

LANDSCAPING FOR ENERGY CONSERVATION

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Although it is not possible to control temperature, wind and other weather elements, certain landscape practices can modify the climate in and around homes significantly. By placing trees, shrubs, vines and landscape structures properly, the homeowner can reduce the energy required to keep homes and surrounding areas comfortable during winter and summer. If the landscaping is well done, one receives the added benefits of beauty and increased real estate values. A well planned landscape is one of the best investments a homeowner can make.

Protection From the Sun

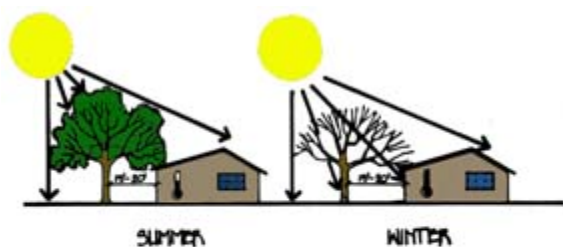


Figure 1. A deciduous tree on the south and west walls of a house will reduce indoor air temperature in summer and increase indoor air temperature in winter.

Trees. Trees can reduce summer temperatures significantly. Shading the roof of a house from the afternoon sun by large trees can reduce temperatures inside the home by as much as 8 to 10 degrees F. Deciduous trees (those that lose their leaves in winter) provide summer shade, then drop their leaves in the fall, which allows the warmth of the sun to filter through their bare branches in winter and help warm the home. If a home can be situated to take advantage of shade from existing trees on south and west exposures, energy expended to cool the house can be reduced considerable.

To shade the roof or a wall of a one-story home, trees which will reach a medium to large size should be selected and placed 15 to 20 feet from the side or 12 to 15 feet from the corner of the structure. To be most effective, the canopy of the tree should extend over the roof. Smaller trees such as crape myrtles and redbuds can be planted closer to the house and used for shading walls and window areas. Since they are deciduous, they will provide shade during the summer and allow light and sun to penetrate during the winter season.

Another way to reduce energy consumption with trees and shrubs is to provide shade for the outside portion of a split system air conditioner. A study by the American Refrigeration Institute shows that shading of this type can reduce the temperature inside the home as much as 3 degrees F. However, shrubs planted near the compressor should not obstruct the air flow or access for needed service. In addition to reducing energy consumption, screening outdoor air conditioning equipment with plantings enhances the esthetic value of the home.

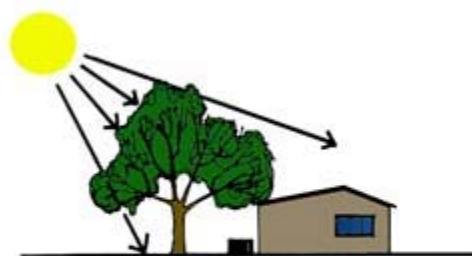


Figure 2. An air conditioning unit on a south or west wall should be protected from the sun.

Espaliers and Vines. In addition to shading roof areas, plants can protect walls from heat and cold. Vines, shrubs and certain trees can be used as espaliers (plants trained to grow flat against walls). The foliage cover insulates the wall against summer heat and cold winter winds. Trees, shrubs and vines can be highly effective in reducing noise and dust pollution also.

There are several ways to support plants against walls. Some vines such as English Ivy have specialized roots that cling to masonry or wooden surfaces. However, this can harm wooden surfaces since it hastens the decomposition of the wood and provides protection for termites and other insects. Vines that do not cling usually twine and must have support. This can be provided by trellises placed on or close to the house. A third way to support shrubs and vines on a wall is to place mortar nails in the joints between the brick and tie plant stems securely with plant ties or similar material.



Figure 3. Plants trained on a wall moderate indoor air temperature.

Windows as well as walls may be shaded by vines on trellises. Deciduous vines such as Boston Ivy and wisteria will allow the sun to penetrate during the winter. If a quick effect is desired, annual vines such as morning glories and moon vines can be planted economically from seed in early spring and usually will provide the needed shade in time for the hottest summer weather.

Overhead Structures. Arbors and slatted wooden overhead structures can be effective either attached or adjacent to the home or farther out in the landscape. If adjacent to the home, they provide the bonus of shading walls and windows, thus reducing heat and glare and providing cool, restful sitting and viewing areas.

If wooden structures are used, the 1 or 2 inch strips of treated pine, redwood, cedar or other long-lasting wood are usually spaced 1 to 1 1/2 inches apart. This spacing provides adequate shade while allowing the air to circulate freely. If vines are used as a partial or complete cover, the structure is referred to as an arbor. Grape arbors, once as common as patios are today, can serve as attractive, practical additions to the landscape. Muscadines are excellent for arbors since they require little or no spraying for insects and disease problems and are attractive plants which produce tasty fruit. Wisteria, Carolina jessamine and grapes are other popular choices which are well adapted to most of the state.

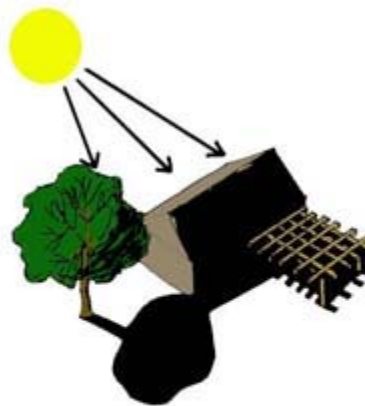


Figure 4. Use a trellis to reduce penetrating sunlight and to provide an outdoor area with shade. A deciduous vine may be planted to provide a solid overhang in summer and a more open effect in winter.

Groundcovers. The temperature a few inches above turf or other groundcover plants is frequently 12 degrees to 15 degrees F. lower than above asphalt or concrete surfaces. By using turf and groundcover plants between homes and paved areas such as drives and walks, summer temperatures can be reduced. Consult your county Extension agent or local nurseryman for recommendations on adapted groundcovers and turf species in your area.

Protection From the Wind

Although living windbreaks have been utilized for many years, their value has increased with the



advent of higher fuel costs. Winter winds in Texas usually blow from the north or northwest and accelerate the rate of air exchange between a house and the outdoor environment. Savings up to 23 percent have been recorded in comparing completely exposed homes and a house landscaped to minimize air infiltration.

Summer winds normally blow from the south or southwest with generally positive effects on human comfort. Tall trees from the south and west can reduce the temperature while allowing breeze to pass beneath and through the foliage canopy.

Planning Windbreaks. Windbreaks obstruct and redirect the flow of wind. As wind strikes an obstruction it can move over, around or through it. The extent of protection on the leeward side is related to the height and length of the windbreak. Impenetrable windbreaks create a strong vacuum on the protected or leeward side which reduces the protection. Windbreaks composed of living plants allow some of the wind to penetrate which makes them more effective. The effective zone of protection for a living windbreak is approximately thirty times its height although maximum protection occurs in a range of 5 to 7 times the height of the planting.

Therefore, if planning a windbreak 25 feet tall, it should be located 125 to 175 feet (5 to 7 times 25 feet) from the house to be most effective.

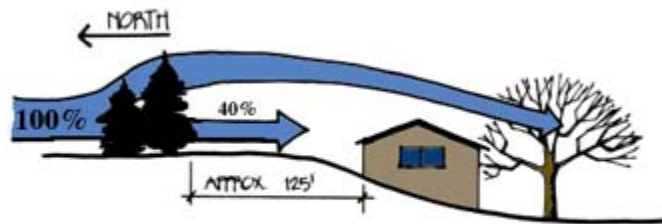


Figure 6. A 20-foot-tall evergreen creates a windbreak on the north exposure.

The following criteria are helpful in planning an effective windbreak:

1. The optimum foliage density for the windward side is about 60 percent.
2. Windbreaks are most effective when they extend to the ground.
3. The width of the planting is important as it relates to penetrability. For most evergreen plants, two or three rows are sufficient but if deciduous materials are being used, four or five rows may be necessary. Rows should be staggered.
4. Windbreaks work most efficiently when the length is 11.5 times greater than the mature width.
5. The height of species within the width of the windbreak should be varied to create rough windbreak edges.



Figure 7. A tall, deciduous tree on the south exposure allows air filtration beneath and through the canopy in summer.

Selecting Species for Windbreaks. Some of the species appropriate for windbreak plantings in various parts of Texas are:

Upper Panhandle of Texas

- Oriental Arborvitae (*Thuja orientalis*)
- Eastern Red Cedar (*Juniperus virginiana*)
- Austrian Pine (*Pinus nigra*)

Central and South Texas

- Arizona Cypress (*Cupressus glabra*)
- Elaeagnus (*Elaeagnus pungens*)
- Salt Cedar (*Tamarix aphylla*)
- Japanese or Tree Ligustrum

Ponderosa Pine (*Pinus ponderosa*)
 Scotch Pine (*Pinus sylvestris*)
 Russian Olive (*Elaeagnus angustifolia*)

(*Ligustrum lucidum*)
 Eastern Red Cedar (*Juniperus virginiana*)
 Rocky Mountain Juniper (*Juniperus scopulorum*)
 Yaupon (*Ilex vomitoria*)
 Oriental Arborvitae (*Thuja orientalis*)

North and West Texas

Eastern Red Cedar (*Juniperus virginiana*)
 Rocky Mountain Juniper (*Juniperus scopulorum*)
 Aleppo Pine (*Pinus halepensis*)
 Oriental Arborvitae (*Thuja orientalis*)
 Arizona Cypress (*Cupressus glabra*)
 Russian Olive (*Elaeagnus angustifolia*)



Figure 8. Evergreens adjacent to the north and west sides of a house reduce wind speed and create dead air space for insulation.

Fall, late winter and early spring are ideal planting times since adequate moisture and cool weather can promote root growth before hot dry weather. Mulching the newly set out plants helps prevent excess moisture loss and heat gain. For additional information on transplanting and fertilizing woody plants, ask county Extension agents for Fact Sheets L 1037 *How to Transplant Wood Plants* and L-1097 *Fertilizing Woody Ornamentals*.

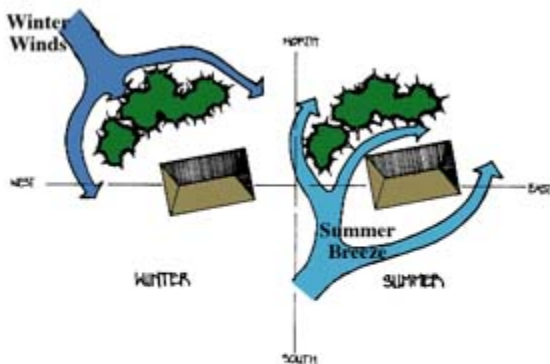


Figure 9. Rows of shrubs on the northwest side protect from cold winter winds and direct summer breezes.

Other Types of Windbreaks. In addition to traditional windbreaks, shrubs can also be used closer to the home for winter protection. This is more practical for small areas and subdivision lots where space does not allow the use of conventional windbreaks. For this type of protection, dense evergreen plants are most appropriate. They should be planted close enough to form a solid wall and far enough away from the house (about 4 to 5 feet minimum) to create a dead air space. This relatively still or dead air has much less cooling power than moving air which can decrease the loss of heat through the walls.

Still another way to moderate the temperature inside the home is to use rows of shrubs on the northwest side to protect it from cold winter winds as well as to direct summer breezes around it.

Good landscaping practices offer one of the most practical methods of reducing energy

consumption in homes. When the homeowner considers the added benefits of increased real estate value and more attractive homes and communities, the investment becomes an even greater bargain.

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