



An urban forest issue brief

Energy Conservation through Trees



Shade Trees Conserve Energy

Trees lower temperatures through shade, the cooling effects of which can save millions of energy dollars. Even on a residential level, just 3-4 shade trees located strategically around a house can cut summer cooling costs by 30-50%. Complicating the problem, cities are 2-10° F warmer than their rural surroundings. This marked increase in city temperatures is known as urban heat island effect and it adversely affects health.

Energy security is tied to greening.

Energy benefits of trees:

Cleaner Air Cooler Cities. More U.S. deaths are attributed to high temperatures than to any other weather related event. However, heat island mitigation is also an effective air pollution control strategy, more than paying for itself. The cooling energy savings in the U.S., when fully implemented, is about \$5 billion per year (about \$100 per air-conditioned house). Another way to look at it, reducing air temperatures in Los Angeles by just 2-3 degrees would reduce urban smog exposure by roughly the same amount as removing all vehicle exhaust in the entire LA basin.¹

Healthier Utilities. Today, the utility sector is already the largest single source of greenhouse gas emissions in the United States, producing approximately one-third of the country's emissions. That's only predicted to get worse as the climate warms. A first step should be curbing urban heat island effect, which is responsible for 5-10% of peak electric demand and as much as 20% of population-weighted smog concentrations in urban areas due to air-conditioning use alone. Major energy conservation is as simple as planting trees.²

Energy Security. Heating and cooling homes accounts for nearly 60% of residential electricity usage in the United States. It is also estimated that warming trends will increase air-conditioning use by 3-8%, which is 20 million more barrels of oil at a cost of \$2 billion annually. Ironically, all of those fossil fuels that we burn to stay cooler are warming the atmosphere further... energy security is linked to the environment.³

Tree Benefit Facts

Serving Size 1 Million City Trees (2" caliper)
Recommended Servings Per City about 40%

Costs

Volunteer Service \$0 Trees \$250 million

Annual Value*

Energy Conservation 30% less usage

Cost Savings \$10 million

Stormwater 350 million gallons captured

Cost Savings \$3.5 million

Clean Air 1,000 tons less air pollutants

Cost Savings \$5 million

Public Revenue 11% more for goods

Cost Savings varies by city

Property Value 1-10% higher

Cost Savings varies by city

Lower Crime 50% less violent crime

Cost Savings priceless

Total Cost Savings \$18.5 million

ROI within 14 years not including public revenue, property, and crime benefits.

* Annual Values are based on studies from the Center for Urban Forest Research, Center for Urban Horticulture, Lawrence Berkeley Lab, and the Univ. of Washington, and vary by city. Approximate values are indicated where the differences vary less significantly by city.

Recommendations:

- Integrate the environment into residential, commercial, and transportation energy designs.
- Support Sec. 205 of H.R.2454 or Sec. 167 of S. 1733, 'Tree Planting Program,' to create a DOE/EPA program to help utilities and nonprofits plant shade trees for energy efficiency.
- Support the conversion of all government buildings to include real green features such as shade trees and greenroofs. Studies suggest that if 10% of city roofs were greenroofs, that ambient temperatures would be lowered by 2-4° F.
- Increase your urban canopy by at least 1%. The US Forest Service has found that just a 1% would bring maximum midday city temperatures down .07-.36° F.

References:

1. McPherson, G. and Muchnick, J. Effects of Street Tree Shade on Asphalt and Concrete Pavement. Journal of Arboiculture 31(6). November 2005. pp. 303-310.
2. Akbari, Hasheem. Heat Island Group, Lawrence Berkeley National Laboratory. 2001.
3. American Council for an Energy Efficient Economy.

