SCIENCE

EDITORIAL

The Gas Research Institute

The status of natural gas relative to its competitor fossil fuels has been elevated. Coal, though abundant, is being downplayed because of its contributions to pollution and global warming. Production of crude oil in the United States is in a long-term decline. In contrast, the future for natural gas is upbeat. Research and development (R&D) has led to additional potential reserves. Many applications employing the fuel to attain greater energy efficiency have been developed and are being implemented. The Clean Air Act Amendments of 1990 and recently enacted energy legislation foster future use of natural gas.

An important contributor to the improved status of natural gas has been the Gas Research Institute (GRI). One reason is its successful mode of conducting R&D designed to achieve practical goals. The GRI, headquartered in Chicago, has an annual budget of about $200 million. It has no laboratories. Rather, it serves as a nerve center for the identification of worthwhile projects, for determining priorities among them, and for devising and implementing means of achieving goals. The relevant R&D is contracted out to universities, institutes such as Battelle, and industrial companies. Many of the activities with companies are performed on a cost-sharing basis. Some projects also involve cost sharing with the Department of Energy or the Electric Power Research Institute, or both.

The overall goal of GRI is to bring benefits to rate-paying consumers and to GRI members, which include producers, pipeline companies, and local distributors. To continue to receive support, GRI must justify its existence by demonstrating that its efforts are cost effective. Among the many critics and stakeholders it must impress is the Federal Energy Regulatory Commission, which reviews its performance annually and must approve the level of the GRI budget. The actual funds are collected by pipeline companies.

The GRI staff defend well the past decisions of their institute. They point to a success ratio for projects that is twice as good as the average for U.S. industry. They state that GRI has achieved 132 successful products, processes, or techniques that have been commercialized from 545 completed, terminated, or deferred applied R&D projects. For these a benefit-to-cost ratio of 4.4 to 1 is estimated. The successes include furnaces for home heating that have an energy efficiency of 95%, surpassing earlier versions having an efficiency of 60 to 70%. Improvements to manufacturing processes requiring high temperatures save energy, reduce pollution, and increase productivity. Use of cogeneration of electricity and heat has been fostered. Local distribution companies have benefited from development of technologies to permit use of polyethylene pipe. The GRI has had an important role in initiating production of methane from coal seams and expanding production from tight sands and Devonian shale. The R&D has contributed to lowering costs of production, thus benefiting producers and consumers.

In choosing projects to support, GRI uses a project analysis methodology as a decision tool. A sequence of questions concerning each proposed project is asked and the answers are quantified. Questions asked include: What will the project accomplish in terms of efficiency, reliability, emissions levels, and other performance factors? What are the potential markets? What impact will each project have on each market? What is the probability that the calculated benefits will be achieved?

To assist it in attaining balance among its portfolio of projects, GRI utilizes the council of a broad spectrum of experts. About 400 individuals from the gas industry serve on 14 project advisory groups. Another 100 represent the scientific, academic, and policy communities and the broad public interest on board-level advisory bodies. Additional advisers from steel, glass, and engine manufacturers serve in task groups.

Many ongoing projects sponsored by GRI hold promise of significant success. One of them will be natural gas–fueled vehicles. GRI began to build an R&D program for engines in 1986, with a goal of developing natural gas engine technologies for new and existing transit buses and fleet vehicles. As a result, engines are now entering the market in sizes ranging from 3.7 to 12 liters. Passage of the Clean Air Act Amendments in 1990 led to tough air quality standards in nonattainment areas such as California. The California standards are easily met by the new natural gas engines. The big three automakers have begun production of prototype models of natural gas vehicles, including vans and passenger models.

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