

# URBAN FORESTRY

(<http://www.treenm.com/education/deserttrees.shtml>)

## **Why Plant Trees in the Desert?**

As our communities grow, development means more streets, roof tops, parking lots, etc. All these hard, paved surfaces cause “the heat island effect” warming our cities by as much as 10 degrees. Trees are a great natural tool to help mitigate the heat island effect, and keep our cities **clean, beautiful and healthy!**

## **How Trees Function and Save Energy**

Trees are a key factor in reducing consumer energy costs, avoided energy purchase and production costs and overall water savings. Trees use water to grow but produce clean water for the environment through evapotranspiration and they absorb and filter stormwater run-off which in turn recharges the aquifer. Tree shade helps lower energy needs in the summer while allowing winter sun access. Trees also absorb atmospheric carbon which reduces the greenhouse effect, and in turn lowers temperatures city-wide. Well placed, mature trees can save consumers up to 30% of annual cooling costs and save 10-25% of energy used for heating. It is estimated that an additional 1 million trees strategically planted could save \$10 million in energy savings in a city of similar size and climate as Albuquerque. (*Source: Center for Urban Forestry Research – UC Davis*)

- **Cooling:** Shade resulting in cooling is what a tree is best known for. Shade from trees reduces the need for air conditioning in summer. In winter, trees break the force of winter winds, lowering heating costs. Trees and other vegetation also reduce reflected and absorbed heat from concrete, glass, brick asphalt and rock. Studies have shown that parts of cities without cooling shade from trees can literally be "heat islands" with temperatures as much as 12 degrees Fahrenheit higher than surrounding areas.
- **Water and Evapo-transpiration:** (the sum of evaporation and plant transpiration): Evaporation accounts for the movement of water to the air from sources such as the soil, canopy interception, and waterbodies. Transpiration accounts for the movement of water within a plant and the subsequent loss of water as vapor through the leaves. A fully grown tree may release several hundred gallons of water through its leaves on a hot, dry summer day. About 90% of the water that enters a plant's roots is used for this process. When the tree gives off vapor through evapotranspiration through their leaves and the vapor cools, it falls to earth as rain, snow, or sleet.
- **Water Savings:** Trees significantly reduce and clean stormwater run-off by holding rainfall on the leaves, branches and bark, and by absorbing surface runoff, making the threats of flooding less likely. Trees also save water when there are trees shading the lawns and other plants that we water. Statistically, 100 mature

trees catch about 250,000 gallons of rainwater per year, decreasing polluted runoff and decrease soil erosion.

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<http://www.treenm.com/education/treefacts.shtml>

### **Tree Facts**

Today's critical issues of climate change demand real solutions. Trees assist communities in energy conservation, carbon sequestration, and water management. Learn more below!

#### **Energy Conservation**

**Fact:** It is estimated that an additional one million strategically placed trees could save \$10 million in energy costs in a city similar in size and climate to Albuquerque!

- Trees save 10 to 30 percent of total summer air conditioning when placed on the west and south side of a building, and trees save 10 to 25 percent of winter heating costs by allowing sun through leafless branches or blocking winter wind.
- Trees reduce the "heat island" effect of concrete, asphalt, and other hard surfaces by 5 to 10 degrees
- Trees are a key factor in reducing consumer energy costs, and by avoided energy purchase and production costs.

#### **Carbon Sequestration**

**Fact:** A single tree reduces the same amount of atmospheric CO<sub>2</sub> as released by a typical car driven 388 miles!

- Trees absorb one ton of carbon dioxide (CO<sub>2</sub>) over its normal lifetime. The average person in the US generates approximately 2.3 tons of CO<sub>2</sub> every year. Which means, if you live to the age of 80 years, you can plant 1,840 trees to mitigate your carbon debt!
- Trees mitigate the levels of particulate matter (dust and vehicle emissions) - air pollution - that causes diseases in children and adults
- Trees minimize health problems related to sun damage such as skin cancer, cornea damage, and heat stroke.

#### **Water**

**Fact:** Statistically, 100 mature trees catch about 250,000 gallons of rainwater per year, decreasing polluted runoff and soil erosion!

- A fully grown tree releases several hundred gallons of water through its leaves and gives off vapor that falls to earth as rain, snow, or sleet.
- Trees significantly reduce and clean stormwater run-off by holding rainfall on the leaves, branches and bark, and by absorbing surface runoff, making the threats of flooding less likely.

- Trees reduce flooding and run-off of up to 30 percent by intercepting rain and snowfall of polluted stormwater, and mitigate the costly need for construction of stormwater infrastructure and water quality improvements.
- Trees make the soil more porous, preventing erosion through stormwater runoff
- Trees recharge the aquifer by absorbing rain, snow and irrigation water.

(<http://www.treenm.com/education/carbon.shtml>)

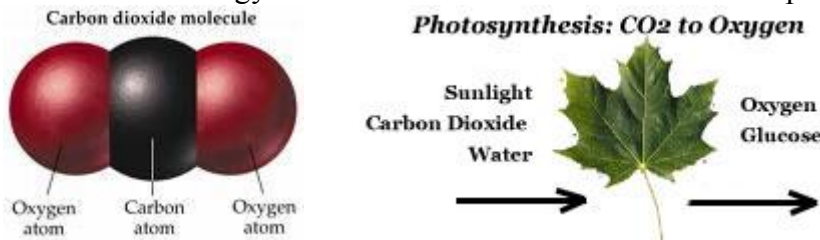
## Carbon Neutral Program

Carbon emissions play an ever increasing role in environmental issues such as global warming. Carbon neutral programs (also called "carbon offset") attempt to "neutralize" the carbon emissions we create with our cars, airplanes, industry, and energy use through urban forestry and reforestation efforts. Individuals and industries can "offset" some of their carbon dioxide emissions by planting enough trees to sequester an amount of carbon equivalent to their emissions.

The US power-generating industry has been at the forefront of carbon neutral programs. In 2006 [PNM](#) pledged \$21,000 to Tree New Mexico to reduce carbon dioxide emissions, and provide educational information on how trees reduce carbon dioxide (CO<sub>2</sub>) levels. TNM began its statewide efforts in December 2006 by planting trees and presenting educational programs to nearly 500 students, teachers and guests in Albuquerque, Gallup and Grants. Eleven more communities will be visited during the coming years.

### How Does Carbon Neutral Work?

**Carbon Dioxide** is a compound produced from the combustion of carbon-based fuels: the colorless, odorless, tasteless gas formed when carbon, a solid, is burned in the open air. Carbon dioxide has long been recognized as a major agent of *global warming* since it is known to block solar energy that would otherwise radiate back into space.



Once carbon is released into the atmosphere, one of the easiest ways to mitigate that gas is to plant trees to absorb it, since carbon is a gas that trees use to grow and reproduce during photosynthesis! **Trees are so effective that an average tree is believed to absorb one ton of carbon dioxide over its normal lifetime.**

### Trees Sequester CO<sub>2</sub>

The average person in the U.S. generates approximately 2.3 tons of CO<sub>2</sub> every year. An average healthy tree stores about 13 pounds of carbon annually - or 2.6 tons per acre each year.

A single mature tree can absorb carbon dioxide at a rate of 48 lbs per year and release enough oxygen back into the atmosphere to support two human beings. If every American family planted just one tree, the amount of CO<sub>2</sub> in the atmosphere would be reduced by one billion lbs annually. That is almost five percent of the amount that human activity pumps into the atmosphere each year. **300 trees can counter balance the amount of air pollution one person produces in a lifetime.**

### How To Reduce CO<sub>2</sub>

- Replace a regular incandescent light bulb with a compact fluorescent light bulb
  - Use energy efficient household appliances like Energy Star products
  - Insulate and weatherize your home, and switch to greener sources of power like wind or solar energy
  - **Plant trees! Plant LOTS of trees.** Tree planting remains one of the cheapest, most effective means of drawing excess CO<sub>2</sub> from the atmosphere.
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More Urban Forestry Resources:

- Urban Watershed Forestry Manual: Chapter 3  
<http://www.na.fs.fed.us/watershed/pdf/Urban%20Watershed%20Forestry%20Manual%20Part%203.pdf>  
The factors that affect trees in the urban/suburban setting can be found on p. 17 of this document
- Benefits of Trees in Urban Areas, plus assorted informational sites  
<http://www.coloradotrees.org/benefits.htm>
- Values of Urban Trees, a Technical Guide  
<http://www.na.fs.fed.us/Spfo/pubs/uf/techguide/values.htm>
- Center for Urban Forest Research  
<http://www.fs.fed.us/psw/programs/cufr/>