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Gas Technology Institute (GTI)

Gas Technology Institute (GTI) is a natural gas test plant and research facility located in a suburb of Chicago. GTI decided to install a 3,600 sq. ft. cogeneration facility/testing lab and 2.5MW cogeneration system. Ballard Engineering designed and built this system around the engines selected by GTI consisting of one (1) Cummins QSV81 engine generator at 1,100KW and one (1) Caterpillar 3516 engine generator at 1,360KW. The system provides 100% of peak operation power and back-up power in cases of emergency, Facility heating, and cooling through the use of an absorption chiller.

DISTRIBUTED ENERGY TECHNOLOGY CENTER (DETC)

Expansion is under way on GTI's state-of-the-art, Distributed Energy Technology Center (DETC). The additional 60' x 60' building will include a "combined heat and power" (CHP) plant and enhanced cooling system capabilities. Expansion is scheduled for completion in early 2002.

Objective

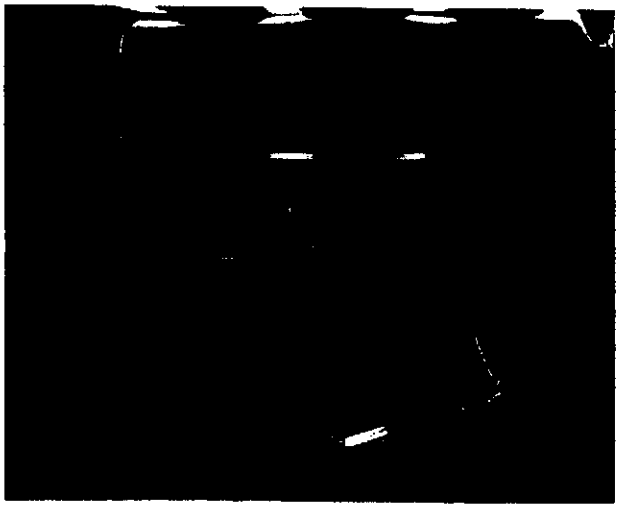
The objective of the DETC is to provide the equipment and technical expertise for testing and monitoring small (10-300 kW) power generation microturbines, reciprocating engines, and fuel cells, including any associated systems for capturing and using waste heat, such as desiccant dehumidification units and absorption chillers.

Background

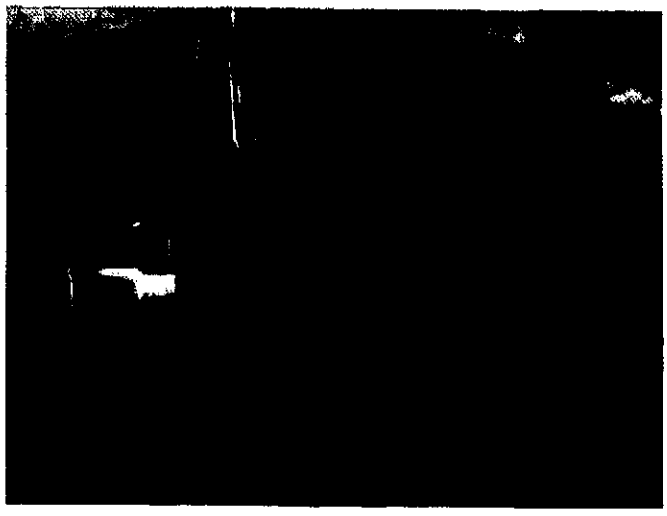
The DETC is used to perform three primary functions:

1. Assess performance claims (efficiencies and emissions) of distributed energy equipment and systems, including their associated control schemes, prior to field deployment.
2. Optimize distributed energy equipment performance, thereby significantly reducing utility and manufacturer's risk prior to technology launch.
3. Provide remote web-based monitoring of multiple installations to document the reliability of distributed energy systems.

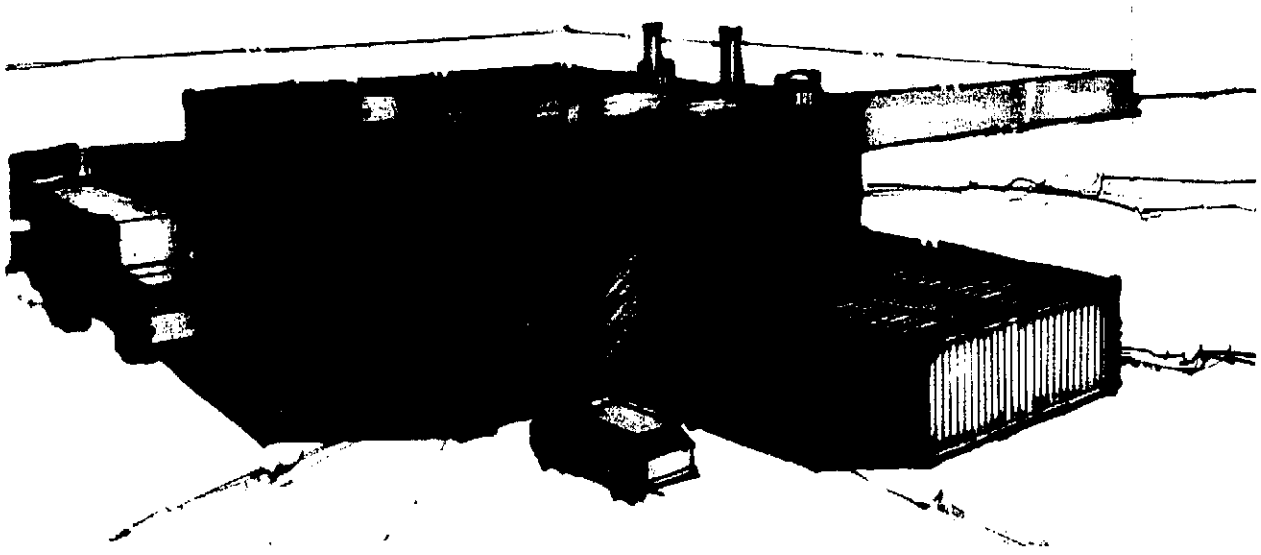
The DETC provides utilities and manufacturers an opportunity to test and prove DE applications that are used at their clients' facilities (e.g., hotels, convenience stores, supermarkets, nursing homes). Performance tests are designed specifically for unique applications in order to increase the reliability of each installation. An added bonus for users of the DETC is the opportunity to tap into GTI's large DE applications database—bridging a number of different site-specific DE applications and equipment options.



Desiccant system performance testing



Microturbine performance testing



Artist's rendering of GTI's expanded state-of-the-art Distributed Energy Technology Center (DETC), to be completed in early 2002.

Initial testing at the DETC focused on microturbines (the first testing for a utility was completed in July 2000). Currently, GTI is contracted to perform endurance tests on several leading microturbines (including units from Ingersoll-Rand Company and Capstone Turbine Corporation). The DETC is being expanded to allow evaluating of reciprocating engines and turbines (up to 3000kW).

In order to evaluate equipment under worst-case environmental conditions, the DETC is designed to record data for varying electrical loads and intake air temperatures, as well as gas, air-intake, and exhaust pressures. When the expansion is completed, the DETC will provide grid interconnection capability and enhanced power quality instrumentation. The two engine bays at the DETC will house Cummins and Caterpillar natural gas reciprocating engines that will generate approximately 2400kW combined—enough to supply the daily power needs for the GTI campus.

Exhaust heat from the engines will be recovered to heat GTI's main building during the winter and to power a heat-driven absorption chiller to cool the building during the summer.

Status

Expansion of the DETC will be completed in early 2002.

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