in operating styles and structures as well as adoption rates.
- Certain organizations may fall within multiple subsectors, complicating implementation.
- All subsectors will not receive immediate attention, and it may take many years to reach all subsectors. EPA could miss out on immediate and impactful water savings opportunities in some subsectors using this approach.

If choosing a subsector to target, EPA would utilize a combination of factors to ensure that the program is implemented as effectively as possible to reduce implementation barriers and maximize results. In the CI sector, the following factors would most likely be considered:

- Relative water use within CI sector.
- Water use intensity.
- Water-efficiency potential.
- Willingness to participate in a water-efficiency program.
- Concentration of customers in a subsector.
- Possible connections to existing efforts and programs (i.e. green hotel associations, local conservation programs).
- Cross-sector applicability of tools and resources.
- Measurability of results.

V.B Program Structure

EPA is considering several basic program structure options for a potential WaterSense CI program including: certification and labeling, partnership commitment, or education and outreach. This section describes each of these program structure options including a discussion of key design issues that need to be addressed. While these programs are discussed separately, combinations of program structures are possible depending on the scope of the program and the stakeholders involved. Regardless of the structure created, EPA would want to design tools to effectively target the identified barriers to implementation of water efficiency in these sectors.

V.B.i Certification and Labeling Program

EPA could create a national-level certification and labeling program by developing specifications for facilities in the CI sector. Upon meeting the specification, the facility would receive the WaterSense label. Similar programs include ENERGY STAR Buildings and Plants and LEED.

Key Design Issues to Consider

Third-Party Certification Versus Self-Declaration

Under this program structure, EPA would have to determine if a facility's performance would be verified by a third-party or through a self-declaration process. Several of the national-level resource conservation programs, including ENERGY STAR, use a self-declaration system. In the case of ENERGY STAR, information is entered into a tracking system and approved by a staff engineer at the facility. Other programs such as LEED require facility inspections. EPA could require third parties to conduct inspections in order to mirror the rigor of other parts of the WaterSense program. In fact, networks of inspectors may already exist through building inspection and code enforcement requirements that could be tapped to provide such verification. Alternatively, a tool such as ENERGY STAR's Portfolio Manager could be used to track facility performance. While a third-party certification system would be the most resource intensive, it would provide the most accurate and tangible water use reductions.

Single-Tiered Versus Multi-Tiered Rating Program

EPA could apply a certification and labeling structure using a single-tiered or a multi-tiered rating system. Under a single-tiered system, organizations could meet the specification, but there would be no differentiation among levels of achievement. Conversely, a tiered rating system would allow organizations to earn points by implementing certain BMPs or achieving water reduction levels, and the organization would receive an overall score based on the sum of its points. Many existing programs use this tiered model to reward the highest achievers, but make the program accessible to a broader range of facilities. The LEED model has been widely adopted with excellent results verified by inspectors. Other programs use more informal rating systems that do not require inspection. A tiered system that rewards various levels of water conservation could aim to complement similar national-level programs. While a tiered system would increase participation, it also could be more resource intensive and complicated to implement.

New Construction Versus Existing Facilities

EPA would consider whether the program would include new commercial facility construction or new and existing facilities. Certain technologies lend themselves better to new construction rather than retrofits. Older facilities may have additional opportunities for saving water by updating equipment, fixing leaks, and other measures that new facilities might not find necessary for water efficiency. Specifications could allow for a facility to be built or retrofit to meet the same specification, or separate specifications could be considered similar to the LEED framework. While working with new facilities could be easier, existing buildings may have greater potential for water-efficiency improvements.

Labeling Criteria

Labeling criteria would be outlined in a specification that could include requirements for water use or water consumption intensity (on a gallons per gross square foot basis) percentage reduction and/or BMP implementation.

The percentage reduction approach would require the facility to determine baseline water use with metered data or other mechanisms, and a data collection procedure would need to be developed. EPA could require that facilities reduce their water use or water use intensity by a certain percentage within a specified number of years in order to receive the label. In order to reflect subsectors with different end uses and water consumption patterns and levels of engagement in existing water-efficiency programs, WaterSense could set percent reduction targets by subsector. Using this approach, WaterSense could survey each subsector to determine an appropriate baseline and percentage reduction target. This flexibility could maintain realistic, yet rigorous standards for each subsector while encouraging the participation of more facilities.

In a specification, EPA could also require the implementation of BMPs by participating facilities. Facilities could be measured based on the implementation of technologies, water use reduction strategies, or other best practices. The program could require facilities to meet a set of specified BMPs or allow them to choose from a broad list of BMPs or water use reduction strategies developed by WaterSense in order to receive the label. The BMPs could apply to the entire CI sector or could be subsector-specific. BMPs could also be provided as a guide to meeting percent reduction targets discussed.

V.B.ii Partnership Commitment

Under a partnership program option, organizations would partner with WaterSense to improve the water efficiency of their facilities. Using a commitment-based approach, organizations could sign up as WaterSense partners and commit to undertaking specific actions. There would be no labeling process but organizations could be required to report their annual activities and water use savings. While this program structure is not necessarily as rigorous as a facility specification and certification, it could result in extensive water savings if combined with technical assistance or third-party verification.

Programs utilizing this structure have been under increasing scrutiny lately to demonstrate results. If using this program structure, WaterSense would need to ensure that the performance of participating facilities is independently verified along with the progress toward meeting their commitments. Regulatory flexibility would not be included in the program structure and mechanisms would be created to remove non-performing facilities from the program on a regular basis.

Key Design Issues to Consider

Program Commitment

Under a partnership-commitment program, organizations could commit to reducing their water use or water use intensity by a certain percentage. Alternatively, they could only commit to implementing BMPs at their facility.

Commitments could be selected by EPA or self-defined by the facility. Either percentage reduction or BMP commitments outlined by WaterSense could be for the entire CI sector or subsector-specific. Alternatively, EPA could choose to allow facilities to set completely

customized goals for water reduction. This option allows the organization to decide a reasonable goal to achieve that may most benefit their facility.

Technical Assistance

In order to assist facilities in meeting their partnership commitments, EPA could partner with other organizations to provide onsite assistance to help organizations identify facility-specific goals and implement projects to achieve them.

In order to facilitate this structure, a network of state and local technical assistance providers from existing water and pollution prevention programs could be tapped to provide assistance to buildings in their area. These partner organizations could either provide the technical assistance themselves or train individual providers to support the water-efficient design, operation, and maintenance of CI facilities in a similar manner to they system set up for WaterSense Single-Family New Homes.[3] Providers could be trained and certified to assist in the implementation of water-efficiency audits, BMPs, fixture retrofits, and other water conservation assistance. The training would have to be developed by a reputable source, such as EPA or the U.S. Green Building Council, and administered through trade associations or other large organizations. The trained and certified providers could be centrally listed and promoted in multiple locations.

Similar networks of technical assistance providers currently exist through several energy programs, but none is specifically focused on water conservation. The ENERGY STAR program lists energy providers on its Web site, while LEED uses qualified inspectors to inspect and certify buildings on a multimedia basis. It may be possible to utilize many of the same providers to deliver water-efficiency assistance at the same time they are promoting energy conservation. DOE conducts a similar program through its Industrial Assessment Centers, which train and qualify providers to assist companies in reducing their energy usage. DOE's training is quite extensive, allowing providers to focus on particular end uses at facilities. Some of these trainings may be easily adapted to include water components as well as energy. One example would be the section focused on heating and cooling systems, which providers could use to advocate multiple-pass cooling systems and other water-saving measures. This connection between the energy providers and water efficiency is especially appropriate, due to the extensive amounts of energy used to heat and pump water throughout a facility.

In addition to technical assistance programs focused on energy, many pollution prevention programs exist around the country which already assist CI facilities to reduce their overall environmental impact. Because these technical assistance programs have very different levels of resources and areas of focus, specific resources would be needed to assist these programs in talking about the WaterSense program and facilitate their work with facilities to improve their water efficiency. Overall, the extensive expertise of these established programs and their existing relationships with CI facilities may be very useful in spreading information about a WaterSense CI program while also improving the effectiveness of its implementation.

[3] For more information about the structure of the WaterSense New Homes program, please visit the WaterSense Web site at www.epa.gov/watersense/pp/new_homes.htm.

Reporting Requirements and Verification

To track water saved through the program, EPA could require organizations to submit an annual report to WaterSense on the progress made toward their goals, be it percentage reduction commitments, BMP implementation, or facility-defined goals. Under this approach, EPA could use data provided by the facilities to approximate water savings through use of online tools such as ENERGY STAR's Portfolio Manager. Third-parties such as water utilities could verify the reductions.

V.B.iii Education and Outreach

WaterSense could choose to develop an education and outreach program that would focus on educating decision-makers (e.g., product specifiers, facility managers, building owners, corporate leaders) on WaterSense program concerns (e.g., the value of water-efficient products and practices).

Key Design Issues to Consider

Level of Technical Assistance

This type of program could include technical assistance resources developed by WaterSense, as well as technical assistance provided through partnerships with regional, state, and local organizations, as well as universities. EPA could provide centralized access to tools and resources relevant to reducing water use in the CI sector. These resources could include BMPs applicable to different types of facilities as well as specific technologies that could be utilized to gain reductions. Many similar technical assistance resources are currently available through different vehicles, but some may need to be modified to be applied to CI facilities. Tools could guide facilities through water use audits, cost-benefit analyses, water use projections, leak detection and repair, and other useful topics. Training manuals and guidance documents could be created along with new calculators and online tools such as ENERGY STAR's Portfolio Manager.

Motivation and Incentives

Since this program is neither a labeling program nor a partnership program, WaterSense would need to put incentives in place to motivate CI sector participation. Experience has shown that formal national recognition through an awards program and the media spurs action. Programs using this method, such as Green Chemistry and WEL, publicly recognize organizations that excel in achieving results aligned with program goals. WaterSense could combine its efforts with the WEL program to specifically create a CI awards program in which organizations submit project descriptions and water savings results. EPA could define award criteria to drive certain activities, and awards could be given on an annual or semi-annual basis. It should be noted that such an awards program could be a component of any program design that might be developed by EPA.

VI. Information Gaps and Outstanding Questions

WaterSense is interested in any data or information on the CI sector that is not presented in this report or included as a reference. EPA can consider information from studies that are more local or regional in scope; however, the Agency will need to be able to roll up the results to paint a national picture that can used for developing a national program. If WaterSense should choose a subsector approach, research will be needed to determine the current state of some subsectors and their water use baseline and water conservation potentials.

Specific research and data needs include:

- Subsector specific data, such as:
  - Water usage by facility and end use
  - Existing benchmarks with which to set targets
  - Capacity and resources available of potentially participating facilities

- Economic data, such as:
  - Capital versus long-term operating costs
  - Other economic considerations in commercial facilities
  - Impacts of commercial rate structures on efficiency
  - Other potential incentives

Information is also requested on potential partners who may assist WaterSense in distributing information, analyzing sector data and potential participation, and providing technical assistance to facilities.

WaterSense would like its partners and stakeholders to be involved in development of a CI sector program and asks stakeholders to consider WaterSense's national scope and program goals when submitting comments. WaterSense in particularly interested in receiving feedback on the following areas and questions:

<u>Data Gaps and Research Needs</u>

- What research needs to be done or data collected on the CI sector? What information gaps exist?

- Are you aware of any reliable data that is not cited in this paper and could add substantially to our understanding of water use in the CI sector?

- If EPA were to set a water use percent reduction target for the CI sector as a whole or for specific subsectors, what should EPA use as the water use baseline and what percent reduction should be targeted?

- What impact could a national sector water-efficiency program have on the revenue and rate structure of drinking water utilities?

- What issues and barriers stand in the way of a national CI sector water-efficiency program? How can EPA overcome them?

Program Design Options

- Should EPA address all subsectors together or separately?
- Are the factors for choosing a subsector appropriate?
- What are the pros and cons of each program structure presented?
- What program structure do you think EPA should adopt and why?
- Is it important to have WaterSense labeled CI sector facilities?
- If a certification and labeling scheme is preferred, should EPA have a single-tiered or multi-tiered program? Should certification be third-party or self declaration? Should a specification include percentage reduction requirements, best management practices (BMP) implementation requirements, or both?
- If EPA chose a partnership-commitment program structure, what should the commitment be? What reporting should be required?
- If EPA offered technical assistance, what should it be and in what form should it be offered?
- If a subsector-specific approach is chosen, should EPA's efforts focus on the largest overall users of water, or on the largest individual accounts?
- If a subsector-specific approach is chosen, what factors should be considered in prioritizing different subsectors?
- Should EPA offer an awards program?
- What other incentives should EPA offer for participating in the program?

VII. Next Steps

EPA is welcoming comments on the above questions and the following white paper. Comments may be submitted to watersense-ci@erg.com through September 20, 2009.

WaterSense will also be holding a meeting to discuss potential CI program options in conjunction with the WaterSmart Innovations conference in Las Vegas, Nevada. If you are interested in attending this meeting please contact the WaterSense Helpline at (866) WTR-SENS (987-7367) or watersense@epa.gov.

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Appendix A:

CI Water Use by Subsector

While data regarding water use in the CI sector is not regularly collected and monitored, studies have been done on the regional and national level. The following is a summary of the best available studies on this subject.

The *Waste Not, Want Not* study examined CI subsector water use in California in 2000. (4) Table A1 presents these findings.

Table A1. Commercial Water Use in California in 2000

CI Subsector	Percent of CI Sector Water Use
Offices	18.3
Schools	13.5
Golf Courses	12.4
Restaurants	8.8
Retail	8.3
Hospitals	2.0
Hotels	1.6
Laundries	1.6
Unexamined Commercial	33.5

Source: Modified from Peter H. Gleick, et. al., *Waste Not, Want Not: The Potential for Urban Water Conservation in California*, November 2003

According to this study, offices, schools, golf courses, restaurants, and retailers account for most of the CI sector water consumption in the state of California. Similar analysis has been done at the water utility level, but little other data exist to classify CI subsector water use at the state level.

The State of California Department of Water Resources, under a grant from EPA, surveyed a dozen water utilities in the United States to categorize water consumption from various CI subsectors in 1997. Table A2 summarizes the commercial and institutional water use of the participating utilities. (7)

The data presented in Table A2 have several anomalies because the individual utilities categorized their customers differently. The 1997 EPA grant study found that the largest water using subsectors are largely the same subsectors as those identified for the state of California from Table A1. In the 1997 study, hotels and motels were grouped with restaurants into a hospitality subsector that comprised approximately 15 percent of the water demand in the 12 communities studied. Additional significant water users in this study included offices (9 percent), healthcare (7 percent), education (5 percent), and a sales category that includes grocery and convenience stores (5 percent). (3)

As presented in the study *Commercial and Institutional End Uses of Water* (2000), billing information of five water agencies in Southern California and Arizona for a single year was evaluated. The study summarized the water use of facilities in 11 different subsectors which

were common to at least two of the five agencies (Table A3). The study further analyzed five of these categories to further disaggregate water uses and attempt to develop benchmarks. (3) The results of this study were very similar to the evaluation completed in the EPA study in 1997. Of note is that the 1997 study had several additional categories that may overlap with the 11 categories of the *Commercial & Institutional End Uses of Water* study. This difference highlights the difficulties in comparing the results of multiple studies. (3, 7)

Some of the disparities in the results from the two studies could be attributed to differences in the conditions at the locations examined. Several economic, technological, and climatic factors contribute to water consumption in these types of facilities. Economically, the growth or recession of local industry can change the demand for the services at a particular facility in the group. This will not only affect the water used by employees, but also the amount of water used by patrons who visit the facility. In addition to the changes in the overall demand of water within the facility, the price of water will also affect the amount of water used. Facilities will be more likely to reduce their water consumption if their water rates increase.

Similarly, the technologies used within the facilities will also affect the water use rates. Areas with newer buildings and more efficient technologies will have significantly lower water consumption rates than older buildings. Finally, the climate of the area can significantly affect the amount of water needed to operate a facility by changing the amount of water needed for irrigation and cooling. For example, the *Commercial and Institutional End Uses of Water* study only utilized information from facilities in California and Arizona, which may have higher irrigation needs than a group of communities from a more diversified set of locations. All of these factors combine to change the water consumption rates in different facilities making it almost impossible to make an equitable comparison.

Table A2. Distribution of CI Water Use by Subsector in Selected Cities as Reported in 1997

Subsector	Austin TX 1992	Buffalo NY 1995	Burbank CA 1995	EBMUD CA 1994	Glendale CA 1995	Miami FL 1995	Orlando FL 1995	Portland OR 1995	San Diego CA 1995	Santa Monica CA 1995	St. Paul MN 1994-1995	Santa Rosa CA 1994	Weighted Average 1992-1995
Percent of All Reported CI Water Use													
Commercial Water Use by Subsector													
Hospitality [a]	13.26	20.94	11.75	7.94	13.45	17.53	34.86	5.45	34.28	38.55	15.96	28.12	14.80
Warehousing	1.79	10.83		30.77	0.45	6.73	30.94	2.78	0.03		16.87	0.25	12.40
Offices [b]	13.97	15.81	11.37	7.09	12.78	12.29	9.7	5.69	7.59		13.03	15.4	9.20
Irrigation [c]	2.18	5.13		21.94	5.12		0.8	1.57	4.25	10.32	3.12	0.3	6.15
Miscellaneous Commercial [d]						31.05	0.45		0.06		0.46		5.72
Sales [e]	6.82	18.15	9.36	3.91	3.54	8.29	2.32	2.99	7.23	6.59	11.97	7.54	5.48
Services [f]	5.64	0.22	0.59	2.61	4.97		0.45	0.75	13.07		0.21	0.43	2.36
Laundries		3.41	3.52	2.53		2.89	2.13	1.10		3.91		5.88	1.73
Vehicle Dealers and Services	0.90	3.39	0.24	0.59	4.17	0.95	2.11	0.50	2.63	0.57	3.37	4.83	1.15
Meeting and Recreation [g]	0.96		2.48	2.13	9.59	0.26	0.53	0.01	2.17	3.14	4.98	0.44	1.11
Communication and Research	0.11	0.06	27.84	0.15	7.77		1.04		2.97	1.43	0	0.26	0.72
Landscape [h]	0.05	2.26	1.01	0.42			0.15	1.63					0.58
Transportation and Fuels				1.40	0.58		0.74	0			0.61 0.3	1.12	0.43
Car Wash		2.15	1.17	0.38	0.40				0.77	2.54	1.24	1.23	0.28
Passenger Terminals	0.45 1.15	1.17	2.31		0.05	 0.20	0.01	0.30	0.22	0.33	0.16		0.20

Table A2. Distribution of CI Water Use by Subsector in Selected Cities as Reported in 1997

Subsector	Austin TX 1992	Buffalo NY 1995	Burbank CA 1995	EBMUD CA 1994	Glendale CA 1995	Miami FL 1995	Orlando FL 1995	Portland OR 1995	San Diego CA 1995	Santa Monica CA 1995	St. Paul MN 1994-1995	Santa Rosa CA 1994	Weighted Average 1992-1995
Institutional Water Use by Subsector													
Utilities and Infrastructure [i]	32.34	0.67	0.77	1.88	8.49		5.59	73.04	0.98		0.06	2.86	22.76
Health Care [j]	5.83	12.03	16.73	5.62	18.21	11.5	4.8	3.5	10.94	20.43	17.18	16.36	7.32
Education [k]	11.14	0.97	10.19	8.30	7.16	7.33	1.55	0.27	11.41	11.96	8.55	11.06	5.88
Church	1.43	0.31	0.67		2.70	1.18	0.70	0.42	1.19	0.21	1.49	2.79	0.73
Nonprofit Service and Organizations [l]		1.42		2.34	0.59		0.76		0.20		0.78	0.5	0.66
Military	2.42						0.02					0.33	0.27

Source: Dziegielewski, et. al., *Commercial and Institutional End Uses of Water*, 2000 (originally derived from U.S. EPA, *Study of Potential Water Efficiency Improvements in Commercial Businesses*, Grant CX 823643-01-0 with the State of California Department of Water Resources, April 1997)

[a] – Hospitality includes restaurant/bar, overnight accommodations, and other group shelter.
[b] – Office includes finance, insurance, real estate, and government.
[c] – Irrigation includes parks, gardens, botanical, zoological, cemeteries, and open land.
[d] – Miscellaneous commercial includes warehousing, warehouse-cold storage, and boat dock.
[e] – Sales include grocery stores, convenience stores, and dry goods.
[f] – Services include miscellaneous repair services, crematories, funeral homes, laboratories, and printing.
[g] – Meeting and recreation include convention center, recreation and theaters, and amusement parks.
[h] – Landscape includes landscape horticultural service, agriculture, soil preparation, crop services, veterinary, equestrian, livestock, poultry, and game propagation.
[i] – Utilities and infrastructure include police and fire station, public works/utility, electric steam, natural gas, gas production and distribution, sanitary collection and disposal, construction, fumigating, and septic tank cleaning.
[j] – Health care includes health services, hospitals, and nursing homes.
[k] – Education includes schools, museums and libraries, colleges/other schools, and social services.
[l] – Nonprofit service and organizations include professional, labor, civic, and political social organizations except churches.

Table A3. Characteristics of Significant CI Subsectors in Five Participating Agencies

Subsector	Average Annual Daily Use (gpdc) [a]	Percent of Total CI Use (%)	Percent of CI Customers (%) [b]	Scaled Average Daily Use (gpdc) [c]
Urban Irrigation	2,596	28.48	30.22	739.0
Office Buildings	1,204	10.19	11.67	123.0
Schools and Colleges	2,117	8.84	4.79	187.0
Restaurants	906	8.83	11.18	80.0
Hotels and Motels	7,113	5.82	1.92	414.0
Laundries and Laundromats	3,290	3.95	1.38	130.0
Hospitals and Medical Offices	1,236	3.90	4.19	48.0
Food Stores	729	2.86	5.20	21.0
Auto Shops	687	1.97	6.74	14.0
Membership Organizations	629	1.95	5.60	12.0
Car Washes	3,031	0.82	0.36	25.0

Source: Modified from Dziegielewski, et. al., *Commercial and Institutional End Uses of Water*, 2000
a – gpdc = gallons per day per customer
b – "Percent of CI customers" pertains to CI customers in agencies utilizing the particular subsector.
c – Scaled average daily use = average annual daily use in subsector x percent of total CI use attributed to the subsector.

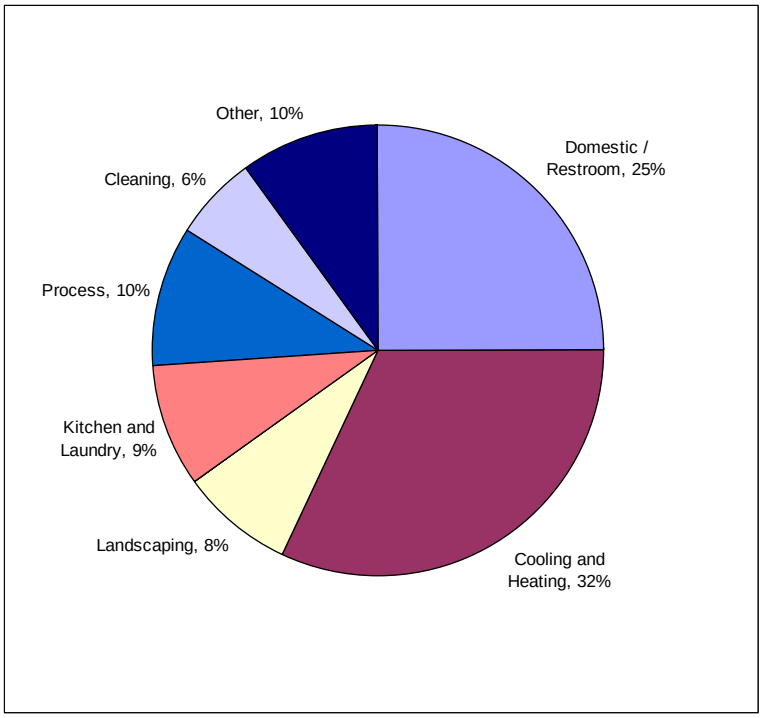
Appendix B:

Data on End Use Application of Water by Subsector

Due to the diverse range of subsectors within the CI sector, generalizing the end use of water can be difficult. By looking at end uses on a subsector level, however, there are a great number of patterns regarding end use that can be established. This appendix summarizes the best available data on the end uses of water on a CI subsector basis.

CI sector water use in Denver was broken out by end use in 1991 (see Figure B1). (11) The figure displays that domestic water use and cooling and heating are among the main water end uses in the CI sector.

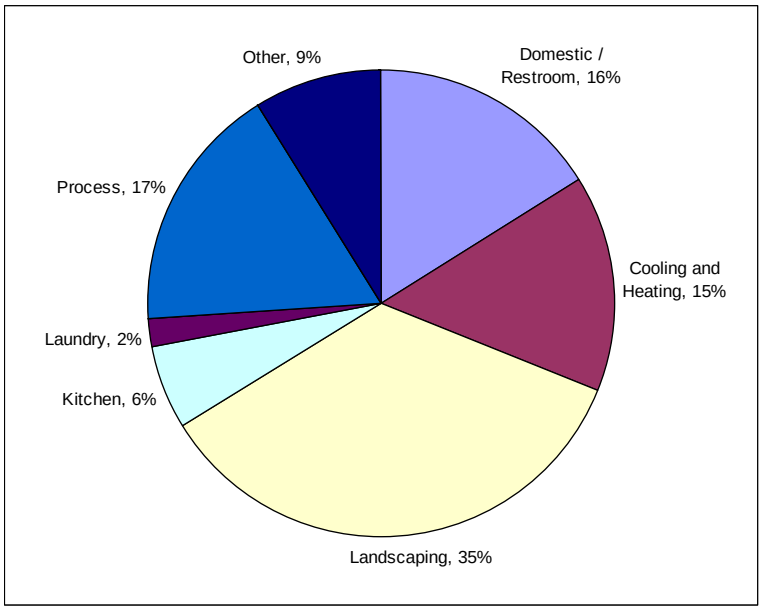
Figure B1. End Uses of Water in the CI Sector in Denver (1991)



Source: Modified from Sharon deMonsabert and Barry L. Liner, *WATERGY: A Water and Energy Conservation Model for Federal Facilities*, January 1996

Waste Not, Want Not characterized CI end uses in California, consolidated in Figure B2. In California, due to climate, water use for landscaping takes precedent over some other end uses. Water use for restrooms and cooling remain significant end uses. (4)

Figure B2. Estimated Water Use in the CII Sector by End Use in California in 2000



Source: Modified from Peter H. Gleick, et. al., *Waste Not, Want Not: The Potential for Urban Water Conservation in California*, November 2003

These models characterize the end uses in the entire CI sector and begin to demonstrate that CI water use varies among geographic locations. In addition, the specific end uses of water in the CI sector vary depending on the nature of the business and the levels of technology and water use efficiency in different business establishments. End use water distribution in the CI subsectors described in Section II.B varies widely. Some potential end uses in CI subsectors include:

- Indoor/Domestic Water
  - Kitchens, cafeterias, staff rooms
    - Faucets
    - Distilled/drinking water
    - Dishwashing machines
    - Ice machines
    - Garbage disposals
    - Food preparation
    - Frozen yogurt and ice cream machines
  - Restrooms and showers
    - Faucets
    - Toilets and urinals
    - Showers
  - Laundry
    - Washing machine
  - Sanitation
    - Facility cleaning
    - Sterilizers/autoclaves
    - Equipment washing

        - Dust control
        - Container washing
    - Process
        - Photographic and x-ray processing
- Cooling and Heating
    - Cooling towers
    - Evaporative coolers
    - Boilers and steam systems
    - Once-through cooling
        - Air conditioners
        - Air compressors
        - Hydraulic equipment
        - Degreasers
        - Rectifiers
        - Vacuum pumps
- Outdoor Water Use
    - Irrigation
    - Pools and spas
    - Decorative water feature

Commercial and Institutional End Uses of Water presents information on the end water uses for several subsectors. Many unique variables apply to each subsector that can create a large degree of variability in terms of how much water is used in those facilities. (3) For example:

- Restaurants: number of meals served; seating capacity; operating hours; type of restaurant; type of kitchen operations; type of meals; etc.

- Hotels and motels: number of rooms; number of occupants; presence of restaurant, kitchen, laundry, swimming pool, and/or spa; type of icemakers; etc.

- Supermarkets: sales; number of aisles; number of public restrooms; mist sprayers on vegetables; hours of operation; presence of deli, meat shop, and/or photo finishing; etc.

- Schools: number of pupils; number of showers; cafeteria/kitchen equipment; hours occupied; number of sporting events; etc.

- Office buildings: number of employees; type of business; number of visitors; presence of eating establishment; type of cooling installation; hours occupied; etc.

While the available data lacks the specificity needed to benchmark CI facilities based on these variables, significant information regarding their typical end uses exist. Tables B1 through B6 present an allocation of end uses in hospitals, schools, hotels, commercial office buildings, commercial laundries, and restaurants, as reproduced from *Commercial and Institutional End Uses of Water* (3). This collection of data is based on measurements and estimates from water audits of six U.S. service areas.

Table B1. End Uses of Water in Hospitals (Percent of Total Hospital Use)

General Purpose	Specific Purpose	Phoenix	Denver	Mesa	Ventura	Los Angeles	Weighted Average [b]
Domestic	Plumbing [a]	24.33	39.7	22.95	37.87	18.65	27.05
	Kitchen	8.5	4.53	2.86	4.51	6.51	6.04
Cooling	Cooling tower	27.43	7.22	32.63	8.11	31.29	23.66
	Evaporative coolers	5.08	8.8	7.76	NA	NA	4.88
	Boilers	2.32	3.61	3.25	1.02	0.31	2.24
Process rinses	Photo processing	2.00	4.91	13.99	3.42	7.26	5.78
	Product water	NA	5.43	0.58	NA	10.85	3.12
Cleaning	Plant cleaning	NA	4.78	NA	NA	NA	0.89
Sanitation	Sterilizers/autoclaves	6.04	4.91	NA	16.95	4.65	5.42
	Ingredients cleaning	NA	NA	NA	0.31	NA	0.03
Laundry		7.68	12.33	NA	8.43	0.5	5.91
Water treatment		3.42	NA	2.4	6.48	16.18	5.22
Landscape		13.16	3.77	9.35	11.59	3.3	8.77
Miscellaneous		0.04	NA	4.22	1.30	0.50	0.97
Number of establishments		3	4	2	1	2	12
Average water use per establishment (gpd)[c]		314,640	160,550	154,000	73,330	159,320	172,390

Source: Dziegielewski, et. al., *Commercial and Institutional End Uses of Water*, 2000 (originally adapted from *Journal of AWWA*, vol. 84, no. 10 [October 1992], by permission, Copyright© 1992, American Water Works Association)
NA – Information not available
[a] – Plumbing includes lavatory faucets, toilets, urinals, and showerheads.
[b] – The average is weighted by the proportion of each service area in the combined total use of this category.
[c] – Gallons per day.

Table B2. End Uses of Water in Schools (Percent of Total School Use)

General Purpose	Specific Purpose	Phoenix	Denver	Weighted Average [b]
Domestic	Plumbing [a]	33.14	47.79	43.47
	Kitchen	6.27	5.35	5.32
Cooling	Cooling tower	1.51	5.21	4.13
	Evaporative coolers	0.16	NA	0.05
	Boilers	0.80	NA	0.24
Process rinses	Photo processing	2.09	5.30	4.35
Sanitation	Ingredients cleaning	NA	2.93	2.07
Laundry		1.92	3.88	3.30
Landscape		54.11	29.54	36.77
Number of establishments		4	5	9
Average water use per establishment (gpd)[c]		36,390	87,110	61,770

Source: *Commercial and Institutional End Uses of Water*, Dziegielewski, et. al., 2000 (originally adapted from *Journal of AWWA*, vol. 84, no. 10 [October 1992], by permission, Copyright© 1992, American Water Works Association)
NA – Information not available
[a] – Plumbing includes lavatory faucets, toilets, urinals, and showerheads.
[b] – The average is weighted by the proportion of each service area in the combined total use of this category.
[c] – Gallons per day.

Table B3. End Uses of Water in Hotels (Percent of Total Hotel Use)

General Purpose	Specific Purpose	Phoenix	Denver	Ventura	Weighted Average [b]
Domestic	Plumbing [a]	17.08	30.62	33.72	23.97
	Kitchen	18.31	9.96	NA	13.26
Cooling	Cooling tower	0.64	18.43	NA	7.49
	Evaporative coolers	0.25	NA	NA	0.13
Process rinses	Product water	NA	6.41	3.62	2.85
Sanitation	Ingredients cleaning	4.67	17.25	29.76	12.03
Laundry		16.82	3.10	22.65	12.07
Water treatment		0.71	NA	NA	0.37
Landscape		41.32	NA	10.25	22.2
Miscellaneous		0.20	14.25	NA	5.63
Number of establishments		4	2	1	7
Average water use per establishment (gpd)[c]		202,140	153,070	38,940	131,390

Source: *Commercial and Institutional End Uses of Water*, Dziegielewski, et. al., 2000 (originally adapted from *Journal of AWWA*, vol. 84, no. 10 [October 1992], by permission, Copyright© 1992, American Water Works Association)
NA – Information not available
[a] – Plumbing includes lavatory faucets, toilets, urinals, and showerheads.
[b] – The average is weighted by the proportion of each service area in the combined total use of this category.
[c] – Gallons per day.

Table B4. End Uses of Water in Office Buildings (Percent of Total Office Building Use)

General Purpose	Specific Purpose	Phoenix	Denver	Weighted Average [b]
Domestic	Plumbing [a]	22.35	40.39	37.21
	Kitchen	1.54	NA	0.27
Cooling	Cooling tower	56.05	20.97	27.15
	Evaporative coolers	1.77	1.61	1.64
	Boilers	0.68	5.24	4.44
Process rinses	Photo processing	0.25	0	0.04
	Product water	NA	0.10	0.08
Sanitation	Cleaning ingredients, containers	0.23	NA	0.04
Laundry		1.54	NA	0.27
Water treatment		4.13	NA	0.73
Landscape		12.87	21.60	20.06
Miscellaneous		0.13	NA	0.02
Number of establishments		13	3	16
Average water use per establishment (gpd)[c]		55,930	261,850	139,150

Source: *Commercial and Institutional End Uses of Water*, Dziegielewski, et. al., 2000 (originally adapted from *Journal of AWWA*, vol. 84, no. 10 [October 1992], by permission, Copyright© 1992, American Water Works Association)
NA – Information not available
[a] – Plumbing includes lavatory faucets, toilets, urinals, and showerheads.
[b] – The average is weighted by the proportion of each service area in the combined total use of this category.
[c] – Gallons per day.

Table B5. End Uses of Water in Commercial Laundries (Percent of Total Commercial Laundry Use)

General Purpose	Specific Purpose	Phoenix	Denver	Weighted Average [b]
Domestic	Plumbing [a]	2.49	3.53	2.92
Cooling	Cooling tower	6.42	0.31	3.95
	Evaporative coolers	1.97	1.58	1.81
Process rinses	Product water	NA	0.31	0.19
Sanitation	Ingredients cleaning	80.73	89.78	84.38
Water treatment		8.26	NA	4.91
Miscellaneous		0.13	4.34	1.84
Number of establishments		13	3	16
Average water use per establishment (gpd)[c]		76,300	51,850	64,090

Source: *Commercial and Institutional End Uses of Water*, Dziegielewski, et. al., 2000 (originally adapted from *Journal of AWWA*, vol. 84, no. 10 [October 1992], by permission, Copyright© 1992, American Water Works Association)
NA – Information not available
[a] – Plumbing includes lavatory faucets, toilets, urinals, and showerheads.
[b] – The average is weighted by the proportion of each service area in the combined total use of this category.
[c] – Gallons per day.

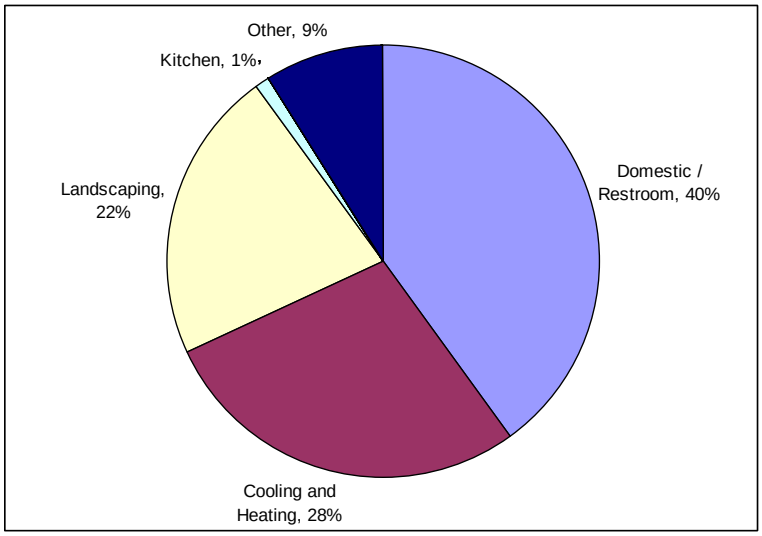
Table B6. End Uses of Water in Restaurants (Percent of Total Restaurant Use)

General Purpose	Specific Purpose	Denver	Tri-county FL [d]	Weighted Average [e]
Domestic	Plumbing [a]	27.75	35.33	31.05
	Kitchen	48.48	50.00	49.14
Cooling	Cooling tower	0.10	0	0.06
	Evaporative coolers	3.20	0	1.81
Sanitation	Ingredients cleaning	4.40	0.22 [b]	2.58
Laundry		0.70	0	0.40
Landscape		4.30	2.45	3.49
Other		2.30	12.03 [c]	6.54
Unaccounted		8.70	0	4.91
Number of establishments		3	6	9
Average water use per establishment (gpd)[f]		7,524	5,800	6,773

Source: *Commercial and Institutional End Uses of Water*, Dziegielewski, et. al., 2000 (originally adapted from *Journal of AWWA*, vol. 84, no. 10 [October 1992], by permission, Copyright© 1992, American Water Works Association)
NA – Information not available
[a] – Plumbing includes lavatory faucets, toilets, urinals, and showerheads.
[b] – Also included laundry.
[c] – Also included unaccounted use.
[d] – Tri-County area includes Hillsborough County, Pasco County, and Pinellas County.
[e] – The average is weighted by the proportion of each service area in the combined total use of this category.
[f] – Gallons per day.

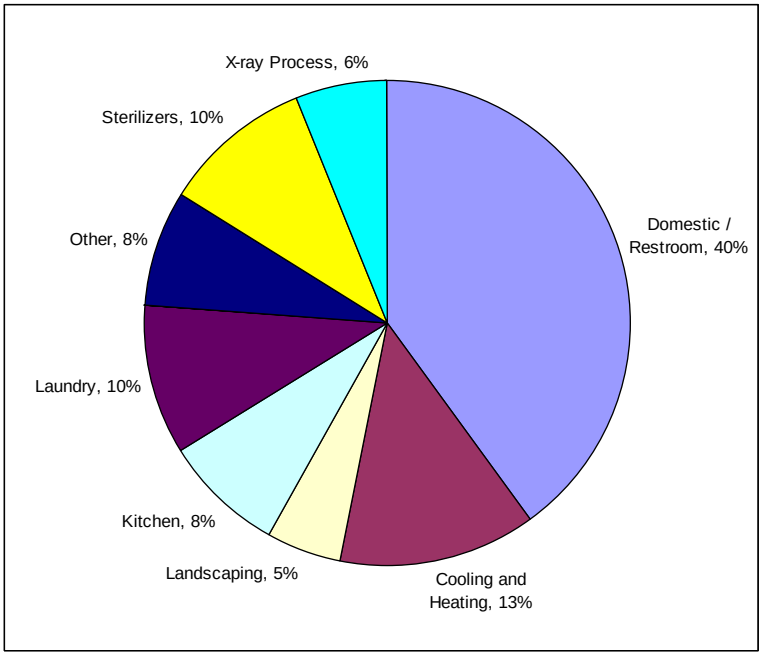
In *A Water Conservation Guide for Commercial, Institutional, and Industrial Water Users* prepared by the New Mexico Office of the State Engineer in July 1999, water usage estimates were developed for several CI subsectors as displayed in Figures B3 through B6. (6)

Figure B3. Water Usage in Office Buildings



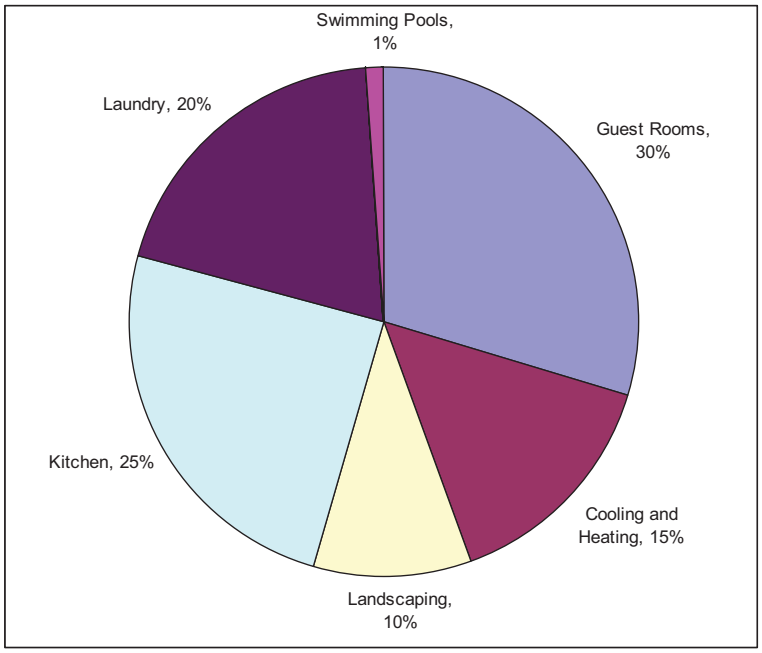
Source: Modified from New Mexico Office of the State Engineer, *Water Conservation Guide for Commercial, Institutional, and Industrial Water Users*, July 1999 (original source: City of San Jose Environmental Services Department)

Figure B4. Water Usage at Hospitals



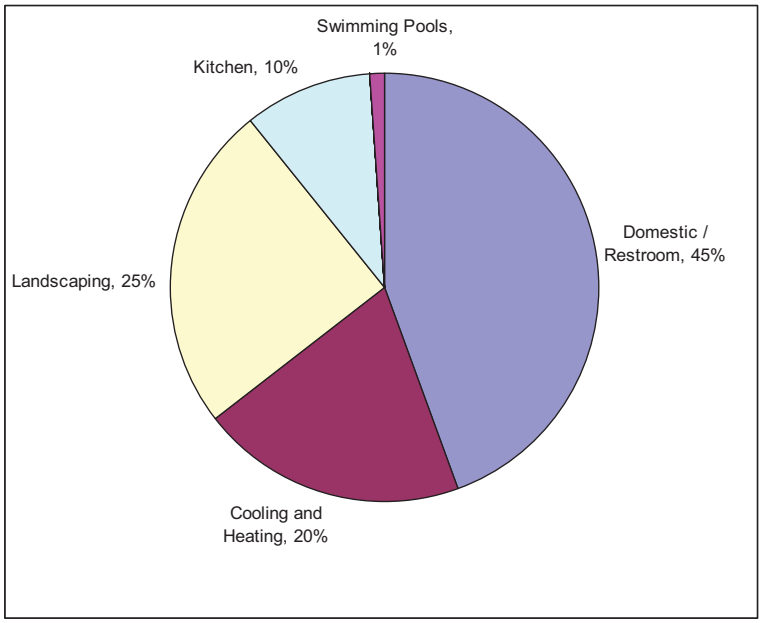
Source: Modified from New Mexico Office of the State Engineer, *Water Conservation Guide for Commercial, Institutional, and Industrial Water Users*, July 1999 (original source: City of San Jose Environmental Services Department)

Figure B5. Water Usage at Hotels and Motels



Source: Modified from New Mexico Office of the State Engineer, *Water Conservation Guide for Commercial, Institutional, and Industrial Water Users*, July 1999 (original source: City of San Jose Environmental Services Department)

Figure B6. Water Usage at Schools



Source: Modified from New Mexico Office of the State Engineer, *Water Conservation Guide for Commercial, Institutional, and Industrial Water Users*, July 1999 (original source: City of San Jose Environmental Services Department)

These figures further illustrate that end use varies by subsector—in type and distribution.

Because water use is so variable among the CI subsectors, it is difficult, or nearly impossible, to compare facilities from one subsector to another. Water use must be normalized per some unit—number of customers, number of employees, total output, facility area, number of seats/chairs, or other units. Even using normalized data, it is not reasonable to compare some subsectors that have different purposes and end uses to one another.

Attachment 2

John Hammerstrom, American Rainwater Catchment Systems Association, Attached Comments

Water Efficiency in the Commercial and Institutional Sector: Considerations for a WaterSense Program

August 20, 2009

Statement of Purpose

The U.S. Environmental Protection Agency (EPA) established WaterSense® with the goal of saving water for future generations. By transforming the market for water-efficient products, services, and practices, WaterSense is helping to relieve the strain of expanding water supply and wastewater infrastructure. Since 2006, the WaterSense label has helped consumers identify products and services that meet EPA's criteria for water efficiency and performance.

In an effort to further this mission, EPA is now considering expansion of WaterSense to include partnership and participation options for users in the commercial and institutional (CI) sector. With this in mind, EPA is seeking input from its partners and other stakeholders on the current state of data related to water use in the CI sector as well as potential program options.

The following white paper summarizes the current state of knowledge regarding water use in the CI sector. While there are gaps in the currently available data, this paper attempts to summarize the best available resources that EPA can use as a basis for future decision-making regarding a national CI program. The paper also includes a discussion of the various forms that a CI focused component of WaterSense could take.

EPA is seeking broad input to be used as guidance in developing the WaterSense CI sector program. In particular, EPA is interested in hearing the responses of stakeholders in the following areas and questions:

Data Gaps and Research Needs

- What research needs to be done or data collected on the CI sector? What information gaps exist?
- Are you aware of any reliable data that is not cited in this paper and could add substantially to our understanding of water use in the CI sector?
- If EPA were to set a water use percent reduction target for the CI sector as a whole or for specific subsectors, what should EPA use as the water use baseline and what percent reduction should be targeted?
- What impact could a national sector water-efficiency program have on the revenue and rate structure of drinking water utilities?
- What issues and barriers stand in the way of a national CI sector water-efficiency program? How can EPA overcome them?

Program Design Options

- Should EPA address all subsectors together or separately?
- Are the factors for choosing a subsector appropriate?
- What are the pros and cons of each program structure presented?

- What program structure do you think EPA should adopt and why?
- Is it important to have WaterSense labeled CI sector facilities?
- If a certification and labeling scheme is preferred, should EPA have a single-tiered or multi-tiered program? Should certification be third-party or self declaration? Should a specification include percentage reduction requirements, best management practices (BMP) implementation requirements, or both?
- If EPA chose a partnership-commitment program structure, what should the commitment be? What reporting should be required?
- If EPA offered technical assistance, what should it be and in what form should it be offered?
- If a subsector-specific approach is chosen, should EPA's efforts focus on the largest overall users of water, or on the largest individual accounts?
- If a subsector-specific approach is chosen, what factors should be considered in prioritizing different subsectors?
- Should EPA offer an awards program?
- What other incentives should EPA offer for participating in the program?

EPA is welcoming comments on the above questions and the following white paper. Comments may be submitted to watersense-ci@erg.com through September 20, 2009.

WaterSense will also be holding a meeting to discuss potential CI program options in conjunction with the WaterSmart Innovations conference in Las Vegas, Nevada. If you are interested in attending this meeting please contact the WaterSense Helpline at (866) WTR-SENS (987-7367) or watersense@epa.gov.

CONTENTS

Page

LIST OF TABLES

Page

LIST OF FIGURES

Page

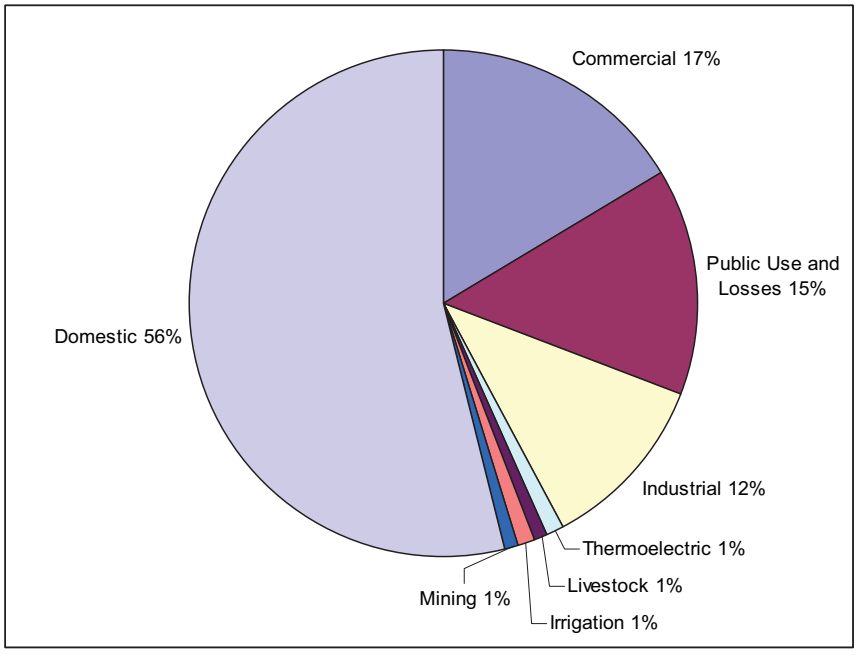
Water Efficiency in the Commercial and Institutional Sector: Considerations for a WaterSense Program

I. Background and Purpose

To help American consumers and businesses use water more efficiently, in 2006, U.S. Environmental Protection Agency (EPA) launched WaterSense, a voluntary partnership program that aims to protect the future of our nation's water supply. While to date WaterSense has focused on the residential sector, EPA is considering adding a program to promote water efficiency in the commercial and institutional (CI) sector as well. As a first step, EPA has written this white paper to summarize information gathered to date on the CI sector and to discuss all potential facets of the program. The purpose of this paper is to solicit input from partners, stakeholders, and the general public that WaterSense can use as a foundation for developing a CI sector program.

The CI sector consumes a significant portion of the publicly supplied fresh water in the United States. The U.S. Geological Survey (USGS) collects data on publicly supplied water as part of its periodic survey of estimated water uses in the United States, and, until 1995, had broken out data on CI uses from publicly supplied water. In those earlier surveys, it defined the CI sector to include hotels, motels, restaurants, office buildings, other commercial facilities, and civilian and military institutions. Public water supplied to golf courses was also included, as were fish hatcheries in some states. In the last water use report containing CI data (compiled in 1995), USGS estimated that the sector utilized 17 percent of water drawn from public water supplies in the United States, as shown in Figure 1. (1)

Figure 1. Estimated Distribution of Water Use From Public Supplies in the United States in 1995



Source: Modified from *USGS Estimated Use of Water in the United States in 1995*