Landscaping to Cut Fuel Costs

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Planting trees and shrubs around your home will help to reduce your heating and cooling costs. How much it reduces costs depends on your choice of plants and where you locate them.

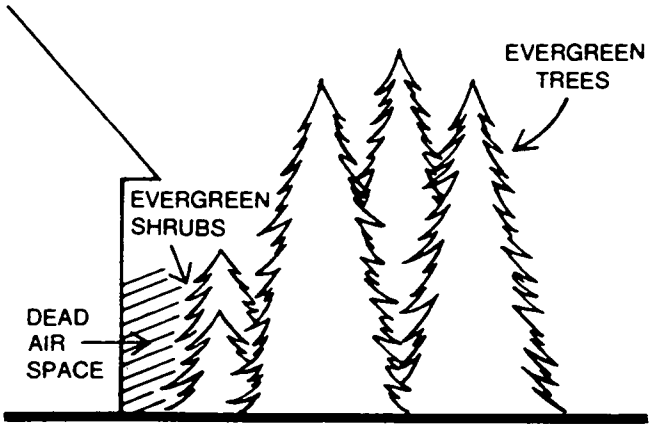
Trees and shrubs also reduce noise and air pollution, and make your home more attractive and more valuable. Therefore, money spent on landscaping your home is a good investment.

Wind Effects

An unprotected home loses much more heat on a cold windy day than on an equally cold still day. Well-located trees and shrubs can intercept the wind and cut your heat loss.

Up to one-third of the heat loss from a building may escape through the walls and roof by conduction. Wind increases the convective air currents along outside walls and the roof, thus increasing the heat loss.

Infiltration or air leakage can account for as much as one-third of heating losses in some buildings. Cold outside air flows in through cracks around windows and doors, and even through the pores in walls. This produces drafts that may cause you to over compensate by raising the thermostat to unreasonable levels just to maintain a modicum of comfort. Both windbreaks and foundation plantings can cut down this penetrating power of the wind.



Windbreaks of two to five rows of trees and shrubs generally provide good protection. Evergreen trees provide the best protection.

Windbreak Benefits

Studies of windbreaks show that windbreaks can reduce winter fuel consumption by 10 to 30 percent.

One study in Nebraska compared the fuel requirements of identical test houses which maintained a constant inside temperature of 70° F. The house protected by a windbreak used 23 percent less fuel.

In one month, an exposed electrically heated house in South Dakota used 443 kilowatt-hours to maintain an inside temperature of 70° F. An identical house sheltered by a windbreak used only 270 kilowatt-hours. The difference in average energy requirements for the whole winter was 34 percent.

The amount of money saved by a windbreak around a home will vary depending on the climate of the area, location of the home, and what the house is built of. A well-weatherized house with adequate ventilation, caulking, and weatherstripping won't benefit from windbreaks nearly as much as a poorly weatherized house.

In addition to reducing the force of the wind, windbreaks also can reduce the wind chill impact on people outside the house.

Studies of three-row windbreaks, where trees were 25 feet tall, show the wind velocities and the wind chill index were effectively reduced. See table.

Impact of a 3-Row Windbreak of 25′ Trees

Measured wind velocities in miles per hour	5	10	15	20	25	30
Wind chill index at 10° F	7	−9	−18	−24	−29	−33
Velocities in miles per hour, 75 ft. in lee of a windbreak	0.5	2	3	5	8	15
Moderated wind chill index at 10° F, 75 ft. in lee of a windbreak	9	8	8	7	−2	−18
Differences degrees Fahrenheit	2	17	26	31	27	15

Windbreaks can be located to control snow, too. This reduces the energy required to remove the snow from around homes, other buildings, and roads.

OREGON STATE UNIVERSITY EXTENSION SERVICE

Windbreak Design and Composition

The height and density of trees determine the amount of protection they will provide. Windbreaks of two to five rows of trees and shrubs generally provide good protection. Evergreen trees provide the best protection, although low, branching deciduous trees can significantly reduce windspeed. Even a single row of evergreen trees will give some protection. Windbreaks will reduce wind velocity significantly for a distance of about 10 times the height of the trees. Thus, a windbreak 30 feet high protects an area extending as far as 300 feet downwind. Some protection is provided for as far as 20 times the height of the trees. Maximum protection is provided within a distance five times the height of the trees.

For onsite assistance in locating and designing windbreaks, and selecting appropriate trees and shrubs, contact your local USDA Soil Conservation Service office, county extension agent, or farm forester.

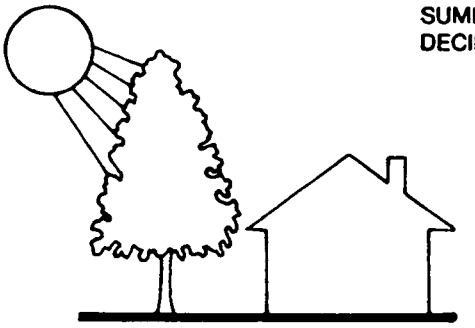
Foundation Planting

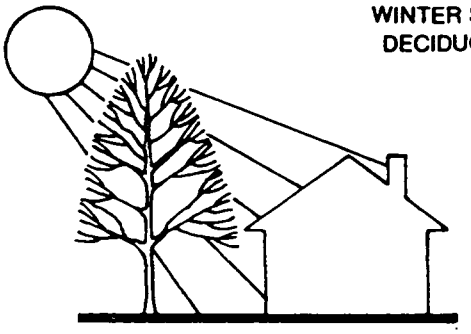
Trees and shrubs planted close to buildings reduce wind currents that otherwise would chill the outside surfaces. These foundation plantings even create a "dead air" space which slows the escape of heat from a building. These plantings also help reduce air infiltration losses around the foundation of the house. Again, evergreen trees and shrubs are thicker and are more effective than deciduous plants. To be most effective, the evergreens should be planted close together to form a tight barrier against air movement.

In summer, the same dead air space helps insulate your home from hot outside air, thus reducing the need for air conditioning.

Solar Radiation Control

Trees and shrubs control solar radiation by shading people and buildings from the direct rays of the sun. During winter, deciduous trees and shrubs shed their leaves and let the sun's rays help warm the house. This might be an important consideration if you are planting for summer shade on the southern exposure of your house.





During winter, deciduous trees and shrubs shed their leaves and let the sun's rays help to warm the house.

Planting For Shade

Maples and other trees with full crowns are best for summer shading. Their high branches permit greater visibility and do not block the flow of cooling summer breezes.

Evergreens have a cone-shaped crown which provides less summer shade on walls and roofs. Their branches often extend to the ground, blocking visibility and flow of cooling breezes. If planted in the wrong location, they may shield your house from the sun's warmth in the winter.

Trees provide maximum shade when planted in groups beside your house. However, a roof need not be totally shaded to achieve excellent results. A study in Alabama showed that air-conditioning costs could be reduced effectively as long as a roof averaged 20 percent or more shade for the entire day.

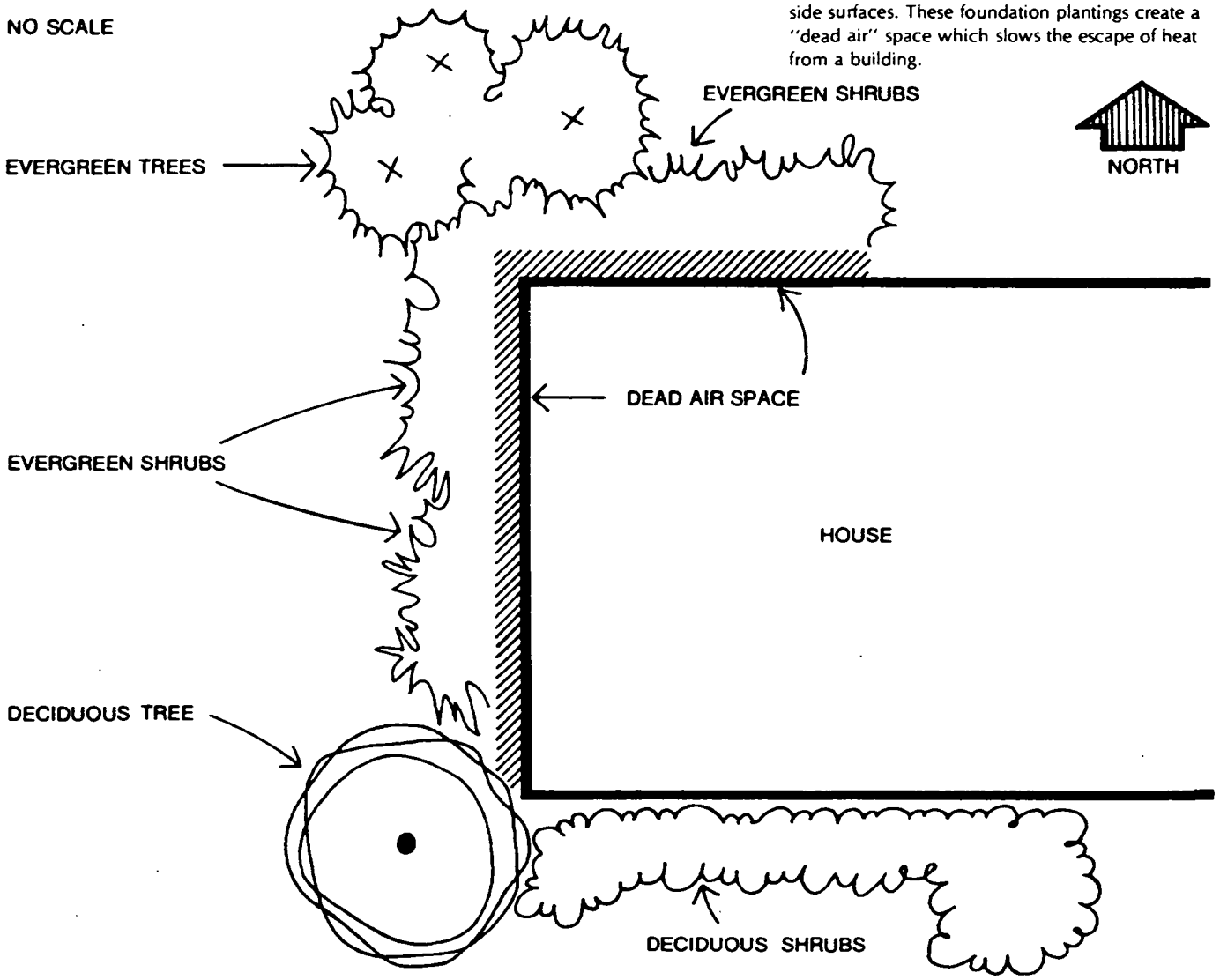
Another study showed that an 8° F difference between shaded and unshaded wall surfaces was equivalent to a 30-percent increase in insulating value for the shaded wall. Temperature differences larger than 8° F between shaded and unshaded building surfaces are common.

Deciduous vines that cling to trellises along the wall can afford protection on the south and west sides of your house. But remember that vines which cling directly to the walls may cause some structural deterioration. By providing direct shade on the walls, vines keep surface temperatures down and reduce convection-caused heat gain. Some additional cooling comes from the evaporation of moisture from the leaves. Evergreen vines such as English Ivy should not be used on walls facing south since the vines block the winter sun's warming rays. Vines may help to insulate walls on the northern and western sides by curbing winter winds.

For specific information on trees, shrubs, and vines for landscape planting in your area, contact your local extension agent.

TYPICAL FOUNDATION PLANTING

Trees and shrubs planted close to buildings reduce wind currents that otherwise would chill the outside surfaces. These foundation plantings create a "dead air" space which slows the escape of heat from a building.



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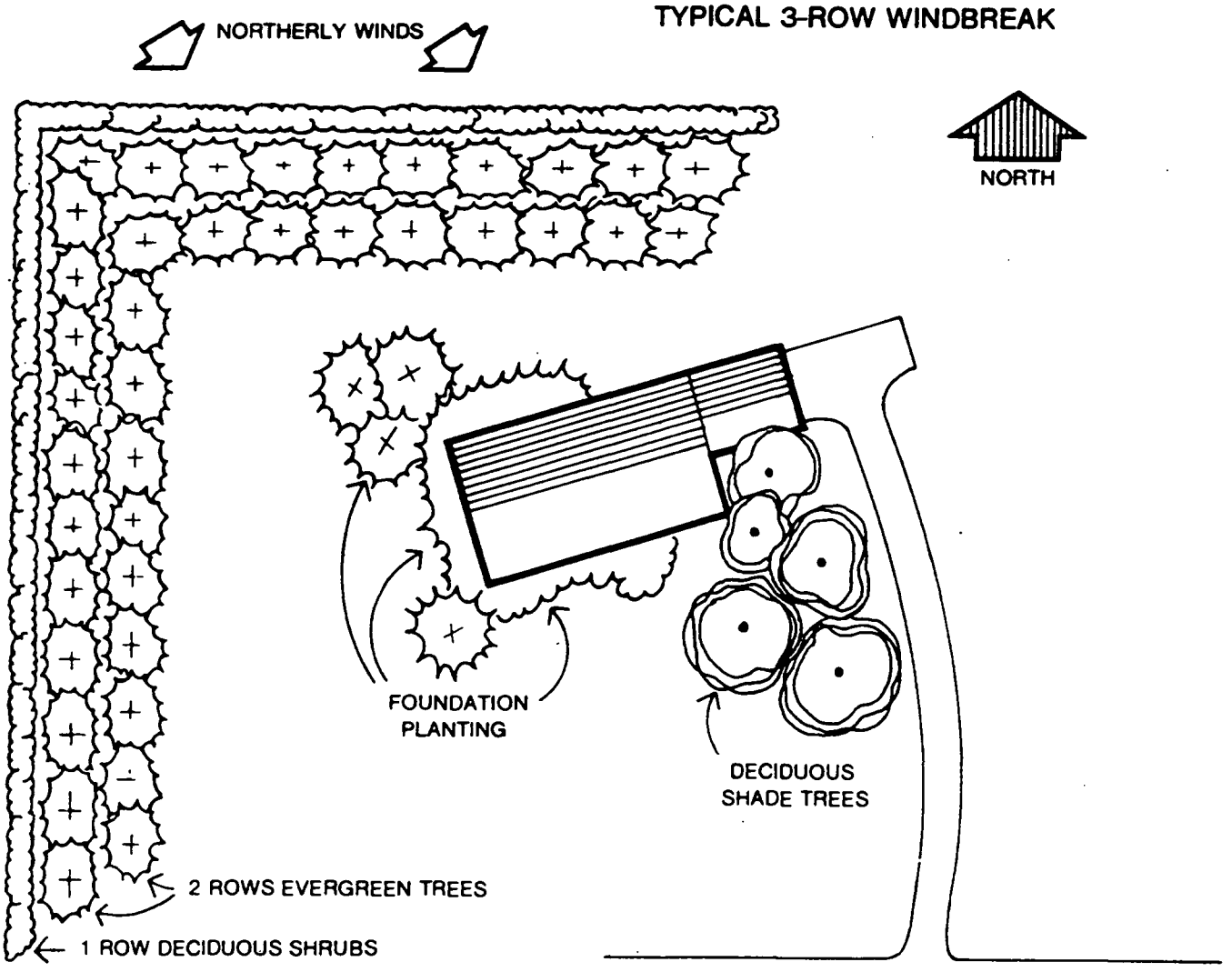
TYPICAL PLANTING PLAN

TEMPERATE CLIMATE — NO SCALE
TYPICAL 3-ROW WINDBREAK



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