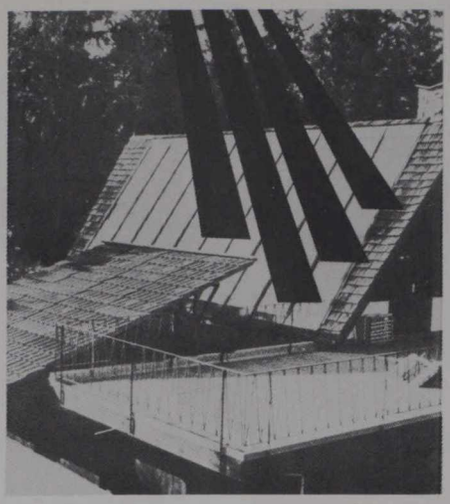
Cover shows artist's impression of solar energy being trapped in the roof of a sun house near Vancouver, see picture opposite for more details.

Canada Today



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Catching the sun in a cold climate

By J. M. Greene

Canada with its long cold winters does not seem the most likely place for experiments with solar energy. But with an eye to the future, when the world's expendable energy sources will be scarcer and may even dry up altogether, Canadians are making a serious study of the possibility of harnessing both sun and wind in the service of man. It rather dates the feeling which inspired the song about the "lucky ole sun with nothin' to do" — though taken literally, the song remains true. Sun power really is like Promethean fire stolen from the gods, for the ole sun knows nothin' about it and keeps on roaming about heaven regardless. That of course is its attraction: the source, unlike other energy sources, is inexhaustible.

This is the main point emphasized by Eric Hoffmann, an electrical engineer whose pioneer sun house in Vancouver has done more than any of the scientists' speeches and papers to promote the idea of solar energy in Canada and persuade Government and industry to take it seriously.

Built in 1970 to his own design, incorporating a solar system he constructed himself, Mr. Hoffmann's sun house is primitive by today's standards. But it works perfectly well and records kept since it went into operation are solid evidence of the fact that such a system can go a long way towards replacing other energy sources for domestic heating.

Expensive start

To set up a solar energy system involves high capital expenditure, as Hoffmann emphasized in his report *Four years in a solar house*, delivered last June to a large conference on "The Potential of Solar Energy for Canada." The cost of his system in 1970, not including labour, was approximately C$2,000. But he was able to keep costs down by doing the work himself. To construct a similar system today, using more sophisticated commercial components and including installation labour, would cost approximately C$5,000. But once that is done, the money saving begins — and there is no end to it.

Mr. Hoffmann reported the value of heat supplied by the solar collector over the year, deduced by comparison with the cost of oil or electrical heat, as C$200 for house heat and C$100 for swimming pool heat (for which there is a special collector). He commented: "Although at today's fuel cost solar heating does not appear to be very economical, it is believed that energy costs will increase more rapidly than the cost of other products and thus change the economics in favour of solar heating."

His records show that the solar system supplied 87 per cent of the heating requirements from March to October and 62 per cent of energy needs for the entire year. He said: "A subjective measure of performance is the observation that almost 100 per cent of the heating required is supplied by the solar system until the middle of October and from the beginning of March. In November, December and January there is usually a heavy cloud cover in Vancouver which is detrimental to solar heating. In February we have a varying amount of sunshine and in a good year the heat supplied by the solar system will be very significant."

Stored in water

Mr. Hoffmann sited and designed his house specifically for solar heating. By using an A - frame at an angle of 58 degrees from the horizontal, he covered the south facing roof with 460 square feet of collector. The heat from the collector is stored in water tanks in an insulated basement room. To heat the house, the door to this room is simply left open. The floor area heated in this way is 1,500 square feet.

The collector itself is double glazed: the outer glazing is double strength window glass and the inner glazing is single strength. The heat absorbing surface is copper sheet 0·005 inches thick. Water is carried through $\frac{1}{4}$ inch tubes which are soldered along the entire length to the copper sheet. The whole assembly is painted with non-selective dull black paint. A wooden frame supports glass and collector panel. The collector is weathertight and replaces roof shingles, thus saving the cost of roofing.

Perhaps the most annoying thing about solar energy is that this gift of fuel from heaven, as so often happens with free gifts, is distributed most generously exactly in those areas where the need is least — namely, the warm countries. Because of course if you have a lot of sun to warm you, you don't want central heating — and so far that is its main use. Conversely, in a cold country like Canada the elements do their best to snatch precious warmth away as fast as you can collect it. This means that in addition to costly equipment for trapping the often sparsely distributed sun, you need a lot of costly insulation to make sure the warmth doesn't escape.