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energy conservation

Homesiting for Fuel Savings

When you plan the site for a new home, check the local zoning ordinances and subdivision regulations. In many communities, the setback requirements are so inflexible that good siting is difficult. However, in open, rural areas, it will be easier to locate the home to save on energy.

Siting A New Home

Use the natural features of the site to best advantage.

Houses can be tucked into valleys instead of built on hilltops, put on protected sides of hills, built on the south or southwest (sunny) sides of slopes or built partly into hills for natural insulation (Fig. 1).

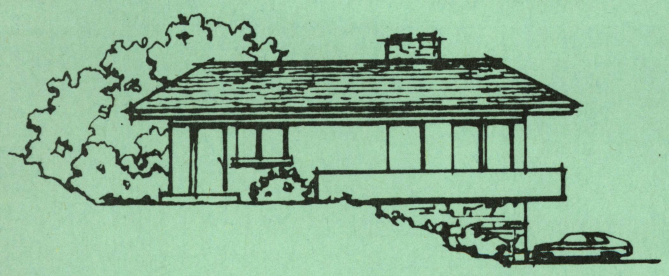

Fig. 1. Houses can be built into hillsides for natural insulation.

Rooms which are at basement level or partly underground have additional earth protection against weather. The relatively constant year-round ground temperature reduces winter heat loss through below-grade walls and provides a cooling effect during summer. Excessively exposed foundation walls have high winter heat loss through the concrete.

The ground surface around the house should be adequately sloped so that surface water will drain away from the dwelling.

Avoid clearing vegetation and protruding rock formations that can act as protection. Natural streams should not be filled in or covered during construction; a site with running water will be cooler than a dry one in the summer.

Position the house with wind and sun in mind.

If you can, locate the main roof of the house about parallel to the east/west axis of the lot. This allows for more south-facing windows for better winter heating and provides a desirable location for a solar heat collector in the future.

Winter winds generally come from the north, hence northern walls should have the best insulation and the least glass. If design permits, the shortest wall should face north; however, with a mobile home, the short side should face into the prevailing wind, from whatever direction it comes (Fig. 2).

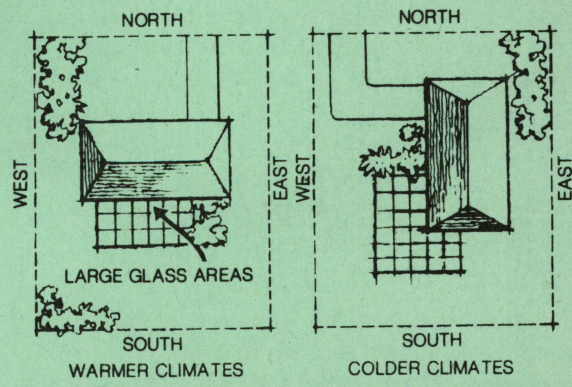

Fig. 2. Houses should be oriented with climate in mind.

If you use extensive glass areas, face them south so that the low winter sun will shine into them during much of the winter daylight hours and so they will be shaded by an overhang from warm summer sun. With properly designed (wide) roof overhangs or awnings, little or no sun will come in during the summer. By contrast, east or west windows pick up heat almost half the day, putting an extra load on the cooling system.

Place garages, carports and porches to reduce energy load.

In cold climates, locate attached garages on the north, northeast or northwest exposures. Keep the doors of any attached garages closed when not in use. Attached porches also shade walls and windows from direct sun rays.

Use landscaping to protect as well as beautify.

Locate a row of evergreens or a slatted fence a short distance to the north or northwest of the house to be a barrier to cold winter winds which increase heat loss from buildings. Shrubs or berms that surround an exposed doorway will have the same effect.

If possible, plant tall, deciduous shade trees for the south, west or east sides to reduce solar heat gain of walls, windows and roofs in the summer. Yet in the winter when the leaves have fallen, the trees will not block the roof and walls from the sun's warmth. Put vines and low shrubbery on the south and west sides of the house to provide protection. Shade your cooling units (compressor-condenser units) with structures or plantings.

Designing A New Home

When designing or planning a new home, check with local authorities on building codes to see if the design can be built in the area.

Consider local climate conditions.

A house that is practical in southern California might look just as good in Idaho, but a sprawling layout and large glass expanses could make it expensive to heat and cool.

Choose house shapes and types that are practical to heat and cool.

The key is the amount of wall area compared with the floor area. Reducing the amount of exterior wall area relative to floor area will reduce the energy demand. A round house is the most efficient, but that shape is difficult to build and, perhaps, to live in. A square house is the next best, and after it, the simple rectangular shape.

Dwellings with an L, H, U or T shape will use more energy (Fig. 3). Mobile homes present a special heating and cooling problem since they have more outside wall surface for heat loss.

Limit large glass expanses.

Glass is the single largest source of heat loss from a structure, even with storm glass or double glazing. The window area of the typical dwelling is probably equal to about 15 percent of the floor area. This can be reduced under most local building codes to 10 percent.

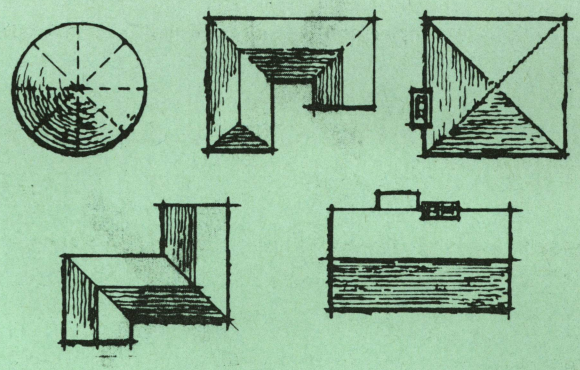

Fig. 3. Some house shapes are more practical to heat and cool.

When reducing the window area, it is better to do it by raising the sill height. This has two advantages. First, it leaves the upper portion of the window area intact, which provides better natural illumination. Second, it helps to reduce heat gain in the summer because the upper portion of the window is more easily shaded by the overhang.

Plan your windows with more than a view in mind; also, consider wind and sun direction. Keep the number of east and west windows to a minimum unless they can be shaded by trees, tall shrubs, fences, awnings or tinted glass. Panoramic windows may not be advisable on the east or west sides of a house even if the most scenic views are there. Wherever practical, locate large glass expanses on the more temperate southern side.

If you shade the southern exposed glass with a retractable overhang, awning or operable shutters, you can reduce heat gain in the summer without impairing heat gain in the winter. This shading also provides wind protection at all times. If half of the 10 percent glass area is in operable windows and the other half in fixed-glass (inoperable, insulated, double glass windows), you will help the ventilation (operable windows) and reduce heat loss (inoperable windows). Place operable windows so that cool air can travel through the house in summer and escape at the high point of interior space, such as an upstairs hallway window.

Design roofs with climate in mind.

Even with a well-insulated ceiling, the color of the roof makes a difference in heat gain. Light-colored roofing materials reflect rather than absorb sunlight, thus considerably reducing the load on cooling equipment in warm climates; however, a dark-colored roof may be better in cold areas.

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*Adapted from U.S.D.A. Fact Sheet 2-3-15. Recommended to Idaho residents by Shirley Nilsson, Extension housing and equipment specialist, and Roy Taylor, Extension agricultural engineer, both at the University of Idaho, Moscow.

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