Where Houses Lose Heat
Michigan State University Extension Service
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Issued January 1978
4 pages

ENERGY FACTS

Cooperative Extension Service
Michigan State University

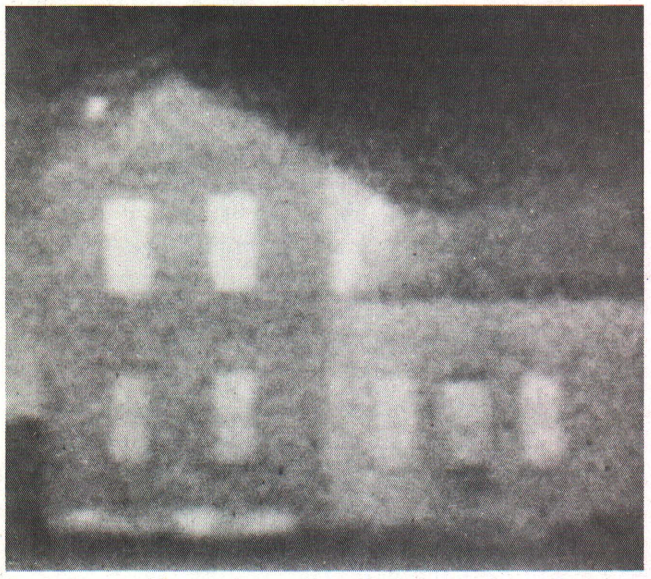
Energy Fact Sheet No. 19 **Extension Bulletin E-1193** **January 1978**

Where Houses Lose Heat

James S. Boyd & James J. Zuiches

When heat bills begin to rise, home owners often wonder where all this heat is going. Heat leaks out of many places in a house and all these small leaks taken together add up to a sizable loss.

Measuring heat loss is a difficult process, but one way to find out where heat is escaping is to take an infra-red picture. Instead of recording light as bright or dim as with an ordinary camera, infra-red pictures show heat waves as bright and colder temperatures as dark. An infra-red camera was used to show heat loss in the homes pictured on this fact sheet.[2]



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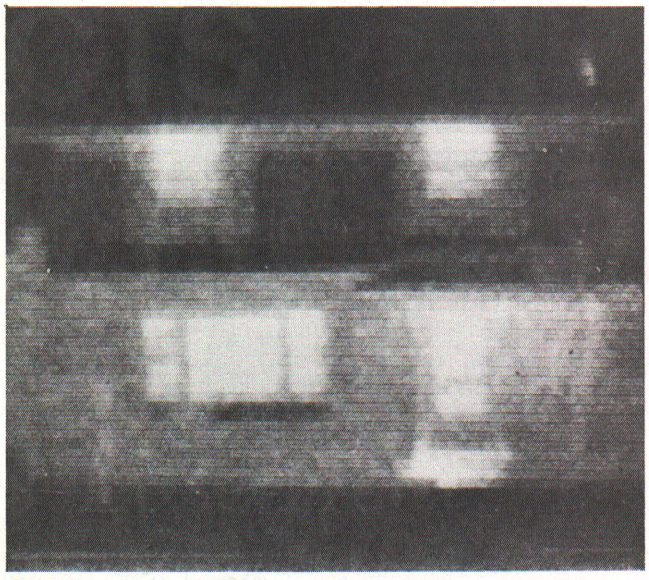
Picture 1. This house had storm windows downstairs but none upstairs so the upstairs windows show brighter, indicating higher heat loss than those on the first floor. Heat loss through windows is an ever-present problem, but storm windows lower the heat lost.



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Picture 2. The second story of this house has been covered with aluminum siding. It is therefore darker and shows lower losses than the downstairs, an uninsulated wood frame exterior wall.

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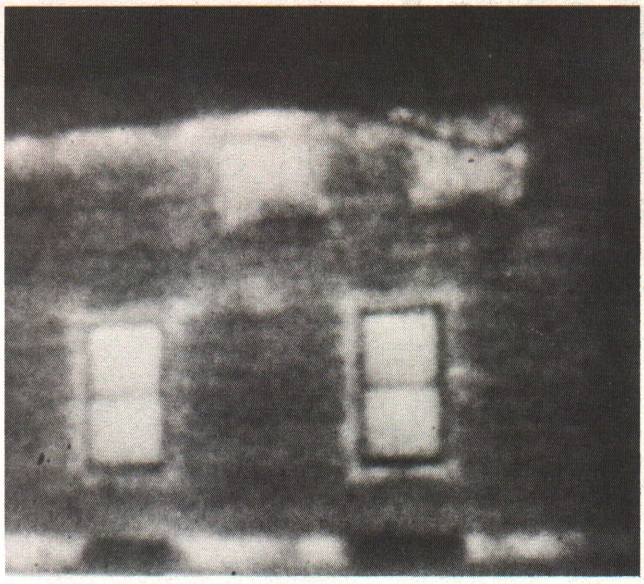
[1] *James S. Boyd, Agricultural Engineering and Human Environment & Design, Michigan State University; James J. Zuiches, Department of Sociology, Michigan State University.*

[2] *The camera was an AGA Thermovision infra-red unit. Pictures were taken for the Energy and Family Project, Institute for Family and Child Study, Michigan State University, East Lansing, Michigan. Project supported by Energy Research and Development Administration, Contract No. EA-77-X-01-2118.*



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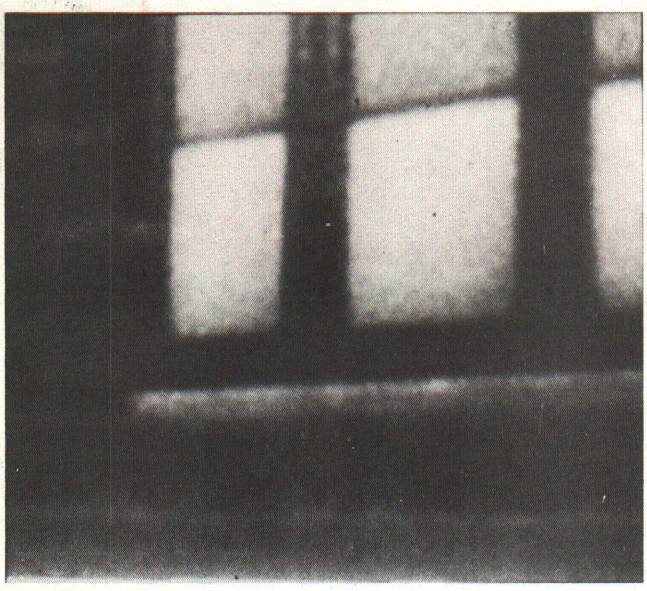
Picture 3. One place where considerable heat is lost is around windows and doors. The light strip around these windows shows where heat is escaping. This could be reduced by caulking around doors and windows and by being sure doors and windows fit tightly and are weatherstripped. Heat is also escaping from the exposed concrete foundation wall.

Picture 4. The light area under the window sill shows heat escaping. This can be stopped with caulking. The wall areas between and around the windows indicate that these windows fit well but there is considerable heat loss through the glass.

Picture 5. This picture shows the heat escaping around a poorly fitted mobile home door. The dark metal panel at the bottom of the door is better than the glass area for reducing heat loss. Weatherstripping around the door would cut heat loss.

Picture 6. The black areas on this wall show good insulation and storm windows with reduced window loss so they show up gray. Notice the chimney is warm.

The bright area in the foreground is caused by a wood burning stove in that corner. Without a fan circulating heat from the stove or ducts to lead the heat away the wall got warm and considerable heat loss occurred.



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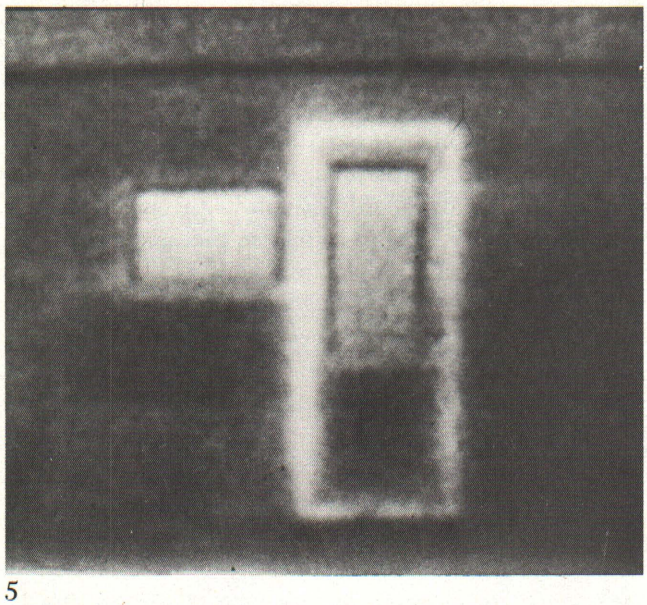

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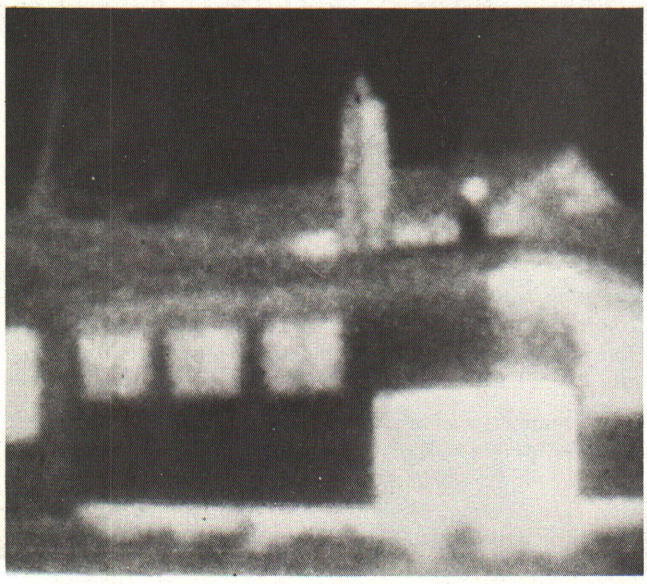

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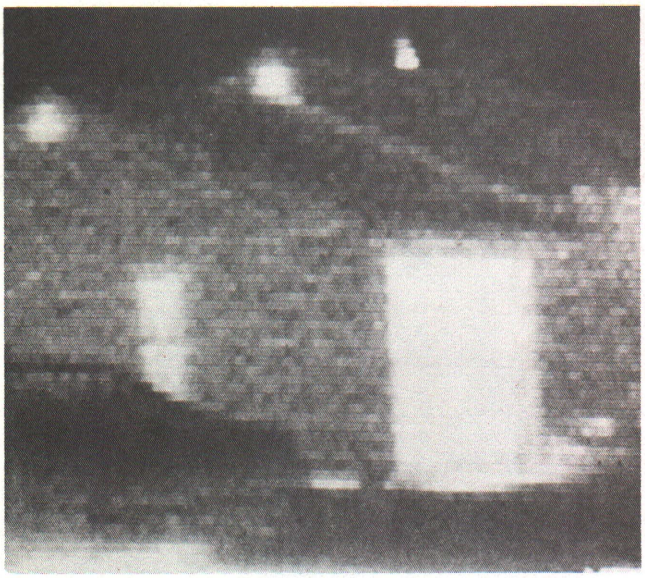
Picture 7. This is an uninsulated garage door in an attached garage that had heat ducts running through the garage. The car is parked alongside the house. Notice the heat coming out of the louvers in the gable ends and the hot chimney.



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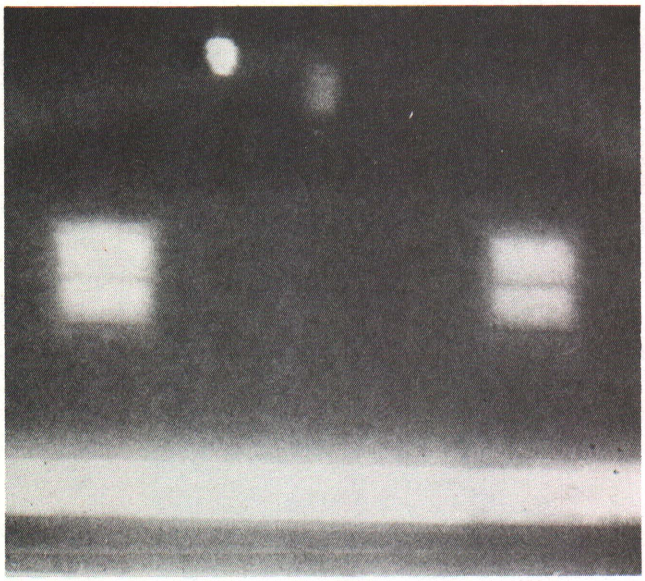
Picture 8. Notice the high heat loss from the exposed basement wall. The gable end shows black while the sides show up a bit lighter. The house has an insulated attic floor so very little heat was getting into the attic area. The louver in the gable does show some loss, however, and the chimney is hot.



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The following conclusions can be drawn:

1. Heat loss from exposed basement walls is high.
2. Many houses need to have the windows and doors caulked and weatherstripped.
3. Storm windows greatly reduce the heat loss through windows.
4. If you use a space heater, keep it well away from the wall and use a fan to circulate the heat. Put the heater near an inside wall if possible.
5. Storm doors with metal panels over part of the door are more effective than glass panels.
6. Chimneys give off considerable heat so keep combustible material like wood, clothing, papers, etc., away from chimneys.

A variety of simple weatherproofing steps, such as insulation, storm doors and windows, caulking and weatherstripping, however, will all contribute to cutting heat loss and keeping down heat bills.

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