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A new model for pushing solar hot water

Most residential water heaters in the US are electric. Now a solar hot water service in Florida helps to promote solar water heaters. What is interesting about the service is that a local power company is involved.

In times of rising energy prices, people's ears prick up if you tell them they can pay a fixed hot water bill for 20 years. A few weeks ago, local power company Lakeland Electric of Lakeland, Florida, started a new programme which promises just that. The customer gets a complete solar water heater, including installation and service, for US\$ 35.95 a month with a 20-year price guarantee and no additional fees. SUN & WIND ENERGY wanted to find out exactly what was behind the programme and whether the model could encourage the large-scale spread of solar thermal systems.

What Lakeland Electric announced on its website seems plain and simple: all of the local company's customers who own their homes and have space on a south-facing roof are qualified for the hot water service. Once a service technician views the premises and gives the O.K., Regenesis Solar Power, a California-based company, installs the solar thermal system in a single day. Customers pay the monthly fixed price along with their electric bill, but in return save electricity costs. Before we calculated whether all this was even worthwhile for customers, we first asked what kind of system the customer gets.

Solar coverage of 80 % is realistic

Project developer Regenesis Solar Power, who came up with the concept and is implementing it for the first time in partnership with Lakeland Electric, was very open to the inquiry from SUN & WIND ENERGY. The system currently on offer is an open-loop differential-controlled active solar thermal system. It consists of a 3.7 m² (40 square foot) flat plate collector and a 300 litre (80 gallon) solar tank which contains a single 4,500 W electric heating element. The collector is supplied by Alternate Energy Technologies (AET) of Jacksonville, Florida. The tank comes from Rheem, a manufacturer based in Montgomery, Alabama. Freeze protection is accomplished by using recirculation, a freeze valve and a positively closing motorized valve, instead of a spring check valve.

The new solar tank with electric backup replaces the existing water heater, which in 95 % of residential buildings in Lakeland is electric. The system is not designed to be used in combination with existing water heaters. The tank, however, contains an electric heating element which, as a backup, makes sure that the water reaches the required temperature, if necessary. Regenesis employs only trained installation and maintenance professionals. The installers, or at least the technicians that do the final inspection, are certified for solar thermal by the North American Board of Certified Energy Practitioners (NABCEP).

It has been sufficiently well established that the state of Florida, with its stable climate conditions and

To take advantage of the solar hot water service, all homeowners in Lakeland, Florida, need is a bit of space on a south-facing roof.

Photos (3): Regenesis



long hours of sunlight, offers excellent conditions for the use of solar energy. But what does that mean in terms of solar energy coverage? In principle, 90 % coverage is possible, says Regenesis, but that would require heating the water just to the state required set point temperature for water heaters. The set point is 49 °C (121 °F). Regenesis assumes, however, that most homeowners set hot water temperature a bit higher than the legal minimum. But even at a water temperature of 53 °C (128 °F), customers can achieve solar coverage of 80 %, according to Regenesis. Despite the apparently low set temperature, legionnaire's disease is not a problem because, "the circulation of the water through the collector daily mixes the water at the bottom of the tank and heats the water to temperatures well above 60 °C," explains Dell Jones, Vice President Renewable Project Development at Regenesis.

An attractive alternative for power company customers

And now to the question of whether the programme is worthwhile to homeowners. The monthly payment is locked in, but how much power do customers actually save? Or to put it another way, how much power is required for the backup heating element in the hot water tank?

This is spelled out clearly on the programme website. The system is designed for a household with

four or more people. This is because the system requires a certain hot water demand in order to pay off. In response to our request, Dell Jones guided us through the calculation for a family of four. At an energy demand for hot water of 350 kWh a month, the bill for a purely electric-powered hot water heater is currently US\$ 43.86, or 12.53 cents per kWh. The solar thermal system covers 80 % of demand at a temperature of 53 °C, which puts the remaining 20 % of the heating demand at a cost of US\$ 8.77. The money saved on electricity – some US\$ 35 – completely covers the cost of the solar service in this case.

But participation in the programme gets really interesting when customers take the long view. After all, costs for the system including all of the service, remain constant for 20 years, whereas electricity prices will certainly rise. If a household has to replace their water heater anyway, the savings really start to mount. Homeowners save the additional one-off costs of replacing the system.

Some homeowners want to know what happens if they decide to sell their homes. If they do, they incur no additional costs. To the contrary; if they move to a new home in Lakeland's coverage area and decide to continue participating in the programme in their new home, the same conditions will apply as applied before the move. The purchaser of the house



Participants in the programme get a standard system, comprising a 300 litre solar tank and a 3.7 m² flat plate collector. The system is designed for a family of four.



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will also have the opportunity to participate in the programme under the existing conditions. If the buyer decides against the programme, there are no additional costs. In that case, the new owner gets a standard, conventional heating tank for replacement. Only families cancelling the programme without moving are charged US\$ 250 for early termination equipment removal. Otherwise, the solar hot water heater becomes the property of the homeowner following the 20-year service period.

An opportunity for the solar thermal industry?

For power company customers, the programme looks like a good deal, but we wanted to know whether it pays for the project partners. Let's sum up who is responsible for what: Regenesis installs the system and is responsible for all maintenance. Lakeland Electric bills the customers for the solar service through its billing system. But who finances the solar service?

Regenesis installs the system, which remains the property of the company during the service period at no cost to the utility or the customer. As Regenesis owns the equipment, the company takes the federal tax credit of 30 % and the associated depreciation, which is based on multi-year calculations and thus is not a fixed value. Regenesis has a long-term Solar Thermal Energy Purchase Agreement with the utility and is paid solar hot water service fees for all the in-service systems on a monthly basis. For the capital requirements of the programme, Regenesis established agreements with financial institutions. Every

Only qualified professionals install the solar thermal systems.

system pays off for the company some five to six years after installation, explains Antony Milner, Vice President Marketing at Regenesis.

In future, Regenesis wants to spread this business model, which it developed on its own, with other partners. Currently the company is in discussions with 15 other utilities and municipalities in Florida and beyond. But can the solar industry as a whole learn something from this model? At the very least, it offers municipal governments the opportunity to significantly develop the share of renewables in their communities while creating local jobs at the same time. Regenesis says that the model is getting a lot of attention, especially because it pays off. The technical data support this: a collector area of 3.7 m² for 2.5 kW thermal capacity and a thermal output of some 3,500 kWh a year is plain to see.

Of course, the calculation has to be adjusted for areas with lower insolation and fewer hours of sunlight, and the system might have to be designed differently. Nevertheless, wherever government incentives through tax credits and depreciation are adequate – and possibly strengthened through municipal subsidies – the model could be implemented with a bit of goodwill.

Ultimately, for homeowners it is a very attractive model – fixed costs for 20 years. Savings on the electric bill are also easily calculated. And one thing is certain: electricity is not getting any cheaper.

Stefan Trojek

Further information:

Solar for Lakeland: www.solarlakeland.com
Regenesis Solar Power: www.regensp.com

