

Meeting the Dual Challenge and Dynamic Delivery Study Impact

Shawn Bennett
Deputy Assistant Secretary
for Oil and Natural Gas

National Petroleum Council

December 15, 2020



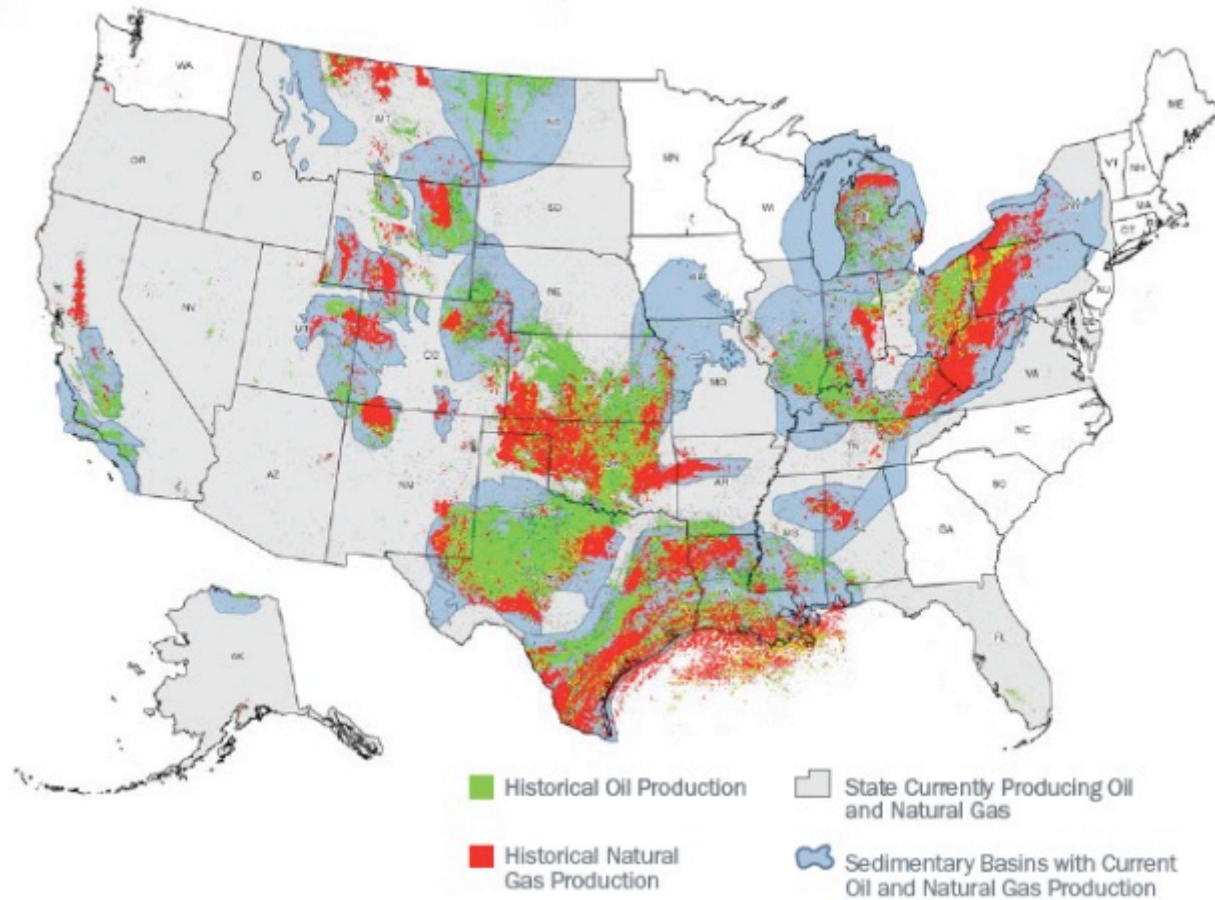
U.S. DEPARTMENT OF
ENERGY

Office of
Fossil Energy

An Evolving Energy Landscape

Through these studies, the Department of Energy sought a better understanding of:

- Enabling an all-of-the-above ***energy transition that provides secure, reliable and affordable energy***, continuing the economic prosperity fueled by the energy industry
- ***Development of key infrastructure*** to address recent shifts in production and resources
- ***Areas where technology advancements are needed***, specific to both study topics



DOE's Role in Implementing the Study Recommendations

Dynamic Delivery offers insight on the nation's vital oil and natural gas transportation infrastructure in an ever-evolving energy landscape and provides recommendations on the following themes:

- Increase the Efficiency, Effectiveness, and Predictability of Permitting Processes for Infrastructure Projects
- Enhance Recent Regulatory Reform Efforts
- Promote Economic Development of Oil and Natural Gas Resources to Support Societal Benefits and Enhance National Security
- Promote More Rapid Development and Implementation of Technology to Increase Transportation Safety and Integrity (including Cybersecurity)

Meeting the Dual Challenge provides a roadmap for the deployment of carbon capture, use, and storage (CCUS) technologies at scale in the U.S., including recommendations on:

- CCUS Supply Chains and the Surrounding Economics
- Policy, Regulatory, and Legal Enablers for the Deployment of CCUS
- The Role of CCUS in the Future Energy Mix

Promoting Development and Implementation of Technology through Midstream R&D

Dynamic Delivery called for continued investment in midstream technology R&D. The Department of Energy's research includes:

- Improving the resiliency and reliability of midstream infrastructure through advances in pipeline materials and inspection technologies
- Supporting industry efforts to improve transmission and distribution efficiency across the natural gas supply chain
- Utilizing AI, machine learning and big data predictive analytics software tools and sensor platforms to mitigate methane emissions
- Developing advanced conversion and utilization technologies that will significantly reduce vented and flared natural gas



Materials



**Transmission and
Distribution**



**Emissions
Mitigation/Quantification**

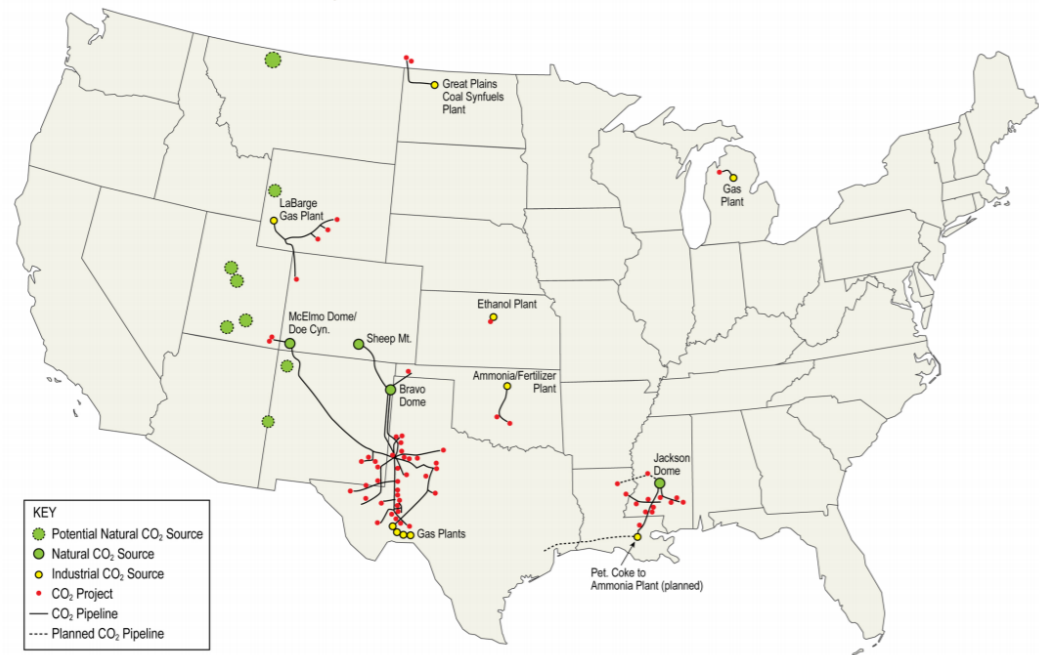


Natural Gas Conversion

Promoting Development and Implementation of Carbon Capture and Storage Technology Through R&D

Meeting the Dual Challenge recommended increased funding for CO₂ capture and storage, including **enhanced oil recovery**. The Department of Energy continues to work in this area, including:

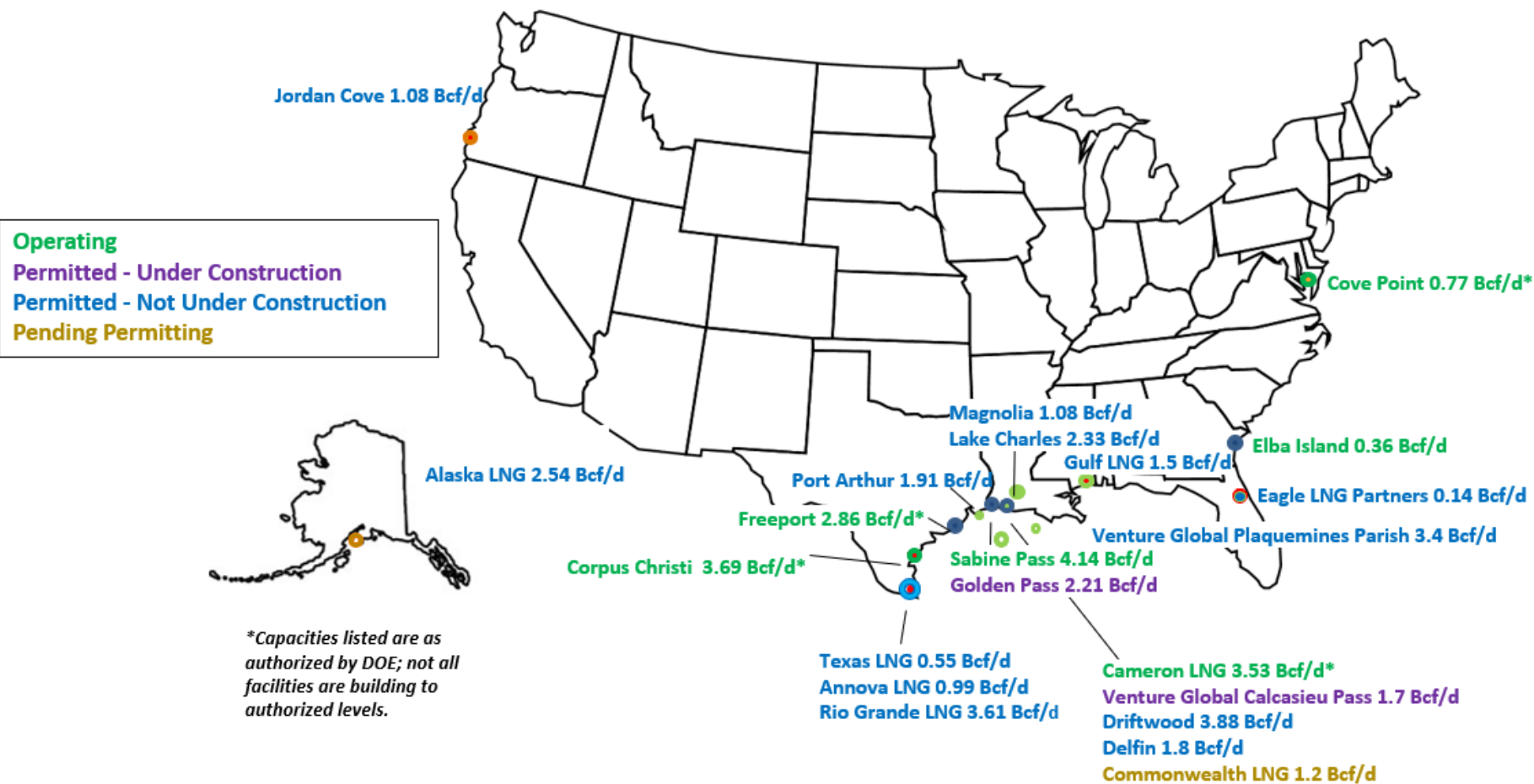
- Field demonstrations of basin-specific technologies to maximize resource recovery and operational efficiency with prudent environmental stewardship
- Using artificial intelligence, big data, and machine learning to model, analyze, and predict subsurface conditions for storage and enhanced oil recovery
- Funding announced in April 2020 for up to \$131 million in cost-shared carbon capture and storage R&D for industrial and power production applications



Location of Current CO₂ EOR Projects and Pipeline Infrastructure

Increasing the Efficiency, Effectiveness, and Predictability of Permitting Processes: LNG Exports

Dynamic Delivery highlights the benefits of America's abundant energy supply. Increased export of American energy products, such as LNG, can expand those benefits domestically and internationally.



Enhancing Regulatory Reform Efforts: Regulatory Adoption of New Technology



Crack Detection In-Line-Inspection Tool

Source: Baker Hughes Company.

In-line-inspection tools are an example of regulatory acceptance lagging behind rapidly advancing technology innovations

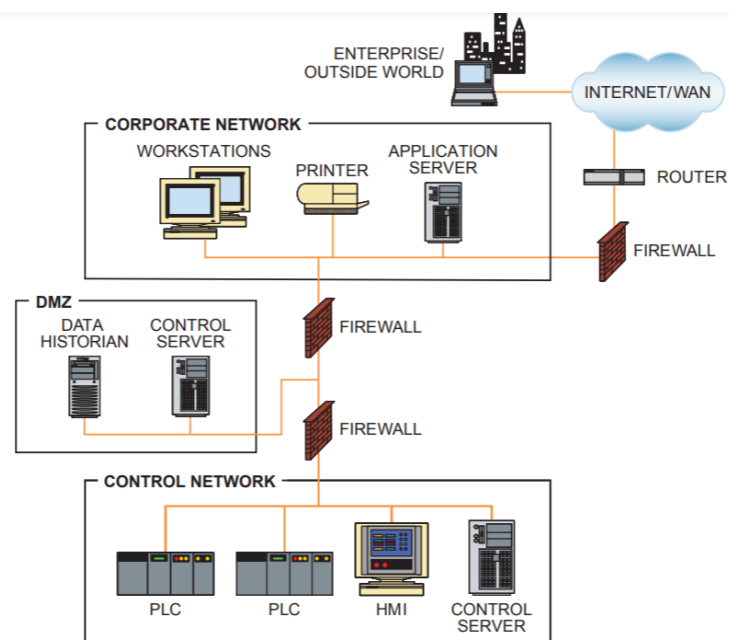
Dynamic Delivery highlighted ways to ease regulatory burdens on midstream operators by accelerating DOT PHMSA adoption of innovative technologies that can **improve the reliability, safety, resiliency, and environmental performance of the midstream industry**. This includes accelerating the testing, validation, and industry standard process for advanced technology.

The Department of Energy is collaborating with other government agencies and industry stakeholders to develop an agile pathway for the adoption of pipeline integrity technologies.

Promoting Development and Implementation of Technology: Cybersecurity

Dynamic Delivery noted the increasing number and severity of cybersecurity threats to operating technology (OT) systems and their potential impacts to resiliency, reliability and deliverability of products. This aligns with the Administration's efforts to understand, identify, and safeguard against these threats.

- DOE's Office of Cybersecurity, Energy Security, and Emergency Response supports R&D to mitigate vulnerabilities and cyber threats and collaborates with industry on information sharing around identified threats



Source: NIST Special Publication 800-82, Guide to Industrial Control Systems (ICS) Security: Supervisory Control and Data Acquisition (SCADA) systems, Distributed Control Systems (DCS), and other control system configurations such as Programmable Logic Controllers (PLC).

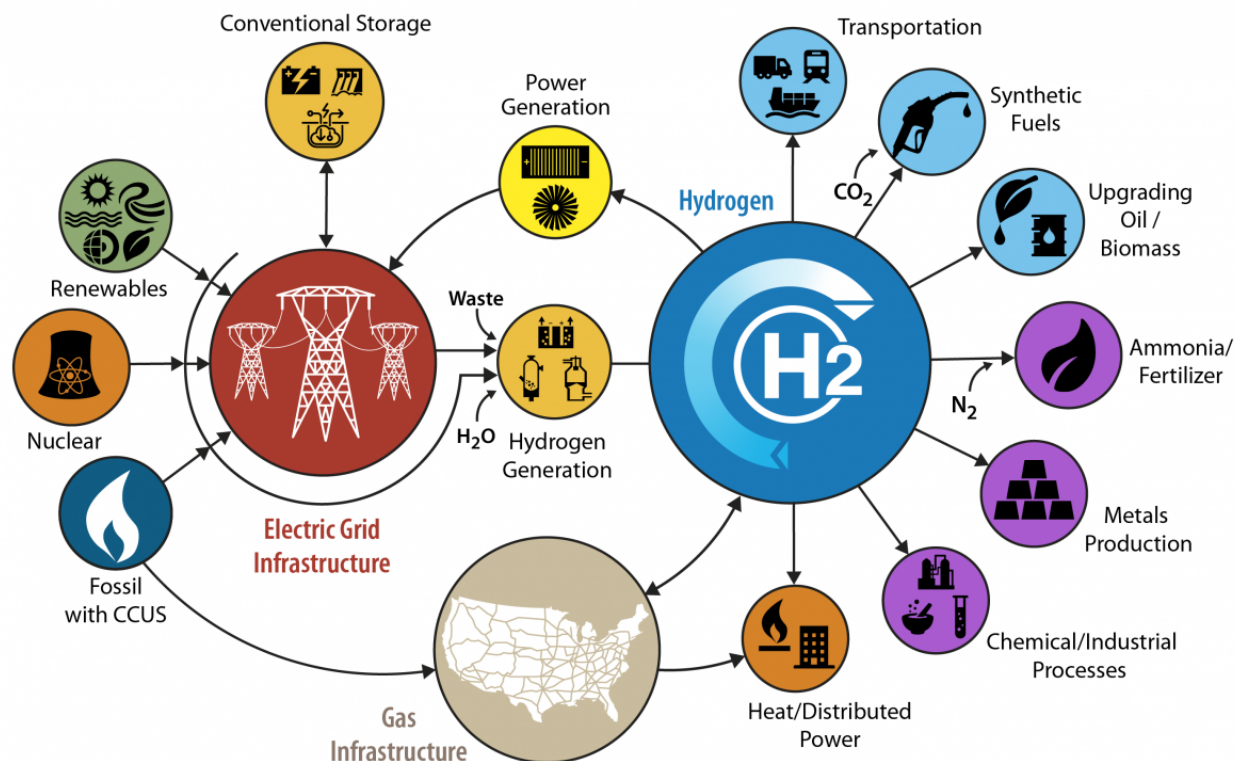
Figure 4-41. Firewall between Corporate Network and Control Network.

Enabling the Energy Transition: Hydrogen

Under a decarbonization pathway, hydrogen could play a key role in the world's transition to a lower CO₂ intensive energy system.

The Offices of Oil & Natural Gas and Clean Coal & Carbon Management have begun collaborating on ideas for how blue hydrogen as a fuel for industry and transportation, among other uses, might be efficiently and impactfully produced and transported, with a focus on:

- Materials science challenges associated with hydrogen infrastructure
- Production and combustion of hydrogen from natural gas and coal resources



Moving Forward

No one forecasted last year a global pandemic that would impact world economies, disrupting energy and other markets. While unexpected events can cause short-term deviations, there is a hopeful trend toward a strong energy market recovery – here in the United States and elsewhere.

The oil and gas industry is a big part of that recovery; it is an important contributor to jobs and economic security in the United States. The oil and gas industry powers our economy and supports our modern lifestyle.

The insights and recommendations from last year's two NPC studies show a path forward for the industry as we navigate the energy transition.

The Department of Energy looks forward to the NPC sharing its insights on topics that will be vital to America's energy future.