SERVICE IN ACTION

COLORADO STATE UNIVERSITY EXTENSION SERVICE

Residential energy management

(Part I)

Lloyd Walker[1/]

In these times of rising energy costs, the prudent homeowner will want to develop an energy management plan to make wise use of dollars spent on energy used in the home.

The first step in an energy management plan is identifying the problem areas. The next step is listing the problem areas in order of importance according to energy losses involved with each. The final step is to systematically correct these problem areas according to the limits of the household energy improvement budget.

The important point in household energy management is to approach the problem in an orderly fashion and make those corrections that give you the most energy saved per dollar invested in improvements.

The use of this checklist is quite simple: answer "yes" or "no" in the blank beside each statement according to whether your house conforms to the statement or not. "Yes" answers indicate areas where the house conforms to energy-conserving principles. "No" answers indicate areas in need of improvement. Thus, this checklist will help you in the first step of an energy management plan by identifying the problem areas.

The items under each topic area are listed in relative order of cost effectiveness; thus, the checklist also helps in the second step of listing the problem areas in order of importance. The final step is up to you—namely, working through the list, step by step, to correct those items that are feasible to undertake so as to make your home energy efficient.

Contact your local CSU county extension agent for other Service in Action sheets that will help you correct problem areas that have been identified.

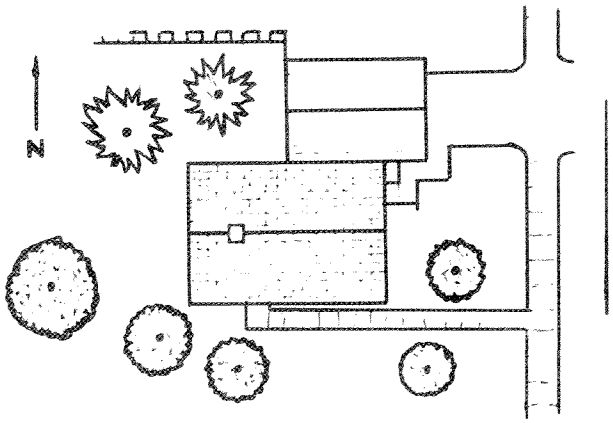
This checklist can be used for several different purposes:

- By homeowners desiring to make energy improvements.
- By home remodelers wanting to incorporate energy-saving design and construction features.
- By home buyers looking for energy-efficient houses.
- By persons wanting to design their own home.

Siting

How a house is located on a building site and the use of landscaping on a site can reduce energy consumption.

_____ House is located on the south slope of a hill (south slope receives more solar heat in winter and hill protects house from cold north winds).



_____ House is built into a hillside or partially into the ground (the relatively constant year-round ground temperature and insulating value of earth reduces winter heat loss through below-grade walls and provides a cooling effect in summer).

_____ Long axis of the house runs east and west (allows more windows on the south to utilize solar heating in winter).

_____ Dense evergreen trees (i.e., blue spruce or upright juniper) or a fence are placed on north and northwest side of house (thus providing a windbreak to reduce the cooling effect of winter winds striking the house).

_____ Large deciduous shade trees are planted on the southeast, south and southwest side of house (to provide a cooling effect in summer but allow the winter sun to shine through bare branches and warm the house with solar energy).

_____ Low, dense evergreen trees and shrubs are planted close to exterior walls on north and northwest side of house (thus creating a dead air space next to the wall which helps insulate the house).

_____ Dense evergreen trees are planted around entry as a windbreak (to minimize cold air flow into a house when doors are opened).

_____ Deciduous vines are planted on a trellis or against the wall on the southeast, south or southwest side of house (to provide a cooling effect in summer but allow solar energy from the winter sun to warm the house).

House Design

There are many design features that can be incorporated into a new house or when remodeling an older home to promote energy conservation or the use of solar heat. Many of these features can be incorporated in a house at little or no extra expense—merely by thought and planning when designing the house or remodeling job.

_____ House has a compact shape. (A circular, square or slightly rectangular house shape is easier to heat because it has a minimum of exterior wall surface and allows more efficient heat distribution.)

_____ House has two-story floor plan (makes more efficient use of heat).

_____ Floor plan locates active areas of house (dining, living, family rooms) on south side and inactive areas (attached garages, bedrooms, workshops) on north side of house. (Inactive areas can be kept at lower temperatures thus acting as thermal buffers to the active areas which can take advantage of solar heat through south windows.)

_____ Main living area has as few partitions as possible (for best heat distribution in winter and natural ventilation in summer).

_____ Attached greenhouse-solarium is located on south side of house. (This type of structure serves several functions: 1) it provides more living space in the house, i.e., family room; 2) as a solar-heated greenhouse, it can extend the growing season and provide fresh food for a family; and 3) it can operate as a passive solar collector and provide supplemental heat for the house.)

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_____ Total window area is no more than 10 percent of floor area of a house. (Windows have a low insulation value; thus, reducing window area will improve the energy efficiency of a house.)

_____ Maximum practical window area should be located on south side of house. (Solar heat gained through these windows in winter will help heat the house.)

_____ South windows are shaded by a roof overhang, awning, vines or a deciduous tree (to prevent unwanted solar heating from summer sun but allowing solar heat in winter to help heat the house).

_____ North windows are kept to a minimum (since they contribute no solar heat and are adversely affected by cold north winds). North windows should only be installed when necessary for complying with fire codes or to provide ventilation.

_____ East and west windows are kept to a minimum or shaded by deciduous trees or vines, awnings or other shading device (to prevent unwanted solar heat from the morning and afternoon summer sun).

_____ Fireplace is designed with a chamber behind the fire box vented to the room, a glass fire screen covering the opening, a tight-fitting damper and an outside air intake for combustion of wood. (Fireplaces are very inefficient heating devices and can lose more energy than they provide if furnace-heated air is allowed to escape up the chimney. A heat circulating chamber will heat room air. A glass fire screen will prevent heated room air from escaping up the chimney while a fire is burning. A tight-fitting damper will prevent heated room air from escaping up the chimney when there is no fire. An outside air intake will provide combustion air for the fire that has not been needlessly preheated by the house furnace. **Note:** With an existing conventional fireplace, the best improvement is the installation and use of a glass fire screen.)

_____ Chimney for fireplace is placed on an inside wall (so that chimney warmth heats house interior rather than outside air).

_____ Attic vents are located under eaves and at roof ridge (thus, cooler air is drawn in at a low point in attic and hot air exhausted at top of attic; this will vent attics effectively in summer and prevent unwanted heat gains and moisture buildup in winter).

_____ Entry doors are protected by vestibules (to reduce the flow of warm air out of the house when doors are opened).

_____ Stairwells to second floor or basement have solid doors at top or bottom (to control heat flow to these areas).

_____ Entry doors are located on south or east side of house. (Entries are protected from cold winter winds.)

_____ Operable windows are located on southwest and northeast side of house (to provide natural ventilation from prevailing summer breezes from the southwest).

_____ Plumbing fixtures are located close to water heater (to reduce heat losses in hot water pipes).

Now that your home has been evaluated through the use of this checklist, you may want more detailed information on how to incorporate some of the ideas mentioned. There are other Service in Action sheets that give more detailed explanations on how to carry out energy improvements, including:

Service in Action #	Title
4.651	Building insulation for comfort and energy conservation
4.652	Insulation—an energy-saving home improvement
4.653	Caulking cracks and openings in the home
4.654	Weatherstripping windows
4.655	Weatherstripping doors
4.656	Installing storm windows and doors
4.657	Insulating foundations and floors
4.658	Insulating crawl space walls and basement walls
4.659	Insulating an unfinished attic
4.660	Insulating wood frame walls
9.511	Energy-conserving window treatments—draperies
9.512	Energy-conserving window treatments—shutters, shades, blinds
9.935	Energy conservation for the home—siting and house design
9.936	Energy conservation for the home—construction and mechanical systems
10.600	Woodburning stove operation and safety
10.604	Solar domestic water heating systems

For more residential energy management information, see Service in Action sheet 10.606.