

Tying Distributed Energy Resources to the Grid

When distributed generators connect to the power system, both the owner of the energy resource and the central power system benefit. Reliability increases for both because they can support each other. However, there are many questions regarding system stability, safety, and control.

ORNL has a strong R&D capability in power transmission and distribution systems, which is now being focused on system simulations that can help provide answers. ORNL collaborates with the Consortium for Electric Reliability Technology Solutions (CERTS)—a consortium of laboratories, universities, and utilities—on computer modeling to predict the behavior of multiple distributed generators connected to the power system. The effort is aimed at lowering the cost and maximizing the benefit of using distributed generation as an integral part of the electric power grid.

ORNL is studying the use of distributed resources for ancillary services and simulating the impact of distributed resources on utility distribution networks. The work to date has studied single placements of distribution resources on electricity networks. The next phase of the research will study the concept of the microgrid—a group of distributed resources with a common interface to integrate communication, control, and protection and to allow the group of distributed generators to operate as a single entity with respect to the utility grid.

ORNL has a significant capability for system analysis using utility-standard, commercially available software codes. The use of industry-standard databases and codes ensures high-quality, repeatable results that are widely acceptable; and in-house modeling expertise ensures appropriate handling of unusual requirements. The analysis codes available include Power System Simulator, Production Costing (both in-house models and DYNASTORE), Electromagnetic Transient Program, Power System Harmonic Simulation and Analysis, System Reconfiguration Analysis Program, Oak Ridge Competitive Electricity Dispatch model, National Energy Modeling System, and Powerdat Database System. The North American Electric Reliability Council provides actual regional utility network and load data to be used in the computer models.

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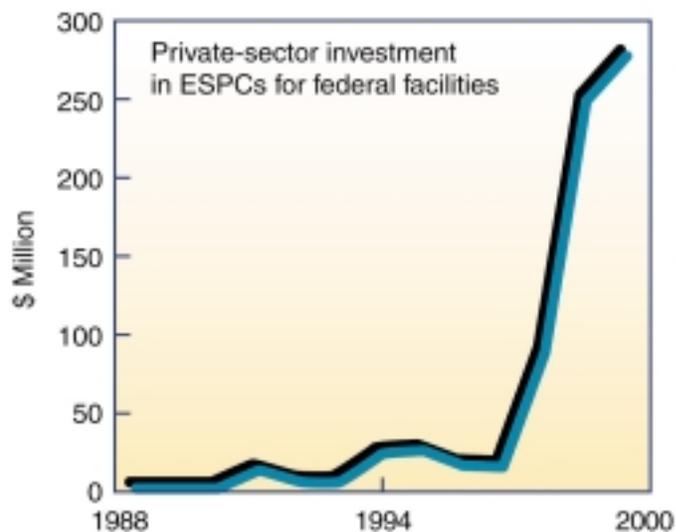
ORNL, FEMP Lead Push for CHP at Federal Facilities

The Federal Energy Management Program (FEMP), in close coordination with the Office of Power Technologies, began to focus on combined cooling, heat, and power (CHP) technologies this year. FEMP tapped ORNL to lead its push to make CHP a visible, accessible, and feasible option for federal agencies.

The ORNL CHP team works within FEMP's efforts to help agencies get more value from funds they are already spending, rather than look for infusions of new dollars. FEMP's design assistance helps secure optimum value from capital appropriations for new construction, and FEMP's technical assistance ensures that building improvements yield more energy-savings bang per buck. FEMP also supports agencies' use of energy service performance contracts (ESPCs) and utility energy service contracts (UESCs), which bring private-sector financing to federal building improvement projects. A top priority for the CHP team is helping agencies use these alternative financing vehicles for their CHP projects.

Agencies need hard evidence to support a decision to implement a CHP project. To provide unbiased, reliable documentation of costs, savings, and financial merit, the team evaluates federal CHP projects, analyzing technology performance and application engineering and addressing issues such as permitting, grid interconnection costs, exit fees, and stand-by charges.

Where energy supplies are constrained, agencies are keenly interested in CHP as a way to add to electricity supplies as well as increase energy efficiency. CHP technology makes economic



Private-sector investment in federal energy projects through ESPCs has increased sharply. The ORNL FEMP team ensures that CHP projects will be feasible under alternative financing vehicles.

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