



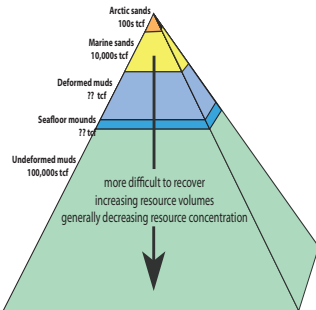
FOSSIL ENERGY RESEARCH BENEFITS

Methane Hydrate R&D

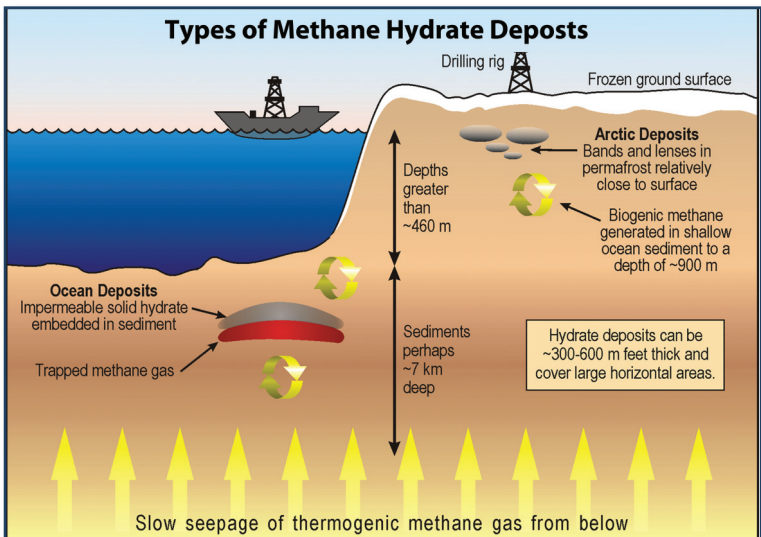
Natural gas is an important energy resource for the United States, providing nearly one-quarter of total energy use. The Department of Energy's **Office of Fossil Energy (FE)** has played a major role in developing technologies to help tap new, unconventional sources of natural gas.

"The (DOE) Program has supported and managed a high-quality research portfolio that has enabled significant progress toward the (DOE) Program's long-term goals."

The National Academies 2010



One of these is **methane hydrate** — molecules of natural gas trapped in ice crystals. Containing vast amounts of natural gas, methane hydrate occurs in a variety of forms in sediments within and below thick permafrost in Arctic regions, and in the subsurface of continental waters with a depth of 1,500 feet or greater.



Source: NETL

In 2008, the U.S. Minerals Management Service identified **6,700 trillion cubic feet** (tcf) of gas in favorable hydrate accumulations offshore in the Gulf of Mexico. A U.S. Geological Survey assessment indicated another **85 tcf** of recoverable resources on the Alaska North Slope. Comparatively, U.S. technically recoverable natural gas resources are estimated at **2,552 tcf**. **FE field projects** in Alaska (2007) and the Gulf of Mexico (2009) have provided initial confirmation of these assessments.



Gas Hydrate test well; Alaska North Slope, April 2011

Facts About FE's Methane Hydrate R&D

- ✓ FE scientists began studying methane hydrate as a possibly immense source of natural gas in **1983**.
- ✓ The **Methane Hydrate Research and Development Act** of 2000 established DOE as the lead U.S. agency for R&D in this field.
- ✓ Early phases of research successfully addressed industry concerns about the **safety of drilling** through deepwater gas hydrates.
- ✓ FE researchers have conducted **the first forward climate modeling** to incorporate potential gas hydrate feedbacks.
- ✓ FE researchers identified and drilled seven targets in the Gulf of Mexico in 2009 — finding resource-grade occurrences in four wells, and **occurrences that matched pre-drill predictions** in six wells.
- ✓ Innovative technology is being developed to **inject CO₂** into methane hydrate deposits to both release the fuel and permanently store carbon dioxide.
- ✓ FE scientists have collaborated actively with researchers in Japan, Korea, India, China, Canada, and other nations.
- ✓ The **National Academy of Sciences** has praised FE's hydrate initiatives as having "moved the field forward."

