



Research and Development in Natural Gas Transmission and Distribution

Executive Summary

The U.S. natural gas transmission and distribution industry has undergone profound and fundamental changes over the past 30 years. Historically, the U. S. natural gas industry has funded research and development (R&D) to address the important industry challenges of maintaining the safety and integrity of the gas transmission and distribution systems, controlling costs and enhancing productivity, and maintaining environmental stewardship. The industry has a solid record of accomplishment in applying the results of R&D to address these challenges.

The purpose of this study is to assess the historical trends and current status of R&D in the gas transmission and distribution (T&D) industry, to examine how that research funding aligns with current industry objectives, to compare gas industry R&D funding to similar industries, and to characterize current R&D organizational structures and strategies. An analysis of general business and gas industry literature and publications, contacts with key individuals and organizations in the gas industry, and independent analysis were used by the research team to complete the work described in this report.

SUMMARY OF FINDINGS

- While R&D spending in U.S. industry as a whole has been increasing, R&D spending in the energy industry, which includes gas transmission and distribution, has been declining and is below comparable industries. In addition, natural gas R&D has also been declining in other countries that have traditionally supported R&D.
- Less than five years ago, the Department of Energy (DOE) and Gas Technology Institute (GTI) managed two significant R&D programs. Today, these programs are gone and collaborative industry funding for R&D has only partially offset the loss of these programs. The resulting decline in industry and government funding has raised concerns about the future impact on the industry and its customers. R&D funding in the transmission and distribution sector has declined about \$25 million and is roughly half of what it was three years ago.
- Funding increases for collaborative industry programs through Pipeline Research Council International for gas transmission, through Operations Technology Development and NYSEARCH for gas distribution, and through the Department of Transportation, Pipeline and Hazardous Materials Safety Administration (PHMSA) for both transmission and distribution have only partially offset these declines.

- An important outcome of the recent funding reductions has been the elimination of formal industry avenues for long-term basic research. With the exception of GTI's SMP program, a small \$2 million program which focuses investments on "mid-term" R&D, the gas industry's R&D funds are focused on near-term developments. In contrast, the electric and water industries each maintain basic research programs oriented at longer-term industry goals through their primary industry R&D collaboratives and their government funding agencies.
- Key non-manufacturing transportation industries (air, rail and trucking transportation) all have federal government R&D programs targeting safety and reliability improvements. These programs are analogous to the DOT PHMSA R&D program for gas pipeline safety and reliability. There is \$8 million of government funding currently available for gas pipeline R&D (\$4 million from DOT PHMSA; \$4 million from the Department of Interior's Minerals Management Service (MMS) for offshore pipelines R&D). The R&D intensity¹ of this combined U.S. government gas pipeline R&D funding is 0.05% compared to 0.10% for air transportation, 0.07% for trucking transportation, and 0.15% for rail transportation.
- Comparable industries (electric utilities, potable water, propane, and heating oil) all have significant collaborative industry programs administered through a surcharge or fee-based mechanism. As of December 2006, the natural gas distribution industry had surcharge mechanisms in 21 states.
- The current gas industry R&D environment places a premium on coordination and communications to assure high priority issues are addressed and to minimize duplication. The former GRI and DOE programs were planned and implemented with public funds. The R&D priority-setting and budget planning processes were open and the resulting plans and "roadmaps" were public documents. Therefore, all interested stakeholders had the ability to know what research was being conducted and to gauge progress. Today, gas distribution R&D programs are conducted in a more decentralized environment that creates a greater demand for the industry to coordinate R&D activities and it creates a greater need for communications. The natural gas transmission (pipeline) sector is less fragmented by its focus on PRCI and the close coupling of the PRCI and PHMSA programs.
- Further investigation is needed to determine what actions may be necessary to address the impact of this downward trend in R&D funding on the development of new and innovative products to meet the future needs of the natural gas industry. The trend should be a concern for all sectors of the industry and should lead to use of collaborative models and long-term planning to ensure that products and services come to the market that address the priorities of the industry and expectations of all stakeholders (including government and customers).

¹ R&D intensity = research funds divided by net revenues