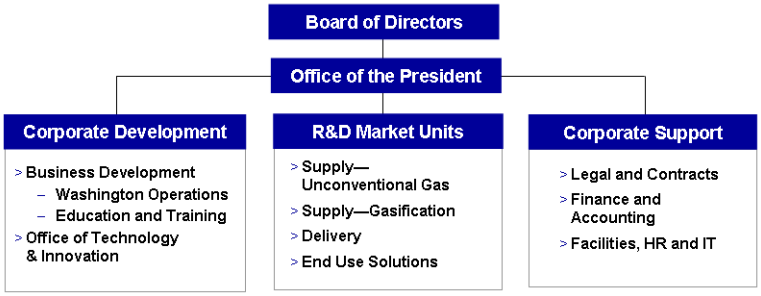
Gas Technology Institute
Background and Capabilities

GTI is the leader in the development and deployment of technology solutions that contribute to a secure, abundant, and affordable energy future. GTI provides economic value to the energy industry and its customers, while helping the government achieve its policy objectives. The organization's primary goal is to enhance the safe, reliable, and environmentally responsible production, distribution, and use of natural gas. More specifically, GTI:

- Performs contract research, development and demonstration projects
- Plans and manages technology development programs for the gas industry and other energy clients
- Provides education and training on technical and business topics related to energy
- Manages the commercialization of new, energy-related technology through a variety of business arrangements

Organization and Structure

GTI is a not-for-profit Research & Development (R&D) organization with national scope. Most of the approximately 250-person GTI staff is based at GTI's headquarters in Des Plaines, Illinois. Over 70% of our personnel are highly trained engineers and scientists.



GTI's R&D Market Units are focused on addressing key issues impacting the North American natural gas and energy markets in areas related to energy supply, delivery, and use. The Office of Technology and Innovation helps to position the organization as a technology solutions leader, staying abreast of energy technologies, issues, and opportunities.

GTI provides programs and services (contract R&D, collaborative R&D, technical services, and education programs) to industry, government and consortia that seek competitive advantages through the development and implementation of technology. GTI programs help organizations outsource and leverage technology investments. The natural gas industry is at the core of GTI's customer base. Other major customers are typically within the broader energy industry and other utilities, government agencies, and private industry with interests in energy and the environment.

GTI R&D Market Units

Supply—Unconventional Gas Sector

Guy Lewis, Managing Director 847/768-0931

GTI's Supply Sector seeks to provide a secure, stable, and competitive domestic energy supply. Through projects within the Unconventional Gas Sector, companies are finding better ways of exploring for and producing natural gas.

GTI Expertise:

- Unconventional Natural Gas
- Field Drilling and Completion
- Downhole Laser Energy Applications
- Carbon Sequestration
- Methane Hydrate Resources

Supply—Gasification Sector

Vann Bush, Managing Director 847/768-0973

Gasification provides an increasingly viable alternative for large scale power production that leaves premium fuel for the burnertip and reduces the demand for natural gas, easing price pressure and reducing volatility. GTI has recently built a one-of-a-kind platform to test and develop advanced gasification, gas cleanup, and gas-to-liquid technologies. The Henry R. Linden Flex-Fuel Test Facility for Thermo-Chemical Conversion of Fuels is available for research and testing purposes.

GTI Expertise:

- Gasification Feedstock Evaluation
- Syngas Generation and Processing for Production of Power, Fuels, and Chemicals
- Syngas Cleanup and Separation Technologies
- Subquality Gas Upgrading

Delivery Sector

Edward Johnston, Managing Director 847/768-0889

The Delivery Sector addresses the strategic concerns of domestic gas transmission and distribution infrastructure. Areas of focus include safety, pipeline integrity, cost reduction, and efficiency. GTI has a Technology Deployment and Implementation (TDI) Program aimed at the "last mile of research". It comprehensively addresses the needs of utilities in implementing new technologies, and emphasizes field trials, prototype evaluation, and the resolution of implementation barriers.

GTI Expertise:

- Third Party Damage Prevention and Leak Detection
- Construction Innovations
- Operations Innovations
- Pipeline Integrity/Distribution Integrity Management
- Pipeline and Storage Solutions
- Forensic, Environmental and Chemical Research Services

End Use Solutions Sector

William Liss, Managing Director 847/768-0753

The End Use Solutions Sector seeks to improve natural gas and energy use in residential, commercial, industrial, power generation and transportation markets. GTI's emphasis is on new technologies that improve efficiency, expand the natural gas product portfolio, increase the competitiveness of U.S. industry, and minimize environmental impact. GTI's program encompasses early stage research and innovation, technology development, deployment and commercialization support services, and technical market analysis.

GTI Expertise:

- Combustion
- Industrial Process Heating
- Power Generation and Combined Heat and Power
- Residential/Commercial Appliances
- Hydrogen and Alternative Fueling Stations and Vehicle Integration
- High- and Low-Temperature Fuel Cell Components and Systems
- Energy Conversion, Fuel Processors and Catalysts
- Codes and Standards
- LNG and Fuel Gas Interchangeability
- Energy System Modeling and Analysis

GTI Facilities

GTI is located on an 18-acre site near O'Hare International Airport, in the Chicago suburb of Des Plaines, Illinois. About half of GTI's 280,000-square-foot headquarters building is dedicated to modern laboratory and research facilities, including a wide range of specialized equipment for design, testing and analysis. Offices, training facilities and an extensive library occupy the remainder. Twenty-eight specialized laboratory facilities on the GTI campus are used to develop and test advanced energy technologies.

Technology Transfer

Just as important as GTI's ability to develop innovative technology is its ability to help bring that technology to the marketplace through field tests, prototype evaluations, and early-market deployment programs in partnership with our clients and manufacturers. To date, GTI RD&D programs have resulted in nearly 500 products, 250 licenses and more than 1,000 associated patents. GTI has over 65 years of experience working with technology developers and users to maximize R&D benefits and define a clear path to commercialization. GTI strives to create and conduct technology programs with the maximum ratio of benefits to R&D costs. Conservative evaluations of GTI's R&D results have consistently shown a gas consumer benefit-to-cost ratio of approximately 8 to 1.

GTI's past research efforts have resulted in major contributions to the energy industry and its customers.

- GTI is a proven leader in adding resources to the U.S. energy portfolio. GTI's work in unconventional resources, such as coalbed methane, has helped extend the availability of cost-competitive gas supplies.
- GTI has a long history of developing gas distribution technologies that maintain a safe and economic gas distribution network. Directional drilling, which minimizes excavations and public inconvenience associated with gas infrastructure operations, includes GTI technology in nearly every system on the market.
- For almost 25 years, GTI has played a major role in the development of advanced high-efficiency, low-emission gas-fired equipment. For example, products developed at GTI in recent years for the high value commercial food service market include the Pitco Fryer, Stellar Sirius Countertop Boilerless Steamer, Avantec Cross Flow and Dual Conveyor Ovens, and MagiKitch'n Charbroiler, among others.
- Over 65 patents on high-efficiency, low-NO_x burners and systems to control emissions establish GTI as a proven technology developer that is making significant contributions to the strong market position of gas in the industrial sector.

Energy Industry Partnerships

GTI collaborates with various energy industry partners to achieve successful technology results. Collaborative efforts are necessary to bring together entities with the combined technical, facilities and funding required to accomplish technology excellence. We have strong contacts and working relationships with a variety of energy industry players that can enhance technology program results and leverage program funding. Some of our teaming partners have included:

- Over 175 Member Companies
- Industry Associations
- Natural Gas Utilities
- Electric and Other Utilities
- National Laboratories
- U.S. Department of Energy
- U.S. Department of Defense
- U.S. Department of Transportation
- State Energy Offices
- Industrial Gas Consumers
- Technology Developers
- Equipment Manufacturers
- Universities and Other Research Organizations
- Private Equity/Venture Capital Firms

Collaborative Programs

GTI excels at collaborative technology program development and implementation. Such programs allow participants to pool financial resources and collectively identify significant technical challenges and business opportunities, thereby reducing risk and achieving maximum impact with research funds.

GTI has helped the natural gas industry further several collaborative mechanisms for supporting needed research. Two independent not-for-profit companies were formed—Operations Technology Development, NFP (OTD), focusing on issues relating to gas operations and infrastructure, and Utilization Technology Development, NFP (UTD), focusing on end-use research. GTI provides administrative support and contract research services to these companies.

GTI's Sustaining Membership Program (SMP) addresses new technologies beyond the near-term horizon, considered the early stage "building blocks" of natural gas research and development. The program strives to develop new and innovative technology concepts or adapt existing technologies already deployed in other markets to the natural gas industry.

Collectively, these industry-driven programs include nearly 30 companies and involve over $12 million annually in leveraged funding.

Education & Training

GTI is addressing key education issues such as aging of the workforce in the natural gas industry, through our technical training programs. More than 55,000 energy professionals have attended GTI training programs. GTI offers traditional classroom training in gas distribution and transmission, energy marketing, and LNG – attracting participants from all over the world. Because many companies face time constraints, tight budgets, and travel restrictions, GTI training options include classroom courses, self-study on-line, CD-ROM courses, and on-site programs.

State Public Utility Commission Relationships and Funding

As part of its effort to broaden support for natural gas R&D and education, GTI has established relationships with the state public utility commissions. To date, 22 public utility commissions have approved the recovery of R&D costs (1Q 2008 value–$23.8 million) for one or more local gas distribution companies. Four states currently have an R&D surcharge request pending before their Commissions. GTI has made presentations at National Association of Regulatory Commissioners (NARUC) meetings and 'Natural Gas Summit' conferences in Montana, Tennessee and Illinois. Staff from GTI are available to serve as expert witnesses during rate cases and to help companies gain approval of R&D funding recovery from gas consumers.

GTI Technical Information Center

GTI's Technical Information Center is one of the world's largest collections of information on natural gas technologies and related energy topics. The Center holds more than 33,000 texts and bound journals; 100,000 technical reports; 5,000 patent documents; 1,000 theses; 130,000 microfiche documents; and more than 500 periodical and newsletter subscriptions. The Center provides access to computerized databases, and houses special collections from the U.S. Bureau of Mines, the Pipeline Simulation Interest Group, and the Fuel Chemistry Division of the American Chemical Society. Information specialists at the Center can access information on almost any energy-related subject published worldwide since the mid-1960s, and can arrange interlibrary loans with major U.S. and foreign universities and technical libraries.