EPRI

Innovators
with EPRI technology

ELECTRIC SMART HOUSE DEMONSTRATES THE ELECTRIC FUTURE

"The Electric Smart House demonstrated to Georgia homebuilders—and people across the nation—that electric living is the smart choice today."

■ **Bill Davidson**
Georgia Power Company

"The automated home has tremendous potential to expand demand-side management programs. The home automation equipment and systems shown in the Smart House can address the design limitations of current load control programs."

■ **Amy Houston**
Oglethorpe Power Corporation

BENEFITS

■ **By pooling their R&D resources, the 40 utilities in the Electric Smart House Consortium leveraged expenditures of $450,000 to introduce to the home-buying American public $9.2 million worth of new electric technologies for improved energy efficiency and comfort. The print and broadcast media coverage for the Electric Smart House reached more than 300 million people worldwide, providing publicity valued at $30 million.**

■ **More than 3000 home builders and some 23,000 potential home buyers toured the Atlanta Electric Smart House. By exposing these individuals to leading-edge home automation technology in an all-electric home, Georgia Power anticipates increased consumer demand for electric Smart Houses.**

■ **The communications technology showcased in the Electric Smart House has a two-way communication capability that could be applied to a utility system's load management program. If Oglethorpe Power were to adopt this communications capability, the corporation would avoid $500,000 in R&D costs to develop a similar product.**

Challenge

In the early 1980s, the home automation technology that would create a "Smart House" was becoming a reality. A Smart House packages high-efficiency design with the latest in automation technology, electronic equipment, and appliances to offer homeowners unsurpassed levels of convenience, comfort, security, safety, and energy efficiency. The first project intended to demonstrate Smart House technology was a research house built in Washington, D.C., that was sponsored by the gas utility industry. It made extensive use of flexible gas piping and gas appliances but lacked intelligent control features, which were to be added later. The electric utility industry saw an immediate opportunity to demonstrate how electric technologies—such as efficient equipment, appliances, and home automation—can create superbly livable and cost-effective homes. Building an electric Smart House would show customers these options.

When the National Association of Home Builders (NAHB) launched its Smart House project in 1985, EPRI, Edison Electric Institute, and the National Rural Electric Cooperative Association (NRECA), together with Georgia Power Company, Oglethorpe Power Corporation, and 38 other electric utilities, decided to build an all-electric Smart House. The objective was to showcase for home builders and their trade allies the comfort, convenience, attractiveness, and efficiency of electric living.

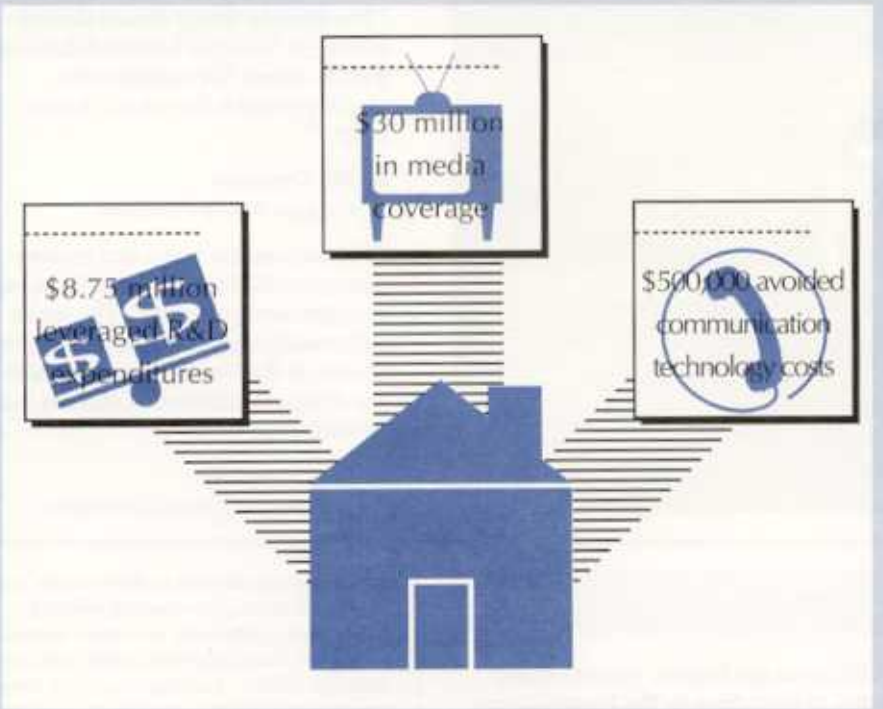
In June 1990 construction began on the Atlanta Electric Smart House, which was scheduled to open for the NAHB show in January 1991. The home's entertainment, security, communications, appliances, and heating/cooling systems were slated for installation and full integration with the home's automation system by December 1990. However, delays in the NAHB's development of Smart House technology meant that only a few of the planned components could be installed in time for the Home Builder's show.

Response

When the Electric Smart House project advisory committee decided to proceed with the project, EPRI immediately commissioned the design of a home automation system that would operate the house for the NAHB show, during the six-month period when Georgia Power Company and Oglethorpe Power Corporation would make it available to builders and the public for viewing, and after its purchase as a private residence. Efficient electric equipment was obtained from many vendors, with the focal piece, an efficient variable-speed heat pump, developed jointly by EPRI and Carrier Corporation. EPRI also commissioned development of a utility communications gateway to work in concert with the electric meter in transmitting information about rates and energy consumption between the utility and the home automation system. EPRI also installed prototype hybrid-breaker remote switches to control the dishwasher, clothes dryer, clothes washer, and water heater in response to real-time electric rates.

To ensure that all the home's automated systems would operate properly under remote control, EPRI also sponsored extensive systems integration work. Because the security, lighting, and audio-visual systems had been procured separately, yet had to function under the control of the EPRI home automation system, systems integration proved a challenge. Nevertheless, the Electric Smart House was ready for its grand opening on January 16, 1991.

Approximately 3000 home builders toured the house during the NAHB show. During the subsequent six-month open house sponsored by Georgia Power and Oglethorpe Power, 23,000 potential home buyers toured the site. Throughout 1991, the Electric Smart House was featured extensively on network television news and in the general and trade press. The response was overwhelming. The Electric Smart House demonstration clearly captured the public's enthusiasm for innovation in intelligent homes.



Basis for Benefits:

1. The technologies showcased in the Atlanta Electric Smart House represented the products of R&D expenditures of $1.5 million on home automation systems and systems integration; $6.5 million on a variable-speed heat pump; and $1.2 million on a hybrid-breaker remote switch. The 40 utilities participating in the Electric Smart House Consortium contributed $450,000 in research funds, for a net benefit of $8,750,000.
2. During 1991, the Atlanta Smart House demonstration prompted coverage on network television, and in both general and trade press publications worldwide, creating an estimated 300 million impressions with potential home buyers. At a value of $0.10/impression, this free publicity netted the electric utility industry a benefit of $30 million.
3. Oglethorpe Power Corporation is owned by 39 member cooperatives. The corporation and its member companies have one of the largest number of load management switch installations in the nation, controlling about 350 MW of capacity. In their load management programs, 2 of the member companies currently employ time-of-use rate structures and 34 use radio-controlled devices. The communications gateway technology developed by EPRI would provide an enhanced utility-customer link in the member companies' load management systems. If Oglethorpe (or any EPRI member) were to utilize the EPRI product, the corporation would avoid approximately $500,000 in R&D costs to develop a similar technology.

Reference

- "Building the Intelligent Home." *EPRI Journal*, June 1991.

EPRI publications are available from the EPRI Distribution Center, (510) 934-4212.

Commercial Availability

For additional information on the EPRI products demonstrated in the Electric Smart House, contact the EPRI project manager, Arvo Lannus, (415) 855-2398.

For further information, contact:

Electric Power Research Institute
P.O. Box 10412, Palo Alto, CA 94303

Arvo Lannus, Manager
Residential Program
Customer Systems Division
(415) 855-2398

Interest Categories

- Building energy systems
- Heating, cooling, & refrigeration
- Load/energy management & controls

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Post Office Box 10412, Palo Alto, CA 94303 **EPRI Hotline (415) 855-2411**

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