

village view

by Andrea Leonard

Over the past few years every scrap of material regarding solar heating I've seen, I've read with care. Much of it has been negative and discouraging; some of it has been positive and given me hope.

A recent article in *Environment News*, the official report of the Regional Office of the Environmental Protection Agency, is worth sharing, in condensed form.

This spring the Monadnock Region of southwestern New Hampshire will host a unique event in building design and construction. The Goosebrook Solar Home, designed and built by Total Environment Action, Inc., will be completed and available for sale.

This house features advanced concepts in solar design, energy conservation and engineering, and is being traditionally financed by the Peterborough Savings Bank. It will be constructed by George Bogosian & Co., with relatively unskilled local labor.

The project has been chosen by HUD to receive a grant which will provide funds for the solar heating equipment, but the bank agreed to finance the house prior to the attainment of the grant; this indicates the bank believes it practical.

The Goosebrook home represents a major successful effort to provide solar homes with a competitive edge over conventional housing. Special workshops and seminars for builders, contractors, bankers, realtors, and other interested people are planned as construction proceeds.

For further information about the workshops, you may contact Total Environmental Action, Inc., Harrisville, New Hampshire 03450.

While the mortgage will be essentially the same as for any house of similar size in the region, energy conserving design, the use of solar energy for primary heat, and off-peak electricity as a back-up system will make the fuel bills less than one-fifth of traditional home heating bills.

The following features make this significant cost difference possible: compact design with judicious placement of doors and windows; extra insulation, including insulation of basement walls; triple-glazed windows on east, west and north; extensive sealing of construction joints resulting in less air leakage; passive solar heating collection from large quantities of glass on the south side, backed by six-foot tubes of water for heat storage; an inexpensive site-built solar trickle collector system; and a Megatherm off-peak back-up heating system purchased from the Public Service Company of New Hampshire.

The Megatherm system is significant for two reasons. For the first time such a back-up is being used in conjunction with solar features in a New Hampshire home; it will directly address the compatibility of solar buildings and electric utilities. This is one of the most complex and controversial topics in the burgeoning solar energy industry.

As a result, Goosebrook will use less than 20% of the energy required by most other three-bedroom houses in this part of the country. What little electricity it needs for heating from the utility company will be purchased only during "off-peak" hours and stored.

Most solar buildings require a full-sized back-up heating (or cooling) system for use when the sun has not shone for several days. Electricity is often the choice for this back-up, resulting in a solar building demanding electricity at the same time and in as large amounts as conventional buildings.

This large demand usually occurs when the utility company is experiencing the greatest need by most other customers, the "peak period." In New England this usually occurs during late winter afternoons.

If solar buildings require a lot of electricity at peak periods, then in spite of the substitution of solar heat, nothing has been achieved to relieve the pressure on utility companies to build additional, larger power plants to provide for all who need power at these times.

As far as the utility companies are concerned, the Megatherm system effectively transfers the building's energy demand to off-peak periods. Thus, Goosebrook will use electricity for space heating when the sun has not shone for several days, but will never require power at peak periods.

The electrical consumption will be monitored on an hourly basis by the Public Service Company of N.H. to develop an off-peak electric rate for solar buildings.

What is this Megatherm? An engineer describes it this way. "Basically, the Megatherm is nothing more than a large pressurized tank of water heated electrically to fairly high temperatures. The heated water serves as stored energy and automatically supplies heat when needed. Since the tank is heated only at night during the utility's off-peak hours, electricity is never used during the utility's peak hours between 4 and 8 p.m.

In addition to backing-up the solar heating system, it performs an especially important function from the point of view of the utility company supplying the power.

Each kilowatt of electrical generating and distribution capacity costs the utility between \$500 and \$1,000 to build. Most conventional electric homes require between 10 and 15 kilowatts during the peak period. The cost to the utility to build the facilities to supply that amount of electricity is then between \$5,000 and \$15,000.

Everyone benefits from the combined use of energy conservation, solar energy, and off-peak electricity. The homeowner benefits from fuel savings ranging (at today's fuel prices) from \$500 to \$1,000 per year; the utility, from being able to sell more electricity without having to build more power plants; and society as a whole, because of the consequent reduction in costs to the environment.

Goosebrook Solar House uses no electricity during the utility's peak-period, and the utility realizes this huge savings in capital expenditure.

If an intense, but very realistic and manageable, program of energy conservation, solar energy, and off-peak electricity were implemented throughout New England, the need for nuclear power plants could be eliminated completely according to Total Environmental Action, Inc.

This is the first clear explanation of the reasons many of us have felt utility companies were dragging their feet on implementation of solar heating systems.

Many of us have interpreted the apparent reluctance of utilities to join enthusiastically in the effort to harness the sun's energy as a reaction to a threat of income losses they might experience if solar heating becomes widespread.

This hasn't been the primary reason, it now appears; at least as far as the Public Service Company of New Hampshire is concerned, it's not a reason at all.

One does wonder whether it might be possible to establish similar mutual goals between power producers and environmentally-concerned consumers in this part of New England as well.