Trees - an Innovative Solution to Climate Change

California is playing a leading role in the fight against climate change. We are cleaning up our industries, working together to conserve energy, and inventing better ways to capture power from wind and sun. Still, the fight is far from won, and success will require using all of these tactics and more.

As we seek out new solutions, we shouldn't overlook one right in our own backyards—trees! The trees in our cities offer a uniquely holistic and local approach to fighting climate change.

How do trees fight climate change?

- Trees sequester carbon dioxide directly from the air and transform it into living matter—trunks, branches, roots, leaves, and flowers
- Trees planted in strategic locations conserve energy by shading buildings, particularly in regions of California with more extreme climates. Reduced energy use means reduced greenhouse gas emissions onsite and from power plants.
- Dense tree canopy in cities helps reduce urban heat island effect, where heavy concentrations of buildings and asphalt adsorb heat and raise urban temperatures by as much as 10°. Lower temperatures mean less energy use for cooling and reduced emissions.

Why trees are a good solution…

- One large tree will sequester 8–10 tons of carbon dioxide from the atmosphere over its lifetime.[a]
- In hot, dry climates, the same tree, planted strategically, will cut energy use for cooling by 30%, reducing carbon dioxide emissions by another 20 tons. [a, b]
- The cooling power of California's 177 million existing urban trees lowers our energy consumption by about 6,400 GWh each year. That's the equivalent of more than seven 100 MW power plants.[b]
- A 2003 study by the Center for Urban Forest Research estimated that a statewide planting effort in California to increase the urban tree canopy by 30% would reduce greenhouse gas emissions by about 6.3 million tons each year.[b]
- As trees work to fight climate change, they also perform many other valuable ecosystem services: reducing air pollution, filtering stormwater, conserving energy, providing habitat, and reducing flooding and erosion.[d]

The urban forest offers an opportunity for everyone - we can all plant and care for trees.

Three things to remember

The magnitude of the climate change benefits that trees provide relates to:

(1) tree size and species—larger and longer-lived species provide more benefits[e]

(2) tree location—target sites that maximize energy conservation[f]

(3) tree health - informed choices on tree species and location, as well as a commitment to long-term care will reap great rewards

As we strive to reduce greenhouse gases in the air and to lower the rate at which we produce more, we will need all of the tools available to us, from conservation to technology and beyond. A solution right in our own backyards—trees—isn't one we can afford to overlook.

References

[a]Center for Urban Forest Research (2010) Tree carbon calculator, v 31.
http://www.fs.fed.us/ccrc/topics/urban-forests/ctcc/

[b]McPherson EG, Simpson JR (2003) Potential energy savings in buildings by an urban tree planting programme in California. Urban Forestry & Urban Greening. 2: 73-86.

[c]Rosenzweig C, Solecki WD, Slosberg RB (2006) Mitigating New York City's heat island with urban forestry, living roots, and light surfaces. NYSERDA, Albany.

[d]McPherson EG, Simpson JR, Peper PJ, Crowell AMN, Xiao Q (2010) Northern California Coast Community Tree Guide: Benefits, Costs, and Strategic Planting. General Technical Report PSW-GTR-228. US Forest Service, Davis, CA.

[e] Center for Urban Forest Research (2004) The large tree argument.
http://www.fs.fed.us/psw/programs/uesd/uep/products/cufr_511_large_tree_argument.pdf

[f]Center for Urban Forest Research (2002) Green plants or power plants?
http://www.fs.fed.us/psw/programs/uesd/uep/products/3/cufr_148.pdf

[g] The Urban Ecosystems and Processes team has published a series of community tree guides (http://www.fs.fed.us/psw/programs/uesd/uep/tree_guides.php) with great tips for tree planting and care.