



FY 2017 Budget Request Office of Fossil Energy

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**U.S. DEPARTMENT OF
ENERGY**

**Fossil
Energy**



“Seven years ago, we made the single biggest investment in clean energy in our history. And meanwhile, we’ve cut our imports of foreign oil by nearly 60 percent, and cut carbon pollution more than any other country on Earth.”

President Barack Obama
State of the Union Address
January 12, 2016

- Selected six Phase I projects to evaluate 2nd generation post combustion capture technologies at large-scale
- Selected five Phase I projects to evaluate the potential benefits of brine extraction associated with carbon storage as a pressure management and enhanced water recovery operation
- Petra Nova – NRG constructions continues below budget and ahead of schedule on this 260 MW flue gas slipstream at the W.A. Parish power station. CO₂ capture will be used for EOR. Operation scheduled for July of 2017.
- Construction of Archer Daniels Midland Industrial Carbon Capture and Storage (ICCS) demonstration project is 97% complete
- Air Products ICCS demonstration at its hydrogen production facility has captured nearly 2.5 million tonnes of CO₂ for Enhanced Oil Recovery
- Research Triangle Institute (RTI) has demonstrated over 2,500 hours of operations on the warm gas clean up at the Tampa Electric Company facility in FL
- DOE's research findings on foam cement quality were featured in the January 2015 Society of Petroleum Engineers' Journal of Petroleum Technology
- Strategic Petroleum Reserve acquired approximately 4.2 million barrels of crude oil using the proceeds from the 2014 operational Test Sale
- Energy finalized the sale of the Teapot Dome Oilfield located 35 miles north of Casper, Wyoming – known officially as the Naval Petroleum Reserve Number 3 (NPR-3) for the price of \$45.2 million
- Released fifth addition of Carbon Storage Atlas (Atlas V)

In FY 2016, Fossil Energy plans to:

- Complete construction of the Kemper IGCC and the NRG post combustion capture projects
- Use the LNG export studies released for public comment in December 2015 – and the comments received on the studies – in the public interest evaluation of pending applications to export LNG to non-FTA countries

In FY 2017, the Budget Request proposes to:

- Initiate the design and construction of a nominal 10 MWe Supercritical Carbon Dioxide (SCO₂) Pilot Plant Test Facility that supports the DOE SCO₂ crosscut
- Complete FEED studies for four advanced combustion pilots and support initial construction of four large-scale pilot projects (including one run on natural gas) of advanced, second generation, carbon capture technologies to make low-carbon fossil energy market competitive

FY 2017 Congressional Budget Request

Fossil Energy

(\$ in thousands)	FY 2016 Omnibus**	FY 2017 Congressional Request	FY 2017 Request vs FY 2016 Omnibus
FOSSIL ENERGY R&D			
CCS and Advanced Power Systems	377,700	368,377	-2.5%
Fuel Supply Impact Mitigation (Formerly Natural Gas Technologies)	43,000	26,500	-38.4%
Unconventional Fossil Energy Technologies from Petroleum-Oil Technologies	20,321	0	-100.0%
NETL Research and Operations	91,984	76,070	-17.3%
NETL Infrastructure	38,950	68,055	74.7%
Program Direction	60,045	60,998	1.6%
TOTAL FOSSIL ENERGY R&D	632,000	*600,000	-5.1%
STRATEGIC PETROLEUM RESERVE	212,000	257,000	21.2%
NORTHEAST HOME HEATING OIL RESERVE	7,600	6,500	-14.5%
NAVAL PETROLEUM & OIL SHALE RESERVES	17,500	14,950	-14.6%
TOTAL FOSSIL ENERGY PROGRAM	869,100	878,450	1.1%

* Includes the use of \$240 million of prior year balances.

** FY2016 Omnibus is shown in the proposed FY 2017 structure

- **In FY 2017, FER&D proposes a restructuring of the program to support clarity, improve execution, and eliminate the categorization by fuel type that is no longer appropriate for this R&D portfolio**
- **Highlights:**
 - **Coal Carbon Capture and Storage (CCS) and Power Systems line will be renamed CCS and Advanced Power Systems**
 - **Natural Gas Technologies line will be renamed Fuel Supply Impact Mitigation**
 - **NETL Research and Operations and NETL Infrastructure will be new lines, combining elements of NETL activities previously requested in other budget lines**

∞ Use of \$240M FER&D from CCS Demonstration Projects

- While there are successful CCS demonstration projects underway, a number of Clean Coal Power Initiative (CCPI) projects have not reached financial close after six years
- The 2016 Omnibus legislation requires reallocation of \$160 million from major demonstration projects (CCPI and FutureGen) that have not reached financial close
- DOE intends to reallocate an additional \$240 million from CCPI projects that have not yet reached financial close and dedicate those funds to support the FY 2017 R&D portfolio

Supports secure, affordable, and environmentally acceptable, near-zero emission fossil energy through research, development, and demonstration (RD&D) to improve the performance of CCS technologies.

FY 2017 Request: \$368.4 M

- **Carbon Capture** (\$170.4 million)
 - Restructured – Now contains Advanced Combustion, as these technologies can help facilitate carbon capture and the new Natural Gas Carbon Capture activity
- **Carbon Storage** (\$90.9 million)
- **Advanced Energy Systems** (\$47.8 million)
 - Restructured – Now contains the STEP (SCO₂) line as this is part of the broader portfolio of fossil-fuel energy conversion systems integrated with CCS that may be capable of producing competitively priced electricity.
- **Crosscutting Research and Analysis** (\$59.3 million)
 - Restructured – Now contains Special Recruitment Program as this consolidates the university-based research programs



*The National Carbon Capture Center
in Wilsonville, Alabama*

Develop technologies to minimize the environmental impact of fossil fuel production and transport

FY 2017 Request: \$26.5M

- **Environmentally Prudent Development** (\$13M)
Provides R&D on water quality and availability, air quality, induced seismicity, and mitigating the impacts of unconventional oil and gas development
- **Emissions Mitigation and Quantification** (\$11M)
Focuses on reducing methane emissions; consolidates the Emissions Mitigation from Midstream Infrastructure and Emissions Quantification from Natural Gas Infrastructure budget lines
- **Gas Hydrates** (\$2.5M) Focuses on conducting investigations, in consultation with the United States Geological Survey, to confirm the nature and regional context of gas hydrate deposits in the Gulf of Mexico.



∞ **SCO₂ (CCS and Advanced Power Systems: \$30.3M)**

- Power cycles based on SCO₂ have the potential to revolutionize electric power generation – cleaner and more efficient, at a reduced cost, and with significant benefits for CCS

∞ **Subsurface Science, Technology and Engineering RD&D (CCS and Advanced Power Systems: \$90.9M; Fuel Supply Impact Mitigation: \$7M)**

- Explore the ability and effects of subsurface storage and sequestering of fluids and waste products

∞ **Energy–Water Nexus (CCS and Advanced Power Systems: \$15.8M)**

- Minimize freshwater usage in thermoelectric cooling and develop technologies to reduce the costs of desalinating water produced through CCS

∞ **Advanced Materials (CCS and Advanced Power Systems: \$23.2M)**

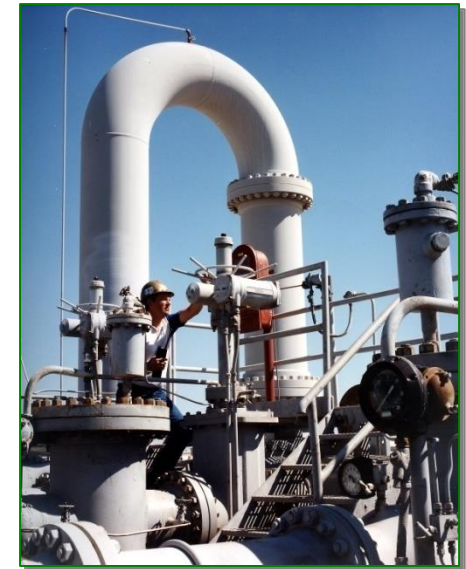
- Build upon FE successes for affordable materials for SCO₂ and advanced ultra supercritical steam extreme environments

Provides “Emergency Stockpile” of crude oil to respond to potential disruptions in U.S. petroleum supplies (international or domestic)

FY 2017 Request: \$257M

FY 2017 funding provides for:

- Operations and security of SPR’s four storage facilities
- Cavern inspections and well remediation
- Increased support for major maintenance requirements
- Degasification of crude oil inventory to ensure its availability
- Acquisition of a custody transfer flow metering skid
- Operational readiness and drawdown capability



Northeast Home Heating Oil Reserve

FY 2017 Request: \$6.5M

- Established in 2000 as “Emergency Stockpile” to respond rapidly to winter related shortages of heating oil
- Maintain one million barrels of ultra-low sulfur diesel at locations in the Northeast.

Naval Petroleum & Oil Shale Reserves

FY 2017 Request: \$14.95M

- NPR-1 (Elk Hills, CA): Provides for the continuing responsibilities to address environmental assessment and remediation at NPR-1
- NPR-3 (Casper, WY): Supports closeout and post-sale monitoring activities for NPR-3

*Provides for the upkeep of a three national laboratory facilities
and their research activities*

FY 2017 Request: \$144.1M

- **NETL Research and Operations** (\$76.07M)
Supports all research activities, including site operations
- **NETL Infrastructure** (\$68.06M) Provides for the upkeep of the lab footprint



Funds all headquarters personnel and operational expenses for Fossil Energy R&D, NETL field office activities, and the Import / Export program

FY 2017 Request: \$61.0M

- **Washington HQ**
(\$30.25M)
- **NETL**
(\$28.74M)
- **Import / Export Authority**
(\$2.01M)



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