Solar energy heats hen house

COLLEGE PARK, MD — Researchers at the University of Maryland have built what they believe is the first solar energy installation for heating chicken brooder houses.

"This should not be considered a practical brooding set up," says Kenneth Felton, the agricultural engineer in charge of the project. "We are looking for data that can answer some questions so that we can make recommendations — either for or against commercial installations."

"This project is not for today, it is for tomorrow," said Jarvis Cain, associate professor in the Department of Agricultural and Resource Economics. "The propane gas used to heat poultry houses comes from natural gas, and that is becoming one of our most limited energy resources. Whether we like it or not, at current usage rates, in 15 years there just won't be much natural gas left. We must have a workable alternative and we are beginning to plan for it now instead of when there are severe limitations on supplies of petroleum products."

"We know that if this system were installed on all the brooder houses in the U. S. it could replace 60 to 70 percent of the heat needed." says James Merkel, agricultural engineer. "This would be the equivalent of about 90 million gallons of propane gas, worth about 26 million dollars on today's market."

The University of Maryland installation near Salisbury on Maryland's eastern shore, is strictly a prototype model. The solar collector — made of easily available building materials — was constructed in sections in the university's agricultural engineering shop and transported to the eastern shore for final assembly. The collector is 32 feet by 16 feet and is free-standing. It could be constructed as part of the building in a new chicken house, Felton explained, but since this project uses a broiler house already in existence, the collector was built to stand alone.

Looking somewhat like a giant mirror, the collector tilts at 52 degrees from the horizontal to take in as much winter sun as possible. In this model, the collector is situated 15 degrees west of due south to take advantage of one hour more of sunlight in the afternoon — because most of the mornings on Maryland's lower eastern shore are hazy.

Felton explained that the collector uses two layers of double strength window pane separated by ½ inch air space. Under this glass, which is solely for insulation purposes, there is approximately one inch of air space above a layer of aluminum roofing. This aluminum roofing is painted black on the upper side to absorb more of the rays of the sun. Underneath the aluminum roofing is a two inch air duct backed up by a masonite board and five inches of fiberglass insulation; the assembly is held together by plywood.

A 12" x 12" duct made of ⅜" plywood on the outside with a one inch polyurethane insulation laminated to a vinyl coating carries the heated air from underneath the aluminum roofing into the heat exchanger inside the building.

This heat exchanger works just the opposite of your car radiator, Felton explains. A fan draws the heated air over the coils and circulating water picks up the heat from the air.

This heated water then goes into a 1300 gallon insulated tank where it is stored until needed in the chicken house. The heated water is circulated through a standard convector in the chicken pen when it is called for by a thermostat.

The equipment does not run continually. It takes about a 10 degree temperature differential between the air and the water to trigger the equipment into action. When the sun goes down, or when the air temperature gets to within five degrees of the water temperature, the equipment shuts down.

Felton explains that it is not only the sun's heat that is being collected, but also the sun's radiation that creates the high temperatures. For this reason, some radiation is collected each day even when the sky is overcast. However, very little heat is collected on extremely cloudy days. That is the reason for the 1300 gallon tank which will store enough water to heat the chicken pen for about three days in case of bad weather.

"Right now, our solar collector is only partly operational. But it's a start." Felton explains, and emphasizes that at this stage it is purely a supplemental heating system. There is still a propane gas heater in the brooder house.

Lewis Carr, the agricultural engineer on the site who is in charge of the day-to-day conduct of the project and Tom Carter, poultry scientist, are responsible for collections and analysis of the physiological data on the chickens themselves. "We are using the conventional warm-room brooding technique with 1,000 broilers per pen." Thus far, there has been no difference with this heating system and with conventional propane heat since the temperature is thermostatically controlled and ventilation and humidity are controlled also.

Carr said the solar heating unit is actually in use now but limited data are being collected on this first flock since adjustments are still being made in the system. "The real test," he said, "will come next winter."

All the researchers agree that this installation is strictly an experimental one; however, since the supply of fossil fuel is growing shorter, the use of solar energy to heat poultry houses, green houses, hog farrowing pens, and grain dryers may come within the next few years. The University researchers want to be ready with some reliable data.

Van Hocker promoted

DEC International, Inc. has announced the appointment of Van G. Hocker, Carlisle, Pennsylvania, as midwest regional manager for its Dairy Equipment Company Division.

Hocker, who had served as zone manager for the company since 1972, will be responsible for coordination of dealer sales and service for Bou-Matic milking systems in a six state area.

A native of Harrisburg, Pennsylvania, Hocker owned and operated a dairy farm near Carlisle and held several sales management positions with John Deere Company.

DEC International, Inc., based in Madison, Wis., is a multi-national manufacturer of dairy farm, liquid transport and food processing equipment; custom stainless products; residential and commercial heating equipment; store fixtures and liquor dispensers; and cheese, butter and dried whey products.