

# MU Guide

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## Landscape Plantings for Energy Savings

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The high cost of home heating and air conditioning prompts efforts to reduce home energy consumption. Although outdoor landscape plants are pleasing in themselves, they can also play a large part in controlling energy use indoors. Therefore, in addition to the beauty of landscape plantings, it is important to consider the entire landscape plan in relation to energy conservation in the home.

### Winds and windbreaks

The use of windbreaks for winter climate control around the home can reduce winter fuel consumption by 10 to 25 percent. Windbreaks can reduce wind velocities as well as deflect wind movement. The effectiveness of a windbreak is determined by the number of rows of plants, type of plants, height of plants, prevailing wind speeds and proper maintenance.

Since prevailing winter winds in Missouri are from the north and northwest, plant protective windbreaks to the north and northwest of the home (see Figure 1). Most effective windbreaks are planted in U or L shapes. Where there is plenty of space, a windbreak should be planted to extend about 50 feet

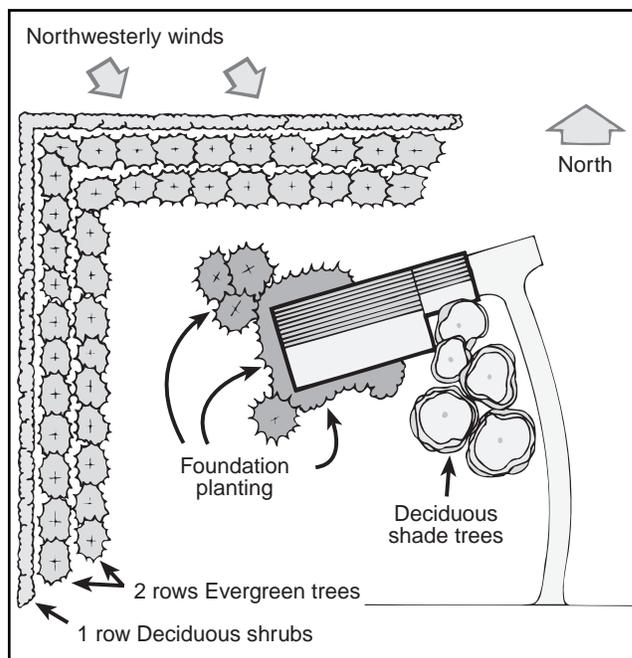


Figure 1. A typical plan for windbreaks.

beyond each corner of the area to be protected. The most effective area of a windbreak is at a distance from four to six times the height of the trees, depending on wind speeds. There may, however, be some slight benefit from a windbreak at a distance as much as 20 times the height of the trees.

### Planting a windbreak

When planning a windbreak, remember that snow drifts in an area from one to three times the height of the trees. If at all possible, plant the windbreak so it does not cause snowdrifts on roads, driveways and walks.

For example, a 20-foot-tall windbreak of evergreen trees would provide the greatest wind reduction 80 to 120 feet to the south or southeast. Snow accumulation would be greatest 20 to 60 feet away in the same direction (see Figure 2).

Windbreaks function by reducing air movement around the home and thereby slowing heat loss from the walls of the buildings. The most effective windbreaks can reduce wind velocity as much as 50 percent.

### How landscape plants save energy

#### In summer, landscape plants

- Direct movement of summer breezes into living areas.
- Channel breezes to increase their speed through outdoor living spaces.
- Reduce glare and reflection of heat from other surfaces.
- Shade roof, walls or windows to keep them cool and prevent heat buildup behind or beneath them.
- Provide outdoor cooling as moisture evaporates from plant leaves.

#### In winter, landscape plants

- Deflect cold winds away from the home.
- Reduce wind speeds near the home.
- Develop dead air space along walls for added insulation.
- Allow winter warming of walls by the sun.
- Control drifting snow.

Figure 2. Deciduous trees on the southwest side of a house reduce indoor air temperature in summer and increase indoor air temperature in winter.

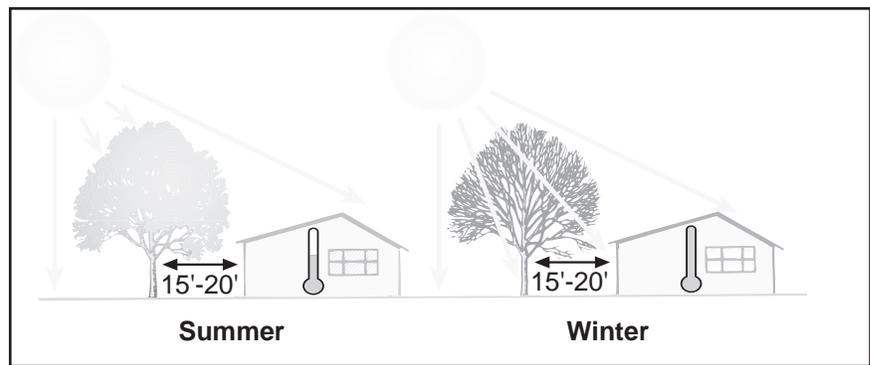
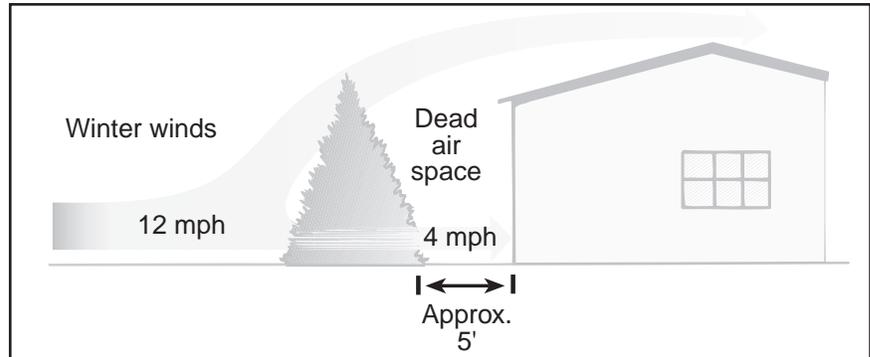


Figure 3. Evergreens adjacent to the northwest sides of a house reduce wind speed and create dead air space for insulation.



Although a single row of trees provides some benefit, several rows are much more effective. When there is room for only one row of trees, pines are the most satisfactory for our climate. However, pines often thin out near the ground as they mature, so it may be necessary to combine them with a row of spreading evergreen shrubs such as yews or junipers.

Space evergreen trees in the windbreak 6 to 8 feet apart. Stagger them if planting more than one row. When several rows are used, rows should be 12 to 20 feet apart, depending on the mature size of the plants.

### Points to remember in planning a windbreak

- They are most effective when plants branch to ground level.
- The wider the planting, the more effective the windbreak.
- When planting more than one row, stagger the plants.
- When using only evergreen plants, two or three rows are adequate. When using deciduous materials, four to five rows are necessary. A mixture of both types is most effective.
- Where space is adequate, plant a row of fast-growing species (such as poplar), but make plans to remove them as soon as better plants have developed adequate height.
- When planting several rows of plants, the heights of the rows should vary to give an uneven rather than an even upper edge.
- Windbreaks should allow some wind penetration. Impenetrable windbreaks create a partial vacuum on the protected side, reducing their effectiveness.

More details on developing a windbreak planting are available in MU publication G 5900, *Planning Tree Windbreaks in Missouri*.

### Diverting air movement

Although windbreaks function primarily by reducing the impact of the wind, they also shift air movement. The ability of plants to divert air streams provides the greatest benefit during the summer months. Increasing the air flow in play, patio and other living areas improves summer comfort and reduces the need for air conditioning. Garden structures such as screens and fences may influence air movement, but plants add a cooling factor as water evaporates from moist leaves.

Since the prevailing winds of summer are from the south and southwest, place plants to be used for channeling breezes around the house in that direction away from the home. Even the windbreak on the north-northwest side of the home channels breezes but may not channel them into the home or outdoor living areas in the summer. The house itself blocks air movement and channels breezes around corners if there are no barriers.

These increased air movements at corners may be used if they are directed into patios and play areas. Position plants or screens to create a funneling effect, which gathers and concentrates existing currents. This plan is more effective with light breezes, since strong winds move up and over a barrier and create a different type of air movement.

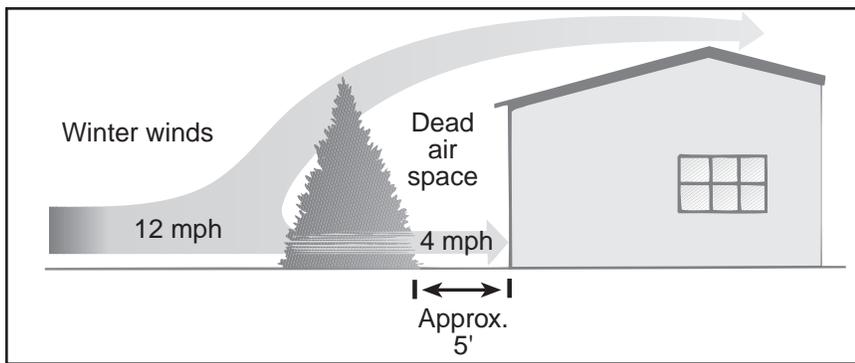


Figure 4. Evergreens adjacent to the north-west sides of a house reduce wind speed and create dead air space for insulation.

## Sun and shade

The use of plants to control wind speed and movement is important for climate control and energy efficiency, but plant location in relation to the sun is also important. Choose and place plants so they do not form a barrier when direct rays of the sun are needed for warmth in winter but so they provide shade for the house from the intense heat of the sun in summer (see Figure 3). Deciduous trees with heavy shade cover in summer but with open branching and complete loss of leaves in winter are the best choices to achieve this result.

### Planting for summer shade

Because of the movement of the sun across the sky in summer, the plants most functional for providing summer shade are those planted to the south and southwest of the home.

The best trees for summer shade, which also produce minimum shade in the winter, are those with spreading branches and few fine twigs. Examples of such trees are ginkgo, Kentucky coffee tree, white ash and green ash. Trees selected for this use should mature large enough to throw shade on the roof of the house on a midsummer afternoon.

To shade the roof of a one-story house 20 feet high, place the tree 15–20 feet from the house. Large trees should not be placed closer than 20 feet while medium-sized trees may be placed up to 15 feet away.

Small, flowering trees such as redbud may be placed closer than 15 feet to provide some shade. Although they may be used for wall or window shade, they do not grow large enough to provide adequate roof shade.

Trees used for shade may also serve other purposes in the landscape. For more complete information on using and selecting trees in the home landscape, see MU publications G5900, *Planning Tree Windbreaks in Missouri*, and G6900, *Tree Placement on Home Grounds*.

### Planting vines for shade

In some locations where space is too limited to plant trees for shade, vines may be used. Deciduous

vines are most effective on southern and western walls. For masonry walls, which allow clinging species of vines to be used, Virginia creeper or Boston ivy are effective. These vines are deciduous, shading the wall in summer but dropping leaves in early fall to allow warming of the walls in winter. Clinging vines are not suitable for wood walls since they tend to hold in moisture and speed wood decomposition.

Where clinging vines cannot be used, twining vines may provide needed shade. They may be trained onto trellises placed near but not against the walls. Wisteria or bittersweet may be used in such locations. Even nontwining “climbers” such as climbing roses may serve this purpose when trained onto trellises.

In some locations, overhead structures such as arbors may serve a dual purpose by providing shade to patios and at the same time casting shade on walls and windows to keep the indoors cooler. Wisteria is a favorite vine for such overhead structures, although any vigorous, fast-growing vine is suitable.

## Dead air space

Another contribution plants make to reduce heat losses from the home is by creating dead air space along walls. Foundation planting of evergreens cuts out air movement close to the house and creates a layer of still air behind it. This layer of still or slow-moving air forms an insulating layer that reduces the greater heat loss caused by moving air. Vines, particularly the evergreen types such as English ivy, can also reduce heat loss in the same way. This technique is particularly useful for north walls where the sun never shines (see Figure 4).

Evergreen plants are most effective for foundation plantings, since their insulating effect is desirable both in summer and in winter. The most effective use of plants for this purpose comes from a continuous line that extends along the wall and around the corners. To achieve an attractive effect, use different kinds of plants with a variety of leaf textures, heights, forms and shades of green. Yew, juniper, mugho pine and holly are a few evergreen plants suitable for these plantings, depending on climates and suitable locations.

## Natural cooling

Summer reduction of air temperature by evaporative cooling as water passes through plant leaves is also important for comfort and for reducing air conditioning needs. Large green areas or a grouping of trees produce the cooling effect of a forest. The lawn or large areas of other groundcovers provide much cooler surfaces than comparable areas of bare ground or paved surface.

To keep the air cooler, keep paved surfaces in the landscape at a minimum, or locate them where they are shaded during the hottest parts of the summer day. Nonpaved surfaces should have green cover over them, either lawn, groundcover or larger plants.

Plants not only control erosion and beautify the landscape, but they also make homes more comfortable and save energy.

### For further information

G5900, *Planning Tree Windbreaks in Missouri*  
G6900, *Tree Placement on Home Grounds*

**Extension Publications**

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