A Checklist for Energy-Saving Homes'
Michigan State University
Cooperative Extension Service
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June 1980
4 pages

# A Checklist for Energy-Saving Homes[1]


**Extension Bulletin E-1384, June 1980**

There are many features about a home that make a difference in the amount of energy needed for heating, cooling and lighting. Thus, these features can have a major impact on the amount of money you devote to maintaining the winter and summer comfort of occupants. This checklist will help you evaluate the energy-saving potential of various housing features.

There are a number of ways you can use the checklist. If you are searching for a new home, take it with you as you visit various houses. Evaluate each house by placing a check beside the features that describe the unit. If you are thinking about building a home or remodeling your present home, use the checklist to evaluate the designs you are considering. If you plan to remain in your present home, but wonder if there are features in your house that could be modified to conserve energy, use the checklist to find out.

After your survey, evaluate each of the checked statements and then evaluate the features not checked. Are there things it would be possible to modify in order to save energy? Not all features can be changed, of course. But where improvements are made, the pay-off will be lower energy bills. In time, the money saved on energy costs will pay for the improvement and eventually begin to save you money. Keep in mind that it will take time before you begin to realize a return on your energy-saving investment. Yet as energy costs continue to increase, dollar-savings will occur sooner.

Housing features to consider include: Site; House Design; Construction and Insulation; Heating and Cooling System; Color and Lighting.

[1]**Adapted from "Energy Saving Homes—A Checklist" (EC 685), Oregon State University Extension Service, by Susan Merkley, Extension Assistant, Department of Human Environment and Design, Michigan State University.**

## Site

- ☐ 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).
- ☐ 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).
- ☐ 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).
- ☐ 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 rec-

tangles, 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 percent 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 certain 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 duct-work 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).

## Construction and Insulation

- ☐ Insulated glass or storm windows used to reduce heat loss (storm windows and double-pane insulated glass will reduce heat loss by approximately 50 to 51 percent, while triple-pane windows will reduce heat loss by approximately 68 percent).
- ☐ Storm doors used on all exterior doors (storm doors will reduce heat loss through exterior doors by approximately 35 to 40 percent).
- ☐ Weatherstripping is installed around jambs of all doors and operable windows (heat losses due to infiltration can increase heating costs by sizeable amounts).
- ☐ Caulking around all door and window frames is in good condition to reduce infiltration heat loss (caulking normally dries out with time and needs replacing).
- ☐ 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.
- ☐ Hot water pipes are wrapped with insulation ex-

cept 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.

- ☐ Insulation above ceiling is rated at least R-33 to 40 (insulation helps stop the flow of heat from warm, heated areas of house to unheated areas or to the outside; if adding insulation, look for the R-rating printed on the type of insulation selected). Note: These are R-values recommended for the Michigan area by U.S. Department of Energy (DOE) and Department of Housing and Urban Development (HUD) as of early 1980.
- ☐ Insulative value of the complete wall system should be rated at least R-19 (insulation stops the flow of heat through walls). Note: R-values recommended by DOE and HUD in early 1980.
- ☐ Insulation under a floor located over an unheated crawl space is rated at least R-19 to 22 (insulation stops flow of heat from heated home to unheated crawl space). Note: R-values recommended by DOE and HUD in early 1980.
- ☐ Batt insulation (R-11) has been installed between floor joists around the perimeter of the basement, i.e., in the space between joists where the joists are joined to the basement wall (insulation stops the flow of heat from the basement).
- ☐ Moisture vapor barrier has been installed on warm (room) side of ALL insulation (unprotected insulation will absorb moisture, thus making it lose its insulating capacity; moisture-filled insulation will also subject the house structure to moisture damage).
- ☐ Moisture barrier of 6 mil plastic, with some sand or earth scattered on top to hold it in place, has been laid over ground in crawl space (unprotected ground gives off moisture which is absorbed by building structure and insulation).
- ☐ Unheated crawl space is ventilated by openings in foundation having net areas of at least one and one-half square feet for each 25 linear feet of exterior wall (vent openings in foundation give off moisture vapor collected in the crawl space). Note: Covering the ground area with a moisture barrier also helps reduce moisture build-up.
- ☐ Attic and gable areas are adequately ventilated (see point above in design features section concerning attic ventilation requirements).
- ☐ Sill sealer/filler has been placed around top of foundation wall below sill plate (to reduce infiltration into basement area).

## Heating and Cooling System

- ☐ 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, hence will not keep room temperature within limits desired).
- ☐ 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 which 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).
- ☐ Mechanical ventilators/fans in kitchen, bath and laundry fit tightly, are weatherstripped and have positive closure shutters (ventilators without shutters allow excessive backdrafts of cold air into home).
- ☐ Mechanical ventilators/fans can be controlled by a timer switch to automatically shut off after a certain period of time in case you forget to switch the fan off (operating exhaust fans for longer periods of time than needed to remove moisture, odor or smoke is wasteful of heated air).
- ☐ Heating system is properly sized to needs of home (oversized equipment operates in short cycles giving lowered efficiency and higher energy consumption; undersized equipment will not maintain desired temperature during cold extremes). Note: Check with your heating and cooling professional and have him/her determine the correct size unit for your home.
- ☐ Furnaces are located as centrally as possible in 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).
- ☐ Home with vaulted ceiling has a forced air heating system that has a continuously operating fan (to keep warm air at ceiling circulating through the house). Note: There are ceiling fans on the market which can help circulate warm ceiling air as well.
- ☐ Forced air heating system incorporates a dual speed fan, permitting continuous low-volume air flow when furnace is not heating, increased air flow when furnace operates (continuous air flow provides more uniform heating, greater comfort, and

more efficient energy utilization. The furnace may be able to operate on "fan only" for summer circulation. Filters can be used for continuous air cleaning.) Note: Not all furnaces are designed for dual speed continuous air circulation and few can be converted; to find out about yours, check with your heating and cooling dealer.

- ☐ Humidity level of home is kept at 30 to 40 percent 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 home will add humidity, or power humidifiers connected to forced air furnaces will add humidity.

## Color and Lighting

- ☐ Outside walls and roof are a light color if summer heat is a greater problem than winter cold, such as in uninsulated 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).
- ☐ Fluorescent lighting is more energy efficient than incandescent lighting. It can be used in the kitchen in flush-to-ceiling fixtures or in an extended soffit (to provide light for working surfaces).
- ☐ It can be used under kitchen cabinets to light the countertop work area (concentrates light on areas of work; ceiling fixtures are also needed for general lighting and to see inside upper cabinets).
- ☐ It can be used in bathrooms, in dressing rooms, over mirrors (for general illumination or for specific work areas; deluxe warm white fluorescent lights give good skin color).
- ☐ It can be used in laundry areas in flush-to-ceiling fixtures or in an extended soffit over the washer and dryer (provides adequate light where tasks are performed).
- ☐ Overhead lights in living areas and bedrooms provide good over-all light for less total wattage than several lamps; lamps can then be used for task lighting of areas 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 they can be easily cleaned (dust on bulbs, tubes and fixtures reduces illumination).

For more information on energy conservation in your home, contact your local Extension Home Economist and ask for copies of a series of "Energy Fact Sheets" and other energy related materials made available by the Michigan State University Cooperative Extension Service. Or contact the Michigan Energy Administration, 1-800-292-4704 (in the Lansing area call 373-0480).

Appreciation is expressed to Douglas Cron, Building Construction Department; Ann Field, Family Ecology Department; and Bonnie Maas Morrison, Human Environment and Design Department, Michigan State University, for assistance in the preparation of this bulletin.

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*1P-10M-6:80-UP, Price 10 cents, Single copy free to Michigan residents.*

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O-12215