OAK RIDGE NATIONAL LABORATORY FACT SHEET

MANAGED BY UT-BATTELLE FOR THE DEPARTMENT OF ENERGY

ORNL and TVA: Neighborhood Partners in Energy Research

ORNL/TVA projects include (clockwise from top) the heat pump water heater, PV roof panels, the frostless heat pump, and AAC blocks.

Oak Ridge National Laboratory (ORNL) is located within 30 miles of the headquarters of the Tennessee Valley Authority (TVA). Naturally, the largest U.S. public power company and a DOE national laboratory specializing in energy research find ways to work together. In the areas of energy efficiency and renewable energy alone, ORNL and TVA are cooperating on numerous projects. ORNL and TVA's Public Power Institute have identified a large intersection of research interests through a series of joint strategic planning meetings.

ORNL's Buildings Technology Center (BTC), TVA, and Babb International concrete makers are testing autoclaved aerated concrete (AAC), which contains 70% flyash from TVA's coal-burning power plants. Tests in the BTC show AAC to have good insulating properties. AAC blocks were used to build a Habitat for Humanity house that is being monitored by the BTC for energy efficiency and airtightness. If AAC works well in the field, it will save energy as well as mitigate the environmental cost of providing it.

TVA is supporting another joint effort between ORNL and Habitat for Humanity to build a neighborhood of Habitat homes that will produce nearly as much energy as they consume. TVA has agreed to sponsor the construction of five "zero-energy" Habitat houses.

The frostless heat pump and the heat pump water heater (HPWH), joint ventures involving DOE, ORNL, TVA, and appliance manufacturers, are expected to be available to consumers soon. The heat pump reduces frosting on heat pump coils, improving energy efficiency and heating performance. TVA is testing the heat pumps in homes during the 2002/2003 heating season.

HPWHs use a third as much electricity as conventional electric water heaters. ORNL's industrial partners EMI and A. D. Little are marketing HPWHs that replace conventional 50- or 80-gallon electric units. TVA and ORNL are working to commercialize a "bayonet" HPWH, a heat-pump insert that replaces the heating element in an existing electric unit. TVA is conducting residential field tests of two bayonet HPWHs and is bringing ORNL together with American Water Heater Company in Johnson City, Tennessee, to discuss commercialization opportunities.

Hybrid lighting uses fiber optic cables to deliver sunlight inside buildings for illumination to reduce the use of electric lighting. ORNL researchers invented the technology and are developing it for commercialization. TVA helped fund the fabrication of the light fixtures used in the research.

TVA also helped fund the installation of a geothermal heat pump (GHP) at a school in Oak Ridge, Tennessee. ORNL researchers have developed an internet-based system being used to monitor the performance of the heat pump and control the system over the web. The monitoring system will compare conditions in a GHP-conditioned classroom with those in a room with a conventional heating/cooling system.

ORNL and TVA have a common interest in the efficiency and reliability of the electricity transmission and distribution system. They are working together to test aluminum-conductor composite-reinforced cables for power transmission lines that can carry two to three times more power than conventional conductors. The advanced conductors will be tested at an outdoor transmission test facility recently built at ORNL.

Renewable energy and its integration into the power grid are another shared interest. ORNL, TVA, and other partners are cooperating in research at the BTC to address issues associated with the integration of photovoltaic (PV) solar panels into roofs. Among other things, the project will investigate how shading of a roof by PV panels affects the amount of energy needed for cooling and the transmission of surplus solar energy to the utility grid.

Finally, ORNL was the first industrial customer to sign up for "green power" produced by TVA when the program was offered in 2000. ORNL looks forward to continuing its important strategic partnership with TVA.

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