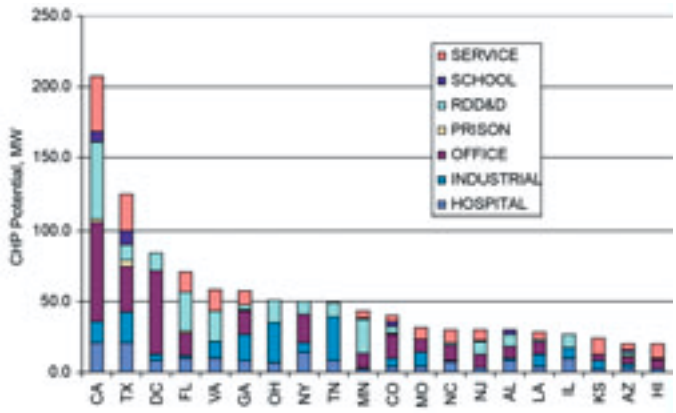
# ORNL and seven industry teams to develop packaged CHP systems

ORNL's new Cooling, Heating, and Power (CHP) Integration Laboratory will be working with seven industry teams to develop and test first-generation "packaged" CHP systems for use in commercial and institutional buildings. Packaged systems include combinations of dissimilar subsystems designed to work in conjunction with each other at a higher efficiency and/or lower cost than they would operate individually. A packaged system might include, for example, a microturbine for power generation combined with a waste-heat-driven absorption chiller and a desiccant machine.

**Researchers at the CHP Integration Lab examine a microturbine that provides power.**




**The potential energy savings from integrated cooling, heating, and power systems in various commercial and institutional settings.**

The advantages of industrial CHP have long been recognized: such a system provides power and heating, allowing large facilities such as manufacturing plants to generate part or all of their own electricity. CHP for buildings is also cost- and energy-efficient because it recaptures and uses the thermal energy from waste heat and provides a reliable supply of electricity. Moreover, CHP systems can be used to provide supplementary power to existing utility grids.

The packaged CHP systems to be developed under the seven DOE contract awards will provide several benefits over today's custom-engineered CHP systems: they will be easy to install and will reduce first (capital plus installation) costs, improve performance (efficiency), increase system reliability, and reduce maintenance costs.

The projects to develop packaged CHP systems represent $18.5 million in contracts awarded by DOE to the seven industry teams on the basis of competitive proposals. The seven industrial teams and their projects are as follows:

- **Burns and McDonnell**, Kansas City, Missouri, in partnership with Solar Turbines, Inc., and Broad USA—design and construct a buildings CHP system that provides electricity from a Taurus 5200-kW turbine generator, up to 3000 refrigeration tons (RT) of free waste heat–driven absorption cooling, and up to 17,000 RT of additional supplemental gas-fired cooling.
- **Capstone Turbine Corporation**, Woodland Hills, California—design and test packaged CHP systems using waste heat from Capstone's 60-kW microturbine coupled with absorption chillers for air-conditioning and a desiccant system for humidity control.
- **Gas Technology Institute**, Des Plaines, Illinois, in partnership with Waukesha and Trane— combine Waukesha engine generators with Trane absorption chillers in engine sizes ranging from 290 kW to 770 kW to match a variety of building types and markets.
- **Honeywell Laboratories**, Minneapolis—develop and field-test (at Ft. Bragg, N.C.) a large CHP packaged system (2–5 MW) in which a turbine generator will be combined with a 500- to 2000-RT absorption chiller.
- **Ingersoll-Rand**, Portsmouth, New Hampshire—combine a new 70-kW microturbine with an ammonia-water absorption refrigeration system. The absorption system will cool the turbine's inlet air and also produce refrigeration for building space conditioning and refrigerator-freezer applications.
- **NiSource Energy Technologies**, Merrillville, Indiana, in partnership with a Hilton Hotel developer—demonstrate a modular packaged CHP system consisting of three microturbines, heat recovery heat exchangers, an absorption chiller, a desiccant unit, and an integrated control system that will be targeted for use by hotel and motel chains.
- **United Technologies Research Center**, East Hartford, Connecticut—develop an accelerated CHP system based on off-the-shelf components to make a packaged system as well as an additional optimized CHP system. These systems will use both recuperated and unrecuperated microturbine combinations. UTRC will also evaluate the use of waste heat–driven ammonia-water refrigeration systems, desiccant systems, and thermal storage.

The industry partners will contribute more than 43% of the total project costs. ORNL staff will provide technical guidance to the industry contractors and manage the contracts. ORNL's CHP Integration Laboratory will be used to support the development of the new systems.

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