UTD

Utilization Technology Development

Efficiency

With growing natural gas demand, there is a tremendous opportunity to take advantage of the positive attributes of this clean and abundant resource to dramatically reduce greenhouse gas emissions and enhance energy security.

Utilization Technology Development (UTD) is at the forefront of research, development, and deployment for end-use equipment and appliances. As a not-for-profit corporation established in 2004 and led by our 16 member companies, we represent over 22 million natural gas customers in 25 states and Canada. UTD directs and sponsors a wide-ranging program to enhance the use, reliability, and efficiency of natural gas appliances and technologies. By taking R&D projects from the laboratory to the field, UTD enhances market success via field testing and commercialization.

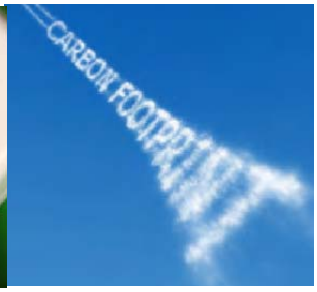
Cooperative research is showcasing the benefits of natural gas in residential, commercial, industrial, power generation, and transportation markets as an environmentally friendly energy source, creating efficient and cost-effective new technologies, and identifying emerging needs and solutions.

Member companies pool their resources to leverage their R&D investments with supplemental program funding from federal and state government sources and other industry stakeholders, benefitting utilities and their customers.

As markets continue to evolve, there is an urgent need for ongoing investment in advanced utilization technology to address changes, along with new opportunities to lower energy intensity and consumption, provide significant economic and environmental benefits, and complement existing utility energy-efficiency programs.

Through participation in UTD, members are combining interests, expertise, and resources into focused R&D projects that will shape our energy future and contribute to a robust economy.

Shaping the energy future with new efficient end-use technologies



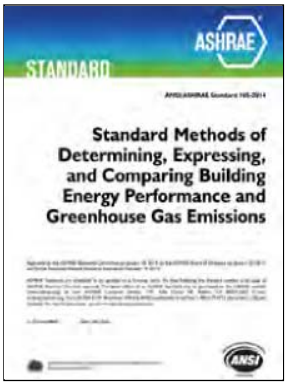
UTD Technology Highlights

"Right now is an exciting time—we are starting to see more and more UTD technologies cross the finish line. I don't think these projects would have happened without UTD's collaborative approach. The program is both unique and vital. Companies from across the nation are able to exchange information and ideas, tap into the experience of others, and learn from one another. UTD is a way for our company to keep research on the forefront and push energy efficiency and reduced emissions."

Bob Kerley, Atmos Energy

Analytical Tools

Providing information that impacts business



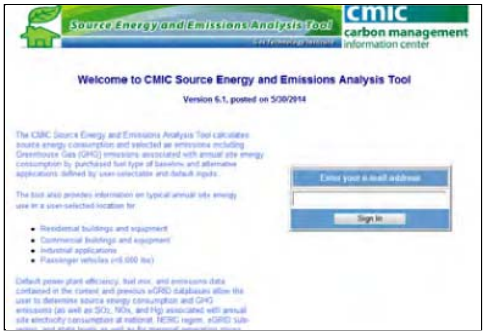
ASHRAE Standard 105-2014 "Standard Methods of Determining, Expressing, and Comparing Building Energy Performance and Greenhouse Gas Emissions

GTI helped author a revised standard that now includes a more comprehensive primary (or source) energy-based methodology for comparing building energy performance. This is a significant advancement over the prior standard that only included site energy metrics.

Carbon Management Information Center (CMIC)

The Carbon Management Information Center (CMIC) serves the gas industry, its customers, and other stakeholders by developing resources and analytical tools that:

- Clearly and fairly evaluate opportunities to improve total energy efficiency, reduce greenhouse gas emissions, and lower energy costs for consumers.
- Provide a clear, concise, and technically-defensible message to policymakers, regulatory authorities, public interest groups and others in reducing the nation's energy consumption and carbon emissions.



Source Energy and Emissions Analysis Tool

The CMIC user-selectable tool estimates source energy consumption and CO_2 emissions associated with annual site energy consumption by purchased fuel type of baseline and alternative appliances and buildings. (Available online at www.cmictools.com.)

Low Emissions

Commercial Successes

Delivering new end-use technologies to the marketplace

Cannon Boiler Works Ultramizer®

An advanced heat-and-water recovery system, including Transport Membrane Condenser (TMC) technology, was installed and commissioned at Baxter Healthcare in Thousand Oaks, CA, meeting performance expectations and increasing the boiler efficiency from 80% to 93%—saving the customer 15% on fuel bills, reducing greenhouse emissions by 15%, and saving over 250,000 gallons of water. The Ultramizer® system is available from Cannon Boiler Works, Inc.

Equinox Solar-Assisted Heating System

GTI, Rotex Australia and Solar Usage Now (S.U.N) introduced the new Equinox technology into the U.S. marketplace-a thermal storage tank and instantaneous water heater that provides 100% of domestic hot water and space heating needs. The solar ready technology marketed as S.U.N. Equinox Heating Systems® is considered one of the most energy efficient systems for residential and commercial applications.

Stellar Countertop Steamer

This compact gas-fired countertop steamer for commercial food service offers enhanced cooking rates while providing users with added savings of energy and water consumption. The unit is the first gas-fired boilerless steamer with an ENERGY STAR rating.

NextAire Gas Heat Pump

GTI conducted a series of tests of the NextAire 8-ton and 15-ton gas heat pump (GHP) in commercial applications. This advanced unit uses variable refrigerant flow and multizone capabilities (up to 33 zones for the 15-ton unit) to efficiently heat and cool commercial building space with substantially less electricity requirements (up to 80% reduction). The NextAire GHP products are commercially available through IntelliChoice and its qualified dealers.

Cummins 8.9L Ultra Low Emissions Engine

This is the first engine certified to the highly stringent California 2010 standards for heavy-duty vehicle engines—achieving emission levels below the 0.2 g NO_x/hp-hr requirement while also retaining high shaft efficiency. Since commercial introduction in 2007, the engine has been widely used in the United States (with over 13,000 engines now in service) and throughout the world in transit, refuse-collection, and regional hauling applications.

"Our dollars, combined with those of other member companies and other funding sources, provide benefits that we would not be able to achieve acting on our own."

Scott Shepherd, Oklahoma Natural Gas

"A small utility doesn't have the staff or the resources to dedicate to research and advocacy for regulatory energy efficiency standards. UTD offers an avenue to participate in efforts in which a small company wouldn't otherwise have a voice."

Jonathan Britt, formerly with Greenville Utilities

New Product Pipeline

Developing technologies to provide clean air, lower energy costs and ensure customer satisfaction

Gas-fired Heat Pump Water Heater

Partnering with absorption technology startup Stone Mountain Technologies and water heater manufacturer A.O. Smith, GTI has designed and demonstrated a novel Gas-fired Heat Pump Water Heater (GHPWH) through laboratory proof-of-concept testing. The GHPWH has compatibility with SCAQMD NO_x requirements and an Energy Factor (EF) of 1.3, over twice that of standard gas water heaters. When commercially available in 2016, it will be the only water heating technology with a source energy-based EF of greater than 1.0.

Ultra-Low NO_x Burner

GTI is partnering with Power Flame Inc. to develop an Ultra-Low NO_x (ULN) burner for firetube boiler applications, capable of achieving NO_x emissions below 5 ppm without the use of Selective Catalytic Reduction (SCR) or external Flue Gas Recirculation (FGR). A prototype unit rated at 4 million Btu/hr has been designed, fabricated, and installed at GTI's research laboratories, and performance validation testing is currently underway.

FlexCHP High-Efficiency Ultra-Clean Power and Steam Package

Researchers are developing a cost-effective supplemental burner, integrated with a gas-turbine-based combined heat-and-power system. Laboratory tests have shown total efficiency of over 85% and NO_x emissions that are below stringent California emission levels. Field testing is planned at a food-processing plant in California.

For More Information
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