Resource Sustainability Program Overview

2024 Resource Sustainability Annual Project Review Meeting

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U.S. DEPARTMENT OF ENERGY | NATIONAL ENERGY TECHNOLOGY LABORATORY

Administration Goals

Carbon Reduction

- 50 percent reduction in economy-wide new greenhouse gas pollution from 2005 levels by 2030
- Carbon pollution-free electricity sector by 2035
- Net-zero emissions, economy-wide, by no later than 2050
- Address environmental justice and job creation

"We have the tools to put America on an irreversible path to achieve net-zero carbon emissions by 2050."

-Jennifer M. Granholm
Secretary of the U.S. Department of Energy

Toward a Cleaner Tomorrow

Supporting DOE Priorities

Investing in Domestic Clean Energy Manufacturing

Advancing Environmental Justice

Tackling the Climate Crisis

Our commitment to a clean energy transition aligns with the vision of a 100% clean energy economy by 2050. NETL enables commercialization, spurring economic development by bringing advanced technologies to market.

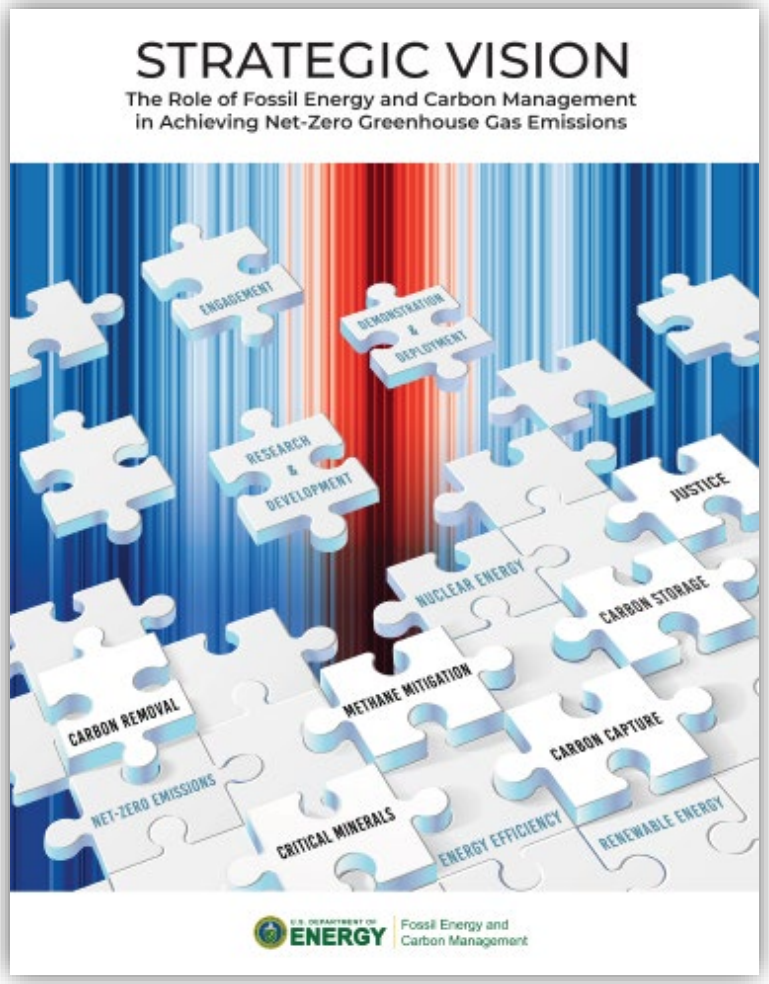
NETL Supports FECM's Strategic Vision

Advancing Technologies that Lead to Sustainable Energy Resources

- Methane emissions mitigation across the natural gas value chain
- Acceleration of hydrogen production, transport, and storage opportunities through existing natural gas resources and infrastructure
- Enabling domestic critical minerals production

Advancing Justice, Labor, and Engagement

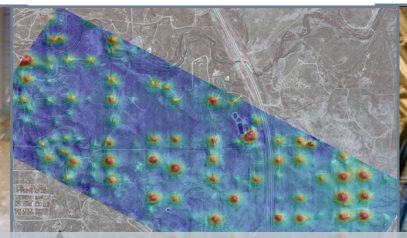
- Justice
- Labor
- International and Domestic Partnerships

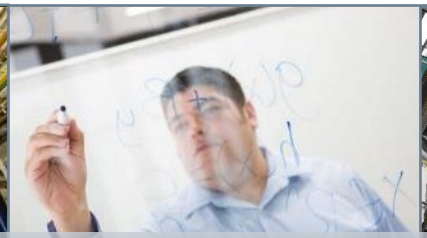
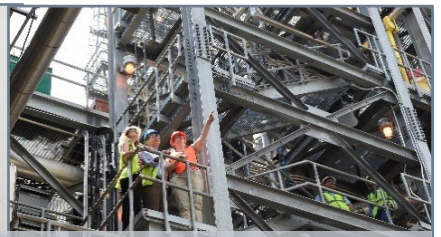


Core Competencies & Technology Thrusts

NATIONAL ENERGY TECHNOLOGY LABORATORY





Computational Science & Engineering | Materials Engineering & Manufacturing | Geological & Environmental Systems | Energy Conversion Engineering | Strategic Systems Analysis & Engineering | Program Execution & Integration

CARBON MANAGEMENT

Carbon Capture 

Carbon Dioxide Removal 

Carbon Utilization 

Carbon Transport & Storage 

Hydrogen with Carbon Management 

RESOURCE SUSTAINABILITY

Decarbonization of Natural Gas Resources 

Methane Mitigation Technology 

Advanced Remediation Technologies 

Critical Minerals & Materials 

Methane Hydrates 

OTHER DOE OFFICES

Energy Efficiency & Renewable Energy

Vehicles 

Buildings 

Adv Manufacturing 

Geothermal 

Hydrogen & Fuel Cell 

Office of Electricity

Adv Grid R&D 

Energy Resilience 

Cybersecurity, Energy Security, & Emergency Response

Security & Restoration 

Cybersecurity 

Resource Sustainability R&D Thrusts

Improving the characterization, production, transportation, and utilization of our Nation's energy resources

Advanced Remediation Technologies

- Environmentally Prudent Stewardship
- Field Test Sites
- Water Management Technologies
- Methane Hydrates

Minerals Sustainability

- Critical Minerals and Materials
- Carbon Ore Processing

Natural Gas Decarbonization and Hydrogen Technologies

- Hydrogen Production, Transport, and Storage
- Value-added carbon products

Methane Mitigation Technologies

- Emissions Quantification
- Mitigation Technologies
- Undocumented Orphaned Wells
- Natural Gas Conversion

Resource Sustainability

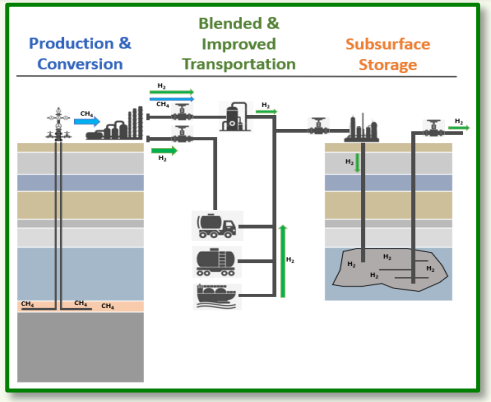
Advanced Remediation Technologies

Reducing or eliminating the environmental impacts associated with the production of fossil energy resources

Methane Mitigation Technologies

Reduce and eliminate methane emissions sources to ensure a safe, reliable, & resilient natural gas supply chain

Natural Gas Decarbonization & Hydrogen



Accelerating the transition towards a clean hydrogen-enabled economy

Critical Minerals and Materials

Developing new, secure domestic sources of critical minerals and materials

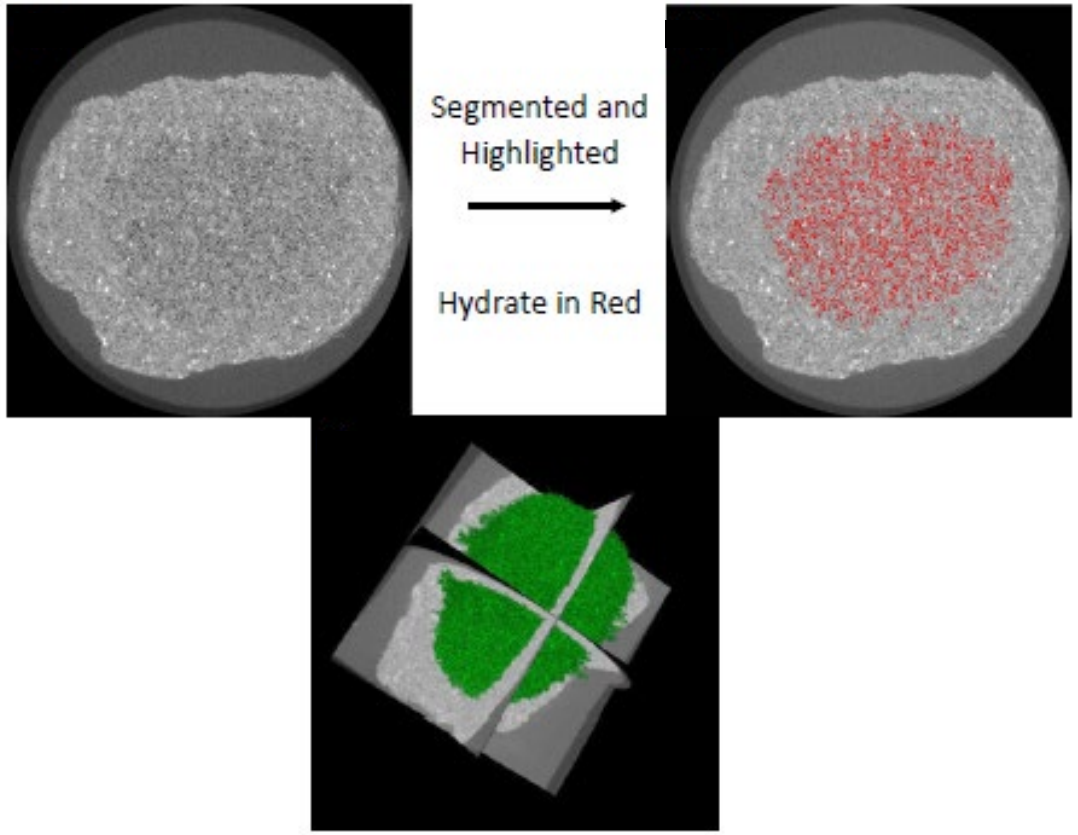
Advanced Remediation Technologies

Research to support the development of technologies to reduce or eliminate environmental impacts associated with the production of fossil energy resources such as oil and natural gas.

- **Environmentally Prudent Stewardship**
- **Gas Hydrates**
- **Water Management Technologies**

NEWTS DATABASE

PARETO
The Produced Water Optimization Initiative



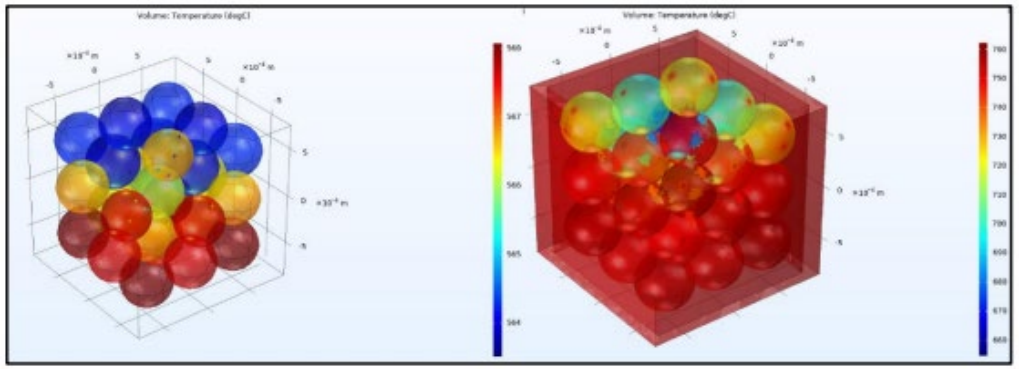
Methane Mitigation Technologies

Reduce and eliminate non-trivial methane emissions sources to ensure a safe, reliable, and resilient natural gas supply chain.

- **Methane Emissions Quantification**
- **Methane Emissions Mitigation**
- **Undocumented Orphaned Wells**
- **Natural Gas Conversion**

CATALOG
Locate Characterize Inform

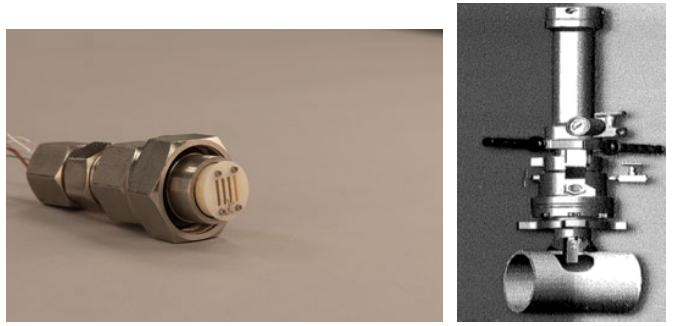
Consortium Advancing Technology for Assessment of Lost Oil & Gas Wells.



Natural Gas Decarbonization & Hydrogen Technologies

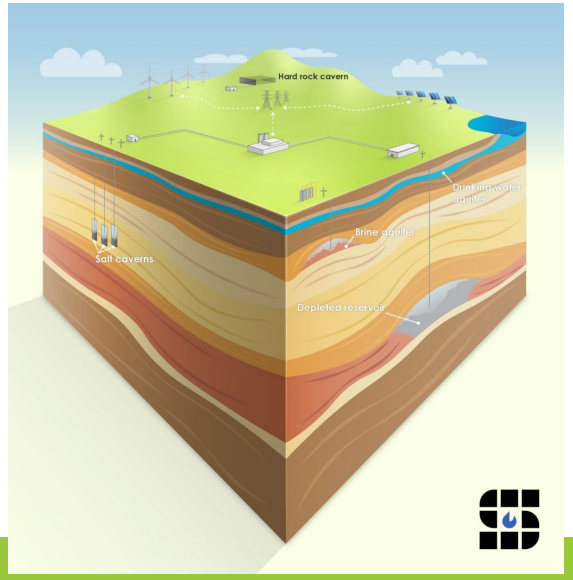
Transform the nation's hydrogen supply chain through technology advancements and adaptations of existing infrastructure that improve the production, transportation, and storage capabilities of hydrogen as a fuel source.

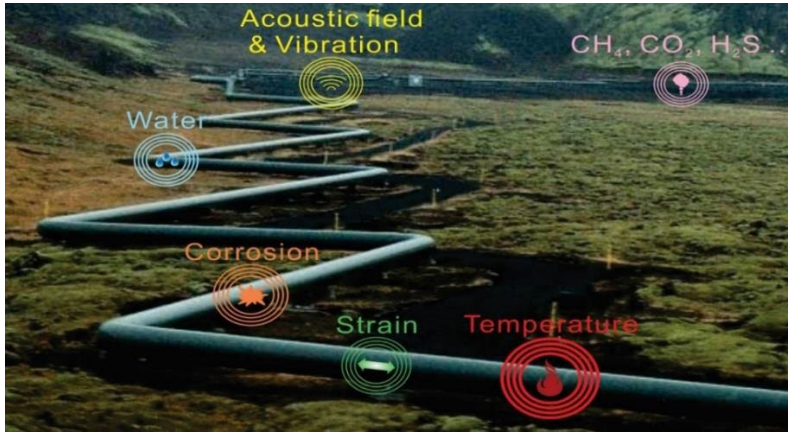
- **Production, Conversion, and Utilization**
- **Transportation**
- **Storage**



An AES prototype for simultaneous monitoring of corrosion rate, environment humidity, and temperature. (right) Example of an AES installation in a natural gas transmission pipeline.

SHASTA-HELP



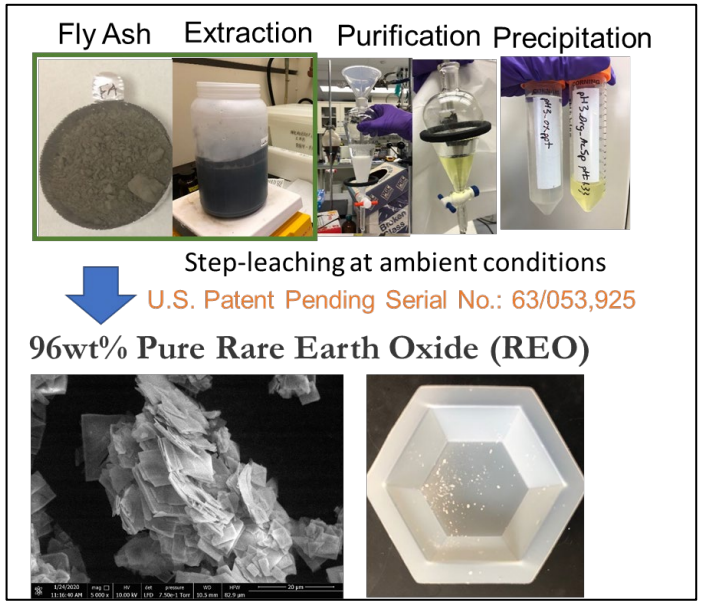


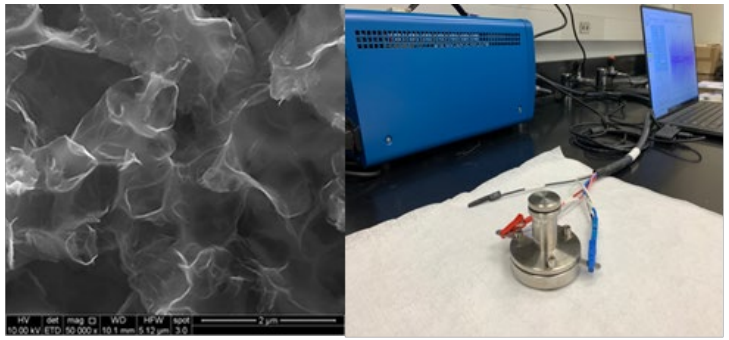
Intelligent pipeline integrated with advanced sensors for real-time multiple-parameter monitoring, incorporating H2 leak detection, complementary to the natural gas pipeline monitoring.

Critical Minerals & Materials (CMM)

Catalyze an environmentally and economically sustainable critical minerals and carbon ore resource recovery industry in the United States that will support clean energy development.

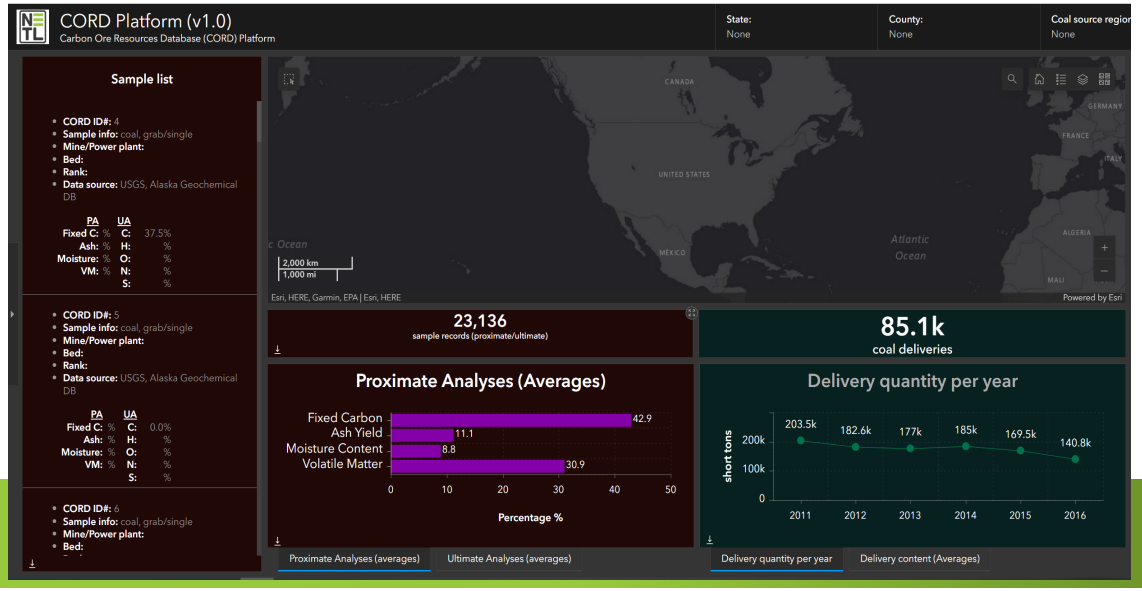
- **Resource Characterization**
- **Sustainable Resource Extraction**
- **Processing, Refining, and Alloying**
- **Standards and Supply Chains Development**





NETL's few layer graphene as capacitive electrode material

NETL's supercapacitor split cell testing



Driving Innovations Through Partnerships

An Active Portfolio from Concept to Market Readiness

500+ partnerships with industry, academia, and gov't agencies

1,100+ research and development projects nationwide

Partnering with NETL

- Cooperative Research and Development Agreement (CRADA)
- Contributed Funds Agreement (CFA)
- Memorandums of Understanding (MOU)/ Memorandums of Agreement (MOA)
- Informal Discussions
- Non-Analysis Agreements (NAA)
- Small Business Innovation Research (SBIR) & Small Business Technology Transfer (STTR) Programs
- Licenses
- Non-disclosure Agreement (NDA)
- Financial Assistance Awards (FA)

Available Technologies

- NETL's technology portfolio contains a broad range of innovations that have resulted from research
- Technologies and intellectual property available for licensing on NETL's website

Available Technologies:
https://www.netl.doe.gov/business/tech-transfer/available-technologies

Funding Opportunity Announcement (FOA)

- NETL uses FedConnect.net, EERE Program Information Center, Grants.gov, and Contract Opportunities to post FOAs
- Proposals and applications are only accepted electronically through FedConnect.net or Grants.gov

Funding Opportunities:
https://www.netl.doe.gov/business/solicitations

Thank You!

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