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## **Four Critical Needs to Change the Hydrate Energy Paradigm from Assessment to Production: The 2007 Report to Congress by The U.S. Federal Methane Hydrate Advisory Committee**

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### **Abstract**

This work summarizes a two-year study by the U.S. Federal Methane Hydrate Advisory Committee recommending the future needs for federally-supported hydrate research. The Report was submitted to the US Congress on August 14, 2007 and includes four recommendations regarding (a) permafrost hydrate production testing, (b) marine hydrate viability assessment, (c) climate effect of hydrates, and (d) international cooperation.

### **Introduction**

A secure supply of natural gas is a vital goal of the U.S. national energy policy because natural gas is the cleanest and most widely used of all fossil fuels. The relative cleanliness of natural gas, (with the lowest CO<sub>2</sub> emission per unit of heat energy of any fossil fuel) in combination with the magnitude of potential reserves, dictates that a comprehensive assessment of domestically available resource be undertaken and included in the national portfolio. Both as a fuel and a feedstock, a secure and reasonably priced supply of natural gas is important to industry, electric power generators, large and small commercial enterprises, and homeowners.

Because each volume of solid gas hydrate contains as much as 164 standard volumes of methane, hydrates can be viewed as a concentrated form of natural gas equivalent to compressed gas but less concentrated than liquefied natural gas (LNG). Natural hydrate accumulations worldwide are estimated to contain 700,000 trillion cubic feet (TCF) of natural gas, of which 200,000 TCF are located within the United States. Compared with the current national annual consumption of 22 TCF, this estimate of in-place gas is enormous. Clearly, if only a fraction of the hydrated methane is recoverable, hydrates could constitute a substantial component of the future energy portfolio of the nation (Figure 1). However, at the present time recovery poses major technical and commercial challenges.

Such numbers have sparked interest in natural gas hydrates as a future potential, long-term source of energy, as well as concerns about any potential impact the release of methane from hydrates might have on the environment. Other countries that import most of their energy, such as India and Japan, are outspending the United States on hydrate science and engineering R&D by an order of magnitude, may bring this resource to market as much as a decade before the United States. It is clear, however, that verifying the role of methane hydrates in global climate change is critical because of the fact that methane has a greenhouse warming potential 21 times that of CO<sub>2</sub>. A better understanding of the pivotal role that hydrates might play in the global climate could influence U.S. policy choices related to global warming mitigation decisions.