

DISTRIBUTED ENERGY RESOURCES: COOLING, HEATING, AND POWER

America in the year 2001 faces the most serious energy shortage since the oil embargoes of the 1970s. The effects are already being felt nationwide. Many families face energy bills two to three times higher than they were a year ago. Millions of Americans find themselves dealing with rolling blackouts.

The National Energy Policy recognizes that businesses and industry need increasing supplies of electricity and thermal energy (heating, cooling, and humidity control) and that combined cooling, heating, and power (CHP) systems represent an efficiency breakthrough for tomorrow's energy needs.

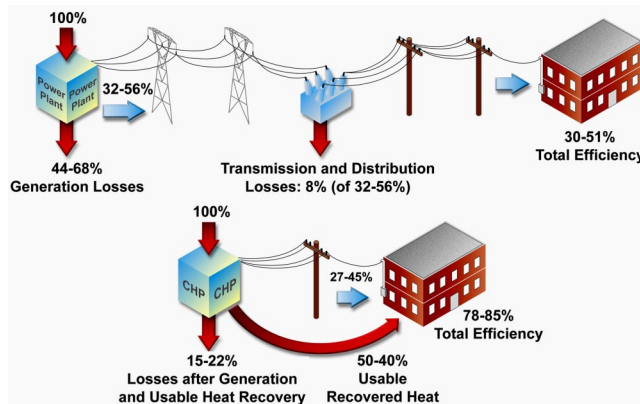
ORNL's CHP Integration Laboratory

A newly installed Cooling, Heating, and Power Integration Laboratory at the Oak Ridge National Laboratory (ORNL) is part of a U.S. Department of Energy (DOE) effort to encourage the use of energy-efficient distributed generation systems, in which users generate part or all of the electricity they use on their own sites. Approximately two-thirds of the fuel used to generate electricity in conventional central power plants in the United States is wasted in the form of discarded heat. By productively recapturing and using that thermal energy, CHP systems can improve overall efficiency levels to 70% or greater in building, industry, and district energy applications.

ORNL's research will focus on the innovative integration of distributed generation, heat recovery, and thermally activated cooling and humidity control technologies into high-efficiency CHP systems. The work includes controls and advanced diagnostics, thermal energy storage, integrated systems performance evaluation, advanced thermal components, and system modeling and optimization.



An ORNL researcher works in a maze of ductwork in the new Cooling, Heating, and Power Integration Laboratory.



Development of Packaged CHP Systems for Buildings

ORNL has also selected seven industrial teams to receive \$18.5 million in DOE cost-shared contracts that will lead to research, development, and deployment of "first-generation" packaged CHP systems for buildings. ORNL staff will provide technical guidance to the industry contractors and manage the contracts for DOE's Office of Power Technologies. ORNL's CHP Integration Laboratory will be available to these and other industrial researchers to support development of CHP systems and components.

CHP for the Federal Facilities

ORNL staff in support of DOE's Federal Energy Management Program are providing technical leadership to expedite CHP projects at federal sites in locales where electricity supply is unreliable. ORNL has inventoried, screened, and ranked federal sites having 1 MW or more of CHP potential in California, New York, and Texas. Next steps include comprehensive technical support to agency sites committed to fast-tracking their CHP projects. Agencies needing private financing will be partnered with energy services companies or utilities. Commercially available advanced CHP technology will be deployed, including the integrated CHP packages being developed with funding from the DOE Office of Power Technologies as they become available.

Within DOE's Office of Power Technologies, the Distributed Energy Resources Office is leading programs to promote the development and deployment of distributed generation, thermally activated technologies, and CHP. For more information, see <http://www.eren.doe.gov/der/chp>.

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