A standard efficiency calculation would produce the following picture:

> The average four-person family has a daily hot water usage of 64 gallons. At the national average electricity cost of $0.08/kWh, this is a $400-$500 annual water heating bill. The typical HPWH uses half the energy of an electric resistance water heater, so the household would save $200-$250 annually. This would give a payback of 2.5 years (Geller, 1985).

Large families with heavy hot water use can get a more rapid payback from a HPWH.

Heat pump water heaters also offer peak electricity demand reductions of 0.03-0.46 kW in winter and 0.08-0.29 kW in summer. The space conditioning load impacts of HPWHs are unclear (Dobyns and Blatt, 1984).

5.2.2 The DOE Role

In 1976 Robert Dunning, the president of Energy Utilization Systems, Inc., (EUS) approached the Energy Research and Development Administration (ERDA) with a proposal to develop a residential-scale HPWH. Although ERDA had some interest in the HPWH concept, it was not interested in the EUS proposal. ERDA wanted rapid commercialization of the HPWH and believed that a large manufacturer had to be involved to successfully bring the new technology onto the market. EUS was small and it was at that time a consulting firm, not a manufacturing firm.

EUS then approached the National Rural Electric Cooperative Association (NRECA). The NRECA gave EUS a $5,000 grant to produce a prototype HPWH, which was displayed in February 1977 at the NRECA Annual Meeting.

At about that same time, under directions from ERDA, ORNL published a Request for Proposals to develop and commercialize highly efficient water heating systems. Copies of the RFP were mailed directly to all of the manufacturers in the water heating field. ORNL recommended that proposals