

## **A Simple but effective solar remodel 1984**

David A. Bainbridge

Dan P. was faced with a common problem, a drafty, cold in winter, home in Berkeley. I developed a design with him to add a sunspace with thermal mass to provide improved comfort and energy savings. The sunspace replaced a dilapidated open porch with an attractive solar room that provides much of the winter heating for the house, and also added another room to the house. In addition to these bigger changes insulation was added where possible and cracks and seams were sealed and weatherstripped.

The 200 square feet of south facing windows capture 200,000 BTU's of solar energy on a sunny day. The stairs were moved over for better sun exposure on the drums full of water that provided the thermal mass. This warmth is transferred to the house through the old front door and windows. In addition to the solar heating, the sunspace also reduces heat loss, particularly from wind; adds privacy, and makes the house quieter and more pleasant.

As a contractor Dan had all the skills and tools needed for the work. The cost of this remodel was only \$800 for materials. After tax credits, it cost only about \$500. Energy savings were expected to be about \$200 per year, so the remodel will pay for itself in less than three years at current energy prices. In 10 or 15 years it will be saving \$500-\$700 per year, and over its lifetime it may save almost \$50,000.

PG&E's Zero Interest Loans may make this type of project possible even if your budget is very tight. If you aren't able to afford a contractor you may be able to do this work by yourself, under the supervision of an experienced local builder. A simple remodel like this solar porch might take a week or two, while a simpler porch to-sunspace conversion could be done more quickly.

A solar water heater may also be a good investment. The simplest type of system is an integral or batch type heater, consisting of a glass-lined water heater tank set in an insulated box with a south-facing sun collecting window. These heaters provide solar hot water for less than any other type of solar system. They are also the most reliable, as there is no complex equipment to break down. Dan's remodel included a three tank integral solar water heater. This was built using primarily recycled materials for about \$300 before tax credits, and \$135 after tax credits. It reduces gas use for water heating enough to save \$120 a year, and paid for itself in slightly over a year. It provides 30-40% of the hot water used during the year, with water temperatures reaching 140°F in the afternoon.

These two solar improvements have not only reduced energy and costs, but they have also considerably improved the comfort and livability of the house. These benefits are often

overlooked but they are the frosting on the energy saving cake. Energy savings are good, but health and comfort are even more valuable.

David Bainbridge is a writer and solar consultant. He helped develop the City of Davis Energy Program, was praised for his work on the passive solar sections of the State Solar Tax Credit. He is the author of five books on solar design and construction. He has taught solar design classes in California and Oregon, and has been involved in residential and commercial solar projects in the western US.

*Further information:*

Bainbridge, D. A. 1981. *Integral Passive Solar Water Heaters*. Passive Solar Institute, Davis, CA. 99 p.

Bainbridge, D. A. 1980. *The Second Passive Solar Catalog-A Mini-Encyclopedia*. Passive Solar Institute, Davis, CA. 115 p. Honoree San Francisco Book Festival.

Corbett, J., D. A. Bainbridge and J. Hofacre. 1979. *Village Homes' Solar House Designs*. Rodale Press, Emmaus, PA. 188 p



Before



During



Almost done



3 Tank Integral Solar Water Heater



### Plambeck remodel 1984

