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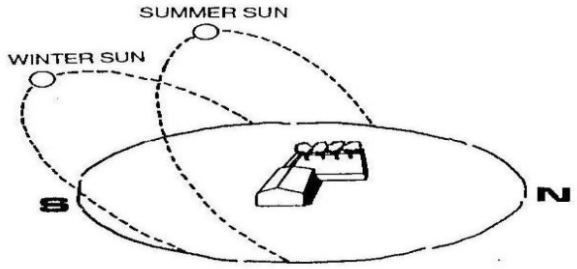
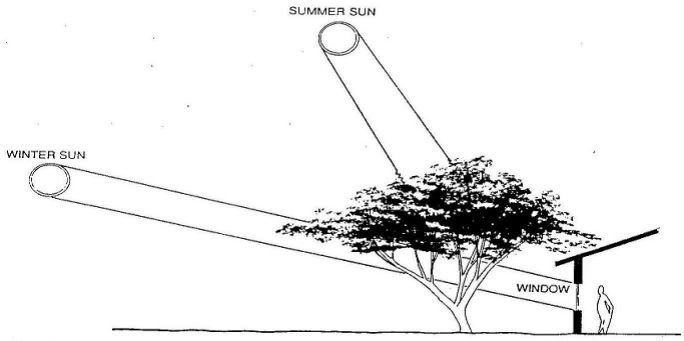
Landscape Design Guidelines for Energy and Water Conservation

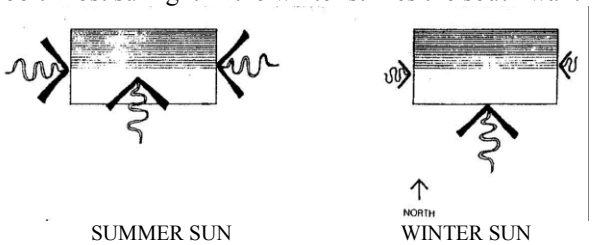
The best landscapes are designed to **use solar energy to its greatest advantage**. The goal is to protect your home from extreme solar heat during the summer and avoid blocking the radiant heat during the winter.



The angle of the sun varies from winter to summer
Therefore, trees can be located and their canopies pruned to block summer sun and still allow winter sun to reach the windows to warm the home.



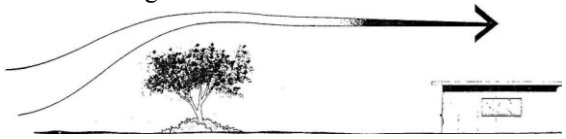
The path of the sun during the summer months is much higher in the sky than it is in the winter. This means that most sunlight in the summer warms the east and west walls and the roof. Most sunlight in the winter strikes the south wall.



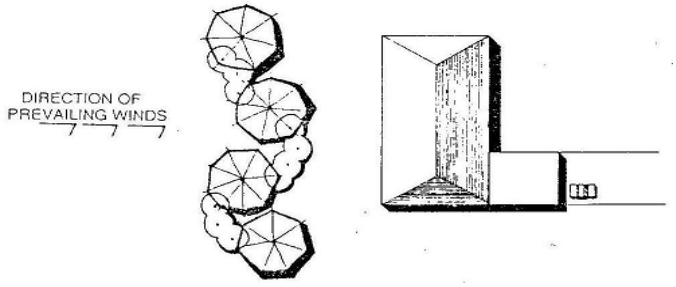
Position trees, shrubs and other vegetation to absorb the summer sun's intense rays thereby shielding the home, especially the windows. Avoid shading windows and walls and outdoor living spaces during the winter when temperatures are low.

The positioning of trees can do much to control energy costs in the home because plant leaves block about 80 percent of the available solar radiation. To reduce heat gain in the summer, locate trees to shade east-and west-facing windows. A dense canopy—many leaves and branches near the top—block more sunlight. On the south side of your home deciduous trees are best because they provide shade in the summer but drop their leaves in the winter allowing more sun exposure.

Consider heat loss from the wind. Wind direction can be determined by careful observation as the seasons change. Place vegetation to block the cold winds of winter and do not obstruct cooling summer breezes.



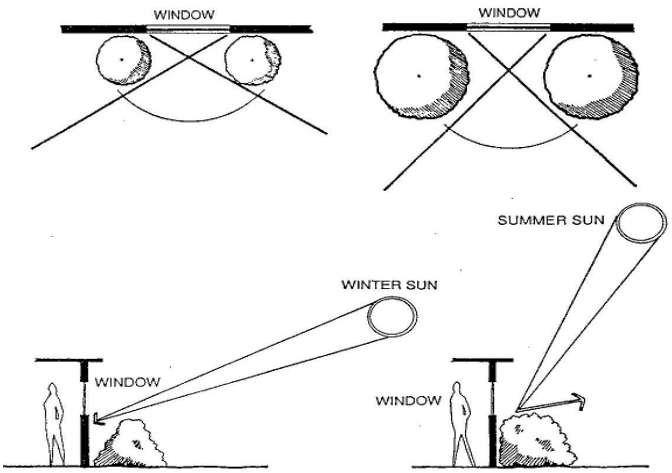
Plantings of dense hedges or thick rows of trees 30 to 50 feet from the home can dissipate and divert undesirable winds away from buildings and outdoor living areas. By placing the windbreaks perpendicular to the prevailing wind direction and between the oncoming wind and the area to be protected, much heat loss in the home can be prevented and outdoor living spaces made more comfortable.



A few additional planning ideas will enhance your design for energy management. The closer the tree is to the surface the larger an area it shades. If you already have trees on the south side, prune them high enough to allow low–angle winter sun to penetrate south-facing windows. Thin the canopy in late fall to allow more sun to penetrate. Do not shade solar collectors on the roof. It is wise, however, to shade air conditioning units, being careful not to block air flow around the unit.

Extensive areas of hard surface, such as brick and concrete, absorb solar heat and pass it on to the house. Such areas should be shaded. Homeowners tend to overlook shrubs but in fact they offer some advantages over trees for shading walls. Shrubs become established more quickly after transplanting, are less expensive to purchase, require less space than trees, and their roots or overhanging branches are less likely to harm utilities, foundations, and roofs. Large shrubs placed next to windows are more effective in reducing solar gain than small shrubs. (See figure, next page.)

Shrubs south of the home can be angle pruned in winter to create a sun pocket, but they will fill out and provide shade during summer.



Vines provide shade by covering walls and reflecting or absorbing solar radiation. They also are used effectively on trellises or ramadas to provide filtered shade for outdoor spaces creating a cooler environment

Groundcovers shade the ground, cool the air and can reduce glare from reflective surfaces such as driveways and sidewalks. Use groundcovers near patios, pools, and buildings. Select dark green plants to reduce reflected heat on nearby walls. If your home has large areas of reflective surfaces such as paving, concrete or stone near windows and outdoor living areas, use of plants to reduce glare is especially important.

Architectural shading devices such as overhangs and roof extensions shade walls well when the sun is at higher angles of elevation. They are particularly good for shading south walls while still allowing solar access in the winter when the sun is at lower angles.

Different areas of your landscape have different water needs. Each of these areas is called a **hydrozone.** The *principal hydrozone* is the area containing plants which require the most water maintenance. This includes lawn or play areas and gardens. The ornamental pear, ash and citrus trees belong in this category.

Areas that are less affected by humans but are visually important make up the *secondary hydrozone*. Texas ebony, bottle brush, and red aloe are included in this zone.

Minimal hydrozones require little water or maintenance and frequently these are areas, such as buffer areas near the edges of the property, receive little or no human use. Species typically used are low water use arid region plants.

Retention zones capture water from the roof and other hard surfaces and direct it via drain ways and berms to high water use areas such as lawns, large trees, etc. thereby reducing the amount of supplemental water needed. Vegetable garden areas need a minimum of 8 hours of sun daily and can use runoff water.

Zoning the landscape helps you avoid using water on areas where people have little contact, impact or exposure, i.e., where the plants can take care of themselves for the most part. Using water where it is most needed and appreciated can save you money and result in a more dramatic and water-efficient Xeriscape.

All the above considerations can be organized on a plan of the property. Begin with a hand-drawn plan to scale on graph paper. Include on your plan the following information for existing or proposed site features:

- Location of the residence
- Driveway, sidewalks, and garage
- Underground and above ground utilities
  - --gas lines
  - --sewer lines
  - --water lines
  - --telephone lines
- Air conditioner
- Neighbors' houses
- Building setback lines and utility rights-of-way
- Property lines
- Major streets
- Contour lines (changing topography may be estimated)
- other structures on the property
- Existing vegetation
- North arrow and scale

Use tracing paper over this base plan to explore various landscape designs including hardscapes as well as plants. Careful planning will enhance the beauty of your landscape, energy efficiency, and water utilization.

[Text adapted from Dr. E. Gregory McPherson & Dr. Charles Sacamano Cooperative Extension U of A College of Agriculture]