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## Linking Science, Innovation, and Policy to Transform the World's Energy Systems: the MIT Energy Initiative

### ABSTRACT

A thesis for the approach MIT has taken in its energy initiative, MITEI, is that positively affecting global energy systems requires significant, multidisciplinary efforts across science, technology, economics, and policy. The structure of MITEI and the organization of its programs flow from this philosophy. MITEI focuses on four major themes: research, education, campus energy management, and outreach. In conducting its work, MITEI engages more than 60 industrial and governmental partners on four different continents. This partnership model involves sponsored-directed research, shared early-stage research, and development of graduate students and postdoctoral research associates.

MITEI's outreach activities are illustrated by a series of integrated studies conducted over the past eight years on key technology/policy issues in meeting projected growth in energy demand by midcentury in a carbon constrained world. A current study on *The Future of Natural Gas* underscores the significant potential for natural gas in the global energy mix over the next 50 years. As the least carbon intensive fossil fuel, it may play a key role as a bridge to low carbon future technologies. Although markets for natural gas are currently primarily regional, this may well change over the next 15 to 20 years.

The natural gas study suggests that in the absence of carbon prices, the most feasible path towards a low carbon future involves three components: demand reduction; coal to gas switching; and research, development, and demonstration to drive down costs for low/zero carbon technologies. Some specific examples of novel research at MIT in this latter category are described in the presentation.

### BIOGRAPHY

**Professor Robert C. Armstrong** is the Director of the MIT Energy Initiative and Chevron Professor of Chemical Engineering at the Massachusetts Institute of Technology (MIT). He was previously Department Head of Chemical Engineering at MIT and served as co-chair of MIT's Energy Research Council and as the Founding Deputy Director of the MIT Energy Initiative. He completed his undergraduate studies at the Georgia Institute of Technology with highest honors in 1970, with the Bachelor of Chemical Engineering Degree. He then received the Doctor of Philosophy in 1973 from the University of Wisconsin, Madison, in Chemical Engineering.

Professor Armstrong has received a number of awards, including the AIChE Warren K. Lewis Award, AIChE Professional Progress Award, the Bingham Medal from the Society of Rheology, the University of Wisconsin-Madison Distinguished Service Citation, and election to the Georgia Tech Academy of Distinguished Engineering Alumni. His two-volume book, "Dynamics of Polymer Liquids" has been named a Citation Classic. He is a member of the National Academy of Engineering.

Professor Armstrong has published and lectured extensively in the areas of energy, polymer fluid mechanics, and the rheology of complex materials.