

Midstream Workshop

**Office of Oil and Natural Gas
Division of Supply and Delivery**

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U.S. DEPARTMENT OF
ENERGY

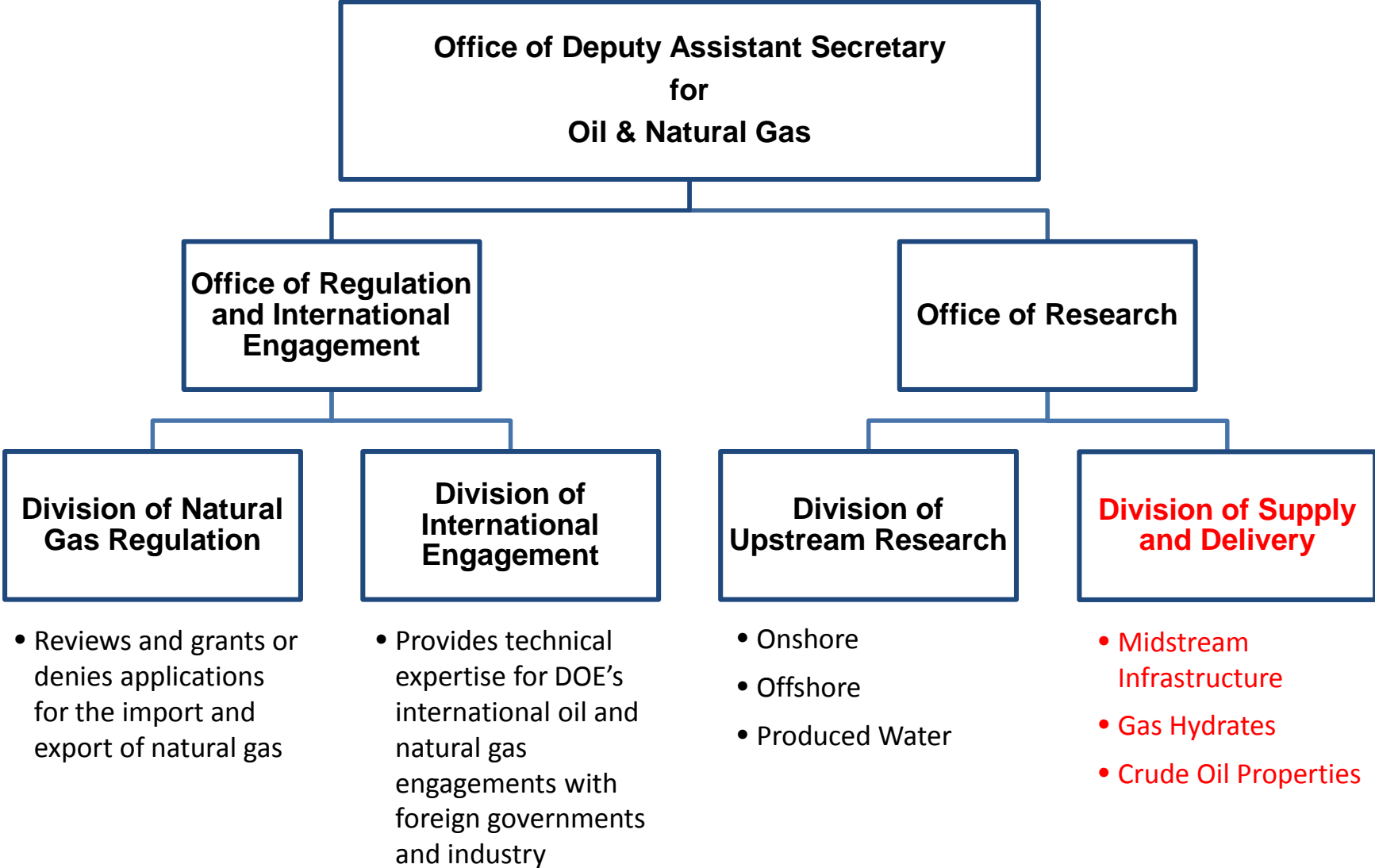
Office of
Fossil Energy

- Division Mission and Organization
- Program Summaries
- Overview of Breakouts

Mission

Maximize the value of U.S. oil and gas resources to the public and ensure their responsible development and delivery through policy, research, innovation, and outreach

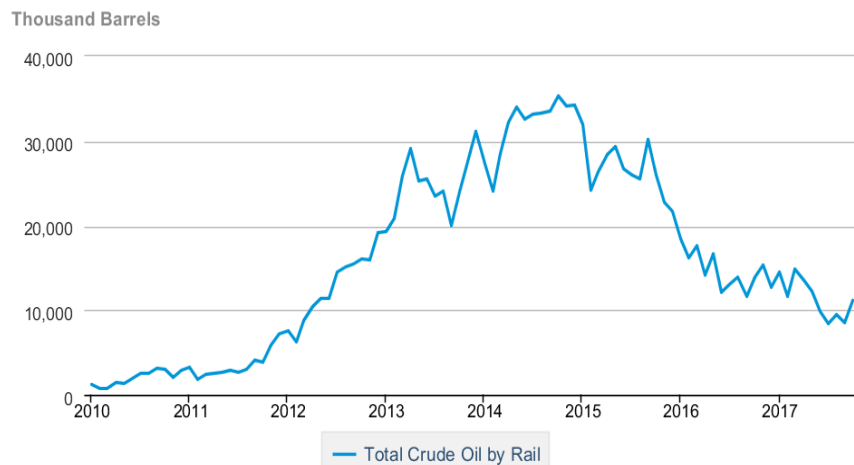
- **Advance America's unconventional oil & natural gas revolution through R&D that enhances energy security, supports economic growth**
- **Regulate U.S. natural gas trade including liquefied natural gas (LNG)**
- **Ensure that oil and natural gas operations are safe and sustainable**
- **Develop technologies to modernize oil and natural gas infrastructure in support of efficiency and safety**
- **Provide data and tools to ensure transparency to public, states, oil and gas producers and other stakeholders**



Crude Oil Characteristics (crude-by-rail)

Total crude-by-rail movements in the United States and between the United States and Canada were more than 350,000 barrels per day (bbl/d) in 2017, up from 55,000 bbl/d in 2010.

Total Crude Oil by Rail



 Source: U.S. Energy Information Administration

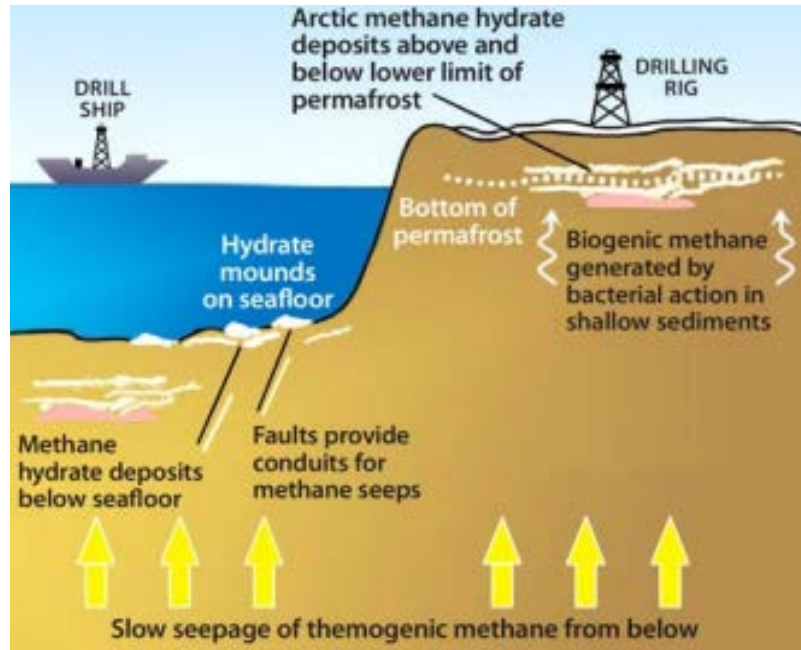
DOE research program includes:

- **Identify the most appropriate sampling and testing methods for crude oils**
- **Sampling, testing and compilation of data on different crude oils using those methods**
- **Combustion testing to identify relationships between a particular chemical or physical property of crude oil, or combination of such properties, and combustion properties**

R & D will evaluate whether unconventional crude oils currently transported in North America, exhibit physical or chemical properties that are distinct from conventional crudes, and how these properties associate with combustion hazards that may be realized during transportation and handling.

Methane Hydrate Research

The world's supply of gas hydrates may contain more organic carbon than coal, oil, and other natural gas combined.



Types of methane hydrate deposits

*Source: U.S. Department of Energy, National Energy
Technology Laboratory*

- Global resource estimates range from 250,000 to 700,000 trillion cubic feet
- DOE research program includes:
 - Production feasibility
 - Resource characterization and modeling
 - Environmental Impacts
 - International collaboration



- R&D has the potential to impact gas hydrates just as it did for shale and unconventional resource development over the past 30 years.

Pipeline Inspection & Repair

- Expand gas loss mitigation into pipeline inspection and repair, valves, controllers, and compressors.

Smart Sensors for Pipeline Operational Efficiency

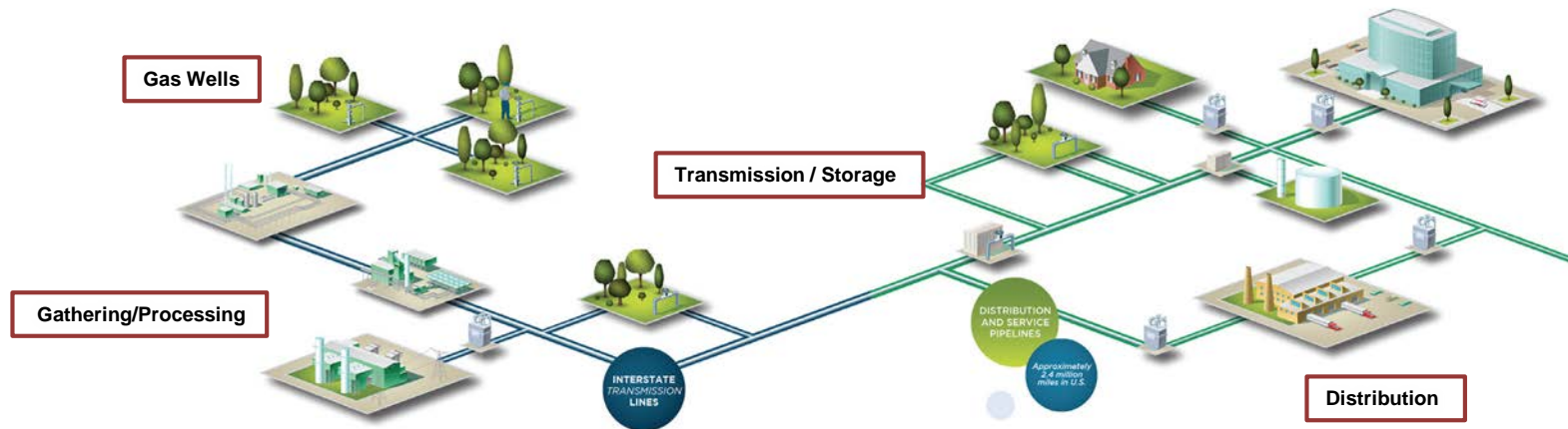
- Continuous in-pipe communication of operational parameters

Advanced Materials Research

- Accelerate advances in materials science that can enhance pipe integrity, reduce gas leaks, and improve the efficiency of midstream infrastructure operations

Leak Detection & Monitoring

- Identification and measurement of gas leaks, quantification into gathering lines, underground gas storage facilities, and compressors, and remote sensing of super-emitters



BREAKOUT SESSION #1

- **Advanced Materials (Pipelines), Coatings, Liners**

Facilitator: Tim Reinhardt | Rapporteurs: Paul Ohodnicki | Note taker: Kelli Snedegar

- **Data Science and Management (Cybersecurity, HPC & Sensors)**

Facilitator: Jared Ciferno | Rapporteurs: Grant Bromhal | Note taker: Karl Lang

LUNCH | Speaker: Yongkoo Seol; overview of gas hydrates

BREAKOUT SESSION #2

- **Pipeline Inspection and Repair and Compressors**

Facilitator: Christopher Freitas | Rapporteurs: Tim Skone & Eric Smistad | Note taker: Karl Lang

- **Methane Recycling**

Facilitator: Tim Reinhardt & Jared Ciferno | Rapporteurs: Natalie Pekney | Note taker: Paige Wagner

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