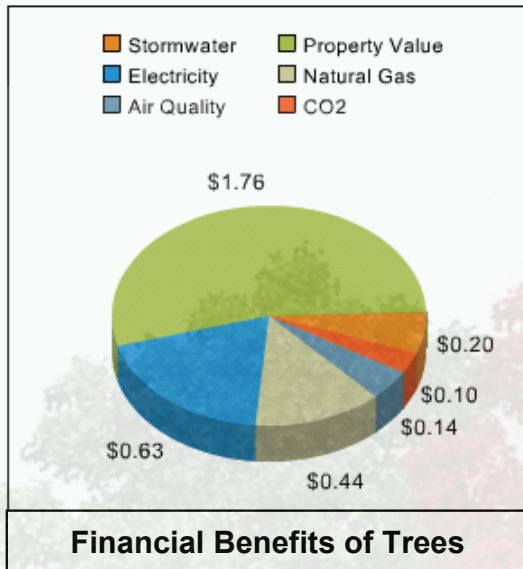


Tree Benefits and the Sandia Urban Forest

Sandia National Laboratories' (Sandia) Facilities Infrastructure Engineering (4821), Strategic Planning (4850), Grounds & Roads Services (48433), and Pollution Prevention/Environmental Programs and Assurance (4133) teams have partnered to commemorate Earth Day and Arbor Day with an Texas Red Oak (*Quercus buckleyi*) tree planting on Take Our Daughters & Sons to Work Day.



Sandia manages over 3,000 trees. These trees or 'urban forest' provide many environmental benefits to Sandia. The benefits of this small oak we plant today are outlined below. As many of our trees are larger than this young tree, the benefits from Sandia's urban forest are much greater.

This oak, with a 3" dia. trunk, provides overall benefits of over \$3 every year. If this tree is cared for and grows to 8 inches in diameter, it will provide \$19 in annual benefits. The value in a residential setting is twice as much. Research has shown the City of Albuquerque obtains \$3 in benefits for each \$2.30 spent on maintenance. Key benefits are highlighted below.

Property Value:

A tree's Leaf Surface Area (LSA) is used to determine increases in property values. That's a researcher's way of saying that a facility with more trees (and more LSA) tends to have a higher value to Sandia's business partners and members of the workforce than one with fewer trees (and a lower LSA). Put simply, trees make Sandia a better place to work and assist in putting it on a more competitive level with other potential employers.



Sandia National Laboratories

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Electricity and Natural Gas

Our oak will conserve 8 Kilowatt / hours of electricity for cooling. Trees modify climate and conserve building energy use in three principal ways:

- Shading reduces the amount of heat absorbed and stored by buildings
- Evapotranspiration converts liquid water to water vapor and cools the air by using solar energy that would otherwise result in heating of the air
- Tree canopies slow down winds thereby reducing the amount of heat lost from a home, especially where conductivity is high (e.g., glass windows)

Carbon Dioxide (CO2)

This year our oak tree will reduce atmospheric carbon by 30 pounds. This small tree will sequester ("lock up") 10 pounds of the CO2 in its roots, trunks, stems and leaves while it grows, and in wood products after it is harvested. Twenty pounds of this CO2 is avoided by reduced heating and air conditioning demands, thereby reducing emissions associated with power production.

Air Quality

The urban forest mitigates the health effects of pollution by:

- Absorbing pollutants like ozone, nitrogen dioxide and sulfur dioxide through leaves
- Intercepting particulate matter like dust, ash and smoke
- Releasing oxygen through photosynthesis
- Lowering air temperatures which reduces the production of ozone
- Reducing energy use and subsequent pollutant emissions from power plants

Stormwater Runoff

Our oak will intercept 40 gallons of stormwater runoff this year. Trees act as mini-reservoirs, controlling runoff at the source.

Trees reduce runoff by:

- Intercepting and holding rain on leaves, branches and bark
- Increasing infiltration and storage of rainwater through the tree's root system
- Reducing soil erosion by slowing rainfall before it strikes the soil

Texas Red Oak
Quercus buckleyi

Data is provided by www.treebenefits.com. See also Center for Urban Forest Research at www.fs.fed.us/psw/programs/cufr/ and the City of Albuquerque, New Mexico, Municipal Forest Resource Analysis at www.fs.fed.us/psw/programs/cufr/products/cufr_674_ABQ_MFRA_for_web.pdf. Contact Jim Alsip, (4855), 845-3274 if you need further information on tree benefits.