

A publication of California ReLeaf

# California Trees

[www.californiareleaf.org](http://www.californiareleaf.org)

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Legislative Update



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



*Young tree hugger Jesse Krause doesn't need to be told that trees are good for the environment!*

**I**ncreasing levels of carbon dioxide and other greenhouse gases in the atmosphere are of growing concern globally and locally, and California has pledged to be a forerunner in the fight against global climate change by reducing emissions to 1990 levels by 2020.

Many of us would like to help but aren't sure what to do. Strategies at the personal scale range from the mundane (using compact fluorescent light bulbs) to the expensive (switching to a hybrid car) to the smelly (converting french fry grease into diesel fuel). All have some disadvantages. But there is one solution sure to appeal to readers of this newsletter, who are likely to find it a strategy without a flaw: we can plant trees.

## The Role of Trees

Why trees? Trees have one big advantage compared to all other methods of addressing global warming: they actually remove greenhouse gases from the atmosphere. Most existing strategies and plans for the future work to reduce the amount of carbon dioxide and other gases being produced without addressing the already high levels that currently exist. Trees, however, take carbon dioxide from the

air and transform it into living matter—branches, trunks, leaves, flowers, and roots. A large tree can remove and store several tons of greenhouse gases over a lifetime.

At the same time, urban trees have a second, equally important advantage. Trees help moderate air temperatures and thereby reduce our need to burn fossil fuels to produce energy for air conditioning and heating. Every kilowatt-hour of electricity or therm of natural gas reduced means less carbon dioxide in the atmosphere (and also fewer air pollutants, less wasted water, and lower energy bills). A judiciously placed large tree *(continued on page 2)*

## California ReLeaf Grant Alert! Applications due March 28

Grant funds are now available for education, outreach, and tree care projects. Non-profit organizations and unincorporated community groups with a financial sponsor are eligible to apply. The program is funded through a contract with the California Department of Forestry and Fire Protection (CAL FIRE). Visit [www.californiareleaf.org](http://www.californiareleaf.org) for information.

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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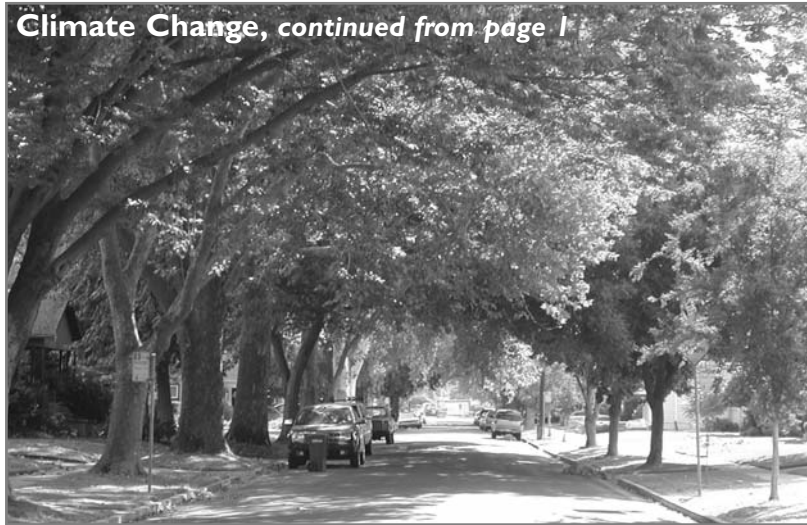
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*The crape myrtles on the right side of the photo will never match the carbon sequestration benefits or the energy conservation benefits of the London plane trees on the left.*

in California's San Joaquin Valley can reduce carbon dioxide emissions from energy production by another several tons over its lifetime. (For information on determining the energy and carbon benefits of your own tree, see the *Online Resources* box, page 4).

### Maximizing Greenhouse Gas Sequestration

Every tree planted works to sequester greenhouse gases, but some do more work than others. How can we maximize the amount of carbon dioxide trapped by the trees?

**Bigger is better.** If trees reduce atmospheric levels of greenhouse gases by transforming the gases into living matter, it stands to reason that the bigger a tree is, the more carbon it is storing. In central California, a large evergreen oak will have sequestered nearly nine tons of carbon dioxide after 50 years, while a Bradford pear will sequester only about a quarter as much. To maximize carbon storage, plant as large a tree as possible.

Remember, though, that large trees require a lot of space both above and below ground to reach their full potential. The only thing that makes a bonsai tree so small is that its growing space has been artificially constricted. When selecting the species, match the tree's mature size to the space available, consider the soil volume necessary to achieve full growth, and note any overhead or underground obstacles, such as power lines, sidewalks, curbs, roads, and water pipes, that will

stunt tree growth or require pruning of branches and roots.

**Longevity is important.** The carbon dioxide that is stored in a tree only remains trapped as long as the tree is alive. Once the tree dies and begins to decompose, the greenhouse gases it has sequestered will return to the atmosphere.

Trees that live longer, therefore, do more to combat climate change

than shorter-lived trees. The evergreen oak mentioned above will not only have captured four times as much carbon dioxide after only 50 years, but because it will outlive the Bradford pear by decades or even centuries, its climate change benefit is even greater.

A tree's longevity isn't only dependent on the species, but also on the individual tree's health. Maximize tree health by selecting a species that is well-suited to the site, matching the species' water needs to the amount of water available, considering potential pests and diseases, and noting potential conflicts with infrastructure that will require substantial pruning of branches or roots that can

weaken the tree. Early care and proper pruning, especially in the first few years, are also important to ensure future health. Have your new tree inspected and, if necessary, pruned each year by a certified arborist for the first five years to set it on the right course for the future. Afterwards, inspection and pruning every 6 to 8

years will keep it healthy and strong.

Finding a long-term use for the wood of a dead or dying tree can extend the climate-change benefits it provides by slowing the decay process. Most urban wood is chipped for mulch or is sent directly to a landfill and decays within a few years. Some California cities like Sacramento and Lompoc, however, are recycling trees to create plaques, fences, benches, tables and other furniture, extending climate benefits by as much as 50 years.

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**Every tree planted works to sequester greenhouse gases, but some do more work than others.**

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## THE GREENHOUSE EFFECT

The existence of greenhouse gases (which include water vapor, carbon dioxide, methane, nitrous oxide, and others) in the atmosphere is critical to life on Earth. These gases act as a sort of insulating blanket, trapping heat from the sun and keeping the Earth's average surface temperature a cozy 59°F. But it's not just the presence of greenhouse gases that is critical, it is also the amount.

Venus and Mars, both much like Earth (and, in astronomical terms, relatively the same distance from the sun), have wildly different temperatures because of the amount of greenhouse gases surrounding them. Venus has a very thick atmosphere composed almost entirely of carbon dioxide with average temperatures near 900°F, while Mars, which has a much thinner atmosphere, has an average temperature around 0°F—about what we would expect on Earth in the absence of greenhouse gases.

The levels of greenhouse gases in the Earth's atmosphere have been increasing steadily since the start of the Industrial Revolution; according to the most recent report of the International Panel on Climate Change (IPCC), carbon dioxide levels have risen by about 35 percent and methane levels by about 150 percent. At the same time, the global air temperature near the surface of the earth has risen about 1.3°F in the last century, and the IPCC's most recent report says that "most of the observed increase in globally averaged temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic greenhouse gas concentrations."

There is also a small but growing market for specialty wood products made from urban trees. For more information on reusing urban wood, see the Urban Forest Ecosystem Institute's Urban Wood Web page: <http://www.ufe.org/urbanwood/index.html>.

### Maximizing Energy Conservation

Trees planted near buildings have a two-fold beneficial effect on our energy use: they lower temperatures by directly providing shade and they have a moderating influence on the overall urban climate when they transpire water. A recent study by NASA and Columbia University found that trees that shade paved or other manmade surfaces provide the "greatest cooling potential per unit area" for reducing the urban heat island effect.

Trees planted in the right places can have a significant impact on our energy consumption and a significant impact on the amount of carbon dioxide (and air pollutants like sulfur dioxide and ozone-forming compounds) that is released when energy is produced. At the same time, a poorly sited tree can have the opposite impact—increasing our heating use by blocking winter sun. How can we maximize energy conservation with trees?

**West is best.** Concentrate first on planting trees on the west and then on the east sides of buildings. This will provide cooling shade for walls and windows on the sides of the house that the sun warms most strongly. Avoid planting evergreen or solar-unfriendly

trees (those with dense branching patterns or that retain dead leaves in the winter) on the southern sides of houses as these will block the warming rays of the winter sun and increase energy use for heating.

A large mature evergreen tree on the west side of a house in the San Joaquin Valley can reduce energy consumption by up to 323 kWh and carbon dioxide production by up to 290 lbs annually! The same tree planted on the south side of the house will have a smaller cooling benefit (283 kWh) and will slightly increase energy use for winter heating (13.4 therms).

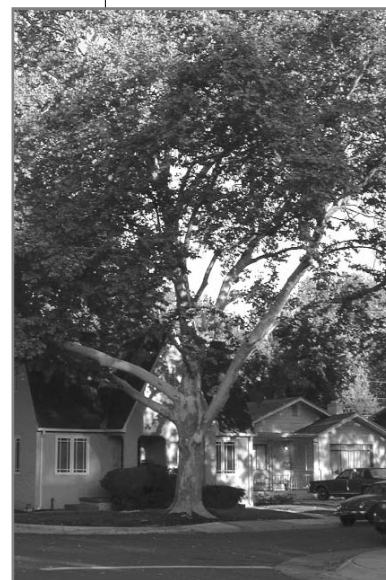
**Size, type, and form.** When choosing a tree, the most significant factor to consider for maximizing energy benefits is tree size. Big trees with large amounts of leaf surface area provide the most shade and the greatest climate moderation effects. Where aboveground space is limited, plant species such as elms, plane trees, oaks, and zelkovas that can be pruned to arch over homes as they grow or evergreen trees such as redwoods whose lower branches can be raised.

Drought-tolerant species also help reduce energy use by reducing the amount of water used. About one-fifth of California's electricity and one-third of our natural gas is used to move, clean, and distribute water, so the less

*(continued on page 4)*

*Below: Large trees have been pruned to arch over a Sacramento home, providing abundant shade for energy conservation and many tons of sequestered carbon.*

Photos both pages:  
Center for Urban Forest Research



*Upper right: Volunteers from California ReLeaf Network group Goleta Valley Beautiful do their part to positively influence climate change by planting trees.*

Photo: Goleta Valley Beautiful

## Climate Change, continued from page 3

water we use, the less energy is wasted. This is especially true in southern California, where conveying water from its distant source to local treatment facilities requires about 60 times more energy than in northern California.

### Energy Efficient Tree Maintenance

Once you have selected the most appropriate, biggest, longest-lived tree for your site, and have cared for it carefully, what more can you do? You can increase the climate-change benefits of the tree further by being mindful of the greenhouse gases produced during tree maintenance. Hire a landscape company or arborist who doesn't have far to travel, or organize their services with your neighbors to minimize trips to your neighborhood. Rake leaves instead of using a leaf blower and compost tree cuttings to create your own mulch on site.

Trees, of course, won't solve all of our climate change problems, but they are a step in the right direction that all of us can take. And remember that the tree you plant to help reduce global warming will also clean the air, filter stormwater, lower your energy bill, provide a habitat for local wildlife, and beautify your neighborhood—that's a claim no compact fluorescent light bulb can make! ■

*Kelaine Vargas is an urban ecologist at the Center for Urban Forest Research in Davis, California.*



### Online Resources

- For more information on the benefits of trees and ways to maximize them, see the Center for Urban Forest Research's regional *Tree Guide* series, available at: [www.fs.fed.us/psw/programs/cufr/tree\\_guides.php](http://www.fs.fed.us/psw/programs/cufr/tree_guides.php).
- For help selecting the best tree for your site, see the Urban Forest Ecosystems Institute's (UFEI) tree selection guide at <http://selectree.calpoly.edu/>.
- For advice on tree planting, pruning, and care, see UFEI's Tree Standards and Specifications page at [www.ufe.org/Standards&Specs.html](http://www.ufe.org/Standards&Specs.html) and Dr. Ed Gilman's Landscape Plants page at <http://hort.ifas.ufl.edu/woody/>.
- To calculate the carbon dioxide emission reductions due to a tree in California's Central Valley, visit the Sacramento Municipal Utility District's Tree Benefits Estimator at <http://usage.smud.org/treebenefit/>.



### Tree Advocate in Action:

Heather Fargo, Mayor of Sacramento

By Jane Braxton Little

Sacramento Mayor Heather Fargo is addressing a group of downtown business leaders: "Plant a tree," she tells them. "Walk more. Switch to tap water. Unplug what you're not using."

Unorthodox advice from a mayor, it could hardly have come as a surprise to the 600 business owners attending her "State of the Downtown 2008" address in the California capital. Fargo, midway through her second term as mayor of Sacramento, has been preaching the environmental gospel her entire political career.

Facing a slew of urban dilemmas that include homelessness, police protection, downtown development, and a budget deficit, Fargo has maintained her commitment to making Sacramento one of the nation's greenest cities.