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Energy Checklist for Building a New Home or Buying an Existing Home

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Energy Facts

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# Energy Facts

## Energy Checklist For Building A New Home or Buying an Existing Homes

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Many home design features make a difference in the amount of energy needed for heating, cooling, and lighting. These features can have a major impact on the amount of money you spend to maintain winter and summer comfort for your family. This checklist will help you evaluate the energy-saving potential of various house design features. Use it to check off the features you want to see in your new home or an existing home that you are contemplating buying.

Factors to consider include: Site, House Design, Color and Lighting, and Heating and Cooling Systems.

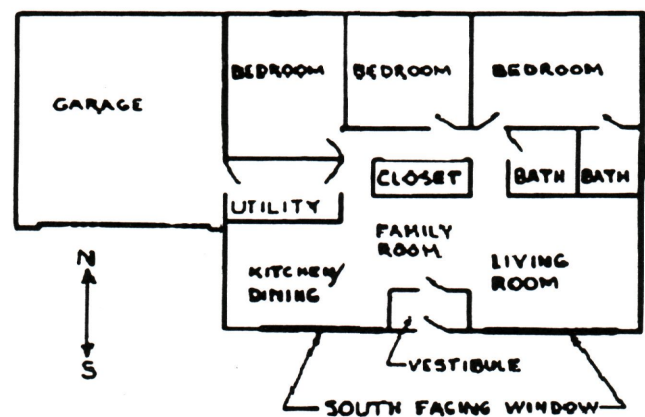
### Site

\_\_\_ House is built into a hillside or partially into the ground (the relatively constant year-round ground temperature reduces winter heat loss through below-grade walls and provides a cooling effect during summer).

\_\_\_ The long axis of the house runs east and west (allows more windows on the south to take advantage of winter sun, and south windows can be protected from summer sun by awnings, roof overhang, trees).

\_\_\_ House is located on south or southwest slope of hill (sun hits at angle so greatest solar heat is received through south windows in winter).

Figure 1. The key principles are:



\_\_\_ Rooms most frequently occupied (living room, family room) face south to make the most effective use of solar energy. Storage rooms, utility rooms, bathrooms, bedrooms, and other less frequently occupied rooms are located on the north and west to serve as a thermal buffer. Attached garage or unheated storage areas are located on the north and west.

\_\_\_ Landscape plan has outside activity areas (patios, decks) on the south side of the house. Patios and decks can be used for a longer portion of the year because of their sunny, protected location.

\_\_\_ House is protected from winter wind by a hill or placement of garage/carport (air infiltration and heat loss are reduced when wind velocity is lower).

\_\_\_Large deciduous shade trees are planted on south and west side of house (to provide summer shade during the hottest part of the day, but allow winter sun to heat house).

\_\_\_Low evergreen trees and shrubs or a slatted fence are placed on side of house exposed to winter winds (to provide a wind break and reduce air infiltration; avoid high evergreens on southeast, south, and southwest as they block winter sun from house).

## House Design

\_\_\_Main roof ridge runs east and west (for better summer cooling and to provide a more desirable location for a solar heat collector in the future).

\_\_\_Shape of house is a slight rectangle (long rectangles, L-shapes, H-shapes, T-shapes, and U-shapes provide more outside wall surface for heat loss).

\_\_\_Entry halls for front and back doors can be closed off to form "vestibules" (thus reducing flow of cold air to inside and warm air to outside).

\_\_\_Main living area, where the living room, family room, dining room, and kitchen are located, has as few partitions as possible (for best heat distribution).

\_\_\_Bedroom wing can be closed off (so heating and air-conditioning can be reduced when not needed during the day).

\_\_\_South windows have an overhang or awning, deciduous trees or vines (to shade from summer sun but allow winter sun into the house).

\_\_\_East and especially west windows are kept to a minimum and/or provided with shade trees and tall shrubs, fences, awnings, tinted glass, or other shading devices (to keep out early morning and late afternoon sun in the summer).

\_\_\_Amount of window area is no more than 10 to 15% of floor area (there is more heat loss through glass, even double or triple glazing, than through an insulated wall). Note: Before you decide to eliminate openings, keep in mind that local building codes may require that certain rooms of the house have windows or doors to the outside. This is for safety's sake, especially fire safety. Check with the building inspector in your local area or county to be certain of requirements.

\_\_\_Operable windows are placed so that cooling air can travel through the house in summer and escape at a high point of interior space (example: an operable

window in an upstairs hallway will draw off warm air from the inside).

\_\_\_Attic ventilators are placed so air is drawn from cooler, shady parts of house (under eaves for inlet of cool air) and exhausted as high as possible (along ridge of roof or at attic gable ends). Vents allow the escape of unwanted moisture from attic in winter and lessen attic heat build-up in summer (be sure ventilation is adequate; at least one square foot of eave inlet and one square foot of gable outlet for EACH 150 feet of ceiling area is recommended. Periodically check vents, especially eave vents, to see they are not obstructed by insulation or other building materials).

\_\_\_Chimney for fireplace is placed on an inside rather than an outside wall (so heat is lost to inside of house).

\_\_\_Fireplace is designed to heat the room (such as a circulating type with a glass fire screen door to prevent heat from the room being lost up the chimney) and has an outside air intake for combustion of wood to prevent furnace-heated air from being used for combustion (newer fireplace systems can be designed so ductwork connected to the system provides outside air for combustion; check with fireplace dealers in your area).

\_\_\_Plumbing fixtures are located close to water heater(s) (to reduce heat loss from water as it moves from tank to point of use).

\_\_\_Water heater is located in a heated space (even a well-insulated heater loses more heat when placed in an unheated area).

\_\_\_Stair wells to second floor or basement have tightly sealed doors either at top or bottom of the stairs (to prevent "chimney" effect and loss of heat to upper area).

\_\_\_Multi-family housing has "extra" energy saving potential. In this type of housing, each dwelling shares one or more walls with other dwelling units (in townhouses, duplexes, or apartments in mid- or high-rise buildings, less wall space in each unit is exposed to the outside, thus greatly reducing the amount of heat loss from each unit through its walls, or ceiling and floor in some cases).

## Color and Lighting

\_\_\_Outside walls and roof are a light color if summer heat is a greater problem than winter cold, such as

in un-insulated summer cabins (light colors reflect the sun's heat while dark colors absorb it).

\_\_\_Interior wall and ceiling colors are light tints or white (so both daylight and artificial light are reflected more than absorbed).

\_\_\_Floor covering is medium to light in color (so light reflectance will save on amount of artificial light needed).

\_\_\_Overhead lights in living areas and bedrooms provide sufficient over-all lighting, but use less total wattage than several lamps; lamps can be used for task lighting as needed (simple fluorescent enclosed fixtures, flush with the ceiling, will provide excellent light with little energy use; incandescent fixtures may be preferred by some).

\_\_\_All light fixtures are located so that they can be easily cleaned (dust on bulbs, tubes, and fixtures reduces illumination).

## Heating and Cooling

\_\_\_Furnaces are located as centrally as possible in the house (to reduce lengths of both hot and cold runs to shortest possible distance).

\_\_\_Furnace design and location permit easy access to air filters (clogged filters reduce efficiency).

\_\_\_Heating controls are designed to allow for zoned heating (permits heating of lightly used areas only as needed). Note: In some homes, heating runs or registers may be designed with dampers or valves that allow you to stop the flow of heat into seldom used rooms (these can be added by heating and cooling professionals); while in other homes, zoned heating may be achieved by the use of two thermostats, one controlling the bedroom area and one controlling the living area (a more expensive alternative).

\_\_\_Heating ducts/runs are wrapped with insulation except where they pass through heated rooms (metal runs in unheated crawl spaces, basements, and attics lose heat to these cold areas). Note: If possible, the system should be designed so heat runs do not pass through unheated areas.

\_\_\_Thermostat is located on an inside room partition (thermostats on exterior walls, near windows, near heat-generating appliances, in drafts, or in sunlight may not react to actual room temperature, and so will not keep room temperature within limits desired).

\_\_\_Hot water pipes are wrapped with insulation except where they pass through heated areas (metal or plastic pipes in unheated crawl spaces, basements, and attics lose heat to these cold areas. Note: If possible, the water supply system should be designed so pipes do not pass through unheated areas).

\_\_\_Humidity level of home is kept at 30 to 40% during the heating season (warm air feels warmer and more comfortable when humidity is present in the air; humidity can reduce static electricity problems as well). Note: Portable humidifiers located centrally in the home will add humidity, or power humidifiers connected to forced air furnaces will add humidity.

\_\_\_Mechanical ventilators/fans in kitchen, bath, and laundry fit tightly, are weatherstripped, and have positive closure shutters (ventilators without shutters allow excessive back drafts of cold air into home).

## More Money-saving Tips for Energy Conservation

\_\_\_Electrical outlets and other pipes or wires are located in interior walls (prevents excessive air infiltration due to decrease in insulation where wires and pipes are placed).

\_\_\_Medicine cabinets are not recessed into exterior walls (insulation cannot be placed behind cabinets to prevent heat loss).

\_\_\_Home with vaulted ceilings has a forced air heating system that has a continuously operating fan (keeps warm air at ceiling circulated through the house).

\_\_\_Water heater is located in a heated space such as closet, utility room, or basement (even a well-insulated heater loses more heat when placed in an unheated area).

\_\_\_Fluorescent lighting is used in the kitchen in an extended soffit or ceiling panels (to provide light for working surfaces without shadows).

\_\_\_Fluorescent lighting is used in the bathroom in a canopy structure over the lavatory with deluxe warm white light for good skin color (for general room illumination and also good lighting of mirror area).

\_\_\_Fluorescent lighting is used in the laundry area in an extended soffit or ceiling panel over the washer and dryer (provides adequate light where tasks are performed).

## Sources of information:

MSU Extension Bulletin E-1384, A Checklist for Energy-Saving Homes.

EEM-00252, Search the Market: Energy-Saving Homes-Checklist from University of Alaska Extension Service

The Sun-Tempered Superinsulated House by L.R. Walker, # 9.936, Colorado State University Cooperative Extension

### Energy Team Acknowledgments

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