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GFX™ Heat-Xchanger

Application Note

PV-Compatible All-Electric Home

Location: 60 Herbert Circle, Patchogue, NY 11772
Current Balanced Billing Amount: $252/mo ($3024/yr)
Special Features: A 20-year old tankless-coil, oil-fired, hydronic heating system was converted in 1995 to an electric-hydronic heating system with a GFX drainwater heat recovery system to boost the shower-capacity of the 15-kW tankless-electric water heater. The house has central AC, and the combined space & water heating is illustrated @ http://gfxtechnology.com/combi.html. (Exhibit A)
Advantages: Site energy savings reduced by 50-60 mmBtu (14.5-17.5 MWh), no annual tune-up required; water-heating efficiency always near 100%; negligible standby loss --- **100% PV compatible for added savings**.

History

Baseline: Last Oil/Electric Year: May 6, 1994 to May 8, 1995

Baseline Energy Use: 700 gallons of oil (28.7MWh-thermal); Electricity: 8,658 kWh
Baseline Energy Costs: Oil **$869** @ ~$1.15/gal + Maintenance; Electricity: **$1,528 (17.10¢/kWh)**
Total: **$2,397;** Monthly Average: **$200**

First All- Electric Year: May 8, 1995 to May 7, 1996

Energy Use: 22,762 kWh
Energy Costs: $2,989 (13.10¢/kWh Avg. from LILCO before LIPA became its DBA)
Monthly Average: $249

First LIPA Year: May 11, 1999 to May 11, 2000

Energy Use: 20,347 kWh
Energy Costs: $2,233 (10.03¢/kWh Avg. from LIPA)
Monthly Average: $186

Recent Balanced Billing Budget Amounts

1. **05/08/08: $252 ($3024/yr)**
2. **01/09/08: $283**
3. **11/07/07: $228**
4. **06/07/07: $276**
5. **01/13/06: $313 ($3756/yr)**

Estimated Costs of Baseline System With $3.35/gal Oil Price Increase

Today's Oil & Electric Costs: Oil: $3,214 @ $4.50/gal + Maintenance; Electricity: $1,787 (~20¢/kWh)
Total: **$5001** compared to **$3,024**
All Electric Savings: **$1,977**
Monthly Costs: **$417** compared to $252
All Electric Monthly Savings: **$165**

HEATING, COOLING & VENTILATION

Projects for Comfort and Value

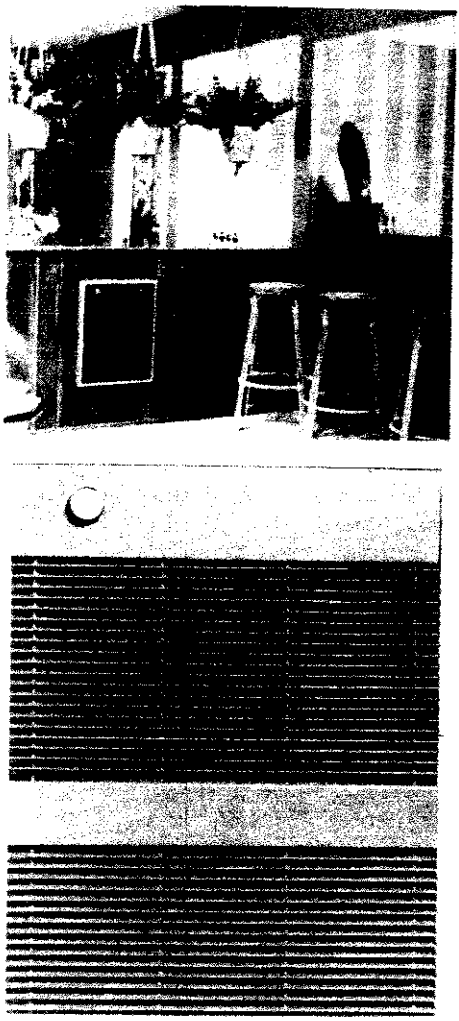
Jay Hedden

(1982)

Excerpts from
pp. 12 & 13 attached.

CREATIVE HOMEOWNER PRESS®

A DIVISION OF FEDERAL MARKETING CORPORATION,
24 PARK WAY, UPPER SADDLE RIVER, NEW JERSEY 07458



Electrical resistance heating is the most expensive to operate, but for room additions, basements and other rooms where the existing furnace does not supply adequate heat, it can be a workable solution.

of a house and the lightweight baseboard units are quickly connected. No flue or chimney is required with electric heating, and each unit in a room can be turned on or off, or set at various temperatures. It is the most flexible of all heating systems. There is no getting around the high cost of running such a system, however, which is why it is not very popular.

Resistance Coils This is the simplest electrical heat supply system. Its coils are much like those in a range top. The wire glows red hot, but it is covered with insulation as for the range-top units.

Antifreeze System Less expensive to power are individual baseboard units that contain a tank of antifreeze that is heated by the resistance wire. When the water/antifreeze solution reaches a preset temperature, a thermostat shuts off

the electricity. Heat flows from the liquid until its temperature drops below the thermostat setting, when the heater again turns on. This kind of heater uses about half the electricity of a straight resistance heater, but the first cost is about twice that of a comparable straight resistance unit. In the long run, such a heater is more economical.

Local Electrical Heaters Other electrical heaters utilize the infrared spectrum to heat people, furniture, rugs and the like, but not the air. These heaters are used for "spot" heating, as in bathrooms (most motel bathrooms have them), but the units can even be disguised as pictures on a wall. Portable infrared heaters with quartz tubes also are available. These can be carried from room to room to keep a person warm, while the main thermostat in the house is set down to 60 or 65 degrees F.

Gas Furnaces

Most gas furnaces have a burner with a number of jets, as on a gas range. Some furnaces may have a single large jet of gas flame that is spread by a deflector plate to heat a surface. Both types will be lighted by a pilot light that also does another job; it heats a thermocouple that converts the heat energy to a tiny electric current. Although the current is small, it is sufficient to hold open an electrical valve that supplies gas to the furnace.

Keeping the Pilot Light Going If the pilot light goes out, the thermocouple cools, the electric current shuts off and the gas valve closes. Thus, even though the thermostat calls for heat and the burner valve opens, no gas is supplied to it. This prevents the gas from flowing unchecked into the furnace and the house and setting up a deadly, explosive condition in the house. The pilot light must be relighted, which requires holding open a special valve for a specified time. Relighting instructions are on or near the pilot light of the furnace (the same is true of gas hot water heaters). Modern furnaces now utilize an electric ignition system.

To prevent a gas pilot light from being blown out by downdrafts from the vent pipe and chimney, gas furnaces have a draft diverter either built into the furnace or fitted in the vent pipe that connects to the chimney. The most common