

## Benefits of Shade Trees

Recently, the USDA Forest Service, in conjunction with other tree experts, developed a public-domain software package, i-Tree, which analyzes and categorizes the benefits of urban forests. By entering the Palmyra shade tree inventory data collected from 2001 to 2005 into the i-Tree program, it is possible to assess the ways the municipal shade trees contribute to the health and economy of the community. A summary of these benefits is presented in the Table below.

### Total Annual Benefits, Palmyra, NJ, 2008

Benefits	Total Dollars	Dollars per Tree	Dollars per Capita
<i>Energy</i>	46,084	16.79	6.49
<i>CO<sub>2</sub></i>	10,777	3.93	1.52
<i>Air Quality</i>	11,021	4.01	1.55
<i>Stormwater</i>	125,867	45.85	17.73
<i>Aesthetic/Other</i>	155,977	56.82	21.97
<b>Total Benefits</b>	<b>\$349,726</b>	<b>\$127.4</b>	<b>\$49.26</b>

Each of the approximately 2,700 municipal shade trees in Palmyra contributes, on average, \$127 to the community. Some of these contributions may be noted in lower heating and cooling expenses, felt in the comfort of a healthy environment, and noticed in real estate sales.

The i-Tree User's Manual defines the benefits.

1. **Energy** - the sum of energy savings due to reduced natural gas use in winter (measured in MBtu/tree/year) and reduced electricity use for air conditioning in summer (measured in kWh/tree/year).
2. **Stormwater** - a measure of reduced annual stormwater runoff due to trees (measured in hundred cubic feet [CCF]/tree/year).
3. **Air quality** - the sum of air pollutants O<sub>3</sub>, ozone; NO<sub>2</sub>, nitrogen dioxide; SO<sub>2</sub>, sulfur dioxide; and particulate matter) deposited on tree surfaces and reduced emissions from power plants due to reduced electricity use (measured in pounds/tree/year). The model accounts for potential negative effects of trees on air quality due to Biogenic Volatile Organic Compounds emissions.
4. **Carbon dioxide** - the sum of decreased atmospheric CO<sub>2</sub> due to sequestration by trees and reduced emissions from power plants due to reduced energy use. The model accounts for CO<sub>2</sub> released as trees die and decompose and CO<sub>2</sub> released during the care and maintenance of trees.
5. **Aesthetic/other** - a measure of the tangible and intangible benefits of trees reflected in increases in property values due to trees.