

# WATER CONSERVATION NEWS

*Building sustainability, reliability, and accountability through efficient water use*

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## Climate Change Imperative: Protecting and Conserving California's Water Resources

By Lester Snow, Department of Water Resources Director

Although scientists have documented that our climate has been changing for some time, only recently has the general public begun to understand the significance of the changes looming in both the short and long term. According to the Inter-governmental Panel on Climate Change, effects that we see or expect in California include: a reduction in snowpack; reductions in average annual runoff as well as shifts in seasonal timing; and more extensive or extreme weather events (deeper droughts and higher flood peaks).

Governor Arnold Schwarzenegger, now a nationally recognized spokesman for climate change action, recently summarized the importance of California in a

speech he gave in Georgetown, "What we do in California has unbelievable impact and it has consequences. As a matter of fact, when you look at the globe, California is a little spot, but the kind of power of influence that we have on the rest of the world is an equivalent of a whole huge continent."

The IPCC conveys that some impacts are dependent not so much on climate change itself but on the vulnerability (and adaptive capacity) of a system or region to that change. The report recommends that more adaptive action is needed, emphasizing a portfolio approach. For water, a portfolio approach means developing diverse tools to provide a reliable supply, including

*See CLIMATE CHANGE on Page 2*

## Water Conservation in Iran

By Manucher Alemi

In a recent personal visit to Iran in December of 2006, I went to pay a visit to my former colleagues in Karaj College of Soils and Engineering, University of Tehran where I taught irrigation courses from 1975 to 1984. When I arrived, the entire faculty was in a meeting. Department Chair, Dr. Hoorfar, invited me to join them. About 15 faculty members, some my former colleagues, were discussing academic and administrative issues. They asked me to speak to the students on the California Department of Water Resources water conservation programs. I spoke to a room full of students and faculty about water use efficiency issues in California. We had a very productive discussion. The climate in Iran is similar to California so



Manucher visiting with former colleague

water conservation is a way of life. I was impressed by the students' depth of knowledge and interest on water issues and for the students' and faculty's hospitality.

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### *CLIMATE CHANGE, continued from Page 1*

water storage--both groundwater and surface--water recycling, desalination, and of course, conservation. Such a portfolio approach is already a fundamental part of the California Water Plan Update, as well as our Integrated Regional Water Management (IRWM) grant programs.

Our approach to fighting global climate change must be two-pronged: mitigation, meaning reduction in the greenhouse gas (GHG) emissions which accelerate global warming and climate variability, and adaptation, referring to the ways in which our culture and infrastructure will have to change in order to successfully manage the extremes that global warming threatens.

As one of many water management tools, conservation is uniquely suited to address the concerns associated with climate variability for the very reason that it can reduce GHGs, but also help us to adapt to reduced, or at best, more varied, supplies. Conserving one acre foot of water (enough to serve two families of four for one year) reduces GHG emissions by approximately one metric ton.

California's population is expected to grow to 48 million by 2030. This growth increases demand for both water and energy. Water conservation, while preparing our state to adapt to impending water supply uncertainty, is also a major tool for coping with tremendous population growth.

Recently passed by the Legislature, The Global Warming Act of 2006 (AB 32) sets target GHG reduction goals for California. As a member of the Governor's Climate Action Team, DWR has put forth an early goal of increasing water use efficiency

through grants. DWR will adopt standards for projects and programs funded by recently passed water bonds that will require consideration of water use efficiency in construction and operation.

The less water we use, the less we need to transport, pump, treat, heat, or de-salt water. All of which are energy-intensive processes. Each drop of water conserved has compounding benefits throughout the water-use cycle.

Already, it seems shocking that just one year ago the reality of climate change was still widely debated. It has been said that hindsight is always 20/20, but focusing on past errors will not help us to prepare for changes ahead. Climate change only underscores the importance of the IRWM planning approach in general, and the value of conservation programs specifically. Adaptation via water conservation can help us to meet future water needs and reduce GHG emissions and will result in greater water supply reliability.

At the Association of California Water Agencies conference this past May, the governor challenged local water agencies to step up their water conservation actions. He spoke passionately about California's leadership in conservation and told the crowd, "We need a water management strategy that tackles our long-term water needs on all fronts. That means increasing water storage, that means fixing the Delta, including conveyance, restoring key water resources, and aggressively moving forward with our conservation efforts."

The challenge could not be more clearly defined, and the solution is within reach: We must redouble our efforts to conserve water

## *Office of Water Use Efficiency and Transfers Mission Statement*

The Office of Water Use Efficiency and Transfers (OWUET) provides support for the stewardship of California water resources and energy efficient use of water. This office is responsible for water use efficiency planning and coordination. Our services include technical and financial assistance, information collection and dissemination, resources evaluation and implementation.

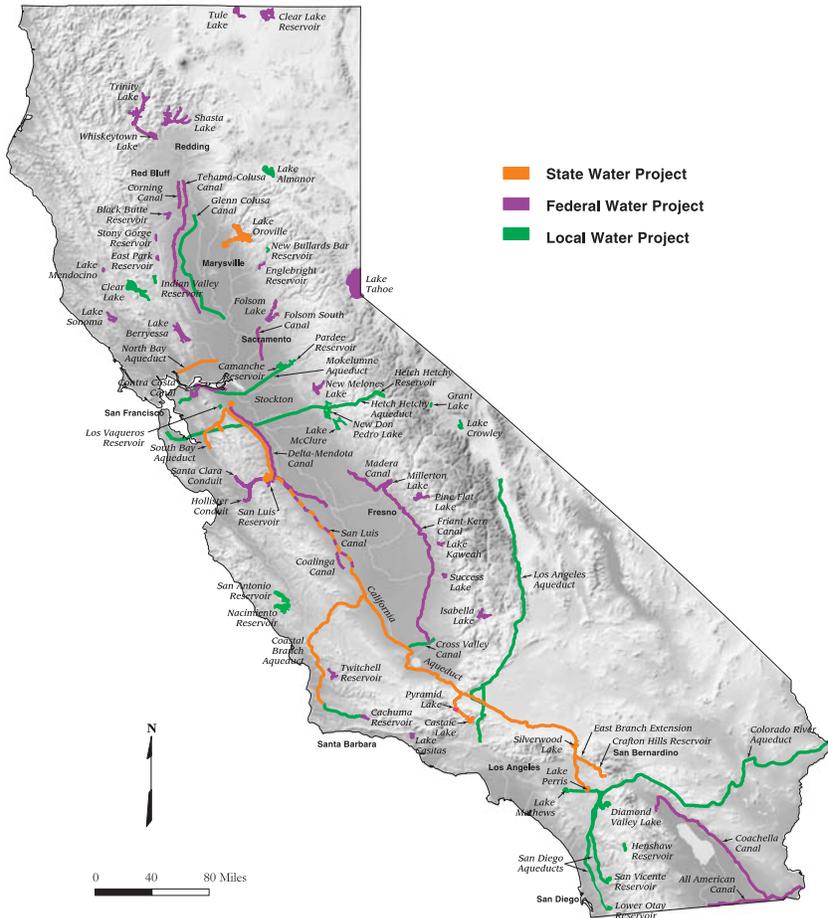
# Proposition 50 Supports Desalinated Groundwater

By Fawzi Karajeh

A \$49 million Irvine Desalter Project (IDP), which is a joint groundwater quality restoration and utilization project by the Orange County Water District (OCWD) and the Irvine Ranch Water District (IRWD) has started yielding potable water. The IDP includes the construction of one potable water reverse osmosis (RO) treatment system and two nonpotable water/air treatment systems. The nonpotable treatment systems are part of the IDP. The U.S. Department of the Navy, however, is responsible for the costs of these facilities, which are being installed to remediate volatile organic carbon (VOC) contaminated groundwater near the former Marine Corps Air Station (MCAS) at the El Toro Base. The nonpotable water will meet Title 22 recycled water requirements for reuse. Groundwater from the Irvine Sub-basin in areas outside the El Toro VOC plume will be extracted and treated to bring it in line with drinking water standards.

Natural geology and past agricultural drainage have resulted in undesirable levels of total dissolved solids (TDS)

See *DESAL* on Page 4



# Reduce Greenhouse Gas Emission Using Water Use Efficiency

By Dave Todd

Approximately 19% of all electricity and 30% of all natural gas is used to convey, treat, distribute and use water and wastewater in the State. Many of the state’s inter-basin transfer systems also have significant hydroelectric generation. The Central Valley Project, the East Bay Municipal Utility District’s (EBMUD) Mokelumne Aqueduct, and San Francisco’s Hetch Hetchy Regional Water System, are all net

energy producers. Despite its significant hydroelectric capacity, the State Water Project is a net energy consumer. However, the SWP has some storage capacity. Moving less water off peak, but the same amount during peak periods could still result in the same amount of hydropower production from the project.

As part of DWR’s climate change strategy,

the Office of Water Use Efficiency and Transfers (OWUET) is working with the California Energy Commission staff on an on-going basis to identify the embedded energy intensity of water. Water and energy use efficiency is a key to reducing greenhouse gas emissions. Based on data from the draft “Statewide Assessment of Energy Used to Manage Water”, the

See *GREENHOUSE GAS* on Page 6

# New Thinking about Drought

By Dave Todd

“The seasonal drought that California endures each year--when it hasn't rained in months” is called summer.” More prolonged droughts in California are nature's way of telling us to pay attention to both short and long term climate trends in our state. The convention among meteorologists is to refer to precipitation data for a given time period as “normal” weather. What is actually meant by “normal” is the average of data in the period over which records have been kept, usually, 100 to 150 years. Records have not been kept long enough in California to know what is “normal.”

There is evidence that droughts in California may be both longer and more severe than what we have experienced during the historical period. According to a study published by the Department of Water Resources, “Six years in the past 1,000 have been reconstructed as drier than the single lowest annual flow of the gauged record (1977)”. These facts mean that water suppliers must have a plan for serving water to their customers throughout such extended droughts.

The Urban Water Management Planning Act requires an urban water supplier (serving more than 3,000 customers or more than 3,000 acre feet per year) to include a Water Shortage Contingency Plan that documents in its Urban Water Management Plan (UWMP). However the maximum time period covered is five years. Of the 367 2005 UWMPs submitted, 36% cover a one year period, less than 1% cover a two year period, 56% of the contingency plans cover a three year period, 7% cover a four year period, and only 1% cover more than four years. California experienced two six year droughts in the last century. In addition, the United States Geologic Service reports the current 7 year drought on the Colorado River which is the largest source of imported water may be “Comparable to or more severe than the largest known drought in 500 Years.”

Global warming is also bringing new uncertainty about the reliability and timing of the precipitation and run-off that the state receives. What the climate models indicate is that drought periods may be deeper and wet periods wetter. Based on what we

know about droughts in California's past and present and the projected impact of global warming planning for extended drought, it is not unreasonable to begin now to work together to plan for periods of drought that last from ten to twenty years.

The California Department Office of Water Resources Office of Water Use Efficiency and Transfers (OWUET) reviews urban water management plans and provides technical assistance to urban water suppliers working to develop a Water Shortage Contingency Plan. DWR will hold workshops on drought planning. For questions, contact Dave Todd at (916) 651-7027 or at e-mail [dtodd@water.ca.gov](mailto:dtodd@water.ca.gov). Also, the OWUET will hold leak detection training workshops for small water systems, and provide technical assistance in leak detection. Please contact Simon Eching at (916) 651-9667 or [seching@water.ca.gov](mailto:seching@water.ca.gov) for more information about the workshops. In addition, agricultural drought tips are available on the OWUET web site at: <http://www.owue.water.ca.gov/drlinks/drlinks.cfm>.

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## DESAL, continued from Page 3

(>1,000 milligrams per liter (mg/L)), nitrates, and selenium in the potable groundwater supply wells. VOCs have not been detected in the potable groundwater wells. The brackish water RO desalination system generates up to 5,000 acre-feet (1.6 billion gallons) of drinking water, enough for about 25,000 people per year

In addition to potable water supplies, the IDP nonpotable treatment systems will yield an additional 3,900 acre-feet (1.3 billion gallon) of water, enough for 1,300 acres of landscape ir-



IRWD new Brackish Groundwater Reverse Osmosis Desalter

rigation annually. The project also has environmental benefits. By pumping and treating the groundwater containing

elevated salts, selenium, and nitrates, the IDP will prevent the migration of these contaminants from the Irvine Sub-basin into the main Orange County Groundwater Basin, which is just west of Irvine.

Financial support for the OCWD and IRWD joint project was provided by U.S. Navy, Metropolitan Water District of Southern California, U.S. Department of Interior Bureau of Reclamation, and the California Department of Water Resources through Proposition 50 desalination grants program.

# Desalination and Water Treatment Technologies Flex Your Water Power

By Fethi BenJemaa and Fawzi Karajeh

While high amounts of energy are needed for desalination as well as water and wastewater treatment technologies, energy efficiency and conservation is the new frontier in reducing their cost and making them more environmentally friendly.

It is important to note that wastewater treatment systems reduce environmental impacts of discharges in the receiving waters by averting water quality degradation; however, these systems create other environmental impacts mainly through energy consumption that translates into greenhouse gas (GHG) emissions. The total energy consumption of wastewater treatment ranges from 2,300 to 3,700 kWh/million gallon (mg).

An inventory of U.S. GHG emissions and sinks published by the United State Environmental Protection Agency (USEPA) in 2004 reported that emissions resulting from publicly owned treatment works (POTW) operations (excluding organic sludge degradation) led in 2002 to a global warming potential of 15.5 teragrams (Tg) carbon dioxide (CO<sub>2</sub>) equivalence, an acidification potential of 145 gigagrams (Gg) sulfur dioxide (SO<sub>2</sub>) equivalence, and eutrophication potential of 4 Gg phosphate (PO<sub>4</sub><sup>3-</sup>) equivalence. Additionally, an estimated 28.7 and 15.6 Tg CO<sub>2</sub> equivalence of methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O), respectively, resulted from organic sludge degradation in wastewater treatment systems.

Desalination can also offer several benefits including helping many communities reduce their dependence on imported water, enhancing water reliability, supplying high quality potable water, and reducing groundwater overdraft and restoring use of polluted groundwater. However, energy consumption of desalination is still a limit-

ing factor to economical desalination projects as power represents 60 percent of the direct operation and maintenance expenses of a desalination plant. As a result, efforts to reduce desalination energy use will significantly contribute toward the reduction of the GHG emission impacts of many proposed desalination projects in California. In its 2005 report, the California Energy Commission (CEC) stresses that 'if desalination is to be pursued in earnest as a water supply alternative in California, efforts should be made to advance desalination technologies so the process is more energy-efficient and the materials are longer lasting.'

Two case studies involving Department of Water Resources (DWR) funded projects are presented herein to show how energy efficiency techniques can help lower cost while reducing the environmental impacts of GHG emissions associated with energy consumption of wastewater treatment and water desalination, respectively.

## Case I: UC Davis WWTP Energy Reduction Retrofit

A DWR sponsored retrofit project of the UC Davis wastewater treatment plant to use energy-conserving process feedback controls for oxidation ditch as well as multiple channel ultra violet (UV), showed that there is substantial room for energy use optimization. Through the implementation of automatic feedback control allowing decreased use of aeration disks and greater turn-down of UV systems by eliminating parallel channels during periods of low flow, the plant achieved significant energy savings. The use of variable frequency drives (VFDs) for oxidation ditch aeration in conjunction with dissolved oxygen (DO) feedback loop control has reduced the plants electrical consumption by about

25%. For more information on this project, visit DWR Water Recycling and Desalination Programs and Projects webpage at: <http://www.owue.water.ca.gov/recycle/pgm/pgm.cfm>

In California, considering that there are more than 200 wastewater treatment plants in operation, treating about 5 billion gallons of wastewater generated every day by California's citizens and businesses, with an average energy consumption of 3,000 kWh/mg, there is a potential saving of 3,750,000 kWh/day.

Using a conservative estimate of GHG emissions of 400 g CO<sub>2</sub>-eq./kWh (assuming electricity generated from natural gas, this number climbs up to 900 g CO<sub>2</sub>-eq./kWh for coal), the potential energy savings translate into a reduction of GHG emissions of 1,500 tons of CO<sub>2</sub>-eq./day (about 0.5 million tons of CO<sub>2</sub>-eq./year).

## Case II: Affordable Desalination Demonstration Project

Through an inter-agency agreement with West Basin Municipal Water District (WBMWD), DWR along with a dozen stakeholders participated in funding a seawater desalination demonstration project to investigate affordable seawater desalination by testing energy recovery, pump efficiency, and low pressure membranes for seawater desalination. This demonstration project is a joint effort of many participants led by the non-profit Affordable Desalination Collaboration (ADC). The first phase of the ADC demonstration seawater reverse osmosis (SWRO) plant completed over four months of testing at the US Navy's Seawater Desalination Test Facility in Port Hueneme, California in March of 2006. Based on the pilot test-

See **WATER POWER** on Page 7

**GREENHOUSE GAS** *continued from page 3*

California Energy Commission (CEC) estimates 44 million tons of CO<sub>2</sub> emissions are expelled annually on average to provide the 44 million acre feet (MAF) of water used statewide. The primary emission sources are: (1) fossil fuel-based electricity generation; and (2) natural gas combustion. The CEC estimates that saving one acre foot would yield equivalent energy savings of approximately 3.2 MW

of electricity. One acre foot of water is 325,851 gallons of water. According to CEC staff, the embedded energy use is understated because the estimate only includes the energy in the water use cycle. It does not include additional use that might be accrued from saving heated or additionally pressurized water at the end use on the customer's side of the meter. Also, the energy required to produce, convey, treat, and distribute water varies significantly among communities depending on their individual circumstances. There is also diversity among customers. For example, hot water consumption in tall buildings (which requires both heating and pressur-



ization) is more energy intense. Because of this diversity, water efficiency programs can emphasize locations and customer uses that have higher than average energy intensity. Given all these factors, the figures are conservative (i.e., probably an underestimate) of the energy savings associated with water efficiency.

The key to the reduction of GHG through water use efficiency is strategic investment in measures tied to water-energy intensity. In general, when a unit of water is saved, so too is the energy required to convey, treat, affect local delivery, use, perform wastewater treatment (for interior water use) and dispose of that unit of water.

Region, elevation, water use sector, and energy source, among other factors, all influence water energy intensity. The statewide average for GHG emissions per acre foot is skewed by the wide local variation in the water energy intensity. For example, everything else being equal, a

cooling tower electrical conductivity meter installed in a industrial plant in Northern California will save 2,920 kWh compared to 9,270 kWh saved in a comparable plant South of the Tehachapi's, annually. The Department of Water Resources Climate Change Strategy is contained in the 2006 Climate Action Team Final Report to the Governor and Legislature which is available on the California Climate Change Portal at: [http://www.climatechange.ca.gov/climate\\_action\\_team/index.html](http://www.climatechange.ca.gov/climate_action_team/index.html). The Department is currently working on a climate change strategy update.

## Will We have a Drought in California?

By Dean Reynolds

Most Californian's know that the true question is; when will the next drought occur? After several years of wet winters our attention turned to floods and flood risk, relegating Drought to the back of our minds. The dry winter of 2006-2007 has brought fears of drought to the forefront.

Previous wet years have left California's major surface water and groundwater reservoirs at or near full capacity. This will certainly help mitigate the dry year impacts during the summer of 2007. Dry winter conditions will not go un-noticed. Some agricultural users will receive only

50% of their surface water supplies causing more pumping of groundwater and potential shortages during the growing season. Many urban water districts have already asked their customers to implement voluntary water conservation measures. If the winter of 2007 – 2008 is dry, water shortages will become more critical.

During the coming months the Department of Water Resources will be evaluating the steps that will need to be taken if next winter is dry. The following resources may help you start preparing for the possibility of Drought:

- Water supply conditions: <http://water-supplyconditions.water.ca.gov/>
- Office of Water Use Efficiency and Transfers: <http://www.wowue.water.ca.gov/>
- Drought Tips: <http://www.wowue.water.ca.gov/drlinks/drlinks.cfm>

The time to re-establish our Drought mentality and to renew our commitment to water conservation is now.

# 2007 Drought Workshops: From Plans to Actions

California's water year 2006-07 ended on a particularly dry note and there is the possibility of another dry year or potential supply interruptions next year. Thus, the California Department of Water Resources, the California Urban Water Conservation Council and the U.S. Bureau of Reclamation are sponsoring workshops to assist urban water suppliers review and update their Water Shortage Contingency Plans and prepare to implement them, if necessary. At each workshop, guest speakers will share local experiences, challenges, and solutions in coping with water shortages in their region.

These workshops are designed to provide step-by-step guidance and information on the following:

- Establish a drought team
- Forecast next year's supply and demand

- Assess drought mitigation options
- Establish triggering levels
- Develop staged demand reduction program
- Adopt the drought plan
- Administer and implement the drought plan
- Sources of information and assistance

DWR's draft revised Urban Drought Guidebook will be presented at the workshops for comments and suggestions.

There is no charge to attend the workshop although reservations are required so that we can arrange lunch.

To register email [heather@cuwcc.org](mailto:heather@cuwcc.org) by August 31, 2007.

## Workshops Dates and Hosts

All workshops will begin at 9:30 a.m. and end at 3:00 p.m.

- 9/11/07: City of Davis
- 09/13/07: Sonoma County Water Agency
- 09/18/07: El Dorado Irrigation District
- 09/20/07: City of Fresno
- 09/25/07: Contra Costa Water District
- 09/27/07: Santa Clara Valley Water District
- 10/02/07: City of San Luis Obispo
- 10/04/07: Metropolitan Water District of So. Calif.
- 10/09/07: Municipal Water District of Orange County with the City of Santa Ana
- 10/11/07: San Diego County Water Authority
- 10/16/07: Coachella Valley Water District

Please go to the CUWCC website at [www.cuwcc.org/calendar](http://www.cuwcc.org/calendar) or the DWR website at [www.owue.water.ca.gov](http://www.owue.water.ca.gov) for more information and directions to the workshops.

## *WATER POWER, continued from Page 5*

ing, ADC reported that power required by SWRO can be between 5.98 to 8.67 kWh/kgal (1.58 to 2.29 kWh/m<sup>3</sup>). This represents a 38 to 40% reduction in power over conventional SWRO system designs.

DWR, through Proposition 50 Desalination Grants Program, awarded ADC with a \$1 million grant to expand the demonstration project. This second phase of the ADC demonstration will carryout further investigations to test different desalination components and configurations to further reduce the desalination total energy consumption, in turn, reduce the associated GHG emissions. For more information on this project, visit ADC's website at: <http://www.affordabledesal.com/>

Assuming the energy consumption of the reverse osmosis desalination treatment is

currently about 1,800 kWh/AF for brackish water and about 4,000 kWh/AF for oceanwater desalination. Considering that the 2005 California Water Plan estimated that 500,000 acre-foot (AF) of water (300,000 AF from brackish water and 200,000 AF from oceanwater) will be generated from desalination by the year 2030, reducing energy consumption by 20%, the potential energy savings amount to about 108 million kWh/year for brackish water desalination and 160 million kWh/year for oceanwater desalination.

Using the above estimate of GHG emissions of 400 g CO<sub>2</sub>-eq./kWh, the potential energy savings, associated with the production of 500,000 AF/year of desalinated water by 2030, translate into a reduction of GHG emissions of about 100,000 tons of CO<sub>2</sub>-eq./year).

# Transforming Cityscapes

By Julie Saare-Edmonds



View of front yard before and during transformation

Rick Soehren, DWR's Water Policy Advisor, hated mowing his lawn. It was difficult to maneuver a mower over exposed tree roots on the sloping lot. Runoff was a problem because of soil compaction and thatch buildup. Overgrown shrubs blocked the house. Overall, it wasn't a pleasant landscape to spend time in nor did the landscape complement the house and charming Sacramento neighborhood. He knew it was time for a change and was inspired by a neighbor who had converted his own landscape several years earlier. As a former Water Conservation Office staffer, resource efficiency was as important to

him as ease of maintenance and a good appearance. Rick hired Dave Roberts of Roberts Landscape to help him transform the ordinary front yard into something special.

During construction, it became clear that erosion control was necessary. Dave, also chair of the Ecolandscape Working Group and a strong advocate of sustainable landscapes, devised an easy, simple, low-tech, but quite effective, method to eliminate runoff from the slope. After the turf and overgrown mulberry tree were removed, the soil was sparingly amended with com-

post to improve drainage and encourage the soil food web to flourish. To preserve the soil structure and avoid disturbing the existing soil organisms, the compost was applied by hand and contours were hand cut into the slope to slow down and capture water. Instead of running off, rain filters into the soil. After the mulch was applied, the contours disappeared from view. To capture rain from the roof downspout, a small retention basin was installed. Rick says that the benefits to water quality and water use efficiency make erosion control measures like these an obvious choice when they are so easy to implement in

*See CITYSCAPES on Page 15*

# California Urban Water Conservation Council

By Mary Ann Dickinson, Executive Director

## Council Launches Smart Rebates Program

On March 1, 2007, the Council launched a statewide rebate program to offer financial incentives for water-efficient products to water agency customers. Thirty-five water agencies and companies in California are participating in the program, which is being funded in part by Proposition 50. It is the first time that a statewide rebate program of this type has been done in California. The only other statewide program was the Council's pre-rinse spray valve program, which was funded by the California Public Utilities Commission as a direct-install program rather than as a customer-driven rebate program. Both of the Council's statewide programs are managed by Honeywell DMC.

The Smart Rebates program was conceived for small to mid-sized water agencies and water companies that may not have the financial resources or a sufficient number of rebates to run their own program. By aggregating the water agency rebates into one statewide program, economies of scale are achieved, which saves money. Although the number of rebates to be issued is only a fraction of the funding and number of rebates originally requested, the Smart Rebates Program will nonetheless be an important pilot for the state in testing the concept of a statewide effort.

## Smart Rebates Program Products:

- High Efficiency Toilets (HETs) for both residential and commercial customers
- Zero-water consumption urinals for commercial customers
- High efficiency washers (HEWs)

for both residential and commercial customers

- Waterbrooms for commercial customers
- X-ray film processor recycling systems for commercial customers
- Cooling tower conductivity-pH controllers for commercial customers.

Please see the Council's Web site for a list of participating agencies and for information on the program:

[http://www.cuwcc.org/smartrebates/smartrebates\\_home.lasso](http://www.cuwcc.org/smartrebates/smartrebates_home.lasso)

## Practical Plumbing Handbook Has Been Reprinted!

The Council has just reprinted its popular consumer-friendly Practical Plumbing Handbook. Revised in 2006, 100,000 copies of the rewritten handbook were sold out in 2006. The handbook is now being reprinted. It includes:

- Top Ten Ways to save water
- Tips on landscape irrigation efficiency
- Improved sections on fixing leaky faucets and toilets
- Consumer information on ULFTs & HETs
- Instructions on toilet replacement
- Conservation practices for pools and spas

Council members can order the booklets at the discounted price of \$1.50 each. The non-member price is \$2.50 each. Bulk orders will include shipping and handling. Order by emailing [heather@cuwcc.org](mailto:heather@cuwcc.org). A Spanish version will be available in early summer at similar prices.

## New Executive Director

The California Urban Water Conservation Council has hired Chris Brown of San Antonio-based Chris Brown Consulting as its new Executive Director. Brown will begin work at the Council's office in Sacramento on July 9, 2007.

Brown's experience authoring water conservation programs ranges from the local level to the federal government. In addition to developing conservation and drought contingency plans for several Texan cities, he has worked with the San Antonio Water System to design the state's first comprehensive Commercial, Industrial and Institutional water conservation program.

Among his groundbreaking collaborative accomplishments in Texas are the design of the Texas Water Development Board's Best Management Practices Guidelines Manual, and the elevation of the Conservation Division to Department status at the San Antonio Water System. Brown has also contributed to creating environmental awareness programs throughout the Southwest and directed public interest campaigns on water conservation.

Brown brings to the Council an extensive background in the public, private, and non-profit sectors, as well as finely-honed leadership, advocacy and facilitation skills.

He has also written and presented several professional papers at national and international conferences on topics ranging from carwash system water use reports to drought and conservation plans and ordinances.

## Fire Protection: Why 100 Feet?

By Julie Saare-Edmonds

A dryer than normal winter and an early start of the wildfire season should serve as a reminder to all living or working in fire danger zones that the first line of defense against fire damage is defensible space. In 2005, state law (Public Resources Code 4291) increased the minimum defensible space around structures to 100 feet. In some areas, such as slopes or high wind areas, a larger space is required. All flammable vegetation should be removed from this area, with the first 30 feet around a structure being the “Lean, Clean and Green Zone” of irrigated greenbelts. Beyond 30 feet, the “Reduced Fuel Zone”, should be clear or be landscaped with fire resistant plants. Important points for fire safe landscaping are:

- Maintain horizontal and vertical spacing between plants to prevent fire ladders
- Limb up large trees and remove undergrowth
- Use shorter, herbaceous plants
- Choose deciduous plants rather than evergreen
- Avoid highly flammable plants
- Maintain soil moisture and plant moisture
- Mulch with gravel or large particle mulch, never use dried grass or leaves as mulch in high fire risk areas
- Keep branches cut back at least 10 feet from roofs, decks, other structures and power lines. Call the utility company for pruning around power lines
- Clear vegetation away from propane tanks and outbuildings
- Routinely remove leaves and needles from decks and roofs
- Regularly remove dead material from plants



Call your local fire department for additional advice and restrictions in your area. More information on “Why 100 Feet?” and fire prevention can be found at: [www.fire.ca.gov](http://www.fire.ca.gov) and [www.firesafecouncil.org](http://www.firesafecouncil.org)

## Virtual Energy Local problem with Global Solution

By Fawzi Karajeh

Energy is a necessity of life. The issue is how can we maintain or improve our standard of living while keeping humans and the environment healthy? Reducing greenhouse gas (GHG) emissions is becoming a requisite for a healthy future. The question, though, is: while GHG might sound like a national problem, it may require a global solution.

By importing agriculture products, naturally-grown products, or manufactured products, these countries avoid having to

use their own water and energy resources to produce these products. All products require energy to produce. The production results in greenhouse gas emissions. Importing countries do not produce emissions. So exporting countries end up with positive GHG emissions while importing countries have negative GHG emissions.

The term virtual energy illustrates the role product-importing countries play in the trade between negative GHG and positive GHG countries. The term virtual energy

compares the amount of greenhouse gas emissions produced to yield a product that can be purchased internationally with the amount of greenhouse gas emission that would be produced domestically to produce the product.

The United States imports more than 40% of its energy resources. When one looks at the consumption of total generated power, 30% is used by industry to produce products for domestic use and export. The amount of energy use varies



## DWR Updates Water-Saving Landscape Requirements

By Kent Frame, Simon Eching and Julie Saare-Edmonds

Assembly Bill 1881 requires the Department to update the Model Water Efficient Landscape Ordinance by January 1, 2009. Before adopting the updated ordinance, DWR must report to the Legislature the extent local agencies have complied with the 1990 model water efficient landscape ordinance (AB325-1990). Also included in this report will be a recommendation of what the landscape water budget, or the ET adjustment factor, should be in the updated Model Ordinance.

### ET Adjustment Factor

The Department of Water Resources has formed a Technical Advisory Committee to guide updating the Evapotranspiration Adjustment Factor. The technical advisory committee members represent a broad group of organizations, agencies, and the green industry. The existing Model Ordinance established a water budget based on the size of the landscape, reference

evapotranspiration, and an ET Adjustment Factor. The ET Adjustment Factor when applied to ETo, adjusts the amount of water needed to be applied to the landscape accounting for plant factor and irrigation efficiency. A field verified ET Adjustment Factor or best available data and current knowledge, in conjunction with field testing and surveys are needed to be completed in order to make the recommendation. DWR is working with University experts to initiate the studies needed to determine the ETAF.

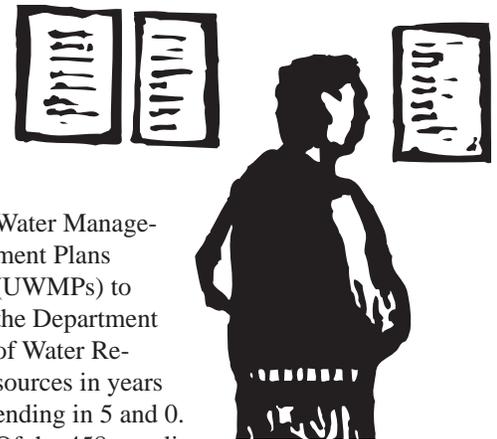
### Survey

In order to complete the report, the Office of Water Use Efficiency and Transfers will conduct a survey of local agencies regarding their adoption and implementation of the 1990 model ordinance. The survey will be sent to county and city planning departments and water conservation coordinators of local water suppliers. In addition OWUET will ask a few questions regarding graywater in response to the AB 1881 recommendation, to “Facilitate the use of graywater.”

## Urban Water Management Plan – Status Report

By Dave Todd

There are 458 urban water suppliers in California serving more than 3,000 customers with more than 3,000 acre-feet of water per year. These water suppliers are required to submit Urban



Water Management Plans (UWMPs) to the Department of Water Resources in years ending in 5 and 0. Of the 458 suppliers, 368 have submitted plans.

For the year 2005, DWR’s report to the Legislature can be found on DWR’s website at: [www.owue.water.ca.gov/urbanplan/pubs/pubs.cfm](http://www.owue.water.ca.gov/urbanplan/pubs/pubs.cfm).

# Statewide Market Research Survey: Landscape Water Use and Efficiency

By Marsha Prillwitz

Want to know how to motivate consumers to conserve water in their landscapes? Then check out the recently-released report by the California Urban Water Conservation Council, *Statewide Market Research Survey: Landscape Water Use and Efficiency*. This project was conducted to implement one of the top twelve actions recommended by the AB 2717 Landscape Task Force in the its 2005 report, *Water Smart Landscapes for California*.

## Task Force Recommendation

Increase the public's awareness of the importance of landscape water use efficiency and inspire them to action by establishing a statewide public outreach, education, and marketing program promoting water efficient landscapes based on a marketing survey to determine what motivates Californians in terms of the relationship between landscape choices and water use efficiency.

Unlike savings in device-oriented programs (such as toilet or clothes washer replacement programs), landscape water savings are often achieved through behavioral changes. Learning what actually motivates people to save water in the landscape is especially important. This market research project explored and analyzed customer behavior relating to landscape water use in the residential,

multi-family, commercial, industrial and institutional sectors so that California water utilities can develop appropriate water conservation communication tools and strategies to reduce inefficient landscape water use.

The survey and interviews were conducted in English and Spanish, and investigated demographic (age, ethnicity, income), regional, and other factors that affect water use behaviors of commercial and residential landscape water users.

Funding for the project came from the United States Bureau of Reclamation's Southern California Area Office, the California Urban Water Agencies, and the California Urban Water Conservation Council, who managed the project. The team of the Institute of Applied Research and Policy Analysis (IAR) and the Water Resources Institute (WRI) at California State University, San Bernardino were together selected as the Contractor to carry out the project.

Six target regions were established throughout California to ensure that the appropriate survey respondents were identified, a statistically valid data set was acquired, and defensible confidence levels were achieved. The six regions were defined as Coastal Southern California, Inland Southern California, Desert, Inland California, Northern California, and the Greater Bay Area. The Contractor then developed sector-based surveys (residential, multi-family, commercial, industrial and institutional). The survey identified target markets within the customer class, messages that would resonate with the target markets, and the types of media appropriate for the target markets.

## Major Activities of the Project

### Literature Search

The Contractor conducted a literature search of other market surveys and studies in the landscape water use efficiency, general water use efficiency, energy, and other market segments. An analysis of the collected materials was performed to determine how organizations address the issue of water conservation and behavior change. This analysis allowed the Contractor to design appropriate marketing surveys that would gather information statewide to contribute toward strategies and recommendations that are not only aimed directly at the consumer, but which also target organizations as change agents for water conservation. Market research was done separately in the single family residential and the commercial sectors due to the inherent differences between these groups.

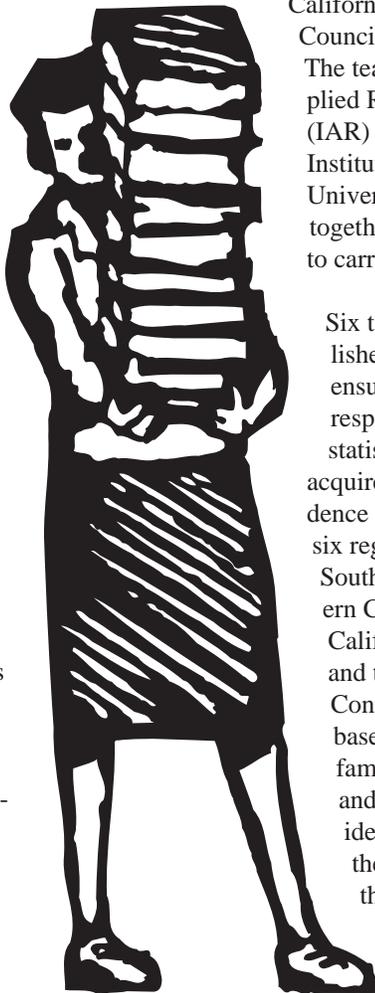
### The Surveys

Two separate survey instruments were developed. For residential customers, the survey target group was the customers themselves. In the case of commercial water accounts, the survey target group included property managers, property owners, builders, commercial landscape design and maintenance contractors, and homeowner associations.

Additionally, data was collected from respondents of the "resident" survey regarding standard socioeconomic status and demographic items (age, gender, ethnicity, income, etc.) designed to elicit information for refined analysis.

The surveys were designed to last no longer than ten minutes, and were intended to:

- Identify barriers to reducing landscape water use
- Identify incentives (and disincentives) that would encourage improvements in landscape water use efficiency



- Identify the messages that will resonate with customers
- Identify types of media for disseminating information
- Identify issues with customers who manage their own landscape compared to those who hire a landscape maintenance company
- Estimate water savings by sector, respondent and/or region (based on survey responses)

Using telephone, web-based, and in-person approaches, the Contractor conducted the surveys based on the following approaches:

*Residential Sector:* The Contractor conducted telephone surveys and employed a probabilistic/random sampling technique to ensure a representative sampling within each region.

The Contractor surveyed 200 respondents in each of the six regions (for a total of 1,200 completed surveys statewide), in order to yield a 95% confidence level, an accuracy of +/- 7% per region, and an accuracy of approximately +/- 2.8% for statewide results.

*Managed Property Sector:* The Contractor conducted a web-based portion of this survey, and then made follow-up phone calls to non-respondents. This sector consisted of multi-family residences, industrial, institutional and other commercial properties. Therefore, the unit of analysis for this portion of the study was comprised of property owners and managers, commercial landscape designers and maintenance contractors, and homeowner associations.

A judgment sampling frame was developed by the Contractor in consultation with the Council. This sampling frame consisted of the three largest irrigated landscape properties in the multi-family, commercial, industrial and institutional sector within each of the specified six regions. This resulted in a total of 72 organizations.

### Evaluation and Analysis

The Contractor performed a quantitative analysis of the phone survey results and web-based survey results, then analyzed and summarized, by market sector and region, the findings from the targeted surveys. This included the following:

- Evaluation of selected customer and regional water use behaviors in communities where water conservation programs have and have not been established
- Cross tabulations of subgroups (variations and trends between respondents in different geographic, economic and water use sectors)
- Production of Excel spreadsheets containing the final survey dataset.

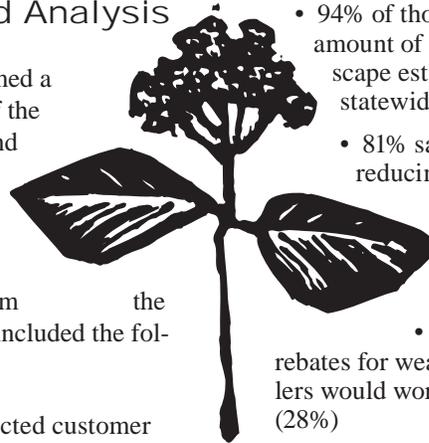
### Results

#### Residential Surveys

- 56% use automatic sprinklers, 31% water by hand, 12% do both
- 89% with sprinkler systems have an automatic timer, set by the homeowner 79% of the time
- 12% have weather based controllers
- 75% already have water efficient

plants in their landscapes

- 76% said they would buy water efficient plants if they were to buy new plants
- 41% said “appearance” was what matters most regarding their lawn and garden
- 55% did not know how many gallons of water is used in the landscape
- 94% of those who guessed at the amount of water used in the landscape estimated far less than the statewide average
- 81% said that offering cash for reducing lawn size and replacing it with more water efficient plants would work (38%) or might work (43%)
- 87% said that offering rebates for weather-based controllers would work (59%) or might work (28%)



#### For Residential customers

- Emphasize that water efficient plants are both low maintenance and attractive and that they help the environment, rather than the cost of water
- Reflect the finding that people listen to their children, gardeners, or university experts more than actors, political leaders or religious leaders regarding the care of their landscapes

#### Managed Property Surveys

- 78% use automated sprinklers
- 31% said turf accounted for less than one-fourth of the landscape, 91% said that grass was very important (68%) or somewhat important (23%)
- 98% said that conserving water is important
- 78% use water efficient plants
- 49% expressed interest in finding a landscaper knowledgeable about water saving techniques and plants

and would listen to their local water district regarding water conservation

- 52% would attend a free weekend workshop
- 71% would pay more for a water saving technology if it would save them time and money in the future

**For Property managers**

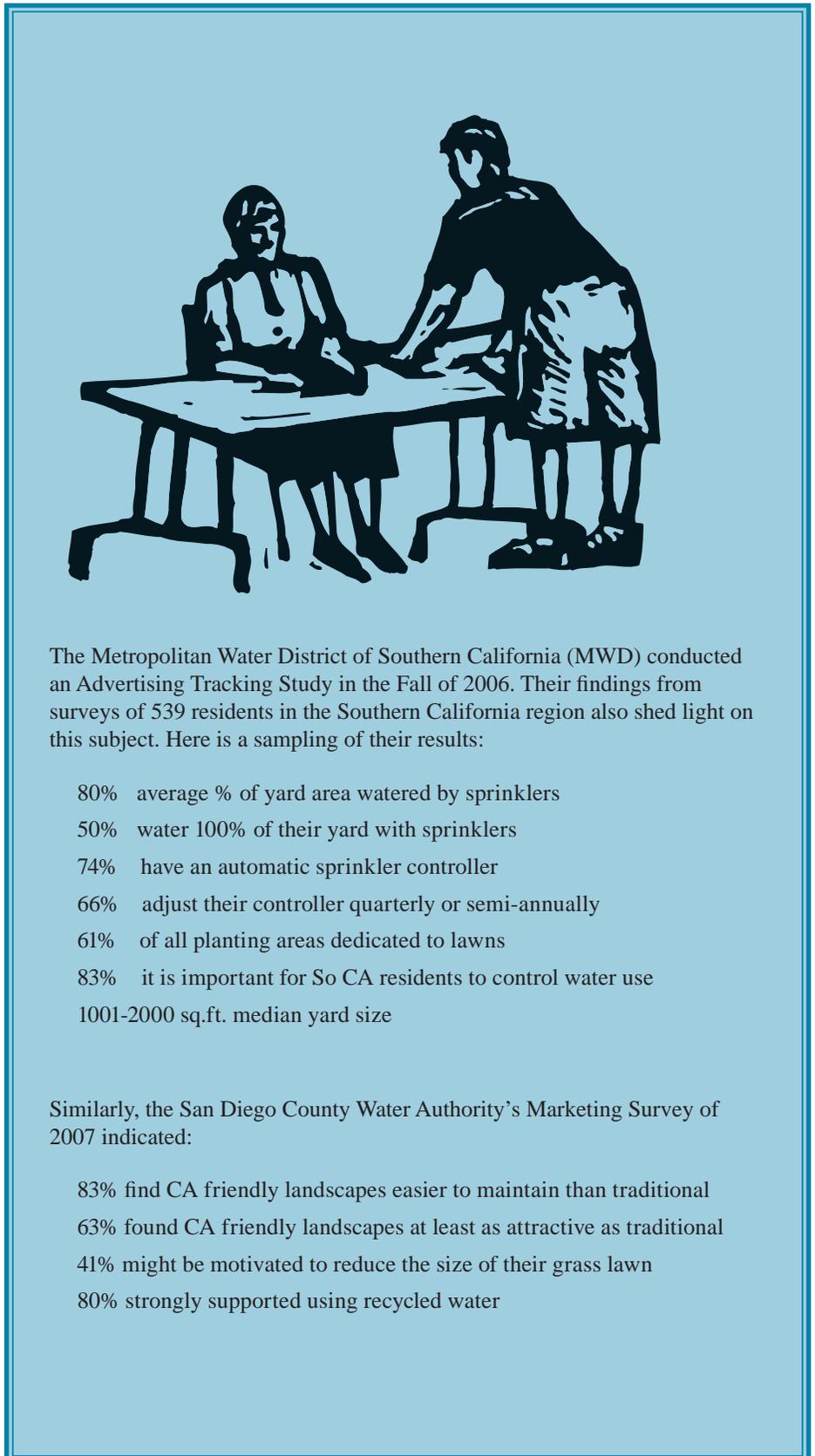
- Emphasize cost savings as well labor savings and environmental benefits
- Reflect the finding that property managers look to their water agencies or garden experts regarding water conserving landscapes

**Recommended Marketing Strategies**

- Use a two-step low of communication strategy to encourage changes in landscape water conservation behavior
- Develop statewide marketing campaign based on several themes such as visual and actual examples of attractive water efficient landscapes, highlighting children as messengers, and emphasizing environmental stewardship
- Provide training to landscape professionals and property managers
- Provide information regarding water costs and education to residential customers regarding the actual amount of water being used in the landscape and how they can reduce it
- Continue and enhance rebate programs for water efficient landscapes

Overall, most people want to “do the right thing.” They want water efficient urban landscapes that are easy to care for, friend- and family-friendly, attractive and environmentally sound. They need information, well-crafted messages, targeted incentives, and in some cases, legislative and regulatory imperatives to help them make the necessary changes. With the information that is being gained through the statewide project and other related marketing research projects, California should be able to shape more effective strategies to improve landscape water use efficiency.

More detailed information is available in the final report. Check the Council website at [www.cuwcc.org](http://www.cuwcc.org).



The Metropolitan Water District of Southern California (MWD) conducted an Advertising Tracking Study in the Fall of 2006. Their findings from surveys of 539 residents in the Southern California region also shed light on this subject. Here is a sampling of their results:

- 80% average % of yard area watered by sprinklers
- 50% water 100% of their yard with sprinklers
- 74% have an automatic sprinkler controller
- 66% adjust their controller quarterly or semi-annually
- 61% of all planting areas dedicated to lawns
- 83% it is important for So CA residents to control water use
- 1001-2000 sq.ft. median yard size

Similarly, the San Diego County Water Authority’s Marketing Survey of 2007 indicated:

- 83% find CA friendly landscapes easier to maintain than traditional
- 63% found CA friendly landscapes at least as attractive as traditional
- 41% might be motivated to reduce the size of their grass lawn
- 80% strongly supported using recycled water



After establishment, the landscape is beautiful and low maintenance

**CITYSCAPES** continued from Page 8

new or retrofitted landscapes and add little to the cost of construction.

The water efficient plants chosen for the new landscape were a mix of California natives and other Mediterranean climate plants. A new valley oak replaced the mulberry. Irrigated with subsurface drip and well mulched, the new plants required water only once a week the first summer and are irrigated about every ten days now that they are becoming established. Dave believes in the benefits of mulching and compost to save water and nurture the soil biota. This includes leaving leaves and trimmings in the landscape (unless there is a disease problem) to replenish the soil organic matter as it decomposes. This concept may be hard to accept for some who prefer the highly manicured look, but the beautiful results of a more natural landscape will convince many who have resisted natural landscaping in the past.

When asked what he thinks is the best part of his new landscapes, Rick mentions the positive reaction from his neighbors. He has had many conversations with passersby about the plants they chose and how easy it is to maintain. The small water

feature on the patio attracts all manner of birds and insects, many of whom are beneficial and control pests. He finds it very relaxing to sit and enjoy watching the birds and butterflies and saying hello to his neighbors. The garden turned out so well, two of his neighbors were also inspired and have had their landscapes renovated by Dave Roberts in a naturalistic style.

Recently two publications have been produced to act as a guide for creating ecologically sustainable landscapes; Alameda County’s “Bay Friendly Landscape Guidelines” and the Sacramento Stormwater Quality Partnership sponsored adaptation called “River Friendly Landscape Guidelines”. These publications are available on the Web at: [www.stopwaste.org](http://www.stopwaste.org) and [www.sacramentostormwater.org](http://www.sacramentostormwater.org). They outline the principles of ecological landscaping and provide ideas and solutions to make sustainable landscaping a preferred alternative.

Principles put into action in this landscape:

- Nurture the living soil through mulching and composting, erosion control and leaving plant matter in place to nutrient cycle.
- Use climate appropriate plants from



Plants used in landscape:

- Penstemon
- Lamb’s Ears
- Echinacea
- Yarrow
- Blue Fescue
- Rosemary
- Coral Bells
- Mexican Bush Sage
- Douglas Iris
- Butterfly Bush
- Japanese Barberry
- Ceanothus
- Monkeyflower
- California Fuchsia
- Society Garlic
- California Poppies

California and other Mediterranean climates and give them enough space to grow.

- Subsurface drip irrigation with a watering schedule that matches the plants needs.
- Recycled the old concrete into a functional side walkway.
- Protect fauna by providing food, shelter and water.
- Capture rain and prevent runoff.
- Design lighting to minimize light pollution.
- Plant trees to shade buildings and paved areas.
- Use integrated pest management where chemicals are used as a last resort.

To see more images of Rick Soehren’s landscape before, during and after construction go to: [www.owue.water.ca.gov/landscape/photo/photo.cfm](http://www.owue.water.ca.gov/landscape/photo/photo.cfm)

## WATER CONSERVATION NEWS

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*Address Correction Requested*

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### **VIRTUAL ENERGY**, continued from Page 10

by product, which is reflected in the cost of the product. Take for example steel, it is reported that energy cost comprises 15% to 20% of the total cost. All process products that are exported by the U.S have “process energy” or “virtual energy” embedded in them. How much of the virtual energy does the U.S export? Does the U.S deserve GHG credit? For that matter, does any country that exports virtual energy deserve GHG credit to lower its positive-GHG emission?

The concept of virtual energy may complement the widely accepted terms mentioned in Kyoto Protocol such as emission trading concept or other terms such as carbon credits. Currently credits can be exchanged between businesses or bought and sold in international markets at the

prevailing market price. In response to the need for a healthy environment, two main exchanges for carbon credits were established: the Chicago Climate Exchange and the European Climate Exchange. ([http://en.wikipedia.org/wiki/Carbon\\_credit](http://en.wikipedia.org/wiki/Carbon_credit)). More information on emission trading can be found at ([http://en.wikipedia.org/wiki/Emissions\\_trading](http://en.wikipedia.org/wiki/Emissions_trading))

### Technology and Innovation Corner

Multi-Stream, Multi-Trajectory Rotators Improve Distribution Uniformity on Small Landscape

A recent study on Multi-Stream, Multi-Trajectory (MP) rotators nozzles used in small landscapes has shown that they apply water more uniformly than fixed spray nozzles. The improved uniformity allows for a decrease in sprinkler run times reducing water use by 20% to 30%. The study was based on 50 landscape audits.

[www.mprotator.com/resources/files/ASABE\\_Paper\\_06-2168.pdf](http://www.mprotator.com/resources/files/ASABE_Paper_06-2168.pdf)

