

*A solar energy project in a model town exemplifies a special area of NASA effort—service to communities through demonstrations of advantageous technology*

# A New Look For Greenbelt

*The solar panels on the roof of this multi-unit building at Greenbelt, Maryland provide almost half of the heating and domestic hot water needs of the four resident families. The solar system was designed by NASA's Goddard Space Flight Center as a community aid project.*



Greenbelt, Maryland, 12 miles from the nation's capital, is an efficiently planned model town and most of its 1600 homes are almost identical in appearance. Four of them, however, stand out from their neighbors; they have distinctive blue glass rooftop superstructures made up of a series of solar collectors. They are part of a NASA community aid program, a joint energy research project involving the Greenbelt housing cooperative and NASA's Goddard Space Flight Center, located near the community.

Built in 1935, Greenbelt is one of three government-planned communities

of President Franklin D. Roosevelt's first administration; the others are Greendale, Wisconsin and Greenhills, Ohio. The government built the towns to make available low-cost housing, provide employment for workers on relief in the Great Depression era, and to establish models designed to encourage construction of similar developments by private industry. In 1952, the residents of Greenbelt formed a non-profit cooperative called Greenbelt Homes, Inc., which bought the dwellings, facilities and a large part of the land from the government. The homes are individually owned but collectively maintained by the co-op, with each owner paying a prorated share of utility and maintenance costs.

Greenbelt residents are mostly in the low and medium income brackets, and one of every three families lives on a fixed retirement income. For that reason, the sharp escalation of fuel oil prices that began in 1973 imposed particular hardship on the co-op community. So Greenbelt Homes' management asked its NASA neighbor, Goddard Space Flight Center, for assistance in setting up a solar energy research project. The idea was to conduct a small scale demonstration to show what savings could be realized by solar heating Greenbelt homes, with an eye toward possible future expansion of solar energy systems as a means of combating rising fuel costs.

Goddard undertook the project as part of the federal government's effort to research and demonstrate ways of conserving energy. The Center was well qualified for the assignment, having acquired extensive expertise in designing thermal control systems for satellites, which must maintain stable temperatures for successful operation.

Goddard selected for the experiment a flat-roofed building containing four separate homes heated by a common oil-fueled hot water heating system. Goddard designed the solar array, controls and instrumentation and procured commercially-available solar heating equipment; construction work was handled by Greenbelt Homes' maintenance crew.

The research structure was insulated and equipped with solar collectors mounted at pitched angles on the roof. Each collector is a glass-covered metal container housing a network of small water pipes. The pipes run to and from a large hot water storage tank



beneath the building. In operation, water is directed through the solar collectors, heated by the sun and routed back to the storage tank, from which it is pumped into the building's regular hot water heating system as needed. During periods when the sun is obscured by clouds, the existing oil furnace automatically takes over the heating job.

To study the system's effectiveness, Goddard instrumented the building to determine oil consumption, water usage and temperatures. For comparison purposes, one other Greenbelt structure without solar collectors was similarly instrumented.

Goddard engineers recorded information through two winter-summer cycles and are now analyzing the data. Preliminary estimates indicate that the solar collectors save between 40 and 50 percent of the oil needed to meet home heating and domestic hot water needs. Based on a mortgage interest rate of eight and one-half percent and a fuel price escalation of 10 percent per year, the fuel savings would repay the cost of

installation in about 25 years. Should fuel costs escalate more rapidly or should systems installations become cheaper—both are likely considerations—the cost benefit of solar energy systems will increase and reduce the investment recovery time.

The Greenbelt project is an example of NASA's community services effort, in which NASA provides technological assistance to communities, state and local governments, medical institutions and other organizations. Generally, this work involves demonstrations of how the application of new technology can help solve major problems or produce better ways of meeting public needs. In this special area of technology utilization, some product spinoff may evolve from the technology applied, but product commercialization is not the primary aim; the intent is to pave the way for community-sponsored application of beneficial technology. The following pages contain other examples of NASA's participation in programs of this type.

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*Shown during installation, the solar panels encase a network of water pipes, visible in left foreground. Water pumped through the panels is heated by the sun, then stored in an insulated underground tank until needed for home heating or hot water.*