

## Year-round effect

In placing shade trees and windbreaks, consider their year-round effect. Deciduous trees will not block the winter sun as much as conifers will. But even deciduous trees can reduce solar radiation by about 20 to 50 percent in winter (depending on species and size), since even bare branches block the sun's rays. Proper location of shade trees will shade the most important parts of the house in the summer without shading too much in the winter.

In general, trees on the east or west sides of the house provide summer shade without excessive winter shade. In cold areas, leave the south clear so the sun is not blocked during the winter, unless you use a species with compound leaves, such as ash or honey locust, which usually have a less dense branch structure. Ash trees are a good choice for a south-facing planting in cold areas, as they are among the last trees to leaf out in spring and the first to drop their foliage in autumn.



A solid row of evergreens next to a wall can create a dead air space, and consequently, a year-round insulating effect, although mold and mildew can sometimes occur. The evergreens can be trees, shrubs, or vines. Evergreen vines like English ivy can be used on a trellis on a north-facing wall to insulate and inhibit winter winds.

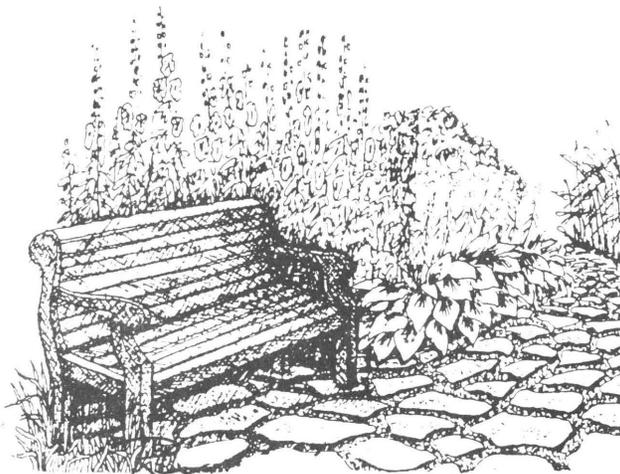
## Additional Benefits

Planting for energy savings combines well with other commonly recognized landscaping benefits. A windbreak provides privacy and noise deflection, in addition to wind and snow diversion. Shade trees beautify the yard and provide a habitat for local wildlife, as well as protecting you and your home from sun and wind. Healthy, well-maintained trees and shrubs increase the value of your property overall.

Reducing lawn areas can also save energy — by planting ground covers or understory shrubs, less mowing is required. Plus, if drought-tolerant plants are used, water use can be significantly reduced.

For more information on selection, planting, cultural practices, and environmental quality, contact your local Virginia Cooperative Extension Office. If you want to learn more about horticulture through training and volunteer work, ask your Extension agent about becoming an Extension Master Gardener. For monthly gardening information, subscribe to *The Virginia Gardener Newsletter* by sending your name and address and a check for \$5.00 made out to "Treasurer, Va. Tech" to The Virginia Gardener, Department of Horticulture, Virginia Tech, Blacksburg, VA 24061-0349. Horticultural information is also now available on the Internet by connecting with Virginia Cooperative Extension's server at <http://www.ext.vt.edu>

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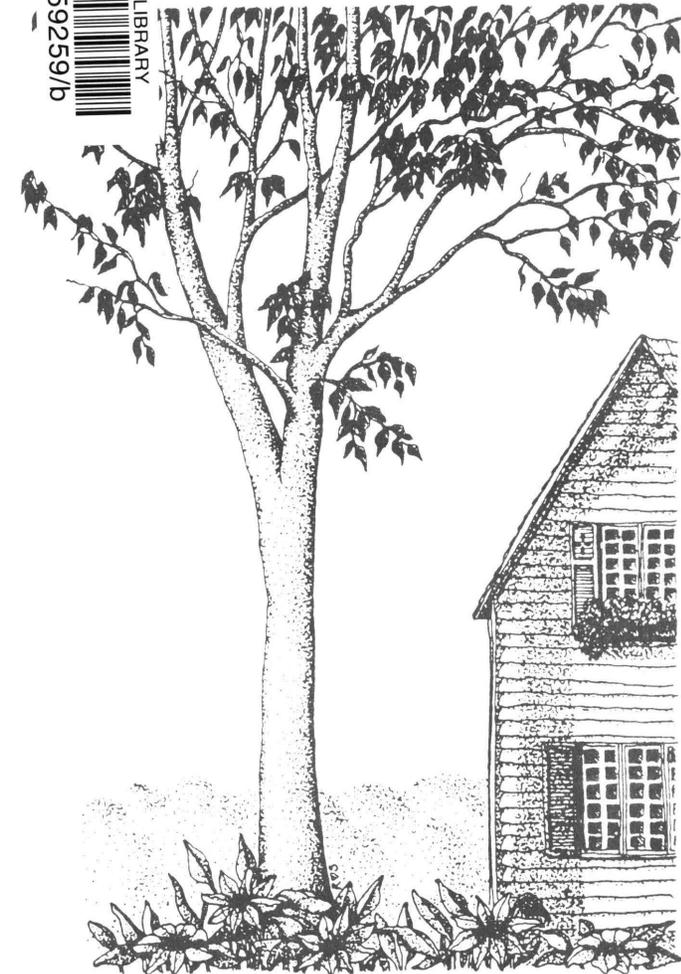
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# Conserving Energy with Landscaping



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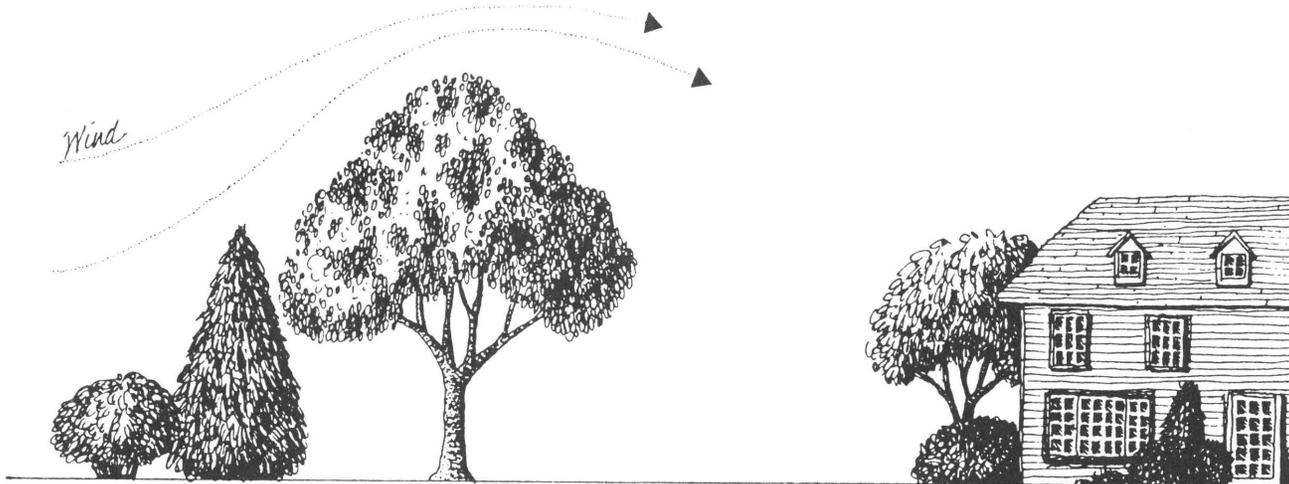
## Conserving Energy with Landscaping

Well-placed plantings can significantly temper the microclimate around a home, resulting in a more comfortable environment and big savings in heating and cooling costs over time.

### Windbreaks for Winter Savings

In a windy site, a windbreak or shelterbelt planting can account for up to 50 percent wind reduction with a 20 to 40 percent reduction in heating fuel consumption. In a calmer spot, wind barriers can still reduce fuel use by 10 percent or more.

A wind barrier that permits 50 to 60 percent wind penetration is more effective than a solid barrier because it provides a larger area of protection on the leeward side. Evergreen conifers (needle-leaf trees) are a perfect barrier to winter winds.



**Location.** The correct location of a windbreak is essential to its ability to cut fuel consumption. Windbreaks should be placed at right angles to the prevailing winter wind — on the north and west in most parts of Virginia. The windbreak should be longer than the area to be protected. Wherever space permits, an extension on the east side will help, too. Generally, savings from windbreaks increase as the protected perimeter of a house increases; however, even only a few well-placed trees make a difference.

Wind reduction downwind occurs for a distance up to 30 times the *height* of a windbreak; the amount of reduction varies depending on the *density* (the thickness of branches and foliage) of the windbreak. Therefore, a house receives the most protection from a 20-foot-high planting not more than 400 feet from the windward side. If a windbreak is required on the south side, it must be placed farther away to prevent winter shading.

**Suitable Species.** Choose a relatively fast-growing, dense conifer species with stiff branches that will mature at a height about 1½ times the height of the house. The species should retain branches low to the ground at maturity.

White pine drops its lower branches and is not recommended as a primary windbreak. If you have or wish to use a white pine windbreak on your property, add a row of dense evergreen shrubs, such as arborvitae, to the windward side.

Norway, white, and Colorado blue spruce are among the best windbreak trees; blue spruce usually provides the most protection, but is slower-growing than the others. Check locally to find evergreens that grow best in your area.

**Spacing.** The effectiveness of a windbreak generally increases with each added row, up to five rows. With dense trees such as spruce, two rows are usually the most cost-effective. The spacing of trees within a

windbreak depends on the species used. Pine and spruce should be placed about 6 feet apart in the rows. Cedar and arborvitae should be 3 to 4 feet apart. The rows should be roughly 10 to 12 feet apart, and should be staggered, not aligned.

**Preparation and Planning.** Soil preparation prior to planting should include testing the soil and applying nutrients and lime as recommended, in addition to breaking compacted soil to a depth of 6 to 15 inches. Early spring is a good time to plant windbreaks, as it allows the plants to acclimate to the site before the first winter.

### Shade for Summer Savings

Well-placed trees and shrubs can also help cut air conditioning costs. Trees, shrubs, ground covers, and grass affect solar radiation more than structural devices, such as awnings. Deciduous plants drop their leaves in winter and have the advantage of allowing sun to reach buildings in the winter for warmth, yet providing shade during the summer.

Shade trees can significantly reduce air temperatures indoors in the summer, as trees intercept and soak up the sun's heat while transpiring cooling moisture into the air. Air-conditioners run much less in a house shaded by trees than they do in a house with a sun-baked roof and walls. Shade trees should be planted mainly to the south and west sides of the house. The placement of shrubs around an outdoor condenser or heat pump also saves energy.

The major considerations for selecting shade tree species for summer cooling are adaptability to your site, ease of maintenance, and aesthetics. Most broad-leaved, deciduous trees are dense enough to block direct summer sun rays.

Shrubs can also help reduce energy use by shading walls in summer, but don't allow tall-growing shrubs to block the winter sun from your windows. In summer, deciduous vines on trellises can be used to cool walls which face south or west. Behind the trellis, a convection current carries warm air away from the wall. Added summer heat reduction can come from the use of lawn grasses and ground cover plants. Glare can be reduced by lawns, and green ground covers outside of windows also reduce summer temperatures of the immediate area by 10 to 14 percent.