

Albuquerque Solar Energy System Cuts Costs

U.P. - A solar energy system cut heating costs nearly 80 per cent over most of two winters in a specially designed office building in Albuquerque, N.M.

A professor of agricultural engineering at The Pennsylvania State University which is developing a computer model and then a design handbook for solar energy/heat pump-assisted heating systems, has reported.

"Our prime objective," says Dr. Stanley F. Gilman, "is to provide design data, allowing widespread use of solar energy for heating and cooling commercial and industrial buildings. The sun's energy would provide at least half of the heating needs."

The Albuquerque findings, he cautions, are not directly translatable to other buildings in other vicinities. Nor can a meaningful comparison be made between heating a home and an office building, since the latter has considerable internal heat sources, such as lighting.

Many factors determine whether a solar system should be used for a specific type of building in a given location: the outdoor temperature and its daily range; the percentage of warm versus cold days; the amount of sunshine potentially available; and local energy costs, today and for the next 20 years.

The picture is complicated, says Dr. Gilman, because while, for instance, the mean temperature range in Albuquerque is only slightly higher than in areas of Pennsylvania -- 45 degrees F. for Albuquerque, 42 for Philadelphia and 38 for

Pittsburgh -- overall, Albuquerque days are warmer and sunnier.

The Albuquerque winter temperature may range from 25 degrees F at night to 55 in the daytime, and 80 per cent of the winter daytime hours are sunny in Albuquerque, versus an average of only 50 per cent in Pennsylvania. And, says Dr. Gilman, this figure does not take into account the reduced sunlight caused by the smog typical of Eastern metropolitan areas.

Dr. Gilman and his colleagues -- E.R. McLaughlin, professor of engineering research at Penn State and M. W. Wildin, professor of mechanical engineering at the University of New Mexico -- recently reported their results at a National Forum on Solar Cooling and Heating in Miami Beach, Fla., and at a meeting in Chicago of the American Society of Heating, Refrigerating and Air-Conditioning Engineers.

Although they are still computing and tabulating the wealth of data gleaned from mid December to Mar. 21 of the 1974-75 and 1975-76 heating seasons, Dr. Gilman says solar energy systems can "significantly reduce consumption of the fossil fuels we are quickly depleting."

The research was conducted in the 20-year-old Solar Building, the world's first solar-heated commercial building, where the system was used for a few years in the late 1950s and later deactivated because fossil fuels were more economical.

With funding from the National Science Foundation, and now under contract to the U.S. Energy Research and Development Administration (ERDA), Dr. Gilman and his colleagues refurbished and modernized the existing system.

Solar rays are harvested by a 750-square-foot collector in the form of 55 aluminum sheet panels mounted behind the windows of one wall of the one-story building. The wall faces south, and is slanted at a 60-degree angle.

An ethylene glycol/water solution circulates through the collector absorbing the energy and storing it in one of three tanks. When the temperature in any tank becomes high enough to heat the building (85 degrees F) the water is pumped to a hot water coil, and a fan and duct system delivers the heat.

"The uniqueness of the system is in the 'marrying' of the solar collector and the heat pump," says Dr. Gilman. "When the water storage temperature falls below 85 degrees F. and is no longer able to supply useful heat, the water-to-water heat pump comes on. The pump very efficiently 'lifts' the water's temperature to a useful 110 to 120 degrees F.

"In turn, the temperature of the stored water markedly increases the efficiency of the solar collector. As sunny, mild days build up the temperature of the stored water, less electricity is needed and the heat pump operates even more efficiently."

The heat pump is an ordinary air conditioning unit that cools in summer and heats in winter, says Dr. Gilman. It is the kind of unit used all over the country because it is an energy-saving device. For some companies, he adds, heat pump sales have doubled and tripled this past year.

Dr. Gilman and his associates did their computations long distance, thanks to a computer system which gathered more than eight million pieces of data and transmitted them via telephone lines to Penn State.

Although not all the data have been analyzed, Dr. Gilman says it is clear already that the system is energy efficient.

During each of the three-and-a-half month winter periods, the heat pump required only 5,288 kilowatt hours of electricity, for a total heating cost of \$158. Dr. Gilman estimates it would cost about \$240 to heat the Albuquerque building for an entire winter.

To electrically heat, without the solar system, an equivalent 5,000 square feet in Central Pennsylvania, he adds, would cost approximately four-and-a-half times as much.

Of Interest Cont. From 3

Juniors at the beginning of the Fall Term, 1976. The test results are being analyzed as part of the Committee on Remediation's study of the need for a remediation program at The Capitol Campus. Individual test scores have been kept and will remain confidential.

Having obtained the Faculty Council's approval, the Committee will inform interested students of their scores. Students who obtain their scores will be asked if they desire remedial help. The number of students who desire such help will be reported to the Faculty Council.

Scores may be obtained from Mr. John Joseph in Room W-205 between 10:00 a.m. and 12:00 noon, Monday-Friday. Mr. Joseph will discuss the results with students who wish to do so. The student identification card must be

presented to obtain the scores.

Negligence

There were several omissions in last week's article on the Charity Basketball game. To correct this negligence, the Reader would like to apologize and thank Cindy Stevens and Beth Kopas for their efforts and Ron Melchiorre for organizing the C.C. Staff and Faculty team.

Spring Jam

All interested musicians are invited to participate in the Spring Jam, scheduled for May 5 at 8:00 p.m. in the Student Center. Three sets are being planned: rock-n-roll, acoustic, and jazz. Admission is \$1.00. The P.A. system will be provided by Disco-to-Go. For further information, call 944-0591.

1977 P.S.P.E. Bathtub Race Coming Soon

The Annual P.S.P.E. Bathtub Race will be held on Wednesday, May 11, 1977 at 3:00 P.M. There is an entry fee of \$5.00 per tub, and the entry deadline is May 4, 1977. First prize is 1/2 keg of beer and a trophy; second is 1/4 keg; third is two cases; fourth is one case. For further information, call Bill Ayres, 944-5134.

Rules

The tub is to be constructed

of standard cast-iron and also be of standard size and shape. No holes are allowed to be drilled into the tub in order to decrease the weight or any other such method employed to decrease the weight such as acid dipping. The bathtub is also not allowed to be powered by any energy source other than that of the team as described below. The steering system and the number of

wheels used is irrelevant.

Team

The team is to consist of eleven persons and no more. Of the eleven, ten of which will propel the tub, there will be one who is designated as the driver. The driver must navigate the tub and at no time is he allowed to leave the tub. The ten men or women, who will be propelling the craft, may be strategically located throughout the course,

because at no time may there be anymore than four persons pushing the tub.

Course Rules

The tub must follow the course layed out and no other interpretation of the course will win. The course will take place on the Capitol Campus and start at the Student Center and end at the Main Building

parking lot. The course is estimated to be 2 miles in length.

Sportsmanship attitudes should be held by all. Any interference with another tub will cause a penalty of substantial nature. Interference can be termed as cutting off the competition, interfering with another tub's progress or any other such forms of cheating.

APPLICATION FORM FOR

THE 1977 ANNUAL BATHTUB RACE

Sponsored by the Student Chapter of the Pennsylvania Society of Professional Engineers

NAME OF TEAM..... CHAIRMAN..... PHONE.....

MEMBERS OF THE TEAM INCLUDING CHAIRMAN:

1..... 4..... 7..... 10.....

2..... 5..... 8.....

3..... 6..... 9.....

ENTRANCE FEE
\$5.00

WHERE WAS YOUR BATHTUB OBTAINED?.....

SIGNATURE OF CHAIRMAN X