



Energy Facts

Energy Conservation Landscaping- Winter Wind Protection

E-2800

Protecting your home from winter wind can help conserve energy by reducing the rate of air exchange between the house and the outdoors. Reducing the rate of air exchange will reduce the amount of fuel needed to warm the house.

What is a windbreak?

The use of windbreaks—a way of planting trees generally consisting of rows of evergreen trees—is one way to diminish the effects of winter winds. Windbreaks do not actually divert all of the wind that reaches them. Some wind penetrates the windbreak, but this is actually beneficial and makes the windbreak more effective. When a windbreak is 100% effective—when no wind penetrates it—a great deal of turbulence is created on the leeward side (back side) of the windbreak on windy days.

A windbreak will reduce wind speed for a distance of as much as 30 times the height of the trees. The greatest benefit of the windbreak occurs on the leeward side at a distance of about five times the height of the windbreak. The windbreak needs to extend 50 feet beyond the space that is to be protected. Such spacing, plus the space occupied by the windbreak itself, may not be a problem for rural homes surrounded by acres of property. But where space is more restricted, typically in urban areas, it will be necessary to compromise.

Most homeowners will not have sufficient property to create as large a windbreak as described. If winter wind is a problem, even a single row of evergreens on the north and west side of the property will provide some benefit. One advantage of a smaller property is that fewer trees will be needed. Consequently, the homeowner may be able to afford large plants that will give an immediate benefit.

How do you design a windbreak?

The best windbreaks consist of multiple rows of trees planted on the north and northwest side of the property. Evergreens are commonly used because they retain their foliage throughout the year and are branched out close to the ground. When the lower branches die, the addition of shrubs or small trees will help fill in the lower part of the windbreak. Avoid planting a windbreak on the south side of the home if you are planning on the winter sun to help heat your home.

When planting a traditional windbreak, use at least two rows (three is better) of evergreen trees. **Stagger the planting** so that a tree in one row lines up with the space between two trees in the adjacent row. Space the rows 12 to 20 feet apart. A row of low shrubs on the windward side of the windbreak can help reduce drifting snow by trapping it before it reaches the yard.

Planting a sizable windbreak can be a challenge. Many times the windbreak is established using young

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trees or seedlings. Depending on growing conditions, it can be difficult to ensure that the trees survive their first year or two. It may be better to plant only the number of trees that can be adequately watered and cared for the first year. When these trees seem to be established, another row or additional trees can be added. The biggest problem will probably be extended dry weather during the summer. If possible, water the trees regularly to get them established.

Tree Selection

Evergreen cultivars are available that offer property owners some additional choices. Rather than plant spruce or pine trees that have large mature heights and spreads, select other plants that have a narrower, upright growth habit. These may be able to provide windbreak benefits while taking up less space.

Another consideration for plant selection involves the choice of species. It is not a good idea to plant rows of a single tree species. They will all be susceptible to the same pest problems. If a fatal problem infects one tree, it is likely to spread to all trees in the windbreak. Mix up the species to prevent or reduce the risk of pests. Deciduous trees can be included in the planting to provide an even greater species diversity. Call your county Extension office for advice on specific species.

In urban areas, evergreen plantings may be used for privacy as well as a windbreak. Many times, evergreens are planted near roads or streets. Keep in mind that most evergreens will be sensitive to salt spray thrown up by automobiles when roads have been salted to melt snow. White pine is particularly sensitive to salt spray.

Be sure to select trees that are adapted to your growing conditions. Consider the soil type and whether the soil is particularly dry or wet. Do not use salt sensitive trees near roadways. If possible, take a look at mature windbreaks in your area to see which species seem to be growing well and holding their form as they mature.

Other solutions

Where space is limited, it may be possible to get some relief from winter wind by creating a dead air space next to the house. Tall, columnar evergreens, or other shrubs, may be planted in groups or in a row near the house to create the dead air space. Make sure the

plants are sufficiently far away from the house so that there is a space between plants and house. The still air acts as insulation to reduce the rate of air exchange between the house and the outdoors.

Plants can be used to control drifting snow. If the snowdrifts can be induced to form where they do not block drives and sidewalks, energy may be saved by reducing the need for snow removal. To be effective, plants used to control snowdrifts cannot be located more than seven times the height of the plants away from the road or drive.

For example, five-foot tall shrubs used to control drifting snow should be planted no more than 35 feet from a driveway to provide maximum benefit. Avoid planting shrubs along driveways since it will tend to enhance snowdrift development where you least want it to occur. Shrubs planted adjacent to driveways may also interfere with snow removal.

Sources of information:

Department of Energy. 1995. Landscaping for Energy Use. Consumer Energy Information: EREC Fact Sheets. The Energy Efficiency and Renewable Energy Clearinghouse. Merrifield, VA. Online. <http://www.eren.doe.gov/erec/factsheets/landscape.htm>. [Downloaded July 20, 2001].

Keyser, Joseph M. Landscaping to Save Energy. Department of Environmental Protection, Montgomery County, Maryland. Online. <http://www.co.mo.md.us/services/dep/Landscape/windy.htm>. [Downloaded July 20, 2001].

Mitchell, Paul J. Landscaping for Energy Conservation. OSU Extension Facts, F-6417. Oklahoma Cooperative Extension Service, Oklahoma State University.

North Carolina Solar Center. 1998. Energy-Saving Landscaping: For Your Passive Solar Home. Online. <http://www.ncsc.ncsu.edu/fact/09body.htm>. [Downloaded July 20, 2001].

Oberlin Municipal Light and Power. 2001. Energy Efficient Landscaping Ideas. Online. <http://www.ompls.org/Conservation/Landscaping.htm>. [Downloaded July 20, 2001].

Perry, Leonard P. 1997. Landscape to Conserve Energy. Ornamental Horticulture Leaflet 47, University of Vermont Extension.

Starbuck, Christopher J. 2000. Landscape Plantings for Energy Savings. Department of Horticulture, University of Missouri-Columbia. Online. <http://muextension.missouri.edu/xplor/agguides/hort/g06910.htm>. [Downloaded July 20, 2001]

Welch, William C. Landscaping for Energy Conservation. Texas Agricultural Extension Service, Texas A&M University. Online. <http://aggie-horticulture.tamu.edu/extension/homelandscape/energy/energy.html>. [Downloaded July 19, 2001]

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