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Description of document: Department of Energy (DOE) Responses to Congressional Questions on Energy Topics 2022

Requested date: 06-May-2022

Release date: 01-July-2025

Posted date: 21-July-2025

Source of document: FOIA Request
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Department of Energy
Washington, DC 20585

Via email

Re: HQ-2022-00587-F

This is a final response to the request for information that you sent to U.S. Department of the Energy (DOE) under the Freedom of Information Act (FOIA), 5 U.S.C. § 552. You requested the following:

A copy of the document for which the table of contents is enclosed.

The document is located in the Office of the Assistant Secretary for Fossil Energy.

I agree to limit this request to records since January 1, 2017. I agree to limit this request to Department of Energy records. I agree to limit this request to records that can be retrieved within a three hour search timeframe.

Your request was assigned to DOE's Office of Fossil Energy and Carbon Management (FE). The search started on May 6, 2022, which is the cutoff date for responsive records. FE has completed its search and identified two (1) documents responsive to your request. The documents are being released to you as described in the accompanying index.

Upon review, DOE has determined that certain information should be withheld from the document pursuant to Exemption 5 of the FOIA, 5 U.S.C. § 552 (b)(5).

Exemption 5 protects from mandatory disclosure "inter-agency or intra-agency memorandums or letters that would not be available by law to a party other than an agency in litigation with the agency." 5 U.S.C. § 552 (b)(5). Exemption 5 incorporates the deliberative process privilege which protects recommendations, advice, and opinions that are part of the process by which agency decisions and policies are formulated. The information withheld under Exemption 5 consists of inter/intra-agency pre-decisional, deliberative information.

Some of the information withheld under Exemption 5 has been deemed pre-decisional and deliberative in nature. The information is both pre-decisional because it was developed before the agency adopted a final position, and deliberative, in that it reflects the opinions of individuals



who were consulted as part of a decision-making process that will lead to the agency's final policy decision about these matters. The DOE may consider these preliminary views as part of the process that will lead to the agency's final decision about these matters. The information does not represent a final agency position, and its release would compromise the deliberative process by which the government makes its decisions. Therefore, portions of the documents are being withheld under Exemption 5 of the FOIA as pre-decisional material that is part of the agency's deliberative process.

In addition, these documents contain communications involving DOE attorneys and are being withheld under the attorney-client communications privilege. The information in these documents includes confidential communication between DOE attorneys and the staff of the program office to which they provide legal advice. Thus, documents are being withheld in part under Exemption 5 of the FOIA.

With respect to the discretionary disclosure of deliberative information, as well as attorney-client communications, the quality of agency decisions would be adversely affected if frank, written discussion of policy matters were inhibited by the knowledge that the content of such discussion might be made public. For this reason, DOE has determined that discretionary disclosure of the deliberative material and attorney-client communications are not in the public interest because foreseeable harm would result from such disclosure.

This satisfies the standard set forth at 5 U.S.C. § 552(a)(8)(A) that agencies shall withhold information under FOIA "only if (I) the agency reasonably foresees that disclosure would harm an interest protected by an exemption...; or (II) disclosure is prohibited by law...". 5 U.S.C. § 552(a)(8)(A) also provides that whenever full disclosure of a record is not possible, agencies shall "consider whether partial disclosure of information is possible...and (II) take reasonable steps necessary to segregate and release nonexempt information." Therefore, we have determined that, in certain instances, a partial disclosure is proper.

Pursuant to 10 C.F.R. § 1004.7(c)(2), I am the individual responsible for the determination to withhold the information described above. The FOIA requires that "any reasonably segregable portion of a record shall be provided to any person requesting such record after deletion of the portions which are exempt." 5 U.S.C. § 552(b). As a result, a redacted version of the documents is being released to you in accordance with 10 C.F.R. §1004.7(c)(3).

This determination, as well as the adequacy of the search, may be appealed within 90 calendar days from your receipt of this letter pursuant to 10 C.F.R. § 1004.8. Appeals should be addressed to Director, Office of Hearings and Appeals, HG-1, L'Enfant Plaza, U.S. Department of Energy, 1000 Independence Avenue, S.W., Washington, D.C. 20585-1615. The written appeal, including the envelope, must clearly indicate that a FOIA appeal is being made. You may also submit your appeal to OHA.filings@hq.doe.gov, including the phrase "Freedom of Information Appeal" in the subject line (this is the preferred method by the Office of Hearings and Appeals). The appeal must contain all of the elements required by 10 C.F.R. § 1004.8, including a copy of the determination letter. Thereafter, judicial review will be available to you in the Federal District Court either: 1) in the district where you reside; 2) where you have your principal place of business; 3) where DOE's records are situated; or 4) in the District of Columbia.

You may contact DOE's FOIA Public Liaison, Todd Burns at foia-central@hq.doe.gov, for any further assistance and to discuss any aspect of your request. Additionally, you may contact the Office of Government Information Services (OGIS) at the National Archives and Records Administration to inquire about the FOIA mediation services they offer. The contact information for OGIS is as follows: Office of Government Information Services, National Archives and Records Administration, 8601 Adelphi Road-OGIS, College Park, Maryland 20740-6001, e-mail at ogis@nara.gov; telephone at 202-741-5770; toll free at 1-877-684-6448; or facsimile at 202-741-5769.

The FOIA provides for the assessment of fees for the processing of requests. *See* 5 U.S.C. § 552(a)(4)(A)(i); *see also* 10 C.F.R. § 1004.9(a). For purposes of assessment of any fees, you have been categorized under the DOE regulation that implements the FOIA at Title 10, Code of Federal Regulations (CFR), Section 1004.9(b)(4), as “other” requester. Requesters in this category are entitled to two (2) free hours of search time and are provided 100 pages at no cost. Thus, no fees will be charged for processing your request.

If you have any questions about the processing of your request, you may contact Cara Hall at cara.hall@hq.doe.gov.

I appreciate the opportunity to assist you with this matter.

Sincerely,

TODD BURNS

Digitally signed by TODD
BURNS
Date: 2025.07.01 15:52:45
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Todd Burns
Assistant General Counsel for
Finance and Information Law

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GENERAL QUESTIONS

QUESTION: With the Administration's expressed support for Coal and domestic fossil energy, why are you proposing cutting the Fossil Energy R&D budget by 29% (from FY18 annualized CR levels)? Are you saying there is no longer a national interest/government role to advance Fossil R&D?

ANSWER:

- A national interest and government role exists to advance Fossil Energy R&D (FER&D). Fossil energy sources constitute over 77% of the country's total energy use, and are important to the nation's security, economic prosperity, and growth.
- The FER&D program advances transformative science and innovative technologies that enable the reliable, efficient, affordable, and environmentally sound use of fossil fuels.
- The FY 2019 Budget Request for the Department of Energy is guided by the reassertion of the proper federal role as a supporter of early-stage R&D—in which the private sector has less incentive to invest—and an increased reliance on the private sector to fund later-stage R&D including demonstration and commercial deployment.
- The budget focuses on cutting edge, early-stage research and development that will prepare innovative new technologies for the private sector to further develop, scale-up, and deploy.
- As a result, the FER&D FY 2019 budget provides a limited level of funding for cost-shared financial assistance projects with industry. The majority of funding, however, is aligned with lab- and university-led early-stage research.
- The FER&D FY 2019 will develop advanced clean, high-efficiency technologies, which underpin our national economy and create new products for export. Executing this plan will improve the competitiveness of the existing U.S. coal fleet and allow it to continue providing affordable and stable power to the grid, and assist the U.S. power industry to achieve unit-specific efficiencies of 52% HHV (54% LHV) by 2030 with 45%+ efficiency systems spun off from this effort by 2025 at a cost of \$3,000-\$4,000/kW.

BACKGROUND:

- The FY 2017 Enacted for FER&D was \$421.2M. The FY 2018 Annualized CR is \$425.1M. The FY 2019 Request is \$302.1M.

QUESTION: I see you proposed a budget restructuring to the CCS and Power Systems program. Can you explain why and what is the significance of the changes?

ANSWER:

- Fossil Energy (FE) proposes restructuring the program, renaming it the Advanced Coal Energy Systems & CCUS program.

- In addition, it will restructure our Advanced Energy Systems, Crosscutting Research, and Carbon Capture and Storage budgets into three subprograms, instead of four, to streamline the structure and better align associated activities.
- The restructuring recognizes the priority and need for a holistic approach to develop solutions for improving the efficiency, reliability and emissions of the existing fleet of coal fired power plants to enable continued low-cost power generation.
- The program will continue to support early-stage transformational R&D in areas such as coal gasification, advanced turbines, solid oxide fuel cells, Carbon Capture, Utilization, and Storage (CCUS), REE/critical materials from coal and coal byproducts, advanced materials for high efficiency/low emissions energy systems, advanced sensors and modeling, and water management.

QUESTION: Why is there such a significant decrease to the Fossil Energy budget request—across the board, but especially in Carbon Capture and Storage—if the Administration’s goal is to advance clean coal technology and revitalize the coal industry?

ANSWER:

- The shift toward early stage R&D in the carbon capture and storage program eliminates a number of high cost R&D efforts such as carbon capture pilots, the National Carbon Capture Center, and field projects in the carbon storage infrastructure activity. These activities represent over 50% of the budget for both programs.
- Both the capture and storage program will focus on early stage R&D, which is lower cost but higher risk.
- The Capture program will focus on transformational technologies for CO₂ separation that will enable adoption of CO₂ utilization opportunities.
- The Storage program will focus on early stage R&D focused on developing advanced monitoring and simulation tools, ensuring well bore integrity, addressing risks from induced seismicity, and characterization of offshore resources.

QUESTION: The budget discusses focusing on lower Technology Readiness Levels (TRLs). What are TRLs and why should the Department not focus on the higher levels? How does this new direction affect the current FE portfolio – will programs that have been approved by Congress be discontinued?

ANSWER:

- Technology Readiness Levels (TRLs) are a framework used to assess maturity of a technology. TRLs are typically measured on a scale of 1 to 9 where 1 represents the concept and 9 represents commercial deployment of the technology.
- The Department’s focus on early stage R&D requires industry to bridge the “valley of death” and to assume later stage technology maturation, demonstration and system integration levels, making FER&D’s role in de-risking early stage technologies critical to industry adoption.
- The Department is focused on supporting early stage R&D (TRL1-4) where the technical risk is very high, the probability of success is low, and typically the rate of return for energy systems is

very long. Many in industry have trouble justifying investment in these long-term R&D activities without some type of financial support from the government.

- Later stage R&D (TRL5-9) is considered to have lower technical risk, higher financial risk, but are closer to commercial deployment and financial return making it more attractive and appropriate for industry to support these later stage R&D efforts.

QUESTION: The Fossil Energy Office has been funding projects that were in the so called financial “valley of death” and has been relatively successful in this endeavor. Does DOE now expect industry to just jump in and take the financial risks and burden? If they don’t, does this mean the end of technology innovation in the coal sector?

ANSWER:

- Technology transfer is a balance between the role of the government and entrepreneurial industry, and we will work with our stakeholders to support technology transfer as much as possible.
- DOE intends to refocus Fossil Energy R&D to lower TRLs where the federal role is stronger, and where we can accelerate innovation for transformational energy technologies.
- Advanced technologies can increase their probability of commercial success through early stage modeling, computational analysis, and validation, which can all increase the probability of technologies becoming commercially viable projects.
- DOE will focus resources where an existing market or demonstrated need is felt within the industry. Opportunities in Rare Earth Elements (REE), CO₂ capture, and efficiency improvements have commercial market opportunities which can help pull these advanced technologies forward.
- Existing major demonstration projects will continue to provide operational data and enable lower cost demonstrations in the future.

SUPERCritical TRANSFORMATIONAL ELECTRIC POWER

QUESTION: What will happen to the Supercritical Transformational Electric Power (STEP) project, an initiative with bipartisan support that has already received \$24M in funding?

ANSWER:

■ [REDACTED]

[REDACTED]

■ [REDACTED]
■ [REDACTED]

ADVANCED ENERGY SYSTEMS

QUESTION: What is your program goal for Advanced Energy Systems, how will the FY 2019 budget let you reach that goal, and what is your strategy to achieve your goal?

ANSWER:

- The \$143.3 million request for the Advanced Coal Energy Systems and CCUS program focuses on high-impact, early-stage R&D that requires a federal government role to succeed. In previous budgets, this program was known to you as CCS and Power Systems.
- This proposed re-naming—Advanced Coal Energy Systems and CCUS program—recognizes the need for a holistic approach to develop solutions for improving the efficiency, reliability, and emissions of the existing fleet of coal-fired power plants, transformational coal technologies, cross-cutting technologies and CCUS. This will enable continued low-cost power generation and will support a secure and reliable power grid.
- The program goal is to support early-stage and advance transformative science and innovative technologies that enable the reliable, efficient, affordable, and environmentally sound use of fossil fuels. Fossil energy sources currently constitute about 77% of the country's total energy use, and are important to the nation's security, economic prosperity, and growth.
- The program focuses on cutting edge, early-stage research and development that will prepare innovative new technologies for the private sector to further develop, scale-up, and deploy. Programs will be restructured and re-scoped to focus on early-stage TRL R&D.
- Funding is aligned with lab- and university-led early-stage research. The limited funding for cost-shared financial assistance projects will be utilized to position early-stage technologies for ultimate industry adoption.

CRITICAL MATERIALS INITIATIVE - REE FROM COAL AND COAL BYPRODUCTS

QUESTION: Under the Advanced Coal Energy Systems & CCUS Program, you request \$23.3 million for a Critical Materials initiative. What is the role of the Office Fossil Energy on Rare Earth Elements? What are the challenges and opportunities? What does this initiative accomplish?

ANSWER:

- Development of an economically competitive domestic supply of critically needed REEs assists the Nation in maintaining our economic growth and national security.
- FE/NETL has undertaken R&D since 2014 to examine the economic feasibility of producing REEs from coal and coal byproducts.
- A significant new body of knowledge has been developed since that time, progressing our understanding of the nature and distribution of REEs in U.S. coal deposits. Through this study, REEs have been discovered at concentrations higher than 300 ppm in coal basins in the U.S. and at least one coal basin is estimated to have reserves of REEs in excess of 6

million metric tonnes.¹ In comparison, the current world demand of REEs is 133,000 metric tons. As more U.S. coal basins are surveyed, the reserve figure is likely to grow.

- The challenge is the low assays found in materials associated with coal deposits. Preliminary results indicate that technology development, in mineral separation, will be required to make this new U.S. REE reserve commercially recoverable.
- The initiative is designed to expanded geologic characterizations, expanded knowledge of the presence, form and distribution of REEs in these basins, and the development of improved separation and concentration processes to make REE recovery from these minerals commercially competitive with those produced from low cost countries.
- DOE's focus is validating, by 2020, the feasibility of prototype REE separation and extraction systems to product salable, high purity rare earth elements from coal and coal by-product feedstock. These include coal refuse – tailings and fines, ash from power generation sources, clays from overburden and under burden materials surrounding coal seams, and acid mine drainage. By 2020, validation is to demonstrate production of 10 pounds-per-day of at least three rare earth elements (as oxides) that at containing in separated fractions and are present in concentrations that at 90-99% pure.
- In addition, the effort will also identify other materials associated with coal and coal by-products, and achieve secure U.S. independence from foreign imports of critical and non-critical materials.

(b) (5)

[REDACTED]

[REDACTED]

- [REDACTED]
- [REDACTED]

[REDACTED]

- [REDACTED]
- [REDACTED]
- [REDACTED]

¹ 6 million tonnes estimated for the Western Basin in a Tetra Tech report. January 2015.

(b) (5) [Redacted]

[Redacted]

[Redacted]

- [Redacted]
- [Redacted]
- [Redacted]

[Redacted]

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- [Redacted]
- [Redacted]
- [Redacted]

[Redacted]

- [Redacted]

- Phase I – Characterization phase focused on the assessment of CO₂ sources and storage potential in the United States and culminated in the publication of a regional storage Atlas.
- Phase II – Over 20 small scale CO₂ injection projects (~ hundreds to tens of thousands of metric tons each) were completed throughout the United States and Canada.
- Phase III – 6 large scale injection projects (~ one million metric tons each) were complete in saline and oil reservoirs to validate that carbon storage was possible throughout the United States. These projects have been in the post-injection phase to maximize data collection and analysis from DOE's investment and to also honor permit requirements.
- The Regional Partnerships have brought together hundreds of organizations and thousands of individuals to implement the field projects and document best practices for developing carbon storage projects in North America.

CARBON STORAGE - CARBONSAFE

QUESTION: What will happen to the CarbonSAFE projects and how will it hinder the commercial deployment of carbon storage infrastructure in the United States?

ANSWER:

- The sixteen CarbonSAFE projects selected to date will complete their research activities on characterizing the sites for commercial opportunities for storage as defined in their agreements with DOE.
- It is expected that industry could partner with these organizations to complete the characterization of these sites if there is interest in developing these facilities for commercial operation. We do not see a role for the federal government in this activity since this is considered later stage R&D.

BACKGROUND:

- Sixteen projects (13 Phase I and 3 Phase II) were selected in the first closing of the FOA.
- The FOA included discussion about later phases to be initiated in the future for site development and permitting of injection wells. These later phases will not proceed as the programs shift toward early-stage R&D.

CO₂ UTILIZATION

QUESTION: Beyond sequestration, there are a number of practical uses of CO₂. What is the Department doing to explore, expand, and advance the other beneficial uses of CO₂ (algae, cement, etc.)?

ANSWER:

- The FY 2019 budget request includes \$2M for carbon utilization that will focus on early stage R&D on technologies that will convert CO₂/carbon waste streams from coal into valuable

products. R&D will focus on catalysts made from low-cost materials and nano-manufacturing to reduce costs.

- Through prior appropriations, activities have focused on early stage R&D that advance CO₂ reuse technologies such as algae and other forms of CO₂ conversion to chemicals, pharmaceuticals, building products, and other valuable products.
- The Office of Fossil Energy's primary focus for algae-based CO₂ reuse projects will continue to focus on addressing the challenges of integrating bioreactor and open pond systems into commercial scale power plants. This ensures there is no overlap between Fossil Energy's work and the other applied offices in DOE.

BACKGROUND:

<i>(\$ thousand)</i>	FY 2015 Appropriation	FY 2016 Appropriation	FY 2017 Appropriation	FY2019 Request	FY 2019 Req. vs. FY 2017 Enacted
FE Carbon Use and Reuse	2,000	10,000	10,000	2,000	–80%

- In FY 2015, the DOE received \$2M to support CO₂ use and reuse projects focused on microalgae.
- In FY 2016 and FY 2017, DOE received \$10M to support CO₂ use and reuse projects and selected an additional 12 early stage-R&D projects focused on biological concepts, mineralization, and catalytic conversion processes.

(b) (5)

[REDACTED]

[REDACTED]

[REDACTED]

(b) (5)

1

2

3

[REDACTED]

4

5

6

MAJOR DEMOS - PETRA NOVA

QUESTION: The Secretary has described the Petra Nova facility as an “example of how investments in clean technology can lead to increased development of conventional sources of energy.” How will the Department’s proposed budget decrease for carbon capture and storage affect the development of this technology?

ANSWER:

- Petra Nova is an excellent example of demonstrating a technology at full commercial scale that provides for the capture of CO₂ and its subsequent utilization in Enhanced Oil Recovery (EOR). This demonstration was accomplished at a significant cost, and we are now focusing our technology development efforts on earlier stage R&D to greatly reduce the cost of CO₂ capture.
- We believe that lowering costs and improving efficiency along with improved utilization accelerates the implementation of new technologies.
- The carbon capture program will be focused on the development of transformational CO₂ separation technologies such as non-aqueous solvents, membranes, and structure sorbents to significantly reduce the cost of capture and expand the use of CO₂ for enhanced oil recovery, conversion to higher value products, and/or storage.
- The carbon storage program is also focused on early stage R&D and will build upon the efforts at PetraNova to improve the monitoring tools used to track CO₂ in the subsurface resulting in better use of the pore space for both associated storage and recovery of mineral resources such as stranded oil and gas assets.

BACKGROUND:

- Petra Nova project was completed on time and under budget starting commercial operations on January 10, 2017. Petra Nova is the largest operating Post-Combustion CO₂ capture system in the world.
- Since the start of commercial operations, the project has captured over 1 million tons of CO₂ and produced over 1 million barrels of oil as of January 2018.
- The CO₂ capture system met all performance guarantees during performance testing. The system has demonstrated operation at 100% of capacity, capturing 5,260 tons of carbon dioxide per day.
- Petra Nova has won the prestigious Power Engineering's 2017 Coal Project of the Year Award, as selected by Power Engineering Magazine. Earlier this year, Petra Nova won a competing award, 2017 Power Plant of the Year, from Power Magazine.
- The goal for the Petra Nova project was to demonstrate profitable construction and operation of commercial-scale post-combustion CO₂ capture and storage technology retrofitted to an existing coal power plant. This was accomplished by retrofitting Unit 8 for CO₂ capture at the NRG's W.A. Parish coal fired plant. W.A. Parish is the largest fossil-fired power plant in the U.S. using both the widely available PRB sub-bituminous coal and natural gas.
- The Petra Nova project capture 90% of CO₂ from Unit 8 with 99% CO₂ purity at approximately 240 MW generation scale. Petra Nova is the world's largest post-combustion CO₂ capture system delivering and permanently sequestering about 1.4 million metric tons of CO₂ per year for enhanced oil recovery.

- The CO₂ captured by Petra Nova is used for enhanced oil recovery operations and will be sent along a new 81-mile long pipeline boosting oil production in the West Ranch oilfield.
- NRG held a ribbon cutting ceremony on April 13, 2017 that was attended by the U.S. DOE Secretary Rick Perry along with the Governor of Texas, and CEOs of NRG, JX Nippon, and Hilcorp.

NATURAL GAS TECHNOLOGIES

QUESTION: Why has the Department decided to stop funding Natural Gas Carbon Capture technologies? Previous budget requests have highlighted the synergies between coal and gas research technologies; is this no longer the case?

ANSWER:

Previous budget requests have included proposals for Natural Gas Carbon Capture research, but DOE did not receive funding through appropriations for that research. The Department continues to invest in early-stage research on carbon capture technologies through the Office of Clean Coal and Carbon Management. The Department continues to recognize the synergies between coal and gas capture technologies.

QUESTION: In the FY 2019 request, you propose a new effort to fund early-stage research to improve U.S. natural gas infrastructure. What work is envisioned and how is this work appropriate for DOE to pursue—isn't industry already doing this?

ANSWER:

The Natural Gas Infrastructure subprogram will focus on early-stage research on advanced materials and sensor technology to address the reliability, public safety, and operational efficiency of the nation's aging natural gas infrastructure. Research will include the development of embedded in-pipe micro-sensor enabled coatings. The sensor devices could communicate valuable information about the onset of corrosion by measuring ionic conductivity changes over time. There are tangible public benefits in DOE conducting this work: safety (reduced damage), economic (improved asset utilization), reliability and service quality (reduction in interruptions of service), environmental, and energy security are all benefits to be derived from this subprogram.

Industry is not currently performing this early-stage research and the federal government has a significant role in addressing research gaps that are in the public interest. Natural gas pipeline failures have a significant safety and cost to U.S. consumers. This subprogram will work to strengthen natural gas pipeline reliability and ensure infrastructure security.

METHANE HYDRATES

QUESTION: Does the FY 2019 budget request result in the termination of the important gas hydrates work already being conducted in the Gulf of Mexico and Alaska?

ANSWER:

The decrease in funding for the Gas Hydrates subprogram is due to the completion of the initial phase of the Gulf of Mexico field research and prioritizing efforts toward fundamental laboratory-based research on the properties of methane hydrates.

The FY 2019 request does not provide funding to support gas hydrates field projects in the Gulf of Mexico and on the Alaska North Slope. DOE will continue to collaborate with industry and international stakeholders on methane hydrate research.

LIQUEFIED NATURAL GAS (LNG)

QUESTION: How does the FY 2019 budget impact the Department's approval of LNG exports? Will the approval process be further delayed?

ANSWER:

The import-export program continues to be adequately funded in the FY 2019 budget. The pace of review for LNG export applications should continue as it has in the past.

Under current procedures, DOE takes final action on long-term applications to export LNG to non-free trade agreement (non-FTA) countries shortly after the environmental review of the export facility required under the National Environmental Policy Act (NEPA) has concluded. The environmental review, typically led by the Federal Energy Regulatory Commission (FERC), remains the most time-intensive portion on the critical path of a non-FTA applicant's review, sometimes taking two years or more. DOE typically acts quickly, within days or weeks, following the conclusion of the environmental review. The FY 2019 proposed budget should allow DOE to continue the same practice with pending long-term non-FTA LNG export applications.

QUESTION: What is the status of LNG projects, pace of approvals, and total approved?

ANSWER:

For the past two years, Cheniere Energy has been exporting LNG from its Sabine Pass facility in Louisiana. LNG from Sabine Pass has landed in 25 different countries around the world during that time. Additional large-scale projects are under construction in Texas, Louisiana, Georgia, and Maryland.

Small-scale LNG exports also began in February 2016 from Florida. American LNG continues to export LNG in ISO containers to Barbados. Additional small-scale projects have been authorized for exports from Florida and Texas.

DOE has approved for long-term export a total of 56.9 billion cubic feet per day to FTA countries and 21.35 cubic feet per day to non-FTA countries.

ETHANE STORAGE HUB

QUESTION: There has been much discussion recently about the potential for an ethane storage hub in the Appalachian region to take advantage of the local resource and spur new petrochemical and manufacturing investments. Can you tell me what DOE is doing on this topic?

ANSWER:

- West Virginia, Pennsylvania, and Ohio have experienced rapid growth in natural gas production from the Marcellus and Utica shale plays. This development also produces significant volumes of natural gas liquids (NGLs), principally ethane. Ethane is a key feedstock for the petrochemical industry in the production of plastics.
- Leaders across the Appalachian region have identified the potential economic opportunity these significant NGL resources present. To contribute to this dialogue, the DOE published, in December 2017, a Natural Gas Liquids Primer to educate the public on NGLs – what they are, how they are used, recent market developments, and the supporting infrastructure in the region. The primer includes the most recent information from DOE and the U.S. Energy Information Administration (EIA) on Appalachian NGL supply, demand, and infrastructure.
- At the direction of Congress, DOE is preparing a report on the feasibility of establishing an ethane storage and distribution hub in the United States, given the increased production of NGLs from shale developments and recognizing that ethane is the largest component of those NGLs. The report will address potential locations, economic feasibility, economic benefits, geologic storage capabilities, above ground storage capabilities, infrastructure needs, and benefits to energy security.

EOR

QUESTION: Another part of this equation is ensuring that we have the ability to utilize carbon dioxide once it is captured. North Dakota has unique geology and resources that make us well-suited to help solve this problem. Separate, but in addition to their work on Allam Cycle, the EERC is researching enhanced oil recovery in shale formations as well. So far it looks like there is enormous potential for utilizing carbon dioxide in the Bakken and other shale formations, as well as in conventional resources.

What kind of support is DOE giving to the development of enhanced oil recovery to further utilize our shale geology?

ANSWER:

- DOE has a broad portfolio of projects that support research and development of technologies for carbon capture, storage, and its utilization for enhanced oil and gas recovery.
- In FY 2019, FE will conduct early-stage research focused on increasing understanding of shale geology, fracture dynamics, rock-fluid interactions, and reservoir behavior in order to increase and enable more cost-effective and environmentally sound recovery of oil and gas from unconventional oil and gas reservoirs (shale gas, tight oil, and tight gas). The early-stage research and development activities will be conducted at Field Laboratories selected under a funding opportunity announcement in FY 2018, gathering field data to inform modeling and analysis. The activities will also include research designed to advance the knowledge base of the potential for enhanced gas or oil recovery (EGR/EOR) from low permeability unconventional resources. Additional work will include fundamental research on fluid flow and chemical interactions in unconventional reservoirs.

DOE'S ROLE IN CRUDE OIL BY RAIL

QUESTION: A few years ago, crude oil transport by rail was getting a lot of attention, and FY 2016 and FY 2017 appropriations provided funding to address the issue. What is DOE's role in both data collection and addressing the risks? (\$ amounts and activities)

ANSWER:

EIA collects monthly data on rail movements of crude oil, ethanol, and biodiesel, propane, propylene, normal butane, and isobutane. New data on crude-by-rail (CBR) movements are integrated with EIA's existing monthly petroleum supply statistics, which already include crude oil movements by pipeline, tanker, and barge.

QUESTION: What is the status of the Crude by Rail study?

ANSWER:

DOE and the U.S. Department of Transportation (DOT) are conducting a comprehensive Sampling, Analysis and Experiment (SAE) plan which includes tasks that address the following general themes:

- Identifying the most appropriate sampling and testing methods;
- Gathering crude oil quality data using those methods; and
- Identifying relationships between any particular chemical or physical property of crude oil, or combination of such properties, and combustion properties.

To date a total of \$9.2M has been applied to the project, including \$4.75M from DOE through the Unconventional Fossil Energy Technologies program.

The total cost of the SAE plan work is \$7.65M and DOE and DOT have agreed to share costs equally. This equates to \$3.825M on per department.

Sandia National Laboratories is conducting the study. In December 2017, Sandia released the "Task 2 Test Report on Evaluating Crude Oil Sampling and Analysis Methods." The report presents results from Task 2, investigating which commercially available methods can accurately and reproducibly collect and analyze crude oils for vapor pressure and composition, including dissolved gases.

CRUDE BY RAIL - CHANGE IN QUANTITY TRANSPORTED

QUESTION: How has the quantity of oil transported by rail changed recently?

ANSWER:

Between 2014 (peak crude-by-rail November 2014 at 1.139 million barrels per day) and 2017, U.S. movements of crude by rail decreased 68%. In October 2017, 360,000 barrels of crude oil per day were transported by rail.

- U.S. crude oil field production increased 3.68% to 9.68 million barrels per day in October 2017 from 9.3 million barrels in November 2014.
- Total U.S. production of natural gas liquids (NGLs) increased 12% to 3.968 million barrels per day in October 2017 from 3.553 million barrels per day in October 2016.
- Total rail movements of propane, propylene, normal butane, and isobutane averaged 464,000 barrels per day and rail movements of fuel ethanol, biodiesel, petroleum coke, asphalt, and road oil averaged 1.02 million barrels per day in October 2017; increases of 21% and 30%, respectively from October 2014.

GENERAL QUESTIONS

QUESTION: Your FY 2018 budget proposed to sell off and close half of the Strategic Petroleum Reserve. Is that proposal included in the FY 2019 budget?

ANSWER:

The FY 2018 budget request to sell off half the SPR and close two storage sites has not been taken up by Congress, and has not been re-proposed as part of the Administration's FY 2019 request.

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QUESTION: Why is the Department continuing to recommend disestablishing the Northeast Gasoline Supply Reserve (NGSR) that is integral to the energy security of the Northeast? Why has there been such an abrupt U-turn since this was only established 3.5 years ago?

ANSWER:

The NGSR is not cost efficient or operationally effective. An Annual Coordinating Meeting of Entity Stockholders (ACOMES) benchmarking study of other oil stockpiling countries indicates that NGSR operating costs are twice as much as the next highest-cost country's gasoline reserve, and four times as costly as the third highest-cost country's gasoline reserve.

Additionally, as a component of the SPR, the NGSR must follow the statutory release authorities of the SPR, which require national impact thresholds, making it operationally ineffective as a regional-type product reserve.

QUESTION: How much is the gasoline stored in the Northeast Gasoline Supply Reserve worth if it is sold?

ANSWER:

Because the NGSR's leased commercial storage contracts expire in early FY 2019, DOE proposes to divest the one million barrels of government-owned gasoline blendstock in FY 2018. This sale is projected to generate \$60M - \$69M in sales proceeds based on OMB economic assumptions. Sales proceeds will offset discretionary spending with any additional proceeds net of costs going to the General Fund of the U.S. Treasury.

NETL

GENERAL QUESTIONS

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QUESTION: Does the Department still intend to refresh the NETL Supercomputer?

ANSWER:

- Yes. Joule, NETL's high performance computer, remains a crucial research asset used by more than 50% of the research teams at NETL. These computational capabilities are increasingly relevant for NETL's rescoped mission focusing on early-stage R&D.
- The FY 2017 budget provided \$5.5M for NETL to enter a 3-year lease for the refresh of Joule. The 2018 and 2019 requests includes an additional \$5.5M for subsequent years of that lease.

LABORATORY IMPACTS

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- These computational capabilities are increasingly relevant for NETL's re-scoped mission focusing on early-stage R&D.

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