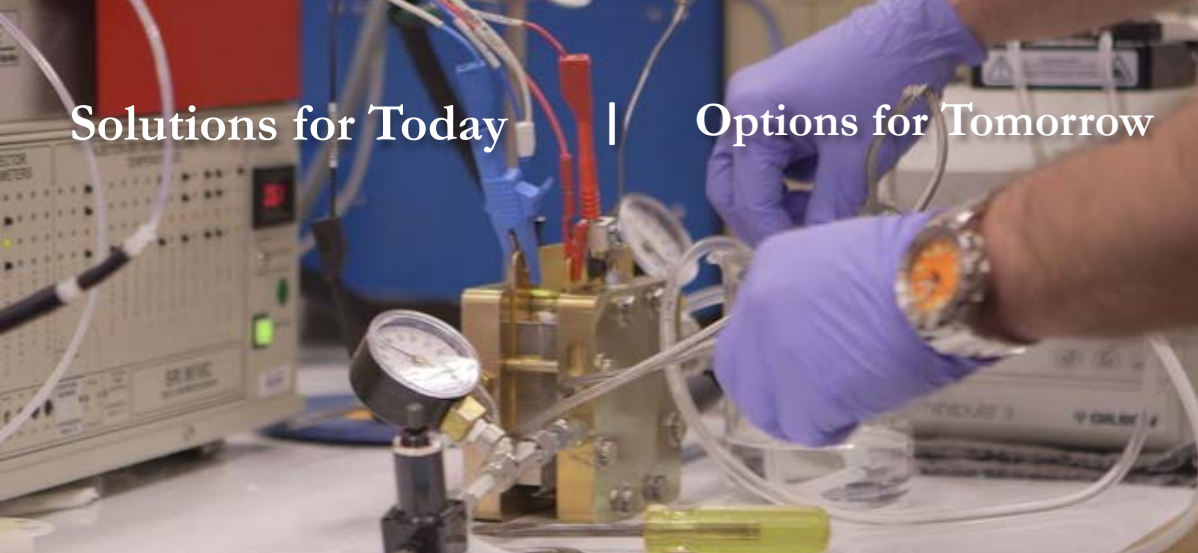


Solutions for Today

| Options for Tomorrow



Lessons Learned on Responding to Funding Opportunity Announcements



Access to Capital Forum &
Workshop
March 11, 2020



José D. Figueroa
Supervisor, Carbon Capture Team
National Energy Technology Laboratory

Partnering with NETL



The TOOLBOX



- Cooperative Research and Development Agreement (CRADA)
- Contributed Funds-In Agreement (CFA)
- Memorandums of Understanding (MOU)/
Memorandums of Agreement (MOA)

- Small Business Innovation Research (SBIR) & Small Business Technology Transfer (STTR) Programs
- Unsolicited Proposals (USP)
- Non-disclosure Agreement (NDA)
- Funding Opportunity Announcement (FOA)

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, Grants.gov and FedBizOpps.gov 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>

Coal Technology Thrusts

Advanced Energy Systems

- Transformative Power Generation
- Advanced Combustion & Gasification
- Solid Oxide Fuel Cells & Gas Turbines
- Coal Beneficiation



Carbon Capture

- Pre- & Post-Combustion Capture Systems
- Solvents, Sorbents & Membranes



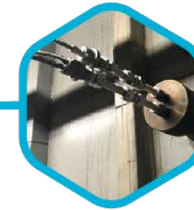
Carbon Storage

- Long-Term Storage Monitoring, Verification, Accounting & Assessment
- Demonstrate Storage Infrastructure
- Carbon Use & Reuse



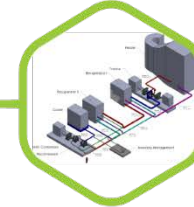
Crosscutting Research

- High-Performance Materials
- Sensors & Controls
- Simulation-Based Engineering
- Water Management
- Energy Storage
- University Training & Research



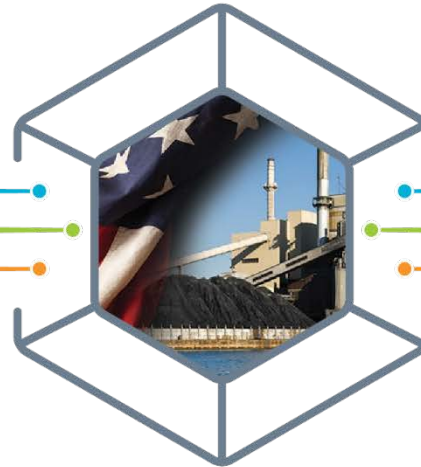
STEP (Supercritical CO₂)

- High-Efficiency Power Cycle
- Reduced Water Consumption & Air Emissions
- Reduced Power Cycle Footprint



Rare Earth Elements (REEs) & Critical Materials (CMs)

- Efficient REE & CM Recovery, Extraction & Separation
- Cost-Competitive Domestic Supply of REEs & CMs



Technology Development Pathway

An Active Portfolio from Concept to Market Readiness

COMMERCIALIZATION

Technology available
for wide-scale market use

TRL 9

DEMONSTRATION

System demonstrated
in operational environment

TRL 8

SYSTEM TESTING

System performance
confirmed at pilot-scale

TRL 6-7

DEVELOPMENT

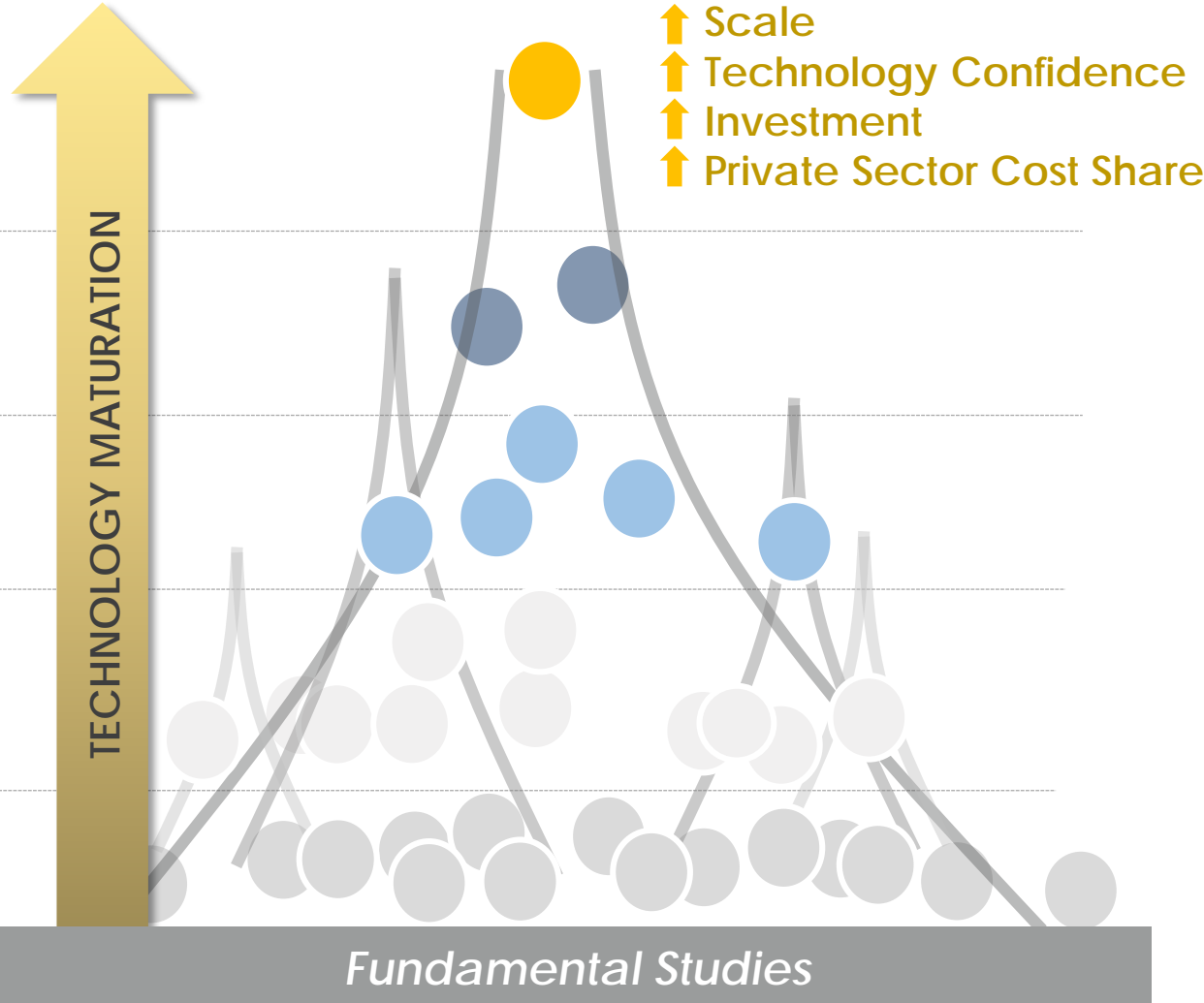
Technology component
validated/integrated

TRL 4-5

DISCOVERY

Concept identified/proven at
laboratory-scale

TRL 1-3



KNOWLEDGE-BASED DECISION MAKING

- Systems Engineering and Integration
 - Engineering analysis
 - Pre-FEED/FEED studies
 - NEPA
- Decision Science and Analysis
 - Screening studies
 - Techno-economic analysis
 - Technology Readiness Assessments

Lessons Learned

- **Connectivity with the funding organizations goals**
 - You are seeking funds from them therefore you need to connect with their needs and expectations
- **Demonstrate awareness of your surroundings**
 - Technical – What has been done by others ?
 - Political – What is the current approach and sensitivities ?
 - Business – What are the current/future business needs ?
 - Legal – Understand how to protect your interests ?
- **Follow the solicitation instructions.**
 - Offer them:
 - What they ask for FIRST
 - Your alternative Second, as an option
 - Answer all of the questions.

Lessons Learned

- **Be specific about your approach**
 - Tell the funding organization that you know what is needed to achieve success.
 - Identify the risks and potential mitigation strategy.
 - Specify the path to success.
- **Educate the application reviewer**
 - Leave the reviewer informed about your concept.
 - Reference credible sources to give you credibility.
 - Provide the excerpt that you are referencing.
 - Make the references easily obtainable.
- **Utilize the teams expertise to your advantage**

Project Related Lessons Learned

- Communication is essential and required throughout the project
- Involve ALL stakeholders early and often
- Scope definition with project partners upfront is critical
- Include performance acceptance testing for equipment and pilot unit.
 - At OEM/Fabricator site as well as host test site on actual gas
- Confirm that host site, state, local codes, standards and procedures are well understood by all parties, since interpretations may differ.
- Review designs in great detail with the host site and other project partners to avoid potential issues
- Expect unknowns will occur. Have a procedure for addressing them
- Delays will occur. So plan for them to avoid critical path efforts that jeopardize the schedule and/or budget

Spring FE R&D Project Review Meeting

Omni William Penn Hotel, Pittsburgh PA

April 21-23, 2020

21st Annual SOFC Project Review Meeting

Marriot Pittsburgh Airport

July 21-23, 2020

Annual NETL CO₂ Capture, Oil & Gas, and Subsurface Review Meeting

David Lawrence Convention Center

Pittsburgh, PA

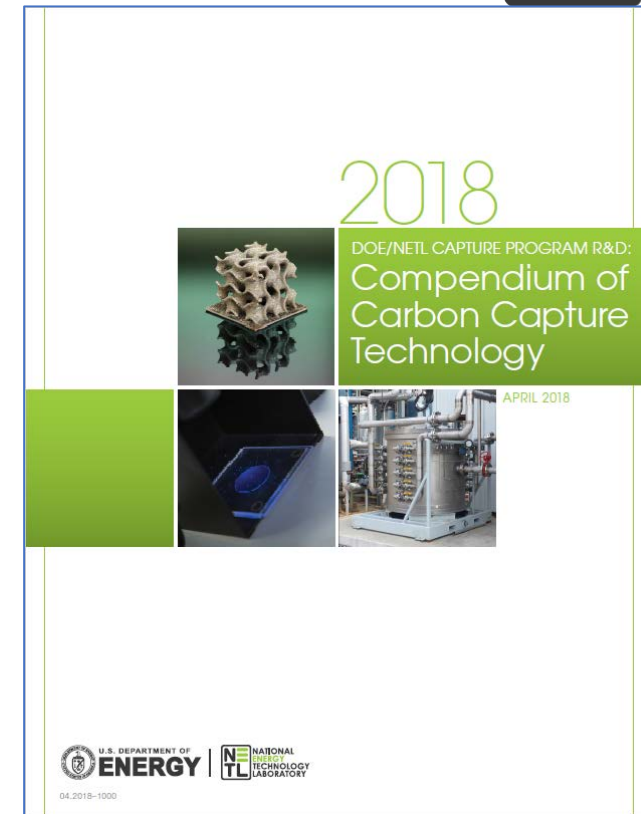
August 24-28, 2020

2012 to 2019 Meeting Proceedings

<https://netl.doe.gov/coal/carbon-capture/CCconferenceproceedings>

2018 Compendium of Carbon Capture Technology

- Recently published and available for download
- This comprehensive handbook provides an update on DOE/NETL R&D efforts on advanced CO₂ capture technologies for coal-based power systems.
- The handbook is available for download on the NETL website at this locations:



<https://www.netl.doe.gov/sites/default/files/netl-file/Carbon-Capture-Technology-Compendium-2018.pdf>

Questions?

VISIT US AT: www.NETL.DOE.gov



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