

Fossil Energy in a Carbon Constrained World

2011 Pittsburgh Coal Conference

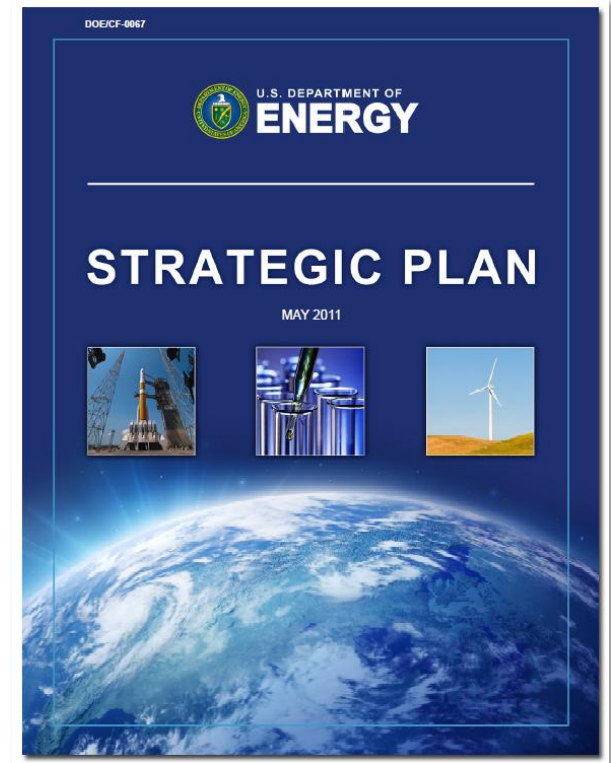
C.D. McConnell
Chief Operating Officer
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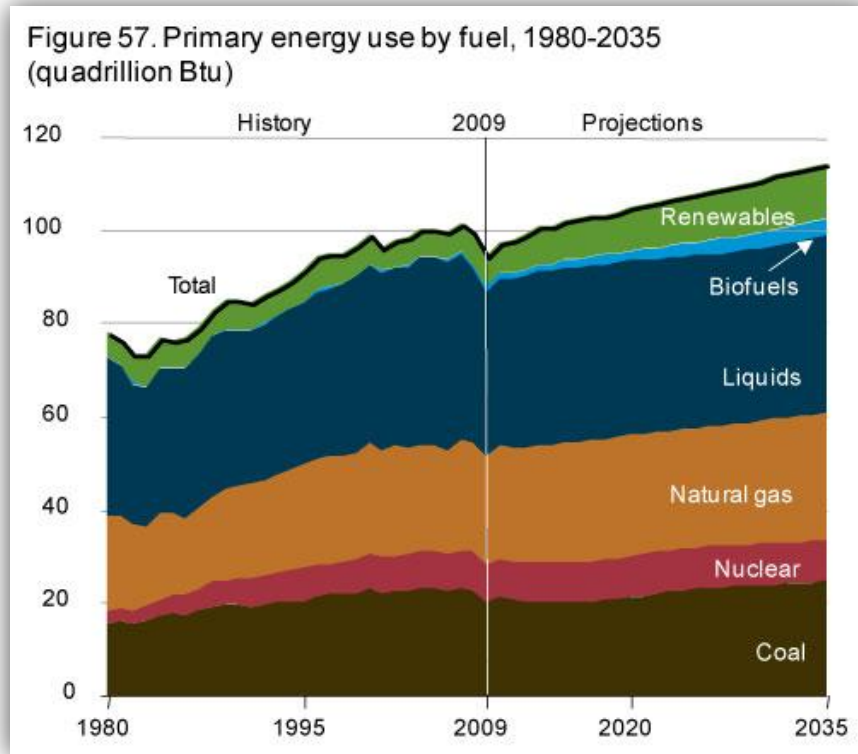
FOSSIL.ENERGY.GOV

DOE Strategic Plan

- ▶ Transform our Energy Systems
- ▶ Science and Engineering Enterprise
- ▶ Secure our Nation
- ▶ Management and Operational Excellence



Importance of Fossil Fuels



Fossil fuels represent over 80% of U.S. energy production

Coal supplies about 50% of electricity generation

Oil and gas supply about 56% of U.S. energy needs

By 2035, oil and natural gas will supply 56% of U.S. energy needs

Source: EIA Annual Energy Outlook 2011



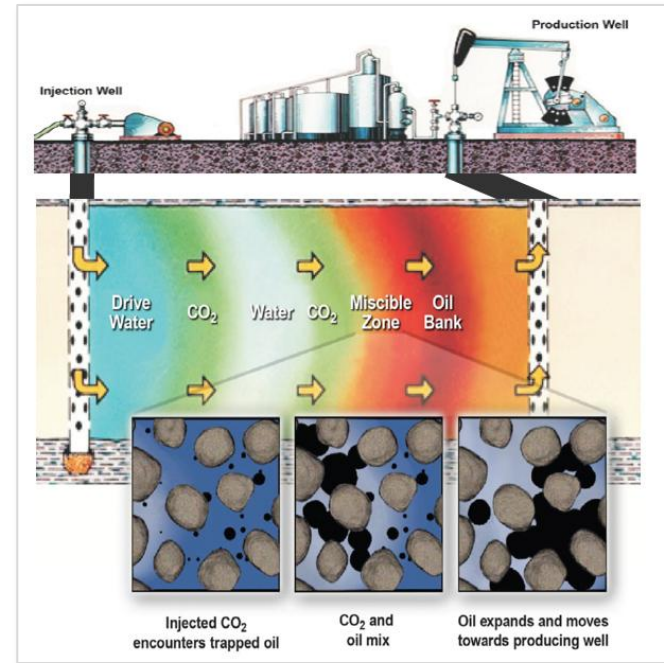
Fossil Energy Portfolio

- ▶ Oil & Gas Technology R&D
- ▶ Petroleum Reserves
- ▶ Clean Coal Technology R&D
- ▶ National Energy Technology Laboratory
- ▶ International Collaboration

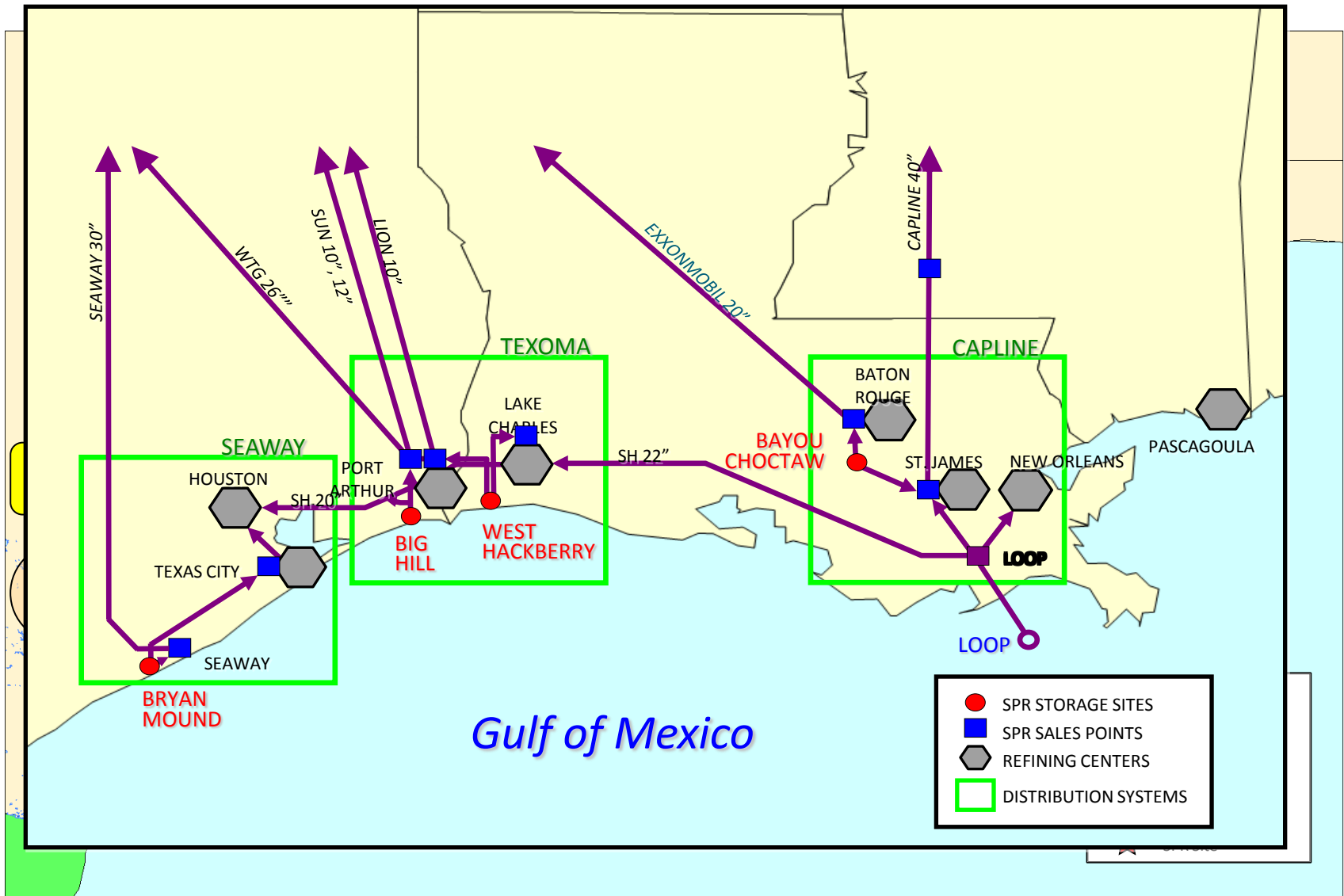


Oil and Gas

- ▶ Enhanced Oil Recovery
- ▶ Shale Gas
- ▶ Sustainability and Environmental Stewardship



Strategic Petroleum Reserve



Clean Coal - Major U.S. Demonstrations



- Large-Scale Geologic CO₂ Storage
- CO₂ Capture from Industrial Facilities
- Post-Combustion Capture
- IGCC with CO₂ Capture
- IGCC with Enhanced Oil Recovery
- Oxy-combustion

Advanced Technology for Carbon Capture,
Utilization and Storage

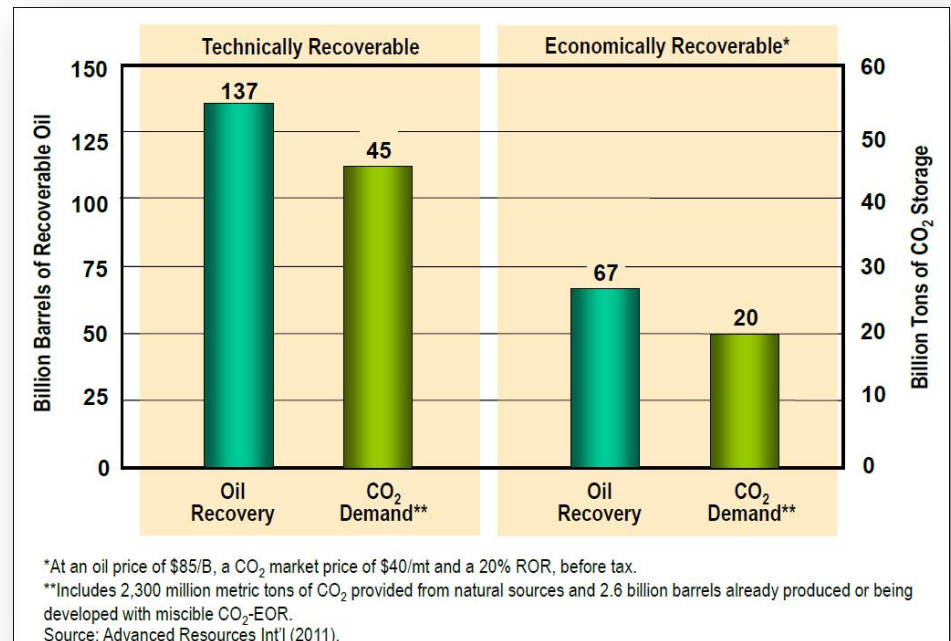


CO₂-Enhanced Oil Recovery

- ▶ The “Un-Mined Gold” Story for Energy and Jobs
- ▶ Benefits¹ of CO₂-EOR:
 - \$10 trillion in economic activity over 30 years;
 - 2.5 million jobs
 - 30 – 40 percent reduction in imported oil

¹ Source: U.S. Carbon Sequestration Council

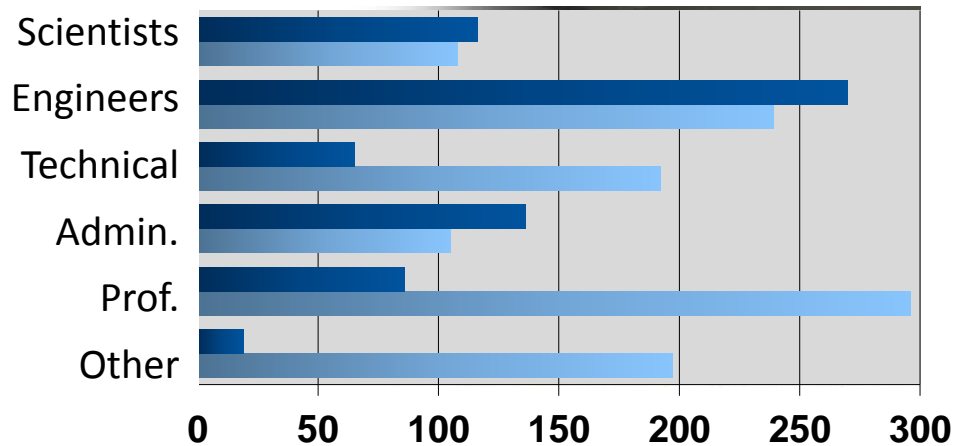
Domestic Oil Supplies and CO₂ Demand (Storage) Volumes from “Next Generation” CO₂-EOR Technology**



National Energy Technology Laboratory



■ 692 Federal Employees
■ 1,137 Site-Support Contractors



NETL – A Century of Innovation



1910
Coal Research Begins in Pittsburgh, PA

1943
Materials Research Begins in Albany, OK

1977
All Four Sites Join New U.S. Department of Energy

1999
FETC Becomes National Energy Technology Laboratory

2001
NETL Opens Arctic Energy Office in Fairbanks, AK

2009
OK Office Moves to Sugarland, TX

1918
Petroleum Research Begins in Bartlesville, OK

1946
Synthesis Gas Research Begins in Morgantown, WV

1996
PA and WV Sites Form New Federal Energy Technology Center (FETC)

2000
National Petroleum Technology Office in Oklahoma Joins NETL

2005
Albany Research Center Joins NETL

Electrical Delivery & Energy Reliability

Energy Efficiency & Renewable Energy

Systems & Policy Analysis

1943 – U.S. Rep. Jerry Seiberling
Climate & Energy

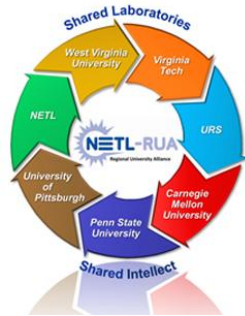
Morgantown
Collaborative R&D Management

Alternative Fuels

Materials Science & Advanced Metallurgy

Enhance Resource Recovery & Operational Safety

NETL Research Partnerships



Regional University Alliance

Regional Carbon Sequestration Partnerships

Clean Coal Power Initiative

FutureGen 2.0

National Carbon Capture Center

RPSEA



National Lab Partnerships



Identify
Promising
Concepts



Develop
Optimal
Designs



Identify
Technical Risk
in Scale-Up



International Collaboration



International Collaboration

Key Bilateral Activities

U.S.-China Clean Energy Research Center

U.S.-India Coal Working Group

Global Carbon Capture and Storage Institute (Australia)



Key Multilateral Activities

Carbon Sequestration Leadership Forum

World Energy Council

International Energy Agency (various)



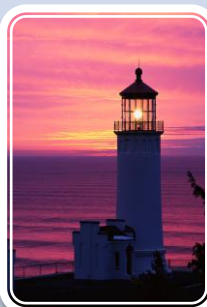
Return on Investment



\$13
Return
for Every
\$1
Invested



1.2
Million
Jobs
Created
(2000-2020)



25
Million
Tons of
Avoided
NO_x
Emissions



2 Million
Tons of
Avoided
SO₂
Emissions



850
Patents
(1978-2010)



\$1.3
Trillion
Estimated
Health
Benefits
from
Reduced
Pollution



In Conclusion...

- ▶ Competition for Global Resources
- ▶ Global Environmental Trends and Policies
- ▶ Technology Demonstrations
- ▶ Commercial Scale

**Create a Compelling Choice for Fossil Energy that is
Game-Changing and Sustainable**

