



CREATING SUSTAINABLE COMMUNITIES

A GUIDE FOR DEVELOPERS AND COMMUNITIES

URBAN AND COMMUNITY FORESTRY

Trees in cities can contribute significantly to human health and environmental quality. Trees are an integral part of any plan to reverse the potentially devastating increase in global temperatures, and the urban forest plays as critical a role in reducing carbon dioxide in the atmosphere as do the massive tropical Amazon forests. This is for the simple reason that the urban forest directly affects human use of energy resources.

In a rural forest, each tree sequesters CO₂ (i.e., removes it from the atmosphere) at the rate of 26 pounds annually and releases about 13 pounds of oxygen. Although there are fewer trees per acre in a city, each tree plays a powerful role in greenhouse gas (GHG) reduction beyond simple CO₂ sequestration. An urban tree lowers the immediate temperature in the summer and usually raises it in winter (depending on location of trees around buildings). As a result, less energy is needed to make people comfortable thereby saving energy and reducing CO₂ production. Combining a tree's ability to store carbon with its energy-saving potential, an urban tree has up to 15 times the benefit of its rural counterpart.

Trees reduce building energy consumption by shading structures, providing evaporative cooling, and blocking winter winds. Thus they tend to reduce energy consumption in the summer months and either increase or decrease building energy use in the winter months depending on how the trees are located relative to homes and other buildings.

Trees also improve air quality by removing pollutants such as nitrogen dioxide, sulfur dioxide, carbon monoxide, ozone, and the smallest particulate matter. Trees slow stormwater runoff, thus reducing peak flows and decreasing storm water management needs and costs, such as storage volume. Other benefits ascribed to urban trees include: (a) absorption of ultraviolet radiation, (b) improved water quality, (c) wildlife habitat (d) reduced noise, (e) improved human comfort, (f) increased property value and business activity, (g) improved physiological and psychological well-being, (h) aesthetics, and (i) community cohesion.

To make use of these benefits, local governments can adopt development standards requiring that trees be planted in new or remodeled developments. These standards will vary from community to community, depending on climate, the type of trees that will grow in the area, and the times of peak energy load (i.e., demand). Even in the absence of a local ordinance, it would be to the advantage of developers to incorporate energy-conserving landscape features into their project design because of the property value enhancement associated with urban and community forestry.

APPLICABLE NEW JERSEY GOALS AND TARGETS

Reduce projected energy use by 20% by 2020 and meet 20% of the State's electricity needs with Class 1 renewable energy source by 2020 (NJ Energy Master Plan).

Stabilize GHG emissions at 1990 levels by 2020/ Reduce emissions to 80% below 2006 levels by 2050 (E.O. 54; NJ Global Warming Response Act, P.L.2007, c.112).

Reduce emissions of ozone precursors and fine particulates to attain the Clean Air Act health standards and visibility goals (DEP Action Plan)

Develop and implement measures to protect and enhance the quality of surface and ground waters (DEP Action Plan).

Plant 100,000 trees in key cities and towns of NJ under the Urban Forest Energy Efficiency program.



SUGGESTED ACTIONS AND STRATEGIES

Adopt/Follow Appropriate Landscaping Standards - Work with professional urban foresters and landscape architects to determine the most energy efficient trees and shrubs to plant, the appropriate locations to plant them, and the manner of establishing and maintaining the trees and shrubs planted. Some of the considerations in planting trees are:

- During most of the hot season in the northern parts of the country, east and west walls receive about 50% more sunshine than walls facing north and south. Trees strategically planted on these sides of buildings will have greatest impact on energy conservation.
- As a general rule, trees should be located fairly close to a building, such that, after a 5-year growth period, the canopies extend to within several feet of the roof. During the hottest part of the year, a tree planted 10 feet from a west wall will provide about four times as much shade as a tree planted 20 feet from the wall.
- Much heat gain in residences comes from direct sun entering through windows. Trees shading windows during the hottest parts of the day will reduce this heat gain.
- Trees can also be employed as windbreaks in winter to deflect cold winds away from buildings. The protection provided depends upon the trees' height and density. Windbreaks are most effective when they are placed at a distance 4 to 6 times their height. For example, trees 40 feet tall should be planted 160 to 240 feet from the building to be sheltered. It should be noted that this differs from standards for trees placed for their shading effects.

Preserve Trees Affected by Development - As a complement to tree planting, it is equally important to preserve already established or existing trees and vegetation as part of landscape design. Effective tree protection is a long process that involves the following steps. First step is to evaluate the trees to determine which specimens are suitable for preservation. Next one is to work with planners and engineers to design improvements so that suitable trees are preserved. Then, proceed to monitor construction around the trees to see that the trees are not injured. Final step is to routinely evaluate the trees to identify maintenance needs.

STATE TECHNICAL/FINANCIAL ASSISTANCE

Technical and financial assistance is available from NJ DEP Forest Service on urban and community forestry, tree planting, and shade trees - www.nj.gov/dep/parksandforests/forest/index.html

FURTHER INFORMATION

Guidelines for Developing and Evaluating Tree Ordinances - A website from the USDA Forest Service and the International Society of Arboriculture, which includes information on planning for an ordinance, drafting an ordinance and evaluating an ordinance. www.isa-arbor.com/publications/ordinance.aspx

USDA Urban and Community Forestry Program - www.fs.fed.us/ucf

Street Trees, Shrubs and Plants Management – ordinance, Carpinteria, California; 1994. Establishes regulations governing planting, care, maintenance and removal of trees and plants.
www.smartcommunities.ncat.org/efficiency/codes/sttrees.shtml

Authors: Jorge Reyes
Marty Rosen
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