



Driving Innovation ♦ Delivering Results



The National Energy Technology Laboratory & The Strategic Center for Natural Gas and Oil R&D Program

Tribal leader forum: U.S. Department of Energy
oil and gas technical assistance capabilities
Denver, Colorado

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Gas & Oil
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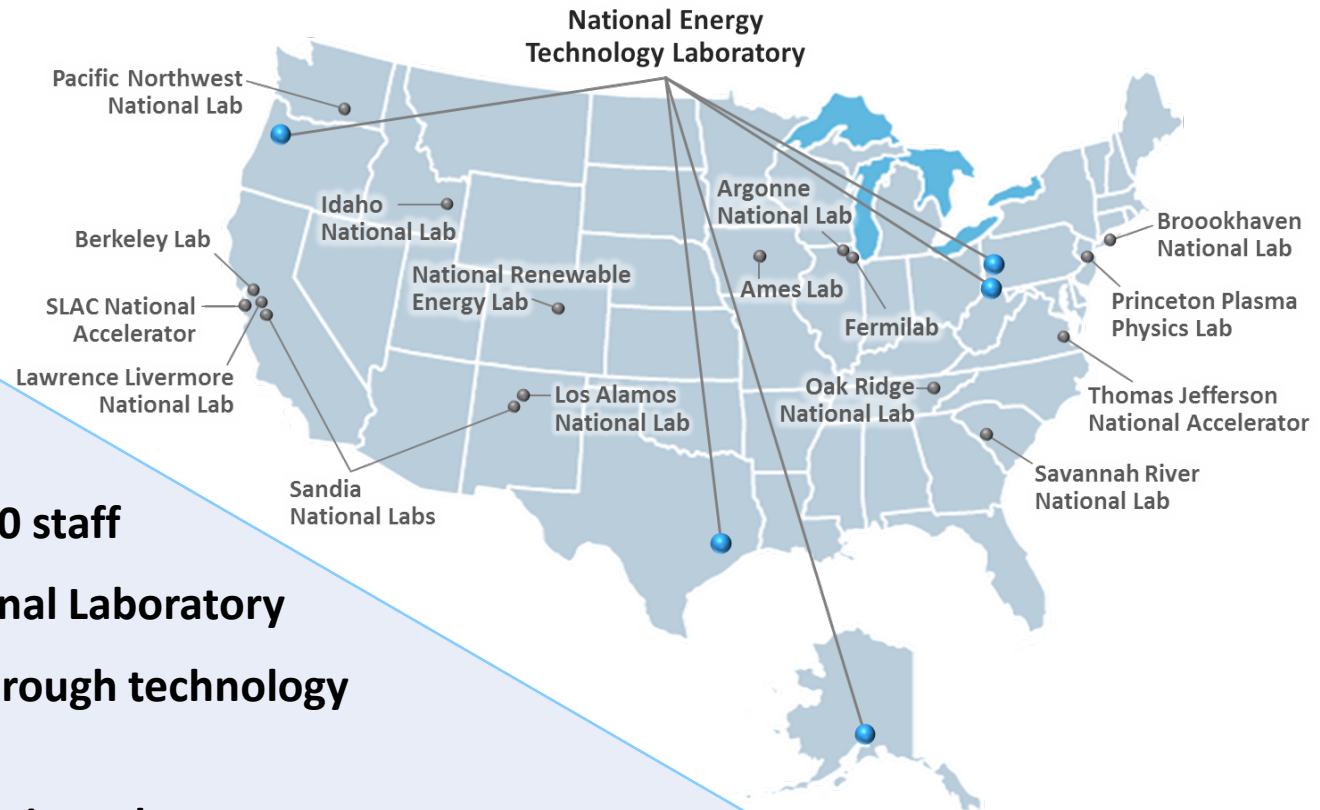
U.S. DEPARTMENT OF
ENERGY

National Energy
Technology Laboratory

National Energy Technology Laboratory



- Partner in DOE's national laboratory system
- Five locations with 1,200 staff
- 'Full-service' DOE National Laboratory
- Fundamental science through technology demonstration
- Unique industry, academia and government collaborations
- The Nation's only laboratory focused on fossil energy
- The only government-owned, government-operated DOE national lab



Enduring FE Mission Elements



Coal



Petroleum



*Faster
Cheaper
Safer*



Natural Gas



Hydrates

*Effective Resource
Development*

*Efficient Energy
Conversion*

Environmental Sustainability

**Advance energy options to fuel our economy,
strengthen our security, and improve our
environment**

*Programs designed to meet stakeholders expectations
for energy production, transportation, and utilization:*

IMMEDIATE ACTIONS

CERTAIN CONSEQUENCES

POSITIVE OUTCOMES

NETL's Unique Business Model

National Lab like no other



NETL's Role:

- 1. Provide Financial Assistance through “Co-operative Agreements”**
 - “Substantial” DOE involvement to ensure “Best Effort”
 - Require Cost Share → 4 R's (Risk Reduction, Relevant Research)
- 2. On-Site Research to fill R&D gaps**
- 3. Systems Analysis to guide R&D programs**
- 4. Collaboration at multiple scales**

NETL Core Competencies:

- 1. Leveraging science and engineering to accelerate scale-up and technology commercialization**
- 2. Coordinating large complex projects and demonstrations**
 - NEPA Regulations, Outreach
- 3. Managing projects and R&D collaborations with international scope**

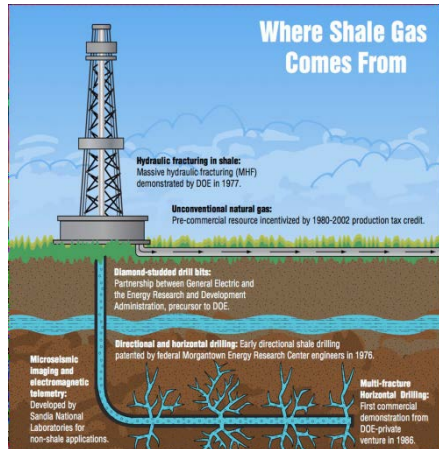


- 1. R&D agenda set by President and Congressional Appropriations**
 - Focus on Energy Security, Environment, Climate & Safety
- 2. Stakeholders include public, industry and other government agencies**
 - Engagement through workshops and posted Requests for Information
- 3. Inform policy makers & regulators on energy science, engineering & technology**
 - Strive to develop solutions ahead of regulations
- 4. Our “payback” time for projects may be quite long – decades**

History of looking “forward”

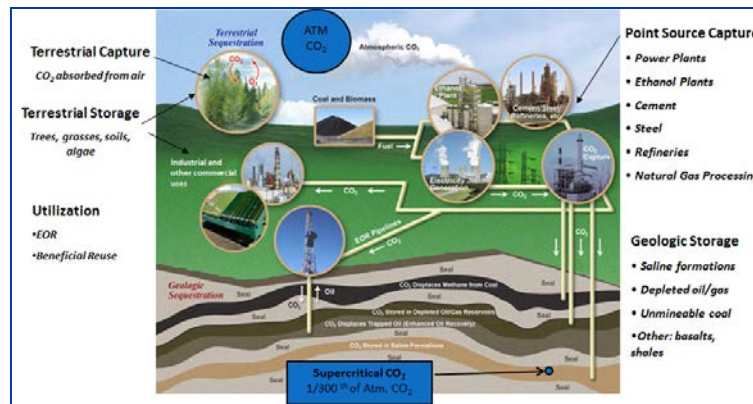


1970’s – Energy Security Shale Gas



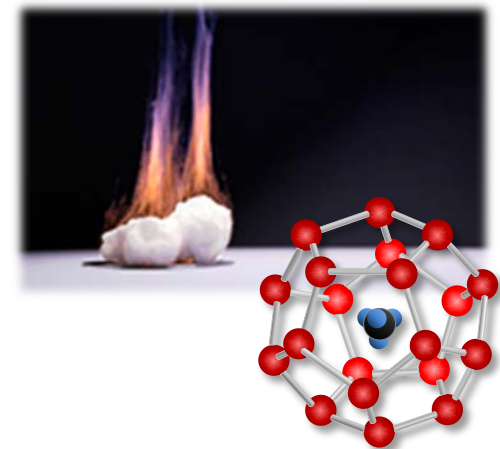
- 1976** Directional/horizontal drilling (DOE-NETL)
- 1977** Hydraulic fracturing (DOE-NETL)
- 1980** Micro-seismic Imaging (DOE-NETL)
- 1986** Multi-fracture horizontal drilling (DOE-Private)
- 2006** TBD

1990’s – Climate Change CO2 Capture Utilization & Storage



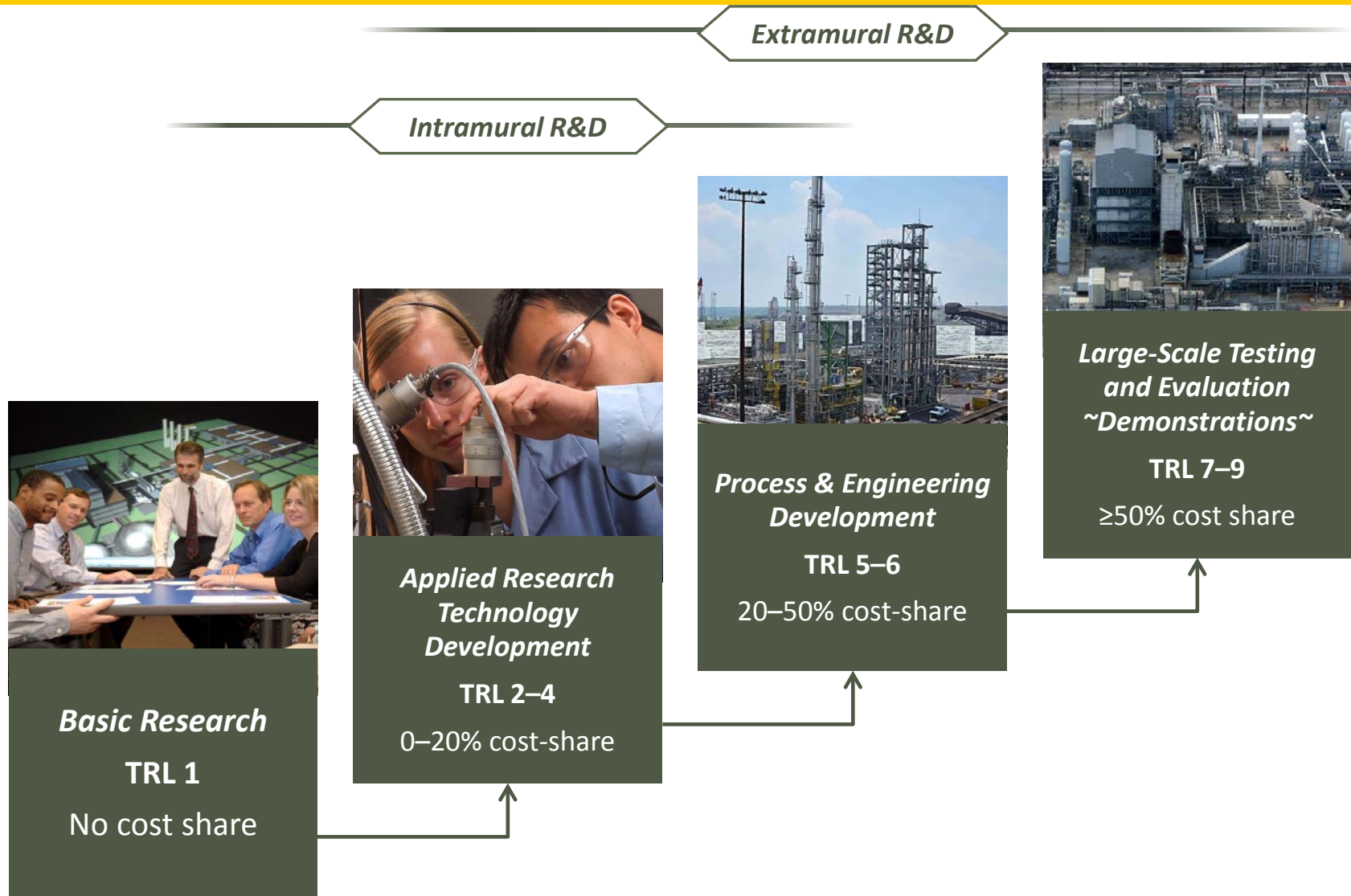
- 1997** Capture Program Initiated
- 2003** Regional Carbon Sequestration Partnerships Formed
- 2007** Multiple CO₂ Injection Tests Begin
- 2009** National Carbon Capture Center Opens
- 2012** DOE Assist. Sec. for FE McConnell Adds ‘Utilization’ to CCS – EOR

2000’s – “Both” Methane Hydrates

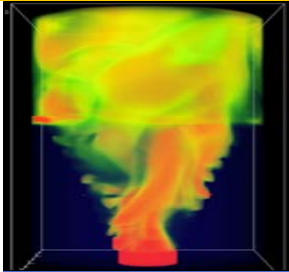


- 2001** Federal GH Program
- 2005** GoM GH Geo-hazards
- 2007** Arctic GH Characterization
- 2009** GoM GH Exploration
- 2012** Limited Arctic Production
- 2014** Arctic GH Production, Marine GH Resource Confirmation

Advancing Technology Readiness



Core Competencies



Computational Engineering

High Performance Computer

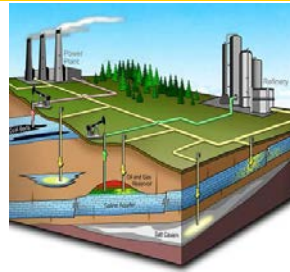
Codes & Data Management



Materials Engineering

Structural & Functional

Design, Synthesis & Performance



Environmental Engineering

Air, Water & Geology

Understanding & Mitigation



Energy Conversion

Component & Device

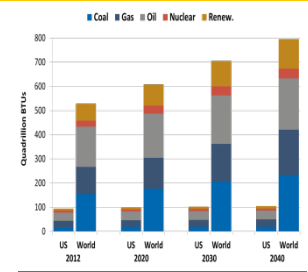
Design & Validation



System Engineering

Process & System

Optimization, Validation & Economics



Markets & Benefits

Technology & Resources

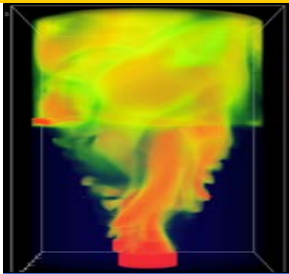
Assessment & Projections

Effective Resource Development

Efficient Energy Conversion

Environmental Sustainability

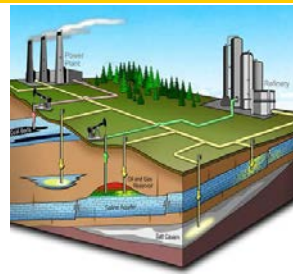
Core Competencies & Technical Thrusts



Computational Engineering



Materials Engineering



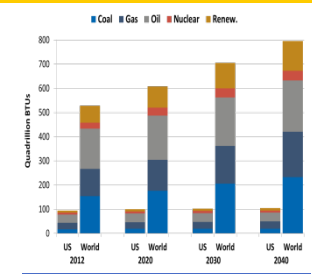
Environmental Engineering



Energy Conversion



System Integration



Markets & Benefits



Carbon Storage



Carbon Capture



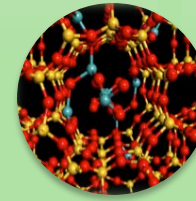
Sensors



Advanced Materials



Advanced Computing



Advanced Energy Systems



Enhanced Resource Production



Environmentally Prudent Development



Transmission & Delivery



Methane Hydrates



Offshore

Partnerships Critical to Mission



Government

Logos of government partners include: NREL (National Renewable Energy Laboratory), Pacific Northwest National Laboratory, Lawrence Livermore National Laboratory, Berkeley Lab, BSEE (Bureau of Safety and Environmental Enforcement), EPA (Environmental Protection Agency), USGS (United States Geological Survey), and U.S. Department of Energy (Energy Efficiency & Renewable Energy).

Academia

Logos of academic partners include: West Virginia University, Carnegie Mellon, Princeton University, University of Pittsburgh, OSU (Oregon State University), Virginia Tech, and University of Kentucky.

Industry

Logos of industry partners include: GE, AEP (American Electric Power), Southern Company, Phillips 66, URS, Chevron, B&W, ANSYS, Fluor, Alstom, and Air Products.

Social Responsibilities

Logos for social responsibility initiatives include: 'Take Our Daughters and Sons to Work', Celebrate Earth Day (April 22), WV Regional Science Bowl, 2015 NSB (National Science Bowl), Society for Analytical Chemists of Pittsburgh, and Pittsburgh Regional Center for Science Teachers (University of Pittsburgh).

- **NETL offers many business opportunities using a variety of contract and funding vehicles:**
 - **Competitive solicitations for R&D:**
 - Grants – where there is no need for substantial involvement between the recipient and NETL
 - Cooperative agreements – where there is substantial involvement between recipient and NETL
 - *<http://www.netl.doe.gov/business/solicitations/index.html>*
 - **Unsolicited proposals** – NETL considers submission of self-generated, unsolicited proposals that are relevant to NETL's R&D mission
 - *<http://www.netl.doe.gov/business/usp/unsol.html>*

- **NETL uses *Fedconnect*, *Grants.gov*, and *FedBizOpps* to post solicitations and funding opportunity announcements (FOA), receive proposals and applications, and disseminate award information.**
 - *<http://www.netl.doe.gov/business/solicitations/index.html>*

Solicitations and Business Opportunities

Technology Transfer Agreements



- **A technology transfer agreement provides access to NETL R&D expertise, facilities, and intellectual property:**
 - *Cooperative Research and Development Agreement* (CRADA)
 - *License Agreement*
 - *Memorandum of Agreement* (MOA) or *Memorandum of Understanding* (MOU)
 - *Non-Disclosure Agreement* (NDA)
- <http://www.netl.doe.gov/tech-transfer/partnership.html>

Solicitations and Business Opportunities

Key Points of Contacts



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It's All About a Clean, Affordable Energy Future



For More Information, Contact NETL

the ENERGY lab

Delivering Yesterday and Preparing for Tomorrow

www.netl.doe.gov

