

Making Investment Decisions to Achieve Energy Dominance - The DOE's Approach*

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Abstract

DOE's Office of Oil and Gas Research is focused on basic research and technology development to address onshore and offshore upstream and midstream oil and natural gas challenges that the nation is facing, with a focus on safety, environmental friendliness, and energy dominance. It builds partnerships with national laboratories, the oil industry, and academia to cover different types of long-term contracts that represent a wide range of risk sharing, funding arrangements, and transparency requirements, in order to improve efficiency, quality, and access. The Director is responsible for managing an annual budget that can vary from year to year, according to Congress, and is divided into different program buckets. The Director must help identify enabling themes and technologies, and determine which R&D projects/partners to fund and at what level. It is also critical to develop and implement a strategy and framework to integrate these seemingly-discrete projects and partners synergistically, moving effectively and efficiently from innovation toward commercialization. Input from oil companies and service companies is an important element of our process.

Making Investment Decisions to Achieve Energy Dominance- the DOE's Approach

2018 Annual AAPG Meeting

Session: "The Business of Oil and Gas: The Many Pathways to Success"

Alan J. Cohen, Ph.D.

Director of Research

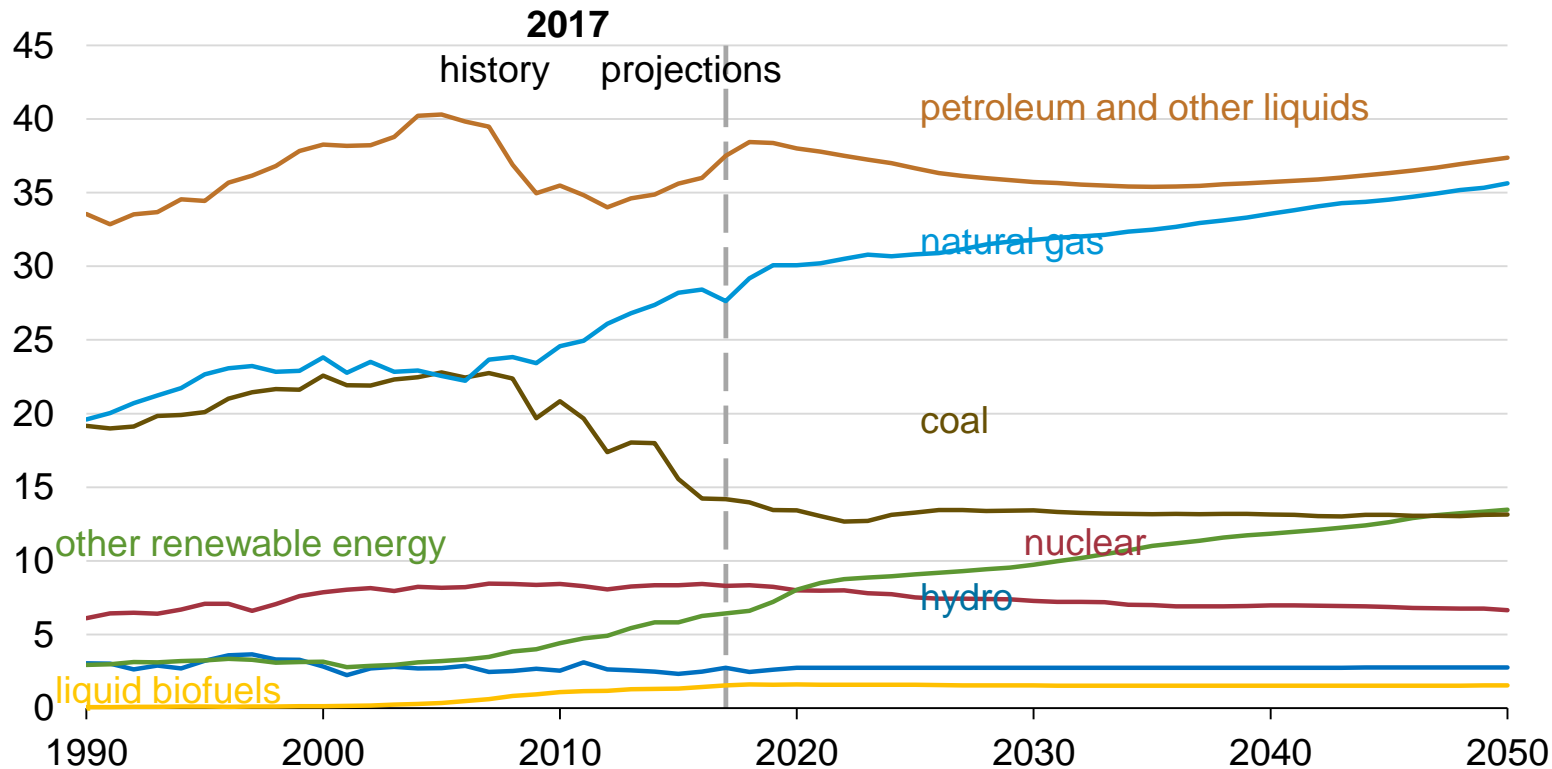
DOE Office of Oil and Natural Gas

May 22, 2018

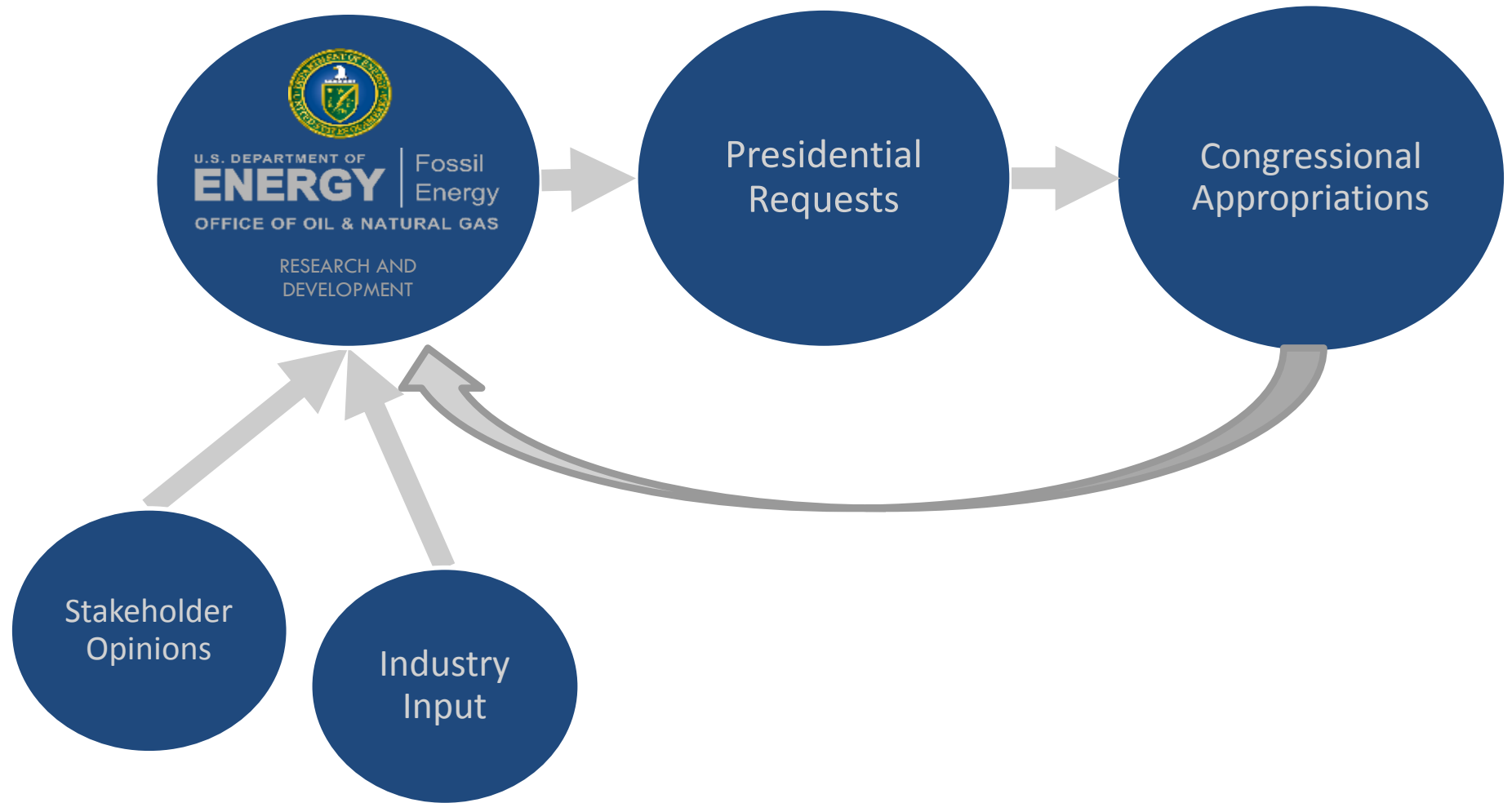


OIL AND NATURAL GAS ARE EXPECTED TO REMAIN DOMINANT FUELS

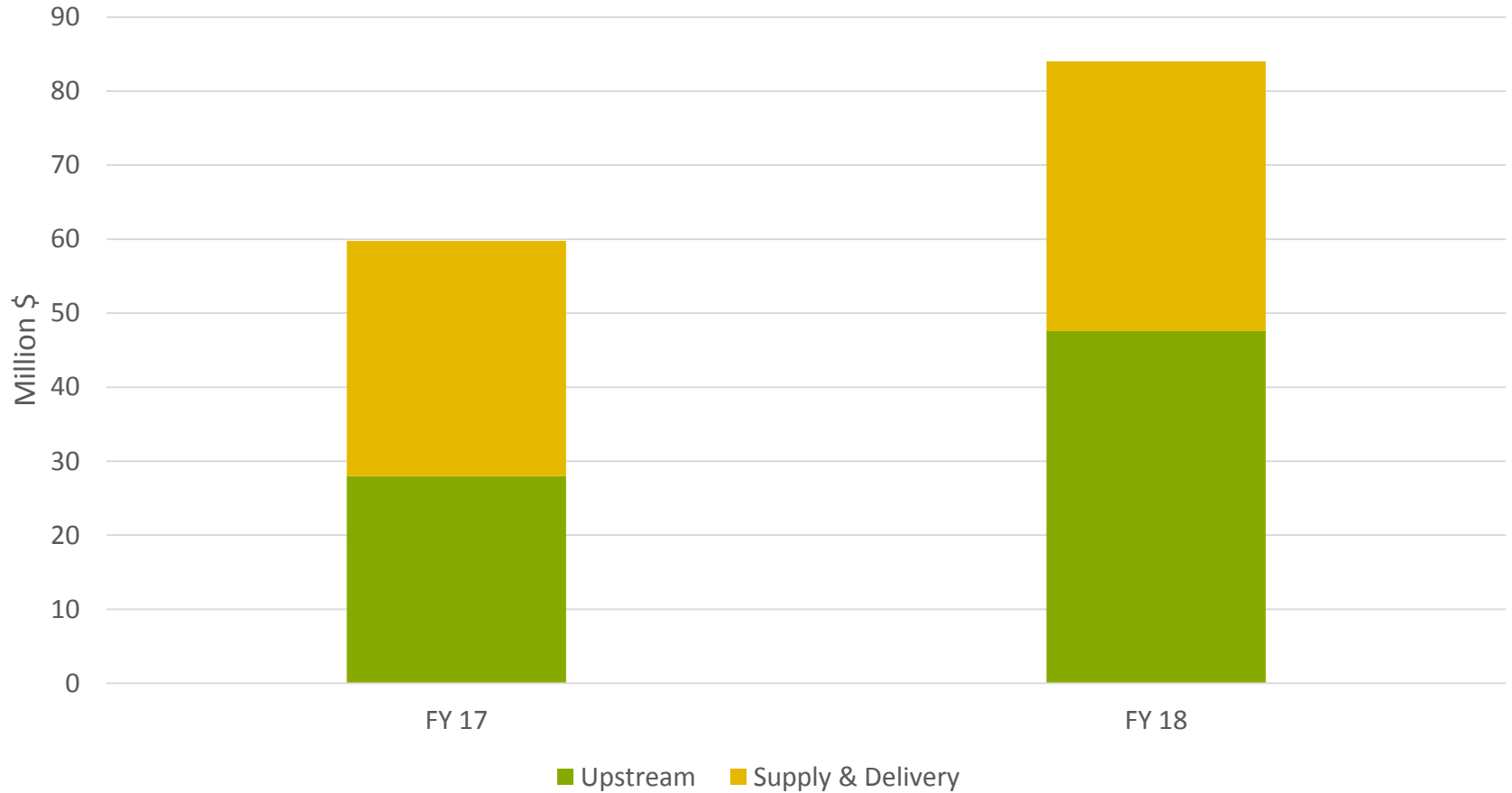
**Energy consumption by fuel
(Reference case)**
quadrillion British thermal units



INPUTS, INFLUENCES, AND CONSTRAINTS



OIL AND GAS R&D BUDGET FY 2017 – FY 2018



OIL AND GAS WORKSHOPS: FEBRUARY 2018

Upstream R&D Workshop

Topics discussed at this workshop included: increasing recovery efficiency in shale/tight oil and gas reservoirs; produced water management; novel systems and sensors; high-performance computing and machine learning; gas hydrate production; and other topics related to prudent onshore and offshore operations.

- Example industry recommendations received (non-consensus) included:
 - Continue R&D on fundamental measurements and advanced models of shale geochemistry and geomechanics to improve recovery efficiency
 - Support R&D to address aging offshore infrastructure
 - Continue cost-shared field laboratories

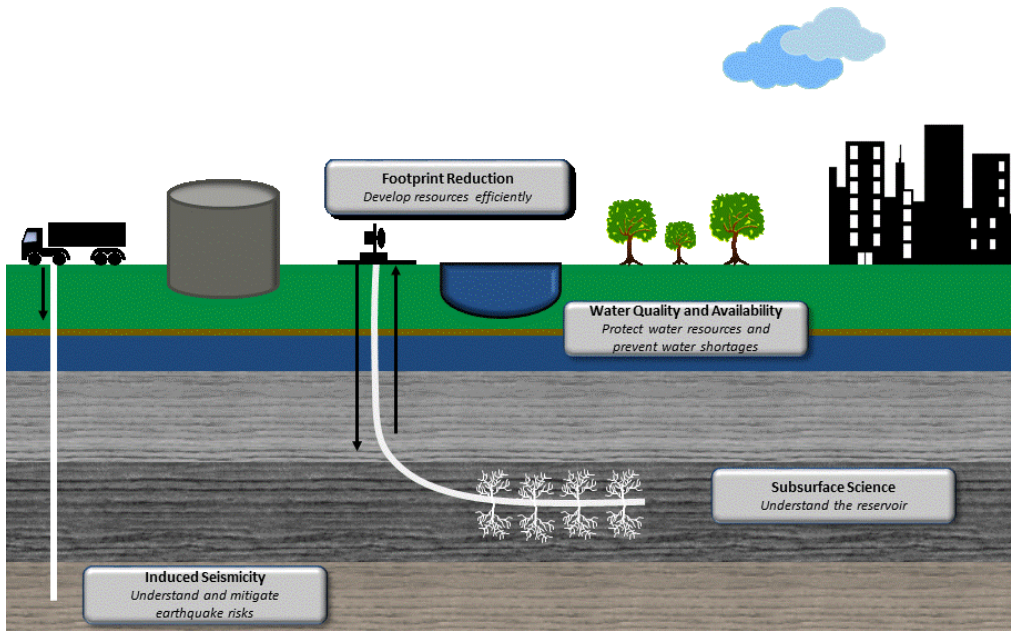
Natural Gas Midstream Infrastructure R&D Workshop

Topics discussed at this workshop included: advanced materials (pipelines), coatings and liners; data science and management (cybersecurity, HPC & sensors); pipeline inspection and repair and compressors; methane recycling— capture and recovery, recycling, direct use and methane conversion technologies; and gas hydrates.

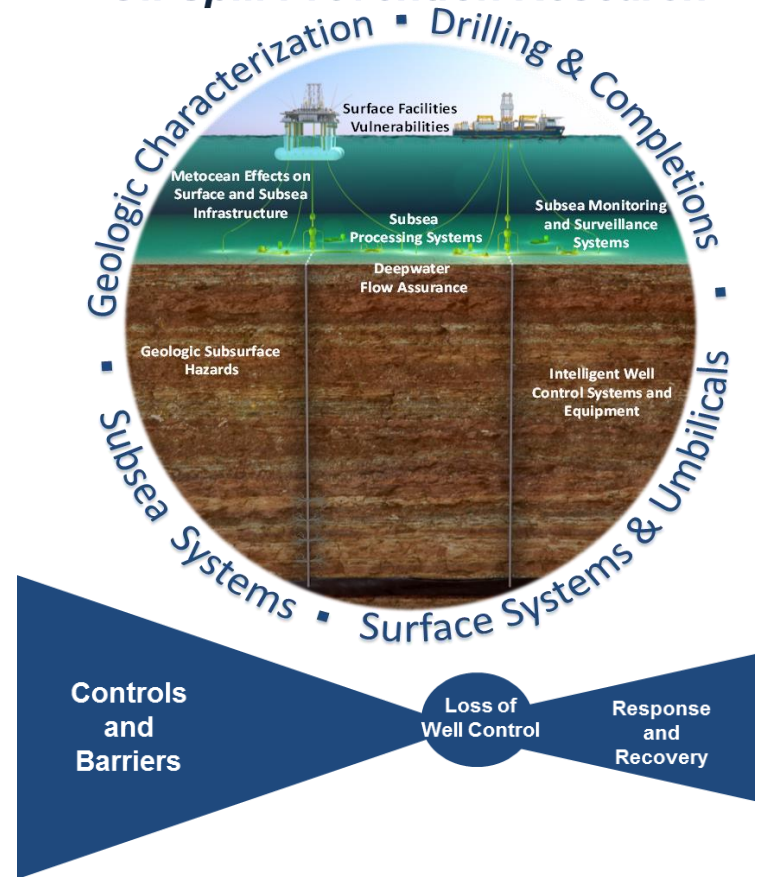
- Example industry recommendations received (non-consensus) included:
 - Develop advanced materials to enhance the pipeline deliverability of methane & mixed fuels
 - Create new predictive analytical models combined with high-performance computing for a better understanding of pipeline material properties to quickly analyze & assign priority to actions associated with observed anomalies
 - Develop technology to inspect & detect anomalies in unpiggable pipes (e.g. corrosion, cracks, dents)

DOE UPSTREAM OIL AND GAS RESEARCH PROGRAMS

Onshore Recovery Efficiency

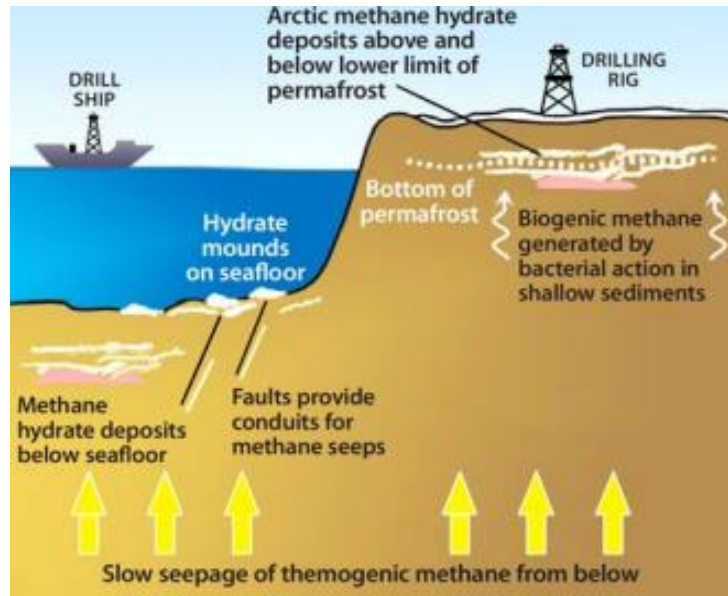


Oil Spill Prevention Research



DIVISION OF SUPPLY AND DELIVERY RESEARCH PROGRAMS

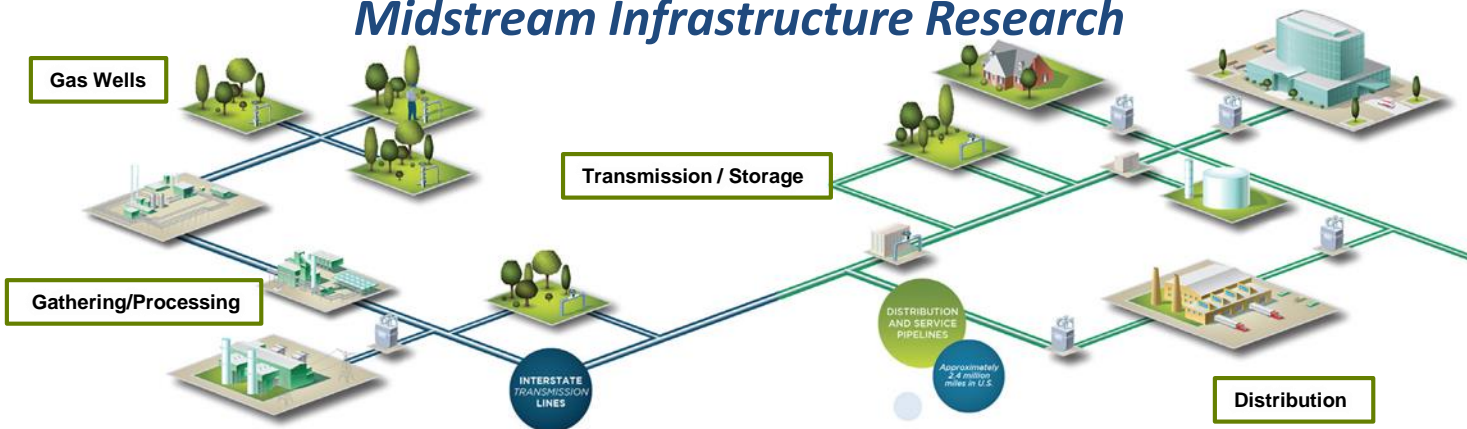
Methane Hydrate Research



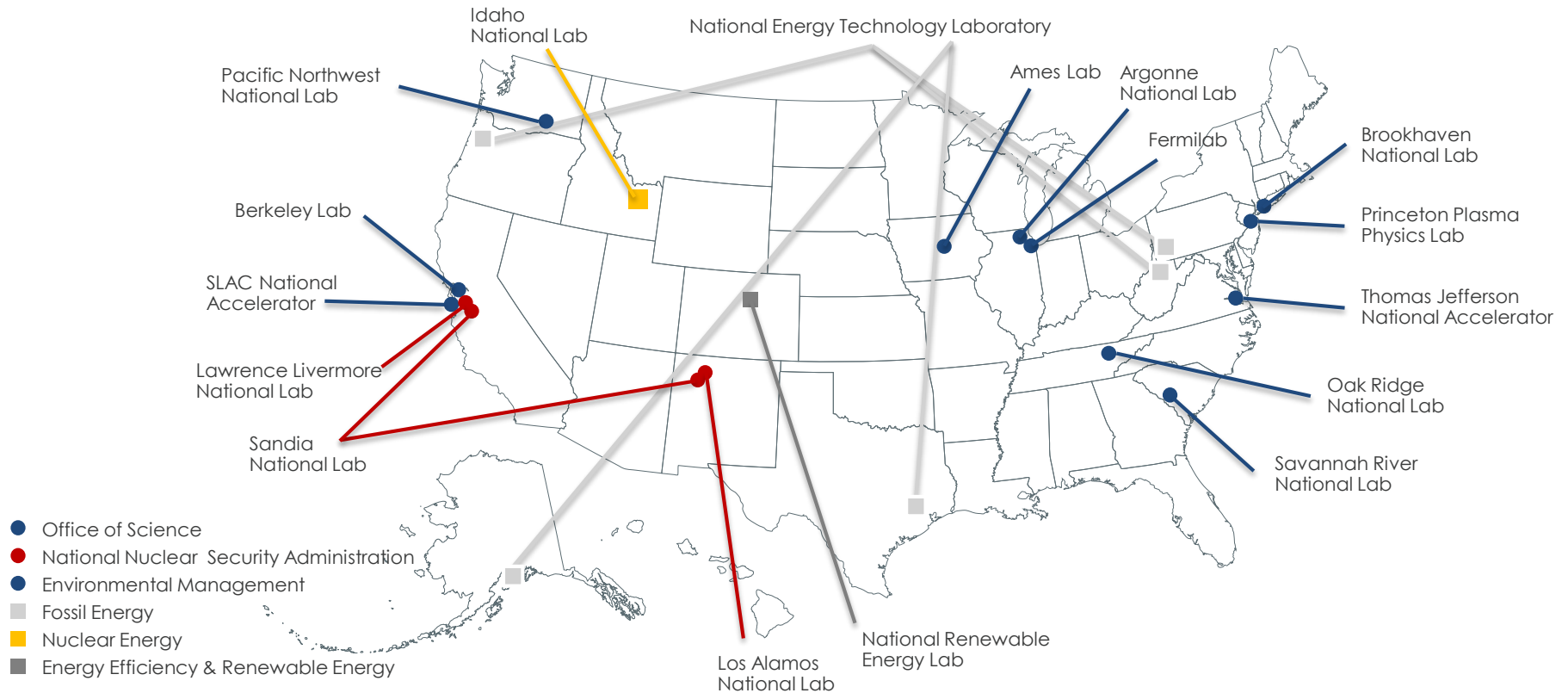
DOE/DOT Crude Oil Research Study



Midstream Infrastructure Research



THE NATIONAL LABORATORY SYSTEM



Fundamental Science at Nanopore scale (National Laboratory R&D)

LANL

- thermodynamics at nanopore scale
- fracture generation and hydrocarbon flow in heterolithic formations

LBNL

- petrophysics of oil-rich shale
- petrophysics of water injection on shale gas mobilization into fractures
- geomechanics of fracture initiation and propagation and permeability evolution

NETL

- geochemical analysis of core from existing Field Labs
- air and water analysis at MSEEL

SLAC

- effects of chemical additives especially mineral precipitation

SNL

- equations of state for CH₄, CO₂, and H₂O
- equations of state CO₂, and H₂O

DOE FE KNOWLEDGE MANAGEMENT SYSTEM – CONTENT, COMMUNITIES, CAPABILITIES

- DOE FE developing a knowledge management system in order to connect people to information, solutions, communities, and other people
- Top priorities include:
 - User Dashboard
 - Personal Profiles
 - Resume, publications, project tracking, communities
 - Technical Communities
 - Calendars, discussion forum, chat
 - Knowledge Resources
 - High-level or opt-in news feeds
 - Wiki-style FE glossary, library, datasets



HOW DOE DOES BUSINESS: COST SHARED FUNDING OPPORTUNITIES

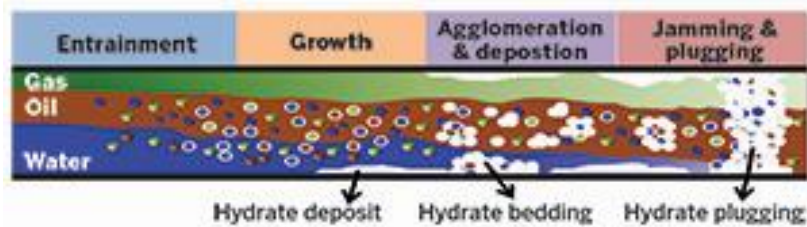


- Funding Opportunity Announcements (FOA) are typically open for 60-80 days
- Opportunities are posted on FedConnect, DOE, and NETL websites

RECENT UPSTREAM COST-SHARED PROJECT SELECTIONS

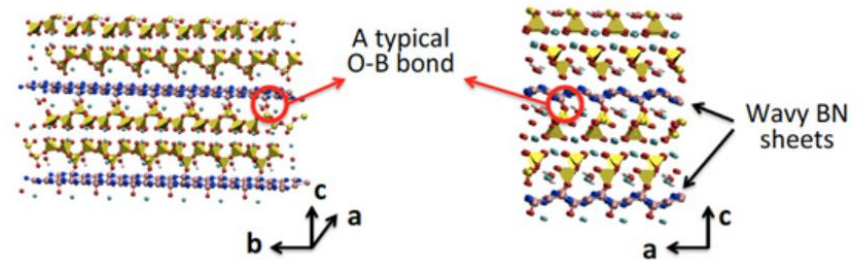
In-Situ Applied Coatings for Mitigating Gas Hydrate Deposition in Deepwater Operations

Colorado School of Mines



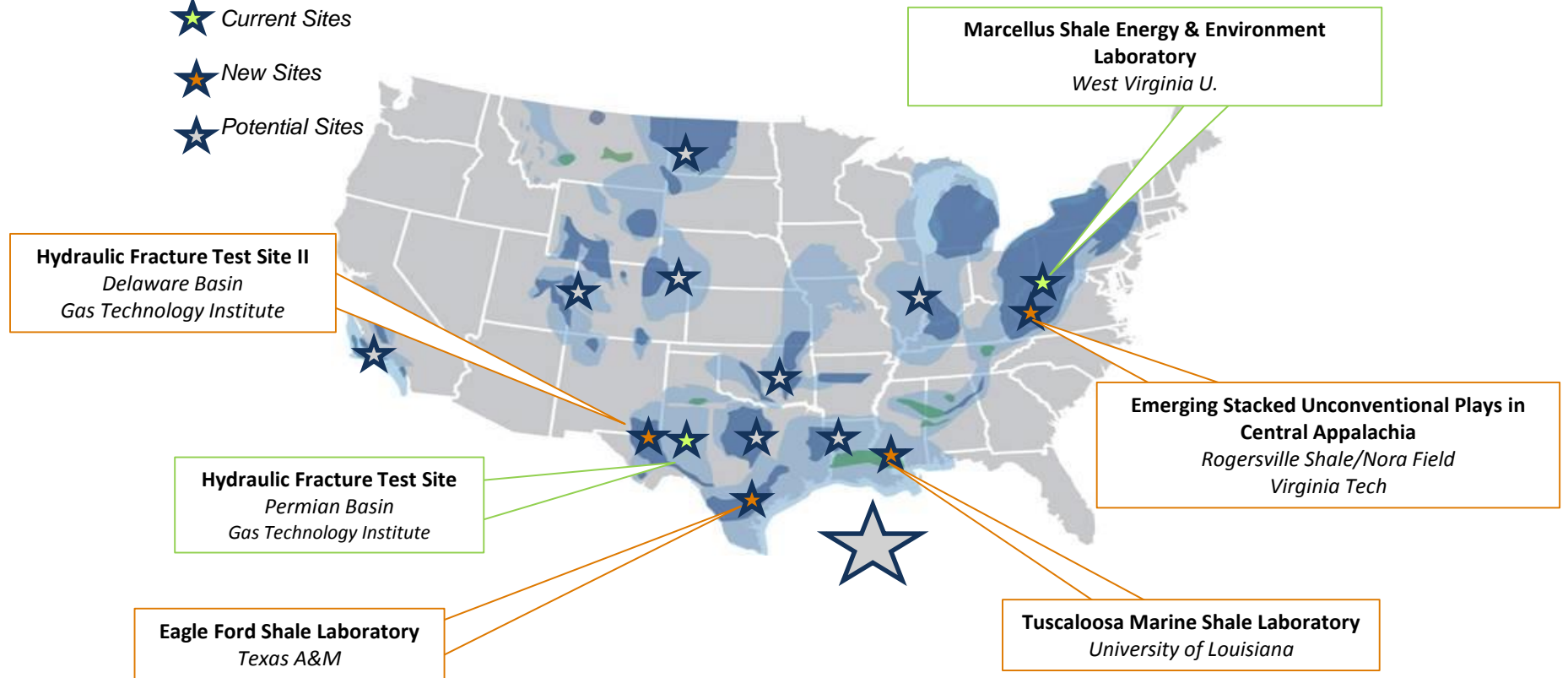
Hexagonal Boron Nitride Reinforced Multifunctional Well Cement for Extreme Environments

C-Crete Technologies



FIELD LABORATORIES (COST-SHARED R&D)

- ★ Current Sites
- ★ New Sites
- ★ Potential Sites



THANK YOU

QUESTIONS?

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For Additional Information Please Visit:
energy.gov/fe/science-innovation/oil-gas-research
<https://www.netl.doe.gov/research/oil-and-gas>



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