

# NEW ENERGY OPTIONS FOR CURE PORCHES

Unique in American architecture, the cure cottages of Saranac Lake, New York, are a remnant of the village's history as a health resort. Trudeau Sanatorium flourished here from 1884 to 1954, pioneering in the study and treatment of tuberculosis. The village around it developed as a little city, providing a high level of products and services to patients, doctors and families. But many more patients came than could be accommodated by the Sanatorium. As the population multiplied, large rooming houses were built - cure cottages - where health seekers could rent bedrooms each with its own sleeping-out porch. Also "cure porches" were added to existing homes and rented to patients seeking rest and fresh air therapy for T.B.

In the process of fulfilling this health need a variety of porch designs emerged, a kind of vernacular architecture, which is coherent in spite of its diversity. Over a thousand buildings with these porches remain a vital part of our housing stock today and they present both problems and interesting opportunities. The purpose of this brochure is to offer design and technical information which will assist owners in achieving energy efficient use of the porches while preserving their original character.



# CURE PORCHES

Many concerns must be addressed in a successful cure porch renovation. Its present condition, exposure, ultimate use, relationship to other rooms, adjacent structures and surrounding vegetation are pertinent to the actual design and construction. Energy and historic preservation tax credits are also important considerations which can significantly reduce final project costs. Awareness of the historic certification requirements for commercial property can not only reduce costs but should encourage more sensitive architectural treatment with more attractive neighborhoods and higher property values for the community.

Federal and state energy tax credits are applicable to residential buildings which are retrofitted with insulation, glazing, caulking and weatherstripping. These credits do not apply to new construction. If a residential or commercial retrofit employs qualifying solar techniques, very large tax credits can reduce project costs by half.

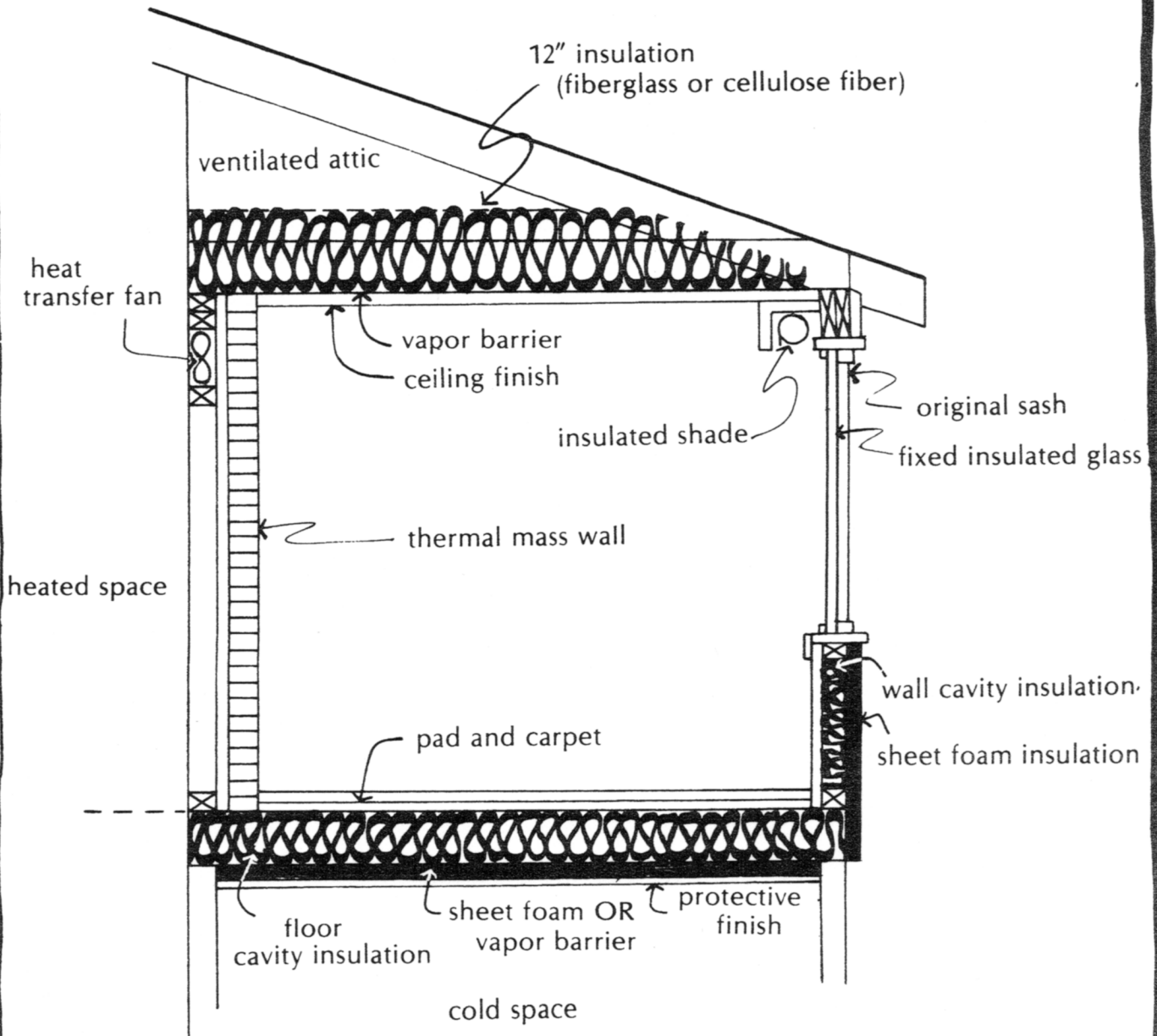
Inside, we have outlined three porch categories based on the major window exposure. A variety of uses is possible in each classification, and many of the same retrofit techniques are suggested. Here we are providing information specifically for cure porch improvements though the principles involved apply to most other energy retrofits. The restoration of cure porches to provide modern energy efficient space is accomplished largely with standard building methods. Preserving their historical integrity is an added goal which can only be achieved with sensitive, thoughtful rehabilitation. Design and use choices are obviously influenced by many factors, but within these guidelines most needs can be met without compromising aesthetics or thermal efficiency. Selection of insulation, windows, thermal drapes, room finishes, exterior siding, heat and solar controls is often made casually when more thoughtful selection could improve quality without increasing after-tax, life cycle costs.

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# SOUTH CURE PORCH

## Retrofit - Cross Section



# NORTH

North porch weatherization measures suggested here apply to all porch exposures and in this climate are crucial to achieving an energy efficient room. Triple or even quadruple glazing are a first priority, with fixed rather than movable windows preferred after ventilation needs are satisfied. Often stationary thermopane units can easily be installed inside the existing sash providing very tight window systems without altering the original 'divided light' appearance. If design constraints permit, a casement style unit is the best choice for new ventilating windows since they allow very low air infiltration.

Insulation should be carefully installed in all exterior walls, ceilings and floors; choices of insulation and glazing will, in large part, determine the cost of heating your porch. If possible a 1" or 2" closed cell sheet insulation such as R-max or Thermax should be included in any wall retrofit system. When used with cellulose fiber or fiberglass batts this material dramatically reduces heat loss due to air infiltration and adds approximately R-8 per inch to the composite wall system.

Most porch ceilings adjoin ventilated attic space, and typically the most cost-effective insulation choice is cellulose fiber or fiberglass batts. If possible at least 12" (R-40) should be installed with a polyethylene vapor barrier carefully applied on the warm side prior to fastening new finish material.

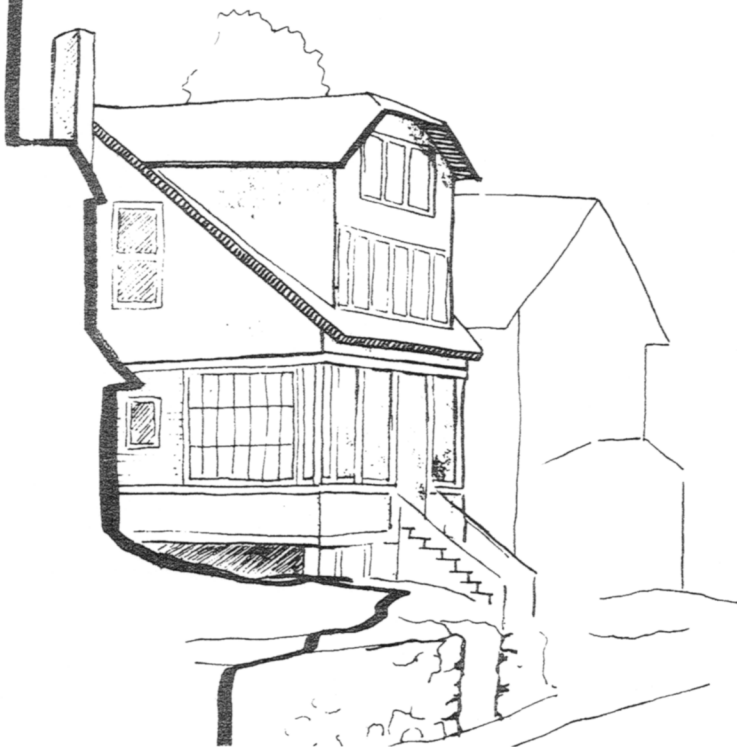
In summary thermal efficiency of a north porch can be increased only through weatherization and heating system improvements while in the remaining cases solar aspects may permit use of special techniques to collect and store energy.



# SOUTH

South-facing rooms with windows obviously have the best solar heating potential, but to maximize heating efficiency and solar gain the total design process is more complex than in the preceding cases. The normal design and weatherization plans must be integrated with a system for collection, storing and distribution of solar heat. If the overall residential project complies with federal and state passive solar energy design requirements, much of the renovation cost is eligible for a major tax credit.

When the porch is to be used as a winter solarium, a decision must be made whether to store solar heat in the porch room or transfer it into adjacent living space. In the first instance some type of "thermal mass" is installed to prevent room overheating during sunny periods by storing the excess solar gain. The mass storage system is designed to gradually release this heat as required over a long time period. The size, type and distribution of any thermal mass system occasionally requires complex judgements based on aesthetic, technical and cost issues. Frequently, though, rather simple solutions are possible such as refinishing of a common house wall with brick, stone or eutectic tile which then functions as a combination storage and finish material. Here again we see that it is useful and cost effective when a single architectural element can serve more than one purpose.



In the second case solar heat is transferred to adjacent rooms thus eliminating the need for a storage mass. This approach may be more expensive and generally is accomplished by passive air circulation through connecting doors and windows or by thermostat-controlled blower. Many storage and transfer mechanisms are possible, but the guiding principle should be solar design which will maximize use and storage of heat at the lowest acceptable temperature. This strategy always results in the most efficient solar (or conventional) heating system.

South glazing presents special problems which are not important with other wall exposures. It is acceptable to retrofit non-south windows with multiple layers of glass but south apertures intended for passive solar collection must be treated differently. If double or triple glazing is done, thin low-iron glass is desirable since it allows more solar penetration yet provides the same insulating value as standard glass.

Current research indicates that double glazing combined with an insulated shutters or curtain is the optimum choice. With this system it is necessary to manually open and close the movable insulation each morning and evening respectively during the heating season. Motorized systems, controlled by clock, are available but the cost is usually prohibitive.

Conventional back-up heating for porches should be carefully designed and the choice determined by anticipated use. If the porch will be occupied infrequently a zoned system is mandatory for good efficiency. For example, simply adding a radiator to a standard hot water heating loop with a thermostat control will provide considerable (wasted) heat to a usually empty space. A better selection would be resistance electric heaters on a separate board or unit heaters which are easily regulated and respond quickly.

Clearly, designing cost effective porch heating systems is a mix of aesthetic, technical and economic considerations. Spending money for extensive weatherization may not be justified for occasional occupancy; it may be much cheaper to simply purchase the limited energy required for heating. Our experience is that developing a consistent priority for the total structure is the only sensible approach to this type of energy-requiring investment.

# EAST & WEST

East and west exposures have some common elements which can be treated with similar retrofit approaches. Again first priority must be careful reglazing, insulation, caulking and vapor barriers; it is difficult to overemphasize the value of these procedures which apply to all retrofits. Meticulous care in weatherization details will repay many times its cost. Without proper weatherizing none of the solar approaches can be very successful.

When the major window faces east or west, control of summer solar heat gain may be a special problem. An attractive thermal curtain such as Window Quilt or Sun Saver chosen for these windows will function to prevent summer overheating, afford privacy and is very effective as night insulation during winter. And in most cases insulating curtains qualify for energy tax credits. A number of these thermal shading products are available but careful scrutiny of quality, air tightness, convenience and cost is advised.

In some instances east and west porches also have expanses of south or north glass. Multiple layers of glazing may be the least expensive, convenient retrofit for the north since shading is rarely required. On the south side insulating curtains or shutters coupled with a simple thermopane is probably the optimum system since several layers of glass would excessively reduce solar penetration in winter.

Choosing a material to serve multiple functions is often desirable and cost effective. The thermal curtains described above are one example. Carpeting of exterior floors is another case, in which a finish material can be selected that provides some additional thermal and sound insulation at no extra expense.

The question of when to insulate the "house" wall of an attached porch depends on amount of winter occupancy. If the porch is heated continuously, don't insulate the house wall; make all weatherization improvements at the outer porch walls and windows. If the porch is used only occasionally during the heating season, insulation is recommended to minimize heat loss from the house wall when the attached porch is cold. However, even if the porch is left in its original condition, house heating costs will be less than if it were removed.

If there is significant solar input some method of transferring or storing this heat should be devised (see south). In these cases where a "solar" porch is usually unoccupied the house wall should be insulated and a fan system installed to automatically circulate the solar heated air into the house. If the porch is usually vacant during the day and occupied later thermal mass located on the porch can be substituted to store daily solar gain for use during the evening. The total heat required for the house and porch combined is the same in both cases. It must be emphasized that even under optimum conditions some kind of back-up heating is required. Extended cloudy cold periods make it impossible to provide all of your porch heating via passive solar means.

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