

# NATIONAL PETROLEUM COUNCIL

*An Oil and Natural Gas Advisory Committee to the Secretary of Energy*

1625 K Street, N.W.  
Washington, D.C. 20006-1656

Phone: (202) 393-6100  
Fax: (202) 331-8539

**VIA E-Mail**

**March 16, 2021**

TO ALL MEMBERS OF THE NATIONAL PETROLEUM COUNCIL

Dear Member:

As reported at the Council's December 15 meeting, the NPC Cochairs' Coordinating Committee (CCC) was developing and prioritizing a list of high-value, high-impact study topics that might be appropriate for the Council's consideration at the request of the Secretary of Energy in 2021. Ryan Lance, Chair of the NPC Agenda Committee, led this effort on behalf of the CCC, and, during the NPC meeting, presented an overview of the preliminary topics under consideration.

At its meeting in late February 2021, the CCC unanimously approved the attached final report on Potential NPC Study Topics. The CCC agreed with the seven topics identified by their Study Topic Subcommittee and prioritized them based on their strategic importance to the nation's energy policy and the NPC's capability to make meaningful contributions. The report includes pre-scoping papers for the following potential topics: three primary, stand-alone comprehensive study topics, three cross-cutting topics, and one short-duration study topic.

- Comprehensive Topics (as ranked by the CCC):
  1. Hydrogen Energy: Opportunities and Challenges for At-Scale Deployment
  2. Optimizing the Role of Oil and Natural Gas in Meeting the Dual Challenge
  3. Responsible Natural Gas Development and Production.
- Cross-Cutting Topics (in alphabetical order):
  - Evolving Energy Workforce
  - Market Mechanisms to Enable Decarbonization
  - Sustainable Development and Environmental Impact.
- Short-Duration Topic:
  - The Future of the Strategic Petroleum Reserve.

National Petroleum Council  
March 16, 2021  
Page Two

The Potential NPC Study Topics report is intended to enhance and facilitate a discussion between the Secretary and Council leadership so that the Council's advice can be the most useful to the Biden Administration. The intent is not just to create a menu of choices, but to stimulate a conversation between the NPC and DOE. A study request might be one or more of the topics identified, a combination of components from the various topics, a follow-on from a previous NPC study, or a completely new idea raised by the Secretary. Separately, Larry Nichols has provided a copy of the Potential NPC Study Topics report to Secretary Granholm and looks forward to working with the Secretary to plan how best to provide the advice of the Council membership through the study process.

On behalf of the officers of the Council, I thank you for contributing to this important task to pre-position the Council to respond quickly to requests for advice from the Biden Administration. I know you join me in thanking the members of the Cochairs' Coordinating Committee and its Study Topic Subcommittee for their assistance.

With best regards,

Sincerely,



Marshall W. Nichols  
Executive Director

Attachment

cc: Study Topic Subcommittee

**NATIONAL PETROLEUM COUNCIL**

**Cochairs' Coordinating Committee**

**and its**

**Study Topic Subcommittee**

**DISCUSSION OF  
POTENTIAL NPC STUDY TOPICS**

**February 26, 2021**

## TABLE OF CONTENTS

SECTIONS	PAGE
Identification and Assessment of Potential Topics for NPC Study	1
Potential Topics:	
Hydrogen Energy: Opportunities and Challenges for At-Scale Deployment	4
Optimizing the Role of Oil and Natural Gas in Meeting the Dual Challenge	6
Responsible Natural Gas Development and Production	8
Evolving Energy Workforce	11
Market Mechanisms to Enable Decarbonization	14
Sustainable Development and Environmental Impact	16
The Future of the Strategic Petroleum Reserve	18
Appendix A: Secretary of Energy Letter Requesting Identification of Potential Topics	A-1
Appendix B: Cochairs' Coordinating Committee and Study Topic Subcommittee Rosters	B-1

## IDENTIFICATION AND ASSESSMENT OF POTENTIAL TOPICS FOR NPC STUDY

This paper addresses a set of topics that the National Petroleum Council (NPC) believes are of high significance for today's energy policy and are within the areas of expertise of the Council. Such preparation is designed to promote productive discussions between the DOE and NPC leaderships at the earliest possible date.

This document includes pre-scoping papers for seven potential topics: three primary, stand-alone comprehensive study topics, three cross-cutting topics, and one short-duration study topic. It is intended to enhance and facilitate a discussion between the Secretary and Council leadership so that the Council's advice can be the most useful to the Administration. The intent is not just to create a menu of choices, but to stimulate a conversation between the NPC and DOE. A study request might be one or more of the topics below, a combination of components from the various topics, or a completely new idea. Therefore, the NPC looks forward to working with the Secretary to plan how best to provide advice and input through the study process.

The sole purpose of the National Petroleum Council is to advise the Secretary of Energy on issues relating to oil, natural gas, and related matters. The NPC only conducts studies in response to specific requests from the Secretary of Energy and operates under the Federal Advisory Committee Act. The NPC does, however, reserve the right to decline to undertake any study requested of it by the Secretary if it determines the subject matter to be inappropriate for Council consideration. The advice of the NPC is transmitted to the Secretary in the form of study reports approved by the Council. The NPC stands ready to assist the Secretary and the Administration.

### Pre-Scoping Papers

The term "pre-scope" is intentionally chosen to describe these papers. After the Secretary requests the advice of the Council, one of the first tasks of the study Committee and Subcommittee will be to prepare a detailed scope of work. While it will be important to capture key study components in the formal request, the detailed scope of work will drive the study process. For example, should the Secretary desire that specific economic or workforce issues be included in a study, that general issue should be articulated in the request so that the issue can be further defined in the study scope. All NPC studies include a structure, including government cochairs, that enable DOE input during the study process. This input includes assistance with assembling the study participants, finalizing the scope of work, and providing input throughout the process. The Council will endeavor to comprehensively address all aspects of the study request while providing an independent report.

### Process to Identify and Assess Potential Study Topics

By letter dated December 11, 2020, Secretary Brouillette formally requested the Council to identify some high-value, high-impact topics that could potentially become the basis of longer-term work with the next Energy Secretary (a copy of the Secretary's letter is attached in Appendix A). This request was preceded by an October 23, 2020 call between the Deputy Secretary of Energy and the Council Chair and is similar to requests made by prior Energy Secretaries in 2008 and 2016.

Given that one of the primary purposes of the NPC Cochairs' Coordinating Committee (CCC) is to discuss potential study topics, that Committee was tasked with conducting this effort, led by Ryan Lance, as Chair of the NPC Agenda Committee. A Study Topic Subcommittee, chaired by Ore Owodunni of ConocoPhillips, was formed to assist the CCC in considering and developing topics for possible future study by the NPC. As with all NPC studies, the Subcommittee was inclusive in its membership and approach. It comprised representatives of the CCC membership, NGOs, thinktanks, and others to gain diverse input. (Rosters of the CCC and its Study Topic Subcommittee are attached in Appendix B.)

The Subcommittee used a multi-pronged approach to identify a broad and comprehensive set of potential future study topics. In addition to these important non-industry voices, the following provided useful suggestions to identify a broad and comprehensive set of potential future study topics:

- The Deputy Secretary of Energy suggested several possible topics in his October 23 conversation with the NPC Chair.
- On October 29, 2020, Larry Nichols wrote to the Council soliciting ideas of topics on which the Council's insights might uniquely inform public policy decision making in 2021.
- The Subcommittee members were asked to provide their top-three topic ideas.
- DOE polled internally and in other federal agencies for additional possible topics.
- The new Administration was consulted and provided additional input including a new topic idea.

This process resulted in over 40 responses, which provided a wide variety of ideas for possible studies.

### Study Topics

From the topic ideas collected through the above outreach, the Subcommittee identified a list of priority topics. The Subcommittee developed problem statements based on these topics and further refined the topics by developing pre-scoping papers for each. As noted, this process resulted in seven topics for further development and Secretarial review. These topic papers and their prioritization have been approved by the Council's Cochairs' Coordinating Committee for transmittal to the full Council membership.

The three following topics would entail comprehensive studies on specific aspects of the energy transition. The Subcommittee prioritized these topics based on criteria including the strategic importance to energy policy and the ability of the NPC to make a meaningful contribution.

#### Comprehensive Topics (as ranked by the Cochairs' Coordinating Committee):

1. Hydrogen Energy: Opportunities and Challenges for At-Scale Deployment
2. Optimizing the Role of Oil and Natural Gas in Meeting the Dual Challenge
3. Responsible Natural Gas Development and Production.

In addition, cross-cutting topics were identified as potentially critical components of all three primary topics identified above. The Subcommittee observed that the cross-cutting topics and the comprehensive topics all support a foundation of ensuring a successful energy transition for the nation. All of these topics would benefit from study participation that included, in addition to DOE, representation from multiple federal agencies and state governments.

Cross-Cutting Topics (in alphabetical order):

- Evolving Energy Workforce
- Market Mechanisms to Enable Decarbonization
- Sustainable Development and Environmental Impact.

Finally, a short-duration topic also was suggested by DOE for consideration in this process. While most of the NPC studies completed in the last twenty years have had broad scopes requiring 18 to 24 months and several hundred participants to conduct, the NPC is also capable of taking on more focused, short-duration (less than 12 months) studies, particularly if the topic is based on past Council work. An example was the 2016 NPC report *Emergency Preparedness Implementation Addendum*, which was a follow-on to the 2014 NPC report *Enhancing Emergency Preparedness for Natural Disasters*.

Short-Duration Topic:

- The Future of the Strategic Petroleum Reserve.

Individual pre-scoping papers on each potential study topic are provided in the following sections. Each paper addresses the scope, organization, and timetable of the potential topic. The CCC recognizes the urgency of the policy implications of these topics and encourages all studies requested by the Secretary to strive for timely completions while maintaining the Council's traditional focus on analytical quality, broad input, new learnings, and consensus results.

## HYDROGEN ENERGY: OPPORTUNITIES AND CHALLENGES FOR AT-SCALE DEPLOYMENT

*(comprehensive topic)*

### WHY STUDY THIS TOPIC?

Hydrogen has the potential to decarbonize a variety of hard-to-abate sectors of the economy.

### Background

To meet the dual challenge of providing affordable energy to the world while reducing greenhouse gas (GHG) emissions, a variety of technologies will need to be deployed, likely including hydrogen at scale. Hydrogen has the potential to decarbonize a variety of market sectors for energy, including industrial, power, residential, commercial, and transportation, and potentially serve as an energy storage mechanism when coupled with renewable power. Technologies exist today to produce low carbon and renewable hydrogen at reasonable scale, but they require collaboration from multiple industries, academia, and government institutions to conduct additional research and to define the policy, framework, deployment sectors, and production pathways and delivery mechanisms needed.

Power, petroleum, industrial gas, and infrastructure companies have experience developing and deploying at scale the technologies required to deliver affordable hydrogen energy. Appropriate federal and state policies will be required for hydrogen to enable this energy system transition.

### Proposed Scope

A study on hydrogen would examine at-scale deployment through the entire hydrogen value chain, including production, storage, liquefaction, transportation, and end use to determine the cost of hydrogen relative to alternatives, how to reduce the cost, and the carbon footprint benefit that would be delivered for each relevant sector. This effort would focus on production and delivery pathways (both from fossil fuel and renewable sources), the potential impact on the power generation, industrial process, residential, commercial, and transportation sectors, and the needed infrastructure and storage requirements. Policy, regulatory, and technical barriers to the use of hydrogen would be identified and recommendations proposed to enable use at scale. Additional research and development requirements to lower costs and increase deployment of hydrogen in these key energy sectors would also be a focus.

### Key Scope Elements:

1. Assemble a range of U.S. hydrogen demand forecasts from existing sources, and the key drivers for the ranges (including when forecasts are tied to a rapid decarbonization objective (e.g., the Paris Agreement)) to use when evaluating infrastructure needs, technology opportunities, and relevant policy aspects.
2. Identify and prioritize integration (across sectors or across the value chain) and infrastructure requirements needed to maximize hydrogen deployment for the sectors identified above. Infrastructure requirements must assess existing constraints that include, for example, existing pipelines and power plants not being able to accommodate high concentrations of hydrogen.
3. Develop or use externally available full life cycle carbon and freshwater footprints and economic comparisons for hydrogen vs. alternatives to determine the end uses and technologies that are most advantaged in GHG reduction at affordable cost.



4. The study will tie back to the NPC Infrastructure and CCUS studies, adding any additional requirements for these technologies to the scope identified when those efforts were completed.
5. Define the policy and government support needed to move technically ready hydrogen value chain technology into deployment in the energy system and drive down the experience curve. Determine whether additional research opportunities exist that should be pursued by DOE National Labs, academia, or industry.
6. Address any safety / health / environmental concerns relative to the acceptance of hydrogen in various market sectors or geographic regions.
7. Define any additional regulatory and legal considerations that should be addressed to capture the environmental, economic, and carbon footprint benefits of hydrogen by increasing the rate of penetration into the energy system.

### Study Organization

As with past studies, a Study Committee would be composed of NPC members to provide overall guidance to the study, and a Coordinating Subcommittee with representation by a cross section of producers, consumers, academia, relevant NGOs, DOE, and other government officials. The Coordinating Subcommittee would guide the detailed analyses and prepare a proposed final report. Key task groups would be as follows:

- Outlook for hydrogen demand and CO2 footprint relative to alternatives to identify the most appropriate use
- R&D and current technology options for hydrogen production, transportation, delivery, and use including combustion, focusing on moving technology into at-scale deployment across the technology readiness level (TRL) spectrum, including a prioritized deployment timeline
- Integration and infrastructure, including storage (cross industry and along the relevant value chains)
- Optimal policy, economics, financing pathways to achieve hydrogen penetration
- Regulatory, legal, environmental, safety, and health considerations.

### Study Timeline

This study would be completed in 12 to 18 months.

## OPTIMIZING THE ROLE OF OIL AND NATURAL GAS IN MEETING THE DUAL CHALLENGE

*(comprehensive topic)*

### WHY STUDY THIS TOPIC?

Maximize the benefits of natural resources in the context of an energy transition.

### Background

The world faces the dual challenge of meeting growing energy demand to support economic growth while also deeply reducing greenhouse gas emissions. Addressing these linked challenges raises the trade-offs associated with providing affordable energy to support human prosperity while addressing the environmental effects of that development, particularly climate change.

The recent polar vortex weather event and resulting power crisis in Texas and elsewhere served as a call to action for society, policymakers, and the private sector. Navigating the energy transition will require flexibility to meet diverse energy applications and increasing consumers choice while maintaining the resilience of energy supplies.

Many studies authored by academics, energy companies, governments, and others have laid out potential pathways to achieve these goals. However, these analyses do not always assess the tradeoffs involved in pursuing different strategies, such as socioeconomic effects (e.g., changes in energy prices and energy sector employment), non-climatic environmental effects, energy security considerations, barriers to deploying new technologies, and more.

### Proposed Scope

This study proposes to examine some of the key challenges and opportunities to reaching the long-term emissions reduction goals articulated in the 2015 Paris Agreement (using an existing scenario such as the International Energy Agency's Sustainable Development Scenario (SDS)).

The study will begin by highlighting the most economical technological options for reducing greenhouse gas emissions, drawing from recent available research. It will also assess the potential for new technologies to further reduce emissions in the coming decades. The study will then identify major opportunities and challenges associated with an energy transition, specifically:

1. Identify the major socioeconomic challenges and opportunities of an energy transition, focused on infrastructure, domestic energy workers, businesses, and communities. Discuss options for capitalizing on opportunities and overcoming challenges.
2. Identify the major technological challenges and opportunities associated with meeting the energy deployment goals laid out in the IEA's SDS. Discuss options for capitalizing on opportunities and overcoming challenges both for the U.S. and globally.
3. Identify the major challenges and propose solutions for the oil and natural gas industry in reaching the long-term emissions reduction goals articulated in the 2015 Paris Agreement.
4. Characterize the potential role of the oil and natural gas industry in supporting the deployment of key enabling technologies, such as CCUS; low-carbon hydrogen and renewable hydrogen; renewable energy; energy storage and electricity grid resilience; and others.

**Study Organization**

The study organization structure, consisting of a Study Committee, a Coordinating Subcommittee, and specialized Task Groups and Subgroups, has served the NPC well in past studies and would likely be replicated in this case. These groups will be chaired by co-leads from industry and the Department of Energy, and staffed by volunteer experts from academia, industry, think-tanks, non-governmental organizations, and governmental organizations. The key committees and task groups could be the following:

Study Committee – Composed of NPC members to provide overall guidance to the study.

Coordinating Subcommittee – Composed of participants from NPC members' organizations and other relevant parties to guide the detailed analyses and prepare a proposed final report.

Task Group One – Framing of challenges and opportunities for the oil and natural gas industry for meeting the 2015 Paris Agreement Goals, such as IEA SDS or similar scenario. The discussion will acknowledge the scale and benefits of the existing oil and natural gas industry in providing reliable energy, discuss its environmental impacts, and frame the magnitude of the energy transition challenge. The value of the existing infrastructure will be summarized based on the work of the NPC's *Dynamic Delivery* study.

Task Group Two – Technological advancements within the oil and natural gas industry addressing challenges and opportunities in meeting Paris goals, focusing on the benefits provided by natural resources in the context of an energy transition.

- Subgroup: Electricity systems resilience, including energy storage
- Subgroup: CCUS role in the energy transition
- Subgroup: National energy security
- Subgroup: Role of hydrogen
- Subgroup: Decarbonization of liquid transportation fuels
- Subgroup: Decarbonization pathways for industrial processes.

Task Group Three – Socioeconomic challenges and opportunities, as well as environmental tradeoffs of an energy transition.

- Subgroup: Energy cost impacts related to the energy transition, including socioeconomic challenges and opportunities.
- Subgroup: Workforce transition challenges and opportunities to support the energy transition. (See cross-cutting topic of "Evolving Energy Workforce" as a possible complement to this study.)
- Subgroup: Community transition challenges and opportunities, including public finance and social justice impacts. (See cross-cutting topic of "Sustainable Development and Environmental Impact" as a possible complement to this study.)

**Study Timeline**

This study could be completed in 18 to 24 months after approval and would include a broad outreach effort.

## RESPONSIBLE NATURAL GAS DEVELOPMENT AND PRODUCTION (*comprehensive topic*)

### WHY STUDY THIS TOPIC?

To support the global competitiveness and decarbonization of U.S.-produced clean natural gas to facilitate greater global GHG emission reductions.

### Background

U.S. and global energy consumers are pursuing cleaner energy sources and energy efficiency measures to limit the global temperature rise to less than 2 degrees Celsius. As renewable power generation and other sources of clean energy increasingly come online around the world, IEA forecasts indicate that oil and natural gas will continue to provide the backbone of reliable and affordable energy supply in a material amount for decades to come.

Although oil and natural gas are expected to be needed and used by the world for a long time, governments and the public are increasingly demanding that they be developed, produced, and used, if at all, with essentially zero emissions of CO<sub>2</sub> or methane and with greatly increased efficiency. Methane is the second most prevalent greenhouse gas (GHG) emitted in the United States and worldwide. Atmospheric methane is a potent GHG that contributes to global warming. Understanding, quantifying, and tracking atmospheric methane and CO<sub>2</sub> emissions are essential for addressing concerns and informing decisions that affect the climate, economy, and human health and safety. The ability to assess in a transparent and consistent method the carbon and methane intensities of global natural gas value chains will be crucial to support the global competitiveness of U.S.-produced natural gas. Substantial government and industry action will be required to achieve these goals while keeping oil and natural gas as affordable as possible.

To support the role of natural gas in the lower carbon fuel mix, the production and delivery of natural gas will need to become more efficient, with lower emissions across the value chain (from wellhead to burner tip, including storage). Existing means of reducing the carbon intensity and increasing production efficiency can be promoted and encouraged with the development of emerging technologies. These improvements should include efforts to reduce flaring, methane leaks, and other major sources of emissions. In addition, these measures should identify and mitigate emissions from orphan well sites. Natural gas plays a central role as both an energy source and a feedstock to ensure the competitiveness of America's manufacturing sector, including production of chemicals that are essential to water treatment, pharmaceuticals, medical devices, personal protective gear, and other daily necessities.

### Proposed Scope

A study should focus on (1) identifying opportunities to lower the emissions intensity of natural gas value chains, including associated gas from liquids production, and (2) developing a standard approach to measuring the carbon intensity of natural gas value chains, including exploring options for certification of natural gas as lower carbon, recognized both domestically and internationally. Supplies of natural gas across the world have varying carbon and methane footprints as they are produced, transported, stored, and delivered to the end user. Currently, there is a lack of consistency in the science and metrics used to measure and to evaluate the GHG emissions and social cost of carbon considerations of natural gas development. There is a unique opportunity for the U.S.-based natural gas industry to lead the development of this framework. A consistent framework to compare domestic and international basins would help the world decarbonize and advance U.S. national security interests.

Several of the cross-cutting topics presented later in this paper are of particular importance to natural gas development. As such, this study should consider the scope and questions described in “Market Mechanisms to Enable Decarbonization” and “Sustainable Development and Environmental Impact.”

Based upon the responsible development practices in the United States, driven by regulatory frameworks and company-level measures to reduce emissions, natural gas produced in the United States is expected to be competitive with value chains originating anywhere else on the globe. Coupled with continued efficiency improvements, a science-based universal framework to quantify, monitor, report, and verify the methane emission intensity in natural gas supply and delivery value chains will enhance national security and be a competitive advantage for domestic production. The study could consider some or all of the following questions:

1. What are the advantages and disadvantages of current reporting standards and verifications for methane and/or total GHG emissions intensity of the natural gas value chain (Natural Gas Sustainability Initiative protocol, MiQ Standard, Energy Infrastructure Council reporting template, Our Nation’s Energy Future protocol)?
2. What should be the role of standards organizations in certifying source-level methane emissions using measurement or country and source-specific emission factors?
3. Should emissions evaluation and responsible development metrics be expanded to oil value chains? Are there other environmental, social, and governance (ESG) considerations that should be included in the evaluation of value chains?
4. What can industry do in producing regions to be more effective in collecting and disseminating effective environmental, health, and safety practices to operators and to enhance community engagement related to development? (See cross-cutting topic of “Sustainable Development and Environmental Impact” as a possible complement to this study.)
5. What is the impact of venting and flaring on the overall GHG footprint of oil and natural gas value chains and what is the role of advanced satellite technology for monitoring of methane in the atmosphere?
6. What are potential impacts of a nationwide effort to plug and restore orphan well sites, both onshore and offshore, to reduce methane leakage and other emissions? (See cross-cutting topic of “Sustainable Development and Environmental Impact” as a possible complement to this study.)
7. How should the federal government use and improve full fuel cycle analysis to inform regulatory decisions regarding natural gas development? What are areas for improvement in policies, regulations, or technology in support of White House Executive Orders, e.g., two orders on January 20, 2021, *Modernizing Regulatory Review* and *Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis*, and a third on January 27, 2021, *Tackling the Climate Crisis at Home and Abroad*?

## Study Organization

The study organization structure of key committees and task groups could be the following:

- Study Committee – Composed of NPC members to provide overall guidance to the study
- Coordinating Subcommittee – Composed of participants from NPC members’ organizations and other relevant parties to guide the detailed analyses and prepare a final report
- Task Group One – Technology

- Task Group Two – Methane Emissions and Carbon Intensity Standards Development
- Task Group Three – Policy, Regulations, and Legislation.

**Study Timeline**

This study could be completed in about 24 months after approval and would seek, like recent NPC studies, to have more participants from outside the oil and natural gas industry than from within.

## EVOLVING ENERGY WORKFORCE (cross-cutting topic)

### WHY STUDY THIS TOPIC?

Leverage the capabilities and expertise of oil and natural gas companies to create a next generation, future energy workforce.

### Background

As the nation emerges from the profound public health and economic crises brought on by a pandemic and aspires to tackle many of the greatest challenges of our time, including enhancing prosperity, achieving racial justice, and tackling climate change, American consumers must continue to have access to clean, reliable, and affordable energy. Oil and natural gas companies, and the nearly 1.5 million people that the industry employed in 2020, produce and deliver fuels and feedstocks that underpin the nation's economic and energy security, and that of many states. As bold steps are taken by government and industry to address these important challenges, the advice of the National Petroleum Council would be helpful to increase awareness of the roles that the oil and natural gas industry could play to create a next generation, future energy workforce.

The potential to create well-paying clean energy jobs is a theme that crosscuts several emerging and related Administrative initiatives. On January 27, 2021, President Biden by Executive Order outlined the key components of a government-wide approach for *Tackling the Climate Crisis at Home and Abroad*, which has linkages to clean energy job creation as illustrated by:

- Section 210, which highlights the potential for federal funding to spur innovation, commercialization, and deployment of clean energy technologies and infrastructure.
- Section 212, which focuses on empowering workers through rebuilding America's infrastructure for a sustainable economy and recognizes that the nation will need millions of construction, manufacturing, engineering, and skilled-trades workers to build new infrastructure and the clean energy economy, in which jobs can bring opportunities to communities that have suffered as a result of economic shifts and places that have suffered the most from persistent pollution, including low-income rural and urban communities, communities of color, and Native communities.
- Section 217, which sets forth a policy to improve air and water quality and create well-paying jobs and more opportunities for women and people of color through revitalizing energy communities and undertaking to reduce methane emissions and oil and brine leaks from abandoned and existing infrastructure and former mining and well sites and to turn properties idled in communities, such as brownfields, into new hubs for the growth of the economy.
- Section 218, which establishes an interagency working group on coal and power plant communities and economic revitalization, housed in the Department of Energy.
- Section 219, which sets forth a policy to secure environmental justice and spur economic development for disadvantaged communities.

To support an orderly energy transition, the workforce of the next decades must continue to advance new fossil fuel technologies while simultaneously developing new strategies for the production and delivery of other energy resources and managing and addressing the environmental risks associated with energy development, generation, and transmission, and carbon emission management.

It has been postulated that to meet the challenges of an evolving energy system, the future energy workforce must be technologically adept, potentially in different ways than today, to address a range of energy sources and issues associated with their development and use. And new competencies will be required to build, support, and sustain a clean energy economy and infrastructure that also supports and enhances environmental and social justice approaches and actions.

Oil and natural gas companies, including the related support companies, have extensive core capabilities in designing, constructing, and operating large-scale energy and industrial projects, as needed to advance the at-scale deployment of carbon capture, use, and storage, and hydrogen energy. Short lists of the positions needed to transition away from fossil fuels, as described in National Academy of Engineering articles and National Academy of Science Earth Science workshops, include job categories that exist in today's oil and natural gas industry such as geologists, geophysicists, geochemists, drilling engineers, mining engineers, petroleum engineers, chemical engineers, and surveyors. The positions and skills relevant to midstream operations are equally robust, including and not limited to electricians, pipeline instrumentation and operations technicians, ironworkers, pipefitters, and welders.

### **Proposed Scope**

An NPC study on this topic could increase awareness and leverage the capabilities and expertise of oil and natural companies to create a next generation, future energy workforce.

Key questions that may arise include:

- What is the profile of America's evolving oil and natural gas-related energy workforce under a range of existing and future energy scenarios?
- What market or other factors could affect the ability of companies to retain a workforce with the skills and ambition necessary to provide clean, reliable, and affordable energy services over the near and long term?
- What are the potential opportunities, challenges, and timeframes associated with creating jobs and revitalizing communities through pathways such as (1) the plugging of orphaned well sites, (2) reducing methane leakage from oil and natural gas infrastructure, (3) reducing regulatory hurdles that impede the use of new, advanced technologies that could improve the operational safety and efficiency of oil and gas infrastructure, or (4) accelerating the commercial or at-scale deployment of advanced hydrogen and carbon capture, use, and storage technologies?
- What actions have companies in the oil and natural gas sector or related energy industries taken to empower employees, expand workforce diversity, and support economic development and employment opportunities in the communities and regions in which they operate? Could these serve as models for wider application?
- What leadership roles could academic and educational institutions play to support the development of a next generation, future energy workforce?
- Are there public-private partnerships that could be pursued or enhanced to increase regional economic and job opportunities that can support small businesses, entrepreneurs, displaced fossil energy workers, or disadvantaged communities?
- What roles could DOE play in catalyzing a comprehensive national effort to support and improve education, training, and job creation in current and future energy-related industries through its programs, national laboratories, or outreach?



**Study Organization**

This effort could be pursued as a cross-cutting activity as part of another study topic. The aim would be to provide optionality in the approach, and to provide more granularity regarding evolving energy workforce needs and issues germane to the capabilities and expertise of oil and natural gas companies.

In profiling the range of skills requirements in existing and future energy scenarios, the effort should include trades or specialty skills where applicable. This effort could also provide insights on the state of science, technology, engineering, and mathematics (STEM) in energy-related industries based on existing data sources. In addition to industry requirements, analysis would also contemplate the adaptability and readiness of education and training systems to meet future skill needs.

**Study Timeframe**

Less than 12 months.

## MARKET MECHANISMS TO ENABLE DECARBONIZATION (*cross-cutting topic*)

### WHY STUDY THIS TOPIC?

Effective and durable market signals are critical to the deployment of low carbon technologies essential to meeting the world's energy needs and the climate challenge.

### Background

A policy-created price signal is an economically efficient approach to reducing emissions and driving investments in low carbon technologies across the economy. A carbon price would discourage use of high-polluting options and favor low-polluting options in all industries simultaneously. Similar approaches have been effectively used in other contexts, such as the Acid Rain Program.

Economists have studied carbon pricing for decades, but at least two critical sub-topics remain relatively understudied: (1) policy durability; and (2) how other market-based policies can complement a carbon price to create a comprehensive emissions mitigation strategy.

### Proposed Scope

During the process of considering this topic, the Study Topic Subcommittee determined that significant study has been completed on this topic by others. However, it could be valuable to carefully evaluate components of possible market mechanisms, particularly in the context of the study topics presented above or as fundamental work related to those topics.

#### 1. *Policy durability*

When applying pricing mechanisms to the climate challenge, a particular concern is the durability of the policy. A carbon price would have a more wide-ranging impact across the economy than prior trading programs. This creates inherent risks, and the higher the carbon price, the greater the potential for repeal or modification in future political environments. We have seen pricing schemes designed, redesigned, and repealed over time, with Australia as perhaps the most prominent example.

As a result, policy durability will be a significant concern for market participants, who will likely demand a high return on investment (to compensate for the risk) in exchange for deploying capital on long-lived projects inherent in retooling for a low carbon world. A poorly designed pricing approach (e.g., one implemented before the marginal abatement curve is sufficiently flattened) could delay the massive emission reductions necessary if this policy risk is not addressed.

#### 2. *Market-based policies that complement a carbon price*

Economists have long recognized that while a carbon price is a necessary part of low-cost mitigation strategy, it is far from sufficient by itself. After all, numerous barriers aside from prices/costs of low-carbon alternatives stand in the way of emissions reductions: underfunding innovation, under-provision of infrastructure and other public goods, and various behavioral biases. Perhaps due in part to a lack of consensus about these complementary policies, support for comprehensive climate policy strategies has been much less common than support for carbon prices alone.

The need for complementary policies differs across emissions source. Complementary policies should avoid picking winners and losers, protect against forcing high-cost abatement options when more economical means are available, and align on a framework that does not exceed the social cost of carbon for any option. For example, cost-effectively reducing emissions from internal combustion vehicles requires not only increasing the price of gasoline and diesel fuels (via a carbon price), but also supporting the buildout of charging stations and funding advancements in alternative fuel vehicle technologies.

### **Study Organization**

The study will be designed to be incorporated into a larger comprehensive study organization structure, such as that of Optimizing the Role of Oil and Natural Gas in Meeting the Dual Challenge. As a result, a specialized subgroup, titled "Enabling Market Mechanisms," would be created.

The group will be chaired by co-leads from industry and the Department of Energy, and staffed by volunteer experts from academia, industry, think-tanks, non-governmental organizations, and governmental organizations.

### **Study Timeline**

This study would be completed in less than 12 months after approval, include a broad outreach effort, and could run concurrently with one of the comprehensive study topics.

## SUSTAINABLE DEVELOPMENT AND ENVIRONMENTAL IMPACT (cross-cutting topic)

### WHY STUDY THIS TOPIC?

Advance progress towards a more sustainable and inclusive energy landscape.

### Background

Abundant oil and natural gas resources and a dynamic infrastructure system in the United States help to deliver affordable and reliable energy. However, oil and natural gas companies face new challenges in meeting societal expectations for greater sustainability, accountability, and a transition to less emissions-intensive energy. Oil and gas companies are adopting new approaches to corporate governance, strategy, and risk management that reflect growing interest in environmental, social, and governance (ESG) metrics among investors, shareholders, employees, and the public at large.

More transparency on emissions, gas flaring, and overall environmental performance will be expected. Investors and civil society groups are also scrutinizing the operational footprint of oil and natural gas companies, as well as their local community engagement and social performance. Further, the environmental justice movement has highlighted the potential impact of oil and natural gas facilities on indigenous groups and communities of color. Other groups have highlighted the economic benefits and burdens to local communities that are dominated by oil and natural gas industry activity and jobs. And some civil society groups have raised doubts as to whether the deployment of low-carbon hydrogen and renewable energy technologies will adequately address the challenges these facilities may present from an environmental justice perspective. These issues all overlap with public policy goals aiming to address climate change, as well as environmental and economic inequities. Achieving these goals will require initiatives ranging in scope from the community or project level to global cooperation.

Transformation within the oil and natural gas industry is not new. Yet, reimagining the role of oil and natural gas in a post-COVID world has become more challenging given uncertainties such as the pace of global economic recovery, evolving public policies, and regulatory reforms that may affect the deployment of new technologies and infrastructure investments. Modernizing or creating new business strategies or energy system models may be needed in some cases to meet energy and environmental objectives that also advance societal objectives and economic opportunity for all Americans. Accordingly, the National Petroleum Council can provide valuable advice on how companies can meet public expectations for a more sustainable and inclusive energy landscape. The effort should consider evolving perspectives on environmental justice and steps that companies could take to address the issue as an integral part of other business activities.

### Proposed Scope

Realizing the potential of abundant domestic oil and natural gas resources and industry expertise to advance the nation's energy, economic, societal, and environmental objectives may require increased focus, collaboration, and alignment on:

1. Developing innovative tools and best practices to advance meaningful progress towards a more sustainable and inclusive energy landscape, including more effective community engagement and consultations.

2. Mitigating adverse impacts to air, water, and land-use for residents of involved communities, especially those in low-income areas as well as indigenous groups in proximity to oil and natural gas facilities.
3. Engaging marginalized groups and communities of color facing unemployment or under-employment to promote workforce development in the energy sector.
4. Identifying DOE's leadership role in catalyzing constructive stakeholder engagement to forge a more sustainable, equitable energy future.
5. Pursuing integrated regional or community-based strategies for advancing economic opportunities, job creation, and forging a more sustainable, equitable energy future that leverage oil and natural gas-related expertise and capabilities within industry and government.
6. Balancing diverse equities among stakeholders, including enabling access to energy services and markets, and empowering communities to have a greater role in energy-related decision making.

### Study Organization

This effort could be pursued as a cross-cutting activity as part of another study topic.

Subgroups would be organized by supply chain segments or cross-cutting topics such as:

- Environmental and Social Performance – Areas of focus, pressure points on the industry, adoption by companies, significance for reporting requirements, significance for social engagement as well as environmental practices. New requirements for companies to maintain their social license to operate.
- Best Practices for Community Engagement – High-level framing of purpose, application, lessons learned from past experience, and recommendations for more effective, inclusive community engagement.
- Environmental Impact – What are the criticisms of the industry or sector, and how can companies do better in identifying these sensitivities in operating areas and prioritizing these concerns in future decisions? Clarify linkages of sustainable development and environmental impact to related concepts such as energy justice, as needed.
- Regulatory and Policy – Framed by scope, potential impact.
- Stakeholder Equities – Mapped by type, geographic area, data sources.

### Study Timeline

This study would be completed in less than 12 months after approval, include a broad outreach effort, and could run concurrently with one of the comprehensive study topics.

## THE FUTURE OF THE STRATEGIC PETROLEUM RESERVE (*short-duration topic*)

### WHY STUDY THIS TOPIC?

Align the SPR with the mission for which it was created in the context of changing energy supplies and historical SPR use.

### Background

The Strategic Petroleum Reserve (SPR) has been in existence since 1977. The global oil and natural gas industry has evolved significantly in the ensuing years and the SPR, its structure, and its usage may need to do the same. In response to declining U.S. oil production, the SPR was created to ensure crude oil supplies in the event of a major disruption caused by natural disasters or political turmoil. Over the last ten years, the United States has seen its oil production grow to a point exceeding domestic demand. The United States is now the largest oil producer in the world and is an exporter of crude oil, refined products, and natural gas.

The SPR has also been used much differently than originally planned. While there have been three instances in which SPR stocks were released in coordination with the International Energy Agency, it has been used far more often to provide relief to U.S. Gulf Coast refineries when there has been a temporary supply shortfall, often caused by hurricanes or shipping channel closures. In 2020, following the dramatic drop in petroleum demand following the onset of COVID-19 in the United States, the SPR was used as never before by providing an additional outlet for U.S. oil producers to store crude oil that had no other outlet.

### Proposed Scope

This topic originated as an idea from the Department of Energy. The original idea was directly related to the operational capacity of the SPR. The Study Topic Subcommittee determined that addressing operational issues of the SPR would necessarily require beginning with a strategic approach looking at the mission of the SPR. There also remain questions on the timing, scope, and value of a potential SPR study given the two current detailed analyses that are underway regarding the SPR (see subheading below).

The above changes in the U.S. oil production profile, both in volumes and geographic location, invite a strategic review of the SPR and its future over the next twenty years:

1. Does the U.S. Strategic Petroleum Reserve serve the mission for which it was created?
2. Is there a need and role for the SPR in the current global crude oil market?

Specific subtopics that would be part of the study include:

- Should excess storage capacity in the SPR be maintained to provide oil storage in times of demand destruction. If so, how should this capacity be managed?
- What lessons have been learned based on the historical use of the SPR?
- What additional insight can the NPC provide to the SPR relative to the two studies referenced below.

### Current Studies Underway:

The SPR is working on two studies that should be available sometime in FY 2021. The first study looks into the future after certain Congressional mandated sales<sup>1</sup> are completed. It will analyze various configurations of the SPR, including how many SPR sites should remain and will also look at the technical and cost aspects of making various SPR sites suitable for commercial use. The second study examines the crude oil landscape within which the SPR operates, highlights many significant changes, and addresses the challenges the country faces in maintaining energy security as it relates to petroleum.

### Study Organization

The study organization would consist of a Study Committee and a Coordinating Subcommittee. It is anticipated that work groups within the Coordinating Subcommittee would perform any detailed analysis, rather than an extensive task group structure. The Coordinating Subcommittee would include oil market, storage, and transportation experts. In addition, expertise in energy and national security would be included. Government representatives from DOE's Fossil Energy and International Affairs offices, as well as the State Department's Energy Bureau, would be encouraged to participate.

Key areas to explore/organize would include:

- Oil Market
  - Historical changes to oil markets and strategic stocks
  - Future outlooks for oil production in the United States, with specific analysis on projected imports and exports
- SPR Operational Changes
  - Current inventories and deliverability
  - Current excess capacity and possible uses
- National Security and Treaty Obligations
- Lessons Learned from Past SPR Uses.

### Study Timeline

This study will build on prior DOE work and is anticipated to be completed in less than 12 months once the Study Committee and Coordinating Subcommittee are assembled. Initiation of the study should be planned to allow the existing DOE SPR studies to be used in an NPC study process.

### Historical Context on the SPR

The creation of the SPR followed the Arab Oil Embargo of 1972/73. This was the first global oil price shock where there was no existing spare capacity that could be added from the oil fields in Texas. U.S. government policymakers decided to create an emergency supply of crude oil that is owned by the U.S. government that could sell crude oil into the U.S. market should the President or Energy Secretary authorize it under specific authorities described in the Energy Policy and Conservation Act. The concept centered on selling large volumes of crude oil when prices are high due to the supply interruption event, and then buying crude oil back once the event is over and prices have declined.

---

<sup>1</sup> Congress has enacted several laws that require the SPR to sell a total of nearly 300 million barrels between FY 2017 and FY 2028.

In reality, the largest volume ever released from the SPR was 30 million barrels and experience has shown that crude oil prices decline precipitously with just the announcement of a release, so that the price received when the crude oil is ultimately delivered is much lower than when the announcement to release was made, thus dramatically reducing the difference in prices from when crude oil was delivered and when it was bought back.

The SPR has also been used much differently than originally planned. While there have been three instances in which SPR stocks were released in coordination with the International Energy Agency, it has been used far more often to provide relief to U.S. Gulf Coast refineries when there has been a temporary supply shortfall, often caused by hurricanes or shipping channel closures. In these instances, which are referred to as Exchanges, a refinery requests a specific volume of crude oil to be delivered in “exchange” for providing the same amount of crude oil, plus a specified amount to cover costs incurred by the SPR, at a later date. This should be done only as a last resort to the refinery, after it has established that it has no other means to secure supply. This is done under the authorization that allows the SPR to acquire barrels. By receiving back more than is delivered, the SPR acquires additional barrels.

Another recent way in which the SPR has been used is through Congressional sales. Congress has enacted several laws that require the SPR to sell a total of nearly 300 million barrels between FY 2017 and FY 2028. The SPR has never had releases in so many consecutive years and will need to monitor closely the impact such sales might have on cavern integrity.

In 2020, following the dramatic drop in petroleum demand following the onset of COVID-19 in the United States, the SPR was used as never before by providing an additional outlet for U.S. oil producers to store crude oil that had no other outlet. This use enabled the SPR to store 23 million barrels, similar to adding demand for 2 refineries over a 1-month period, with releases going back to the companies at a later date, with a specified amount kept by the SPR. In essence, this was similar to a more typical SPR exchange, except rather than delivering oil and getting back more oil later, the SPR took in oil and then released a smaller volume later. This program, labeled Exchange for Storage (EFS) will ultimately provide a net addition of \$40 million in crude oil inventory.

On March 13, 2020, the President also asked the SPR to look into ways to fill the SPR back up to capacity, as a way to provide an outlet for U.S. oil producers. However, in analyzing ways to accomplish this, it was discovered that the SPR does not have the capability to take in crude oil at a rate fast enough to mitigate short-term crude oil market disruptions more than what was done with the EFS, which took over 2 months to complete.

### **Past NPC Studies addressing the SPR**

The following NPC studies address the SPR or issues directly related to the SPR:

2014 – Enhancing Emergency Preparedness

1989 – Petroleum Storage and Transportation

1984 – The Strategic Petroleum Reserve: A Report on the Capability to Distribute SPR Oil

1981 – Emergency Preparedness for the Interruption of Petroleum Imports into the United States

1975 – Petroleum Storage for National Security

1974 – Emergency Preparedness for the Interruption of Petroleum Imports into the United States





## The Secretary of Energy

Washington, DC 20585

December 11, 2020

Mr. J. Larry Nichols  
Chair  
National Petroleum Council  
1625 K Street, NW  
Washington, DC 20006

Dear Mr. Nichols:

As a follow-up to your discussions with Deputy Secretary Mark Menezes and Assistant Secretary for Fossil Energy Steven Winberg, I hereby charge the National Petroleum Council (Council) to identify and delineate the scope of potential future study topics that could be pursued in the coming year. Recent studies conducted by the Council on carbon capture, use, and storage; oil and natural gas transportation infrastructure; and Arctic oil and gas resources continue to help the Department of Energy (DOE) shape constructive public dialogue and more informed decision making by industry and government.

This effort is timely as nations emerge from the COVID-19 pandemic and the United States evolves its strategies to further enhance national economic, energy and environmental security, and maintain global competitiveness in a potentially changed, global energy landscape. Several study topics have been on our radar screen within the Department that could potentially provide us significant, useful advice. These include, but are not limited to, COVID-19 impacts and lessons-learned, hydrogen in domestic and export markets, perspectives on the future role of oil and natural gas in meeting global energy demand, and opportunities for U.S. Global Leadership. I look forward to hearing about other ideas the Council may have and your sense of the priority of the topics identified.

For the purpose of this planning activity, I have designated Assistant Secretary Winberg to represent me. He will provide the necessary coordination between the Department and the Council, as appropriate. Your formal request to hold a virtual Council meeting on December 15, 2020, is an excellent idea and has my approval. I will plan to participate, unless scheduling constraints arise that preclude this being feasible.

Sincerely,

A handwritten signature in black ink, appearing to read "Dan Brouillette".

Dan Brouillette

cc: Marshall Nichols  
Mark W. Menezes, DOE Deputy Secretary

NATIONAL PETROLEUM COUNCIL  
COCHAIRS' COORDINATING COMMITTEE

---

2021

COCHAIRS

J. Larry Nichols  
Chair  
National Petroleum Council

Hon. Jennifer M. Granholm  
Secretary of Energy

SECRETARY

Marshall W. Nichols  
Executive Director  
National Petroleum Council

\* \* \*

Alan S. Armstrong  
President and  
Chief Executive Officer  
The Williams Companies, Inc.

Greg C. Garland  
Chairman and  
Chief Executive Officer  
Phillips 66 Company

Greg L. Armstrong  
Immediate Past Chair  
National Petroleum Council

Joseph W. Gorder  
Chairman and  
Chief Executive Officer  
Valero Energy Corporation

Deborah H. Caplan  
Executive Vice President  
Human Resources and  
Corporate Services  
NextEra Energy, Inc.

Michael J. Graff  
Chairman and  
Chief Executive Officer  
American Air Liquide Holdings, Inc.  
Executive Vice President, Americas and  
Asia-Pacific  
Air Liquide Group

Robert B. Catell  
Chairman  
Advanced Energy Research and  
Technology Center  
Stony Brook University

James T. Hackett  
President  
Tessellation Services, LLC

Deputy Secretary of Energy  
(*vacant*)

W. Byron Dunn  
Founding Partner and  
Chief Executive Officer  
Tubular Synergy Group, LP

Vicki A. Hollub  
President and  
Chief Executive Officer  
Occidental Petroleum Corporation

## NPC COCHAIRS' COORDINATING COMMITTEE

Ray L. Hunt  
Executive Chairman  
Hunt Consolidated, Inc.

Ryan M. Lance  
Chairman and  
Chief Executive Officer  
ConocoPhillips Company

Douglas J. Suttles  
Chief Executive Officer  
Ovintiv Inc.

A. James Teague  
Director and  
Chief Executive Officer  
Enterprise Products Partners L.P.

Frank A. Verrastro  
Senior Vice President and Trustee Fellow  
Energy, National Security and Foreign Policy  
Center for Strategic & International Studies

Gretchen H. Watkins  
President  
Shell Oil Company

William J. Way  
President and  
Chief Executive Officer  
Southwestern Energy Company

William H. White  
Chairman  
Lazard Freres & Co. LLC

Michael K. Wirth  
Chairman of the Board and  
Chief Executive Officer  
Chevron Corporation

Darren W. Woods  
Vice Chair  
National Petroleum Council

Daniel H. Yergin  
Vice Chairman  
IHS Markit

**NATIONAL PETROLEUM COUNCIL**  
**STUDY TOPIC SUBCOMMITTEE OF THE**  
**COCHAIRS' COORDINATING COMMITTEE**

**CHAIR**

Ore Owodunni  
Low Carbon Energy  
ConocoPhillips Company

**ALTERNATE CHAIR**

John M. Dabbar  
Vice President, Fed & State Govt Affairs  
ConocoPhillips Company

**SECRETARY**

John H. Guy, IV  
Deputy Executive Director  
National Petroleum Council

**GOVERNMENT COCHAIR**

TBD<sup>1</sup>  
U.S. Department of Energy

**ALTERNATE GOVERNMENT COCHAIR**

Nancy L. Johnson  
Senior Advisor, Environmental Science and  
Policy Analysis, Office of Oil and Natural  
Gas, Office of Fossil Energy  
U.S. Department of Energy

**ALTERNATE SECRETARY**

James A. Slutz  
Director of Study Operations  
National Petroleum Council

**MEMBERS**

Brian J. Anderson  
Director  
National Energy Technology Laboratory  
U.S. Department of Energy

Kevin D. Book  
Managing Director, Research  
ClearView Energy Partners, LLC

D. Clay Bretches  
Chief Operating Officer  
Apache Corporation

James R. Burkhard  
Vice President  
IHS Markit

Ben Cahill  
Senior Fellow, Energy Security and Climate  
Change Program  
Center for Strategic & International Studies

Chris R. Chandler  
Executive Vice President & Chief Operating  
Officer  
Plains All American Pipeline, L.P.

Brian S. Chase  
Strategy and Sustainability CCUS Manager  
Chevron Corporation

Jay D. Churchill  
Senior Vice President, Health, Safety, &  
Environment and Projects  
Phillips 66 Company  
(Retired January 31, 2021)

Galen L. Cobb  
Vice President Industry Relations  
Halliburton

Ian M. Davis  
Vice President, Government Relations  
Occidental Petroleum Corporation

David Erfert  
Senior Vice President, Health, Safety, &  
Environment and Projects  
Phillips 66 Company

Joseph D. Fawell  
Vice President of Government Affairs  
Air Liquide USA LLC

---

<sup>1</sup> Replaced Shawn Bennett, Deputy Assistant Secretary, Oil and Natural Gas, Fossil Energy, U.S. Department of Energy

## STUDY TOPIC SUBCOMMITTEE OF THE CCC

Mark A. Gebbia  
Vice President, Environmental, Regulatory  
& Permitting  
The Williams Companies, Inc.

Paula R. Glover  
President and Chief Executive Officer  
Alliance to Save Energy

Robert P. Hall III  
Vice President, Federal Governmental  
Affairs  
Entergy Corporation

Noah Kaufman  
Research Scholar, Center on Global Energy  
Policy  
Columbia University SIPA

Jason T. Klein  
Vice President- U.S. Chief of Staff, Vice  
President- Energy Transition  
Shell Oil Company

Matthew A. Most  
Vice President, Government Relations  
Ovintiv Inc.

Daniel P. Raimi  
Fellow, Research and Policy Engagement  
Program  
Resources for the Future

Robert D. Sanders  
Executive Vice President, Asset  
Optimization  
Enterprise Products Partners L.P.

Amy Shank  
Director Pipeline Safety & Asset Integrity  
The Williams Companies, Inc.

Richard J. Walsh  
Senior Vice President and General Counsel  
Valero Energy Corporation

William H. White  
Chairman  
Lazard Freres & Co. LLC

T. J. Wojnar, Jr.  
Vice President, Corporate Strategic  
Planning  
Exxon Mobil Corporation

Michael S. Zenker  
Managing Director, NextEra Energy  
Marketing  
NextEra Energy, Inc

## ALTERNATES

Frank Daily III  
Director  
Lazard Freres & Co. LLC

Brian C. Donovan  
Executive Director of Public Policy and  
Strategic Planning  
Valero Energy Corporation

Christopher J. Freitas  
Senior Program Manager, Natural Gas  
Infrastructure R&D, Office of Oil and  
Natural Gas, Office of Fossil Energy  
U.S. Department of Energy

Jan W. Mares  
Senior Advisor  
Resources for the Future