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California Trees

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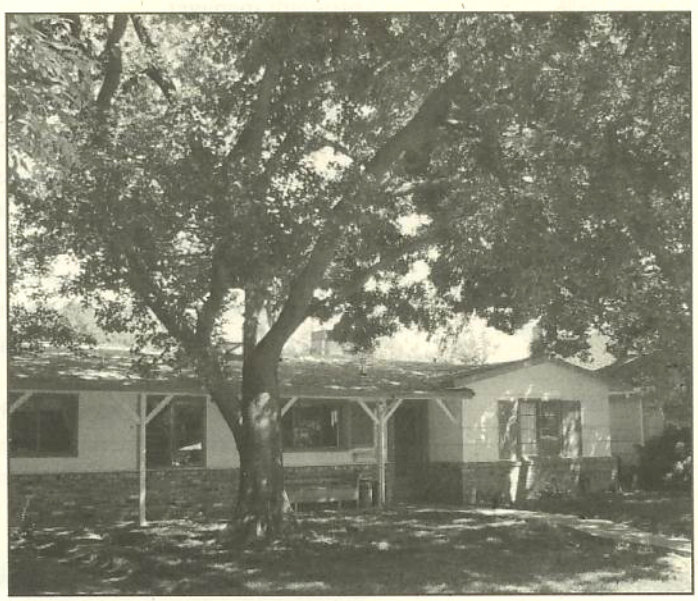
ShadeTrees: The Bottom Line

By Jane Braxton Little



What's a shade tree worth? Can a single strategically placed tree actually reduce energy use and save homeowners hard-earned dollars?

Across California, urban forest groups are working with local utility companies to find out. Their quest transcends the worthy goal of planting trees for their aesthetic amenities. It also goes beyond the valuable role trees play in storing carbon and reducing greenhouse gases. At a time when global temperatures are rising and the cost of electricity is escalating, programs from Sacramento to Stockton are focused on the bottom line. Driving them is a determination to demonstrate what utility companies and ordinary citizens can do to help save the planet and salvage their budgets, all in their own back—or front—yards.

Some general estimates are already available. A large front yard tree saves $29 in air-conditioning costs by shading the building and cooling the air. It also adds about $25 annually to a property's sales price over a 40-year period, according to data developed by the U.S. Forest Service Center for Urban Forest Research in Davis, California.

How to bring those savings home to local utility companies and individual residents is the goal of a variety of shade tree projects throughout America. The most established program in California—perhaps in the nation—is in the state capital. *(continued on page 2)*

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Inside:

CALIFORNIA ReLEAF

Empowering grassroots efforts and building strategic partnerships that preserve, protect, and enhance California's urban and community forests.

Legislation Promotes Shade Tree Programs

By Alice Ewen Walker

On Earth Day 2008, the urban forestry community celebrated the introduction of H.R. 5867, the Energy Conservation Through Trees Act, authored by US Representative Doris Matsui (D - Sacramento). The proposed federal program would encourage utility companies to partner with local nonprofit tree planting organizations to plant trees to reduce residential energy demand. The purpose of the legislation is to help homeowners lower their electric bills (and help utilities lower their peak load demand) by reducing residential energy demand caused by the need to run air conditioners and heaters at a high level. Shade trees not only help miti-

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CALIFORNIA ReLEAF

California ReLeaf is a 501(c)(3) nonprofit organization working to empower grassroots efforts and build strategic partnerships that preserve, protect, and enhance California's urban and community forests.

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The Sacramento Municipal Utility District (SMUD) and the Sacramento Tree Foundation are working together to plant shade trees that increase local energy efficiency. Since launching their partnership in 1990, they have planted 450,000 trees.

SMUD designed the program with singular focus. "This is not a free tree program. This is not an urban forestry program. This shade tree planting program is designed to capture energy and capacity savings for SMUD," says Misha Sarkovich, a SMUD program manager.

It's working. After nearly 20 years, the program has allowed SMUD to reduce the electricity it generates—by an estimated 1.7 million kilowatt hours in 2008. Because the trees planted since 1990 continue to grow, SMUD's benefits increase "year after year after year," Sarkovich says. The shade tree program is one of the factors in its energy efficiency portfolio that contributed to the district's decision to postpone building a new power plant.

Once the average strategically placed tree matures, it saves its Sacramento homeowner 156 kilowatt hours a year, Sarkovich says. At an average cost of 10 cents per kilowatt hour, each tree knocks $15 a year off the utility bill.

"That's not a lot of money for an individual homeowner, but we plant a lot of trees in Sacramento. When you multiply something small with something large, you end up with a lot of energy and capacity savings," Sarkovich says.

Location, Location, Location

When a homeowner requests a tree, the Sacramento Tree Foundation schedules a site visit to the property. A "neighborwoods" forester assesses potential locations and tree species before making a final decision with the homeowner, says Jacobe Caditz, director of the foundation's shade tree program. The forester also evaluates sidewalks, foundations, power lines, and other infrastructure issues that might affect the selection.

Legislation, *continued from page 1*

gate the urban heat island effect, but also help to shield homes from sun in the summer and cold winds in the winter.

The legislation requires the use of science-based tree-siting guidelines to ensure that trees are not planted in locations that will disrupt pre-existing infrastructure, block solar panels and wind turbines, or damage power lines. Consultation during the development of these guidelines would be provided by local Technical Advisory Committees (TACs) that are composed of local energy and arboricultural experts.

The bill also requires participating utilities to partner with nonprofit tree planting organizations or other municipal infrastructure groups to run the technical side of the program. These nonprofit groups are meant to serve as tree planting experts to complement utilities' financial interest in lowering peak energy demand and reducing consumption. They will provide technical and outreach assistance, work with tree recipients, and ensure that trees are planted in the right place to maximize energy conservation.

This very forward-looking legislation is supported by the Alliance for Community Trees, National Arbor Day Foundation, Pacific Gas and Electric Company, American Forests, Sacramento Municipal Utility District, International Society of Arboriculture, American Public Works Association, California ReLeaf, California Urban Forests Council, American Society of Landscape Architects, and many others.

For more information about this legislation and how you can support it, go to: http://actrees.org/site/stories/energy_conservation_through_trees_act.php.

Alice Ewen Walker is the executive director of the Alliance for Community Trees, a national network of over 160 nonprofit and community organizations dedicated to urban forest education and action.

Tree placement is anything but a random decision. To achieve maximum energy savings, foresters consider a site's cardinal orientation, its distance from the building to be shaded, and the tree's size and species. SMUD has developed a total of 72 possible shading scenarios that range from planting a large tree on the west side up to 45 feet away from a building, a substantial energy saver, to planting a small tree on the south side immediately adjacent to the building, an insignificant energy saver. Of the 72 placement possibilities, only 27 are allowed in the shade tree program's strict tree siting guidelines for cost effectiveness, says Sarkovich.

"We're after energy and capacity savings," he says. "That's our purpose."

The results speak for themselves. The Tree Foundation plants an average of around 15,000 free shade trees a year to meet its contract with SMUD. The contract requires planting enough shade trees to attain $1 million in annual energy and capacity savings over the lifetime of the tree, says Caditz.

He also measures the effects in more personal terms. "I can walk a block in any direction from home and find a SMUD shade tree. This program has made such an impact on my neighborhood," Caditz says.

Roseville Weighs In

The success of Sacramento's shade tree program has inspired other cities. In neighboring Roseville, a partnership between Roseville Electric and the Roseville Urban Forest Foundation (RUFF) is nearly as old as SMUD's collaboration with the Sacramento Tree Foundation. The city-owned electric utility, founded in 1911, began planning a shade tree program in 1993 to offset electricity costs for homeowners, businesses, and schools.

"Roseville Electric has always been a forward-looking utility. They've worked hard at getting conservation in place," says Lani Houck, RUFF's program manager.

The residential program begins with a homeowner's application to RUFF. Houck, the foundation's only full-time staff member, does a site visit to determine what to plant and where. Instead of providing a tree, Houck gives homeowners vouchers to buy one. They can also choose to buy their own tree and get a rebate on their electric bill, she says. Roseville's shade tree program for businesses is similar but business owners planting trees receive a cash rebate. RUFF buys trees for local schools to plant around campus buildings.

The shade tree program had so many participants in its first year that Roseville Electric exceeded the funding it set aside, says David Bradford, program manager. Then the city went into a building spurt, which resulted in unprecedented residential growth. Most of the new developments had little or no landscaping. The city's creative collaborators developed a program two years ago aimed specifically at builders, both residential and commercial. They offer builders a rebate on their electric bills when they install trees properly in approved locations, says Houck. She provides training so they know the where, what, and how of strategic planting to reduce energy.

"It's made a lot of difference. Developers want to do the right thing. If they do, the money is their reward," she says.

And everyone else in Roseville wins, too. Bradford estimates that properly placed shade trees have saved city homeowners up to 40 percent annually on cooling costs. "That's pretty substantial," he says. And because it's so substantial, Roseville continues to allocate $100,000 annually to the shade tree program. "It's a valued program. People see it as a perk for choosing to live in Roseville. They know the city is invested in the community through shade trees," he says.

PG&E Tests the Waters

The most recent major participant in a California shade tree program is Pacific Gas and Electric Company (PG&E). One of the largest combined natural gas and electric utilities in the United States, the San Francisco-based company is offering a tree to 1,500 residential customers as part of an energy efficiency program started in 2006. The one-year pilot project will assess the merits of adding shade trees to reduce the demand for electricity in homes using air conditioning, said Katie Romans, a PG&E spokeswoman.

The $320,000 program is testing opportunities for saving energy in San Jose, the Davis/Woodland area, and Stockton, all urban centers with high demands on air conditioning. Each community will receive 500 trees for residential planting. PG&E will use a different system for *(continued on page 4)*

Benefits of the Urban Forest

A large tree in the front yard can provide the following benefits each year:

- Save $29 in summertime air conditioning by shading the building and cooling the air.
- Absorb 10 pounds of air pollutants, including 4 pounds of ozone and 3 pounds of particulates.
- Intercept 760 gallons of rainfall in its crown, reducing runoff of polluted stormwater and flooding.
- Clean 330 pounds of CO_2 from the atmosphere through direct sequestration in the tree's wood and reduced power plant emissions due to cooling energy savings.
- Add 1 percent to the sales price of the property, or about 25% each year when annualized over a 40-year period.

Source: Center for Urban Forest Research, Pacific Southwest Research Station, USDA Forest Service, Davis, CA.

Photo, opposite page: *Proper placement of shade trees depends on the location of pavement, utilities, and distance from the home.*

Credit: Sacramento Tree Foundation

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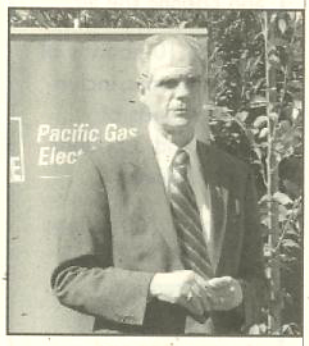

San Jose Mayor Chuck Reed welcomes participants at Our City Forest's PG&E Shade and Save tree planting event in October.

Photo: Our City Forest

Roseville Urban Forest Foundation Board Member Michael Phillips and Program Manager Lani Houck dig holes for new street trees.

Photo: Roseville Urban Forest Foundation

Shade Trees, *continued from page 3*

delivering trees to homeowners in each area.

In San Jose, the program closely resembles the Sacramento model. Our City Forest, a local urban forest group with 15 years of experience, will make site visits to anyone who applies to plant a shade tree, said Rhonda Berry, the organization's director. After identifying the ideal location for energy savings and providing information on tree care and planting, it will be up to the homeowner to plant, water, and care for the tree.

Davis, Woodland, and other Yolo County communities will test another approach to getting trees onto residential properties. Residents can attend workshops explaining how to find the best location for a shade tree and how to care for it once they plant it. This more limited interaction with homeowners has the advantage of requiring less labor by TREE Davis and the Woodland Tree Foundation, the local organizations that are PG&E's partners in the program.

The least labor-intensive model in the company's pilot program is in Stockton, which has no organized urban forest group. There, PG&E will mail rebate coupons to its residential customers, who can redeem them at a local nursery. The nursery will supply the first 500 customers with a shade tree as well as planting and care instructions.

At the end of the year-long pilot program, PG&E officials will evaluate its costs and benefits before deciding whether to make it permanent, Romans says. They will also compare the relative effectiveness of the different tree delivery systems and tree survival rates to help decide which, if any, they will employ in a future program. Using U.S. Forest Service data as a basis, company officials are projecting that each mature tree will save .074 kilowatts of electricity during the late afternoon, when energy costs are highest.

In addition to getting more trees in the ground, PG&E's shade tree program is getting them onto private properties often inaccessible to urban tree groups. Suddenly a vast untapped potential is available for planting, says Berry, San Jose's Our City Forest director. "We've been looking forward to a partnership like this for 15 years. We applaud PG&E for launching this program," she says.

Ruth Williams, TREE Davis executive director, is enthusiastic about her partnership with PG&E in a project that will save money by saving energy, particularly during peak power demands. Trees are one way to use renewable resources to conserve energy, she says. "This is a step in the right direction. And we're lucky: We get more trees in the ground."

Measuring the Bottom Line

PG&E is venturing into the shade tree arena at a time when policy makers are wrestling with climate change and the role energy production plays in increasing greenhouse gas emissions. As public awareness of global warming grows, utility companies are increasingly focused on measuring the effectiveness of their efforts to curb carbon emissions. They not only need to reduce the greenhouse gases they emit, they also need to measure the effectiveness of their efforts. In fact, reporting their measurable impacts on the environment may soon be a mandatory requirement for utility companies.

To measure these impacts, SMUD has developed a tree benefit estimator. This web-based application calculates the amount of energy savings in kilowatt hours, the capacity savings in kilowatts, and the amount of carbon sequestered from the carbon dioxide stored in planted trees as they mature (https://usage.smud.org/treebenefit). The estimator also projects annual energy savings in dollars, using the average cost of electricity combined with cardinal orientation, proximity to the building, and tree species.

Sarkovich says the tree benefit estimator is designed as an easy-to-use tool, free and accessible to anyone: municipality, utility company, or homeowner. It can quantify the potential benefits of urban tree planting to help managers justify investment in shade trees. "A shade tree program doesn't have to cost a lot of money. It can be done on a smaller, less expensive scale," he says.

SMUD and other entrepreneurial utility companies are proving that urban trees have value beyond aesthetics and carbon sequestration. Well-placed trees can reduce the use of energy before any carbon dioxide is emitted. That cuts power generation for utility companies and saves homeowners money. And what a beautiful way to improve the bottom line! ■

Jane Braxton Little is a freelance journalist based in Plumas County, California.