



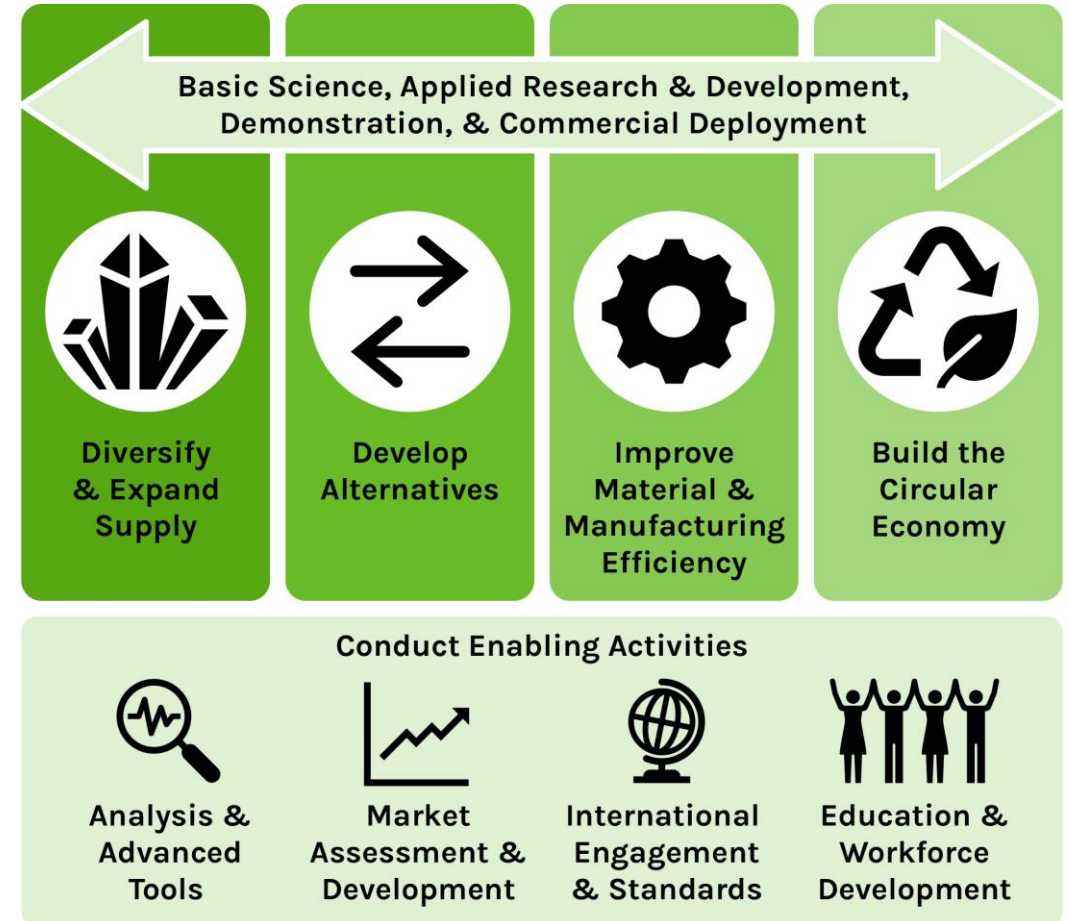
Critical Materials Collaborative

Forming Connections Across the Critical Materials Innovation Ecosystem

Vision:

- Build reliable, resilient, affordable, diverse, sustainable, and secure **domestic critical mineral and materials supply chains**.
- Support the clean energy transition and decarbonization of the energy, manufacturing, and transportation economies.
- Promote safe, sustainable, economic, and environmentally just solutions to meet current and future needs.

CMM Strategies:



<https://www.energy.gov/critical-minerals-materials>

The “Electric Eighteen”

Critical Materials are Vital to the Energy Transition, Climate Goals, and US Competitiveness

Neodymium, Praseodymium,
Dysprosium, & Terbium



Magnets for wind turbine generators
& EV motors

Cobalt, Lithium, Graphite,
Nickel & Fluorine



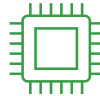
Batteries for electric vehicles & grid storage

Iridium & Platinum



Electrolyzers for green hydrogen production
& **fuel cells** used energy storage

Gallium & Silicon Carbide*



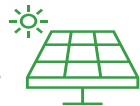
Semiconductors enable high voltage power
& efficient lighting

Magnesium & Aluminum



Lightweight alloys in transportation

Silicon*



Solar panels, lightweight alloys,
electrical steel

Copper* & Electrical Steel*



Wind turbine **generators** & EV **motors**

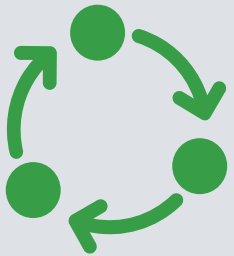
Goals

- **100% clean electricity by 2035**
- **Net-zero economy by 2050**
- **50% EV adoption by 2030**
- **30 GW offshore wind by 2030**
- **Cost of Clean Hydrogen \$1/kg by 2031**

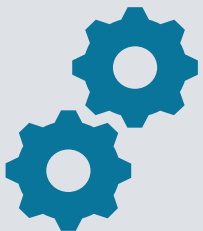
**Not on the U.S. Geological Survey Critical Minerals List*



- Increase domestic supply to combat climate change and address national security needs
- Respond to challenges and opportunities
- Reduce vulnerabilities in our supply chains



- Increase efficiency and circularity
- Decrease environmental and health impacts



- Connect innovation solutions to realize real-world impact

What is the CMC?



A **new mode of connection** created by the U.S. Department of Energy (DOE) to increase communication and coordination between the U.S. government and the research communities working on critical materials projects.



Creates partnerships with industry, academia, national labs, and others to expand access to world-class expertise, capabilities, and facilities as part of a growing ecosystem.



Accelerates the commercialization and deployment of innovative solutions to develop globally competitive, environmentally responsible, and sustainable critical material supply chains.

CMC Mission

The CMC is the connective tissue within the DOE Critical Materials Program and the U.S. government, aligning our RD&D portfolio with DOE climate goals and accelerating adoption of innovative solutions.



Building a robust **innovation ecosystem**



Training the **critical materials leaders** and workforce across multiple sectors



Enabling **industry adoption** of novel, cutting-edge technology



Laying the **scientific and technological groundwork** needed to address emerging challenges

Why a Collaborative?

2010

DOE completed its **first Critical Materials Strategy**, building off decades of basic materials research and catalyzing 10+ years of basic and applied critical materials research, development, demonstration, and deployment (RD&D) at every stage in the supply chain.

2013

The **Critical Materials Innovation (CMI) Hub***, was formed, which has been addressing critical materials challenges for a decade.

**formerly known as the Critical Materials Institute*

2020

The Energy Act of 2020 authorized the DOE Critical Materials Program to **expand critical materials work** to include RDD&D and to create a **Critical Materials Consortium** to be a centralized entity for multidisciplinary, collaborative critical materials research and development.

2021

The Bipartisan Infrastructure Law and the Inflation Reduction Act supercharged DOE's efforts **by investing more than \$8 billion toward critical materials projects.**

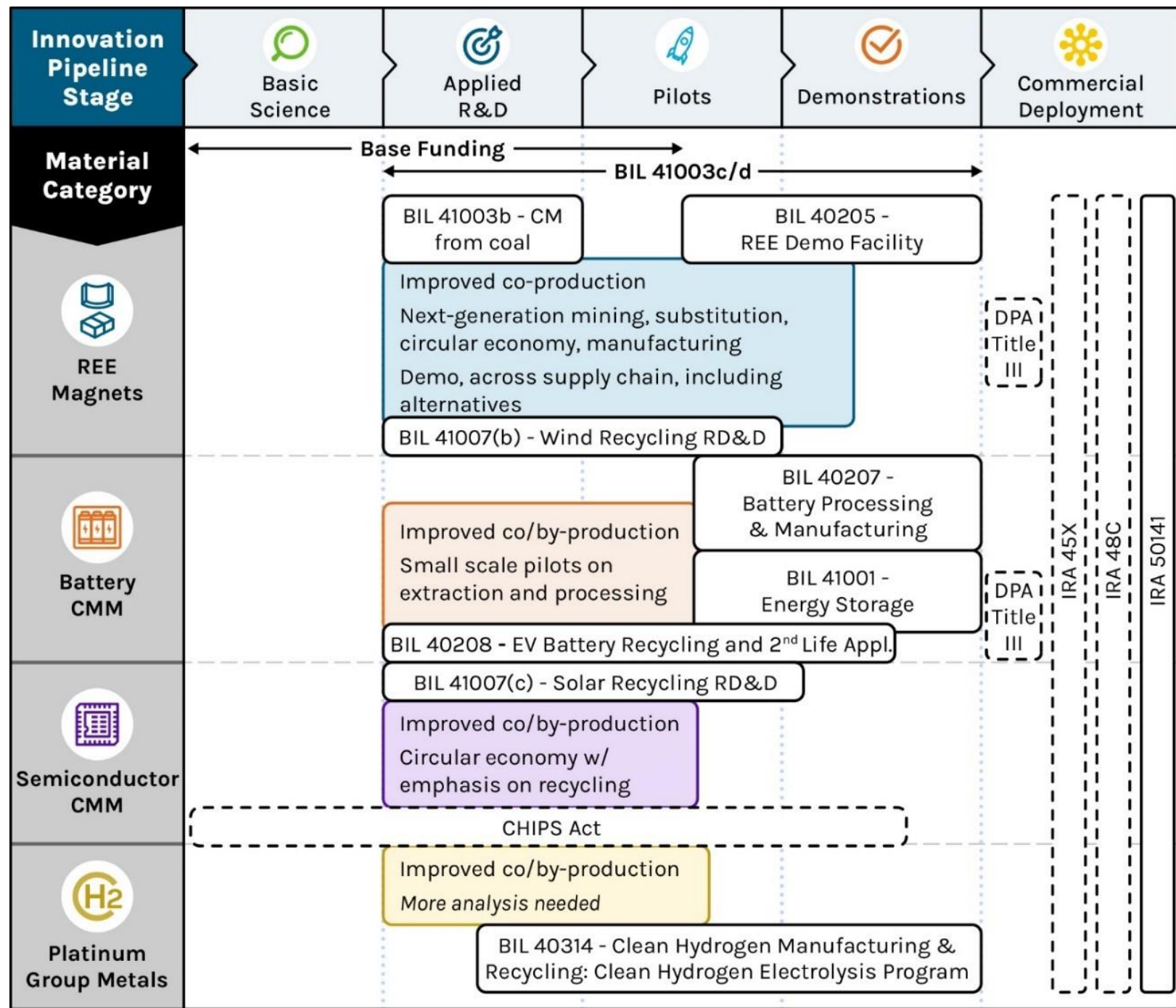
2023

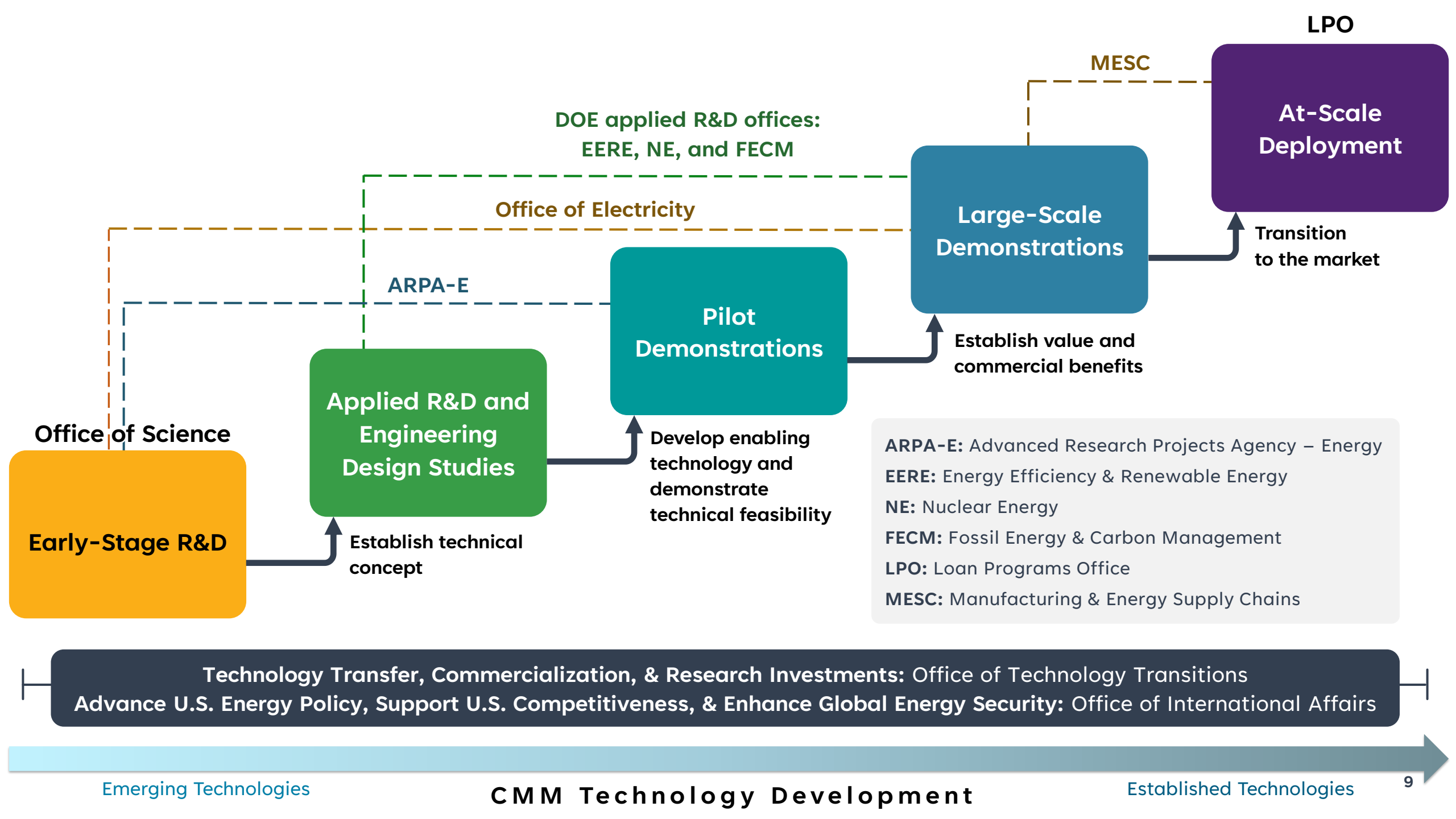
DOE created the CMC to align RD&D across the federal government, industry, and the research community, connecting innovation to basic science discovery and commercialization.



CMC: A Powerful Connector

The CMC connects DOE's diverse critical minerals and materials portfolio with industry and beyond, funding and supporting real-world innovation through each stage of the RD&D spectrum.







OP
Office of Policy

MESC
Office of Manufacturing and Energy Supply Chains

NE
Office of Nuclear Energy

SETO
Solar Energy Technologies Office

OTT
Office of Technology Transitions

HFTO
Hydrogen & Fuel Cell Technologies Office

ORS
Office of Resource Sustainability

FECM
Office of Fossil Energy and Carbon Management
Grant Bromhal

EERE
Office of Energy Efficiency and Renewable Energy
Helena Khazdozian

AMMTO
Advanced Materials & Manufacturing Technologies Office

OCM
Office of Carbon Management

VTO
Vehicle Technologies Office

LPO
Loan Programs Office

WETO
Wind Energy Technologies Office

OE
Office of Electricity

ARPA-E
Advanced Research Projects Agency-Energy

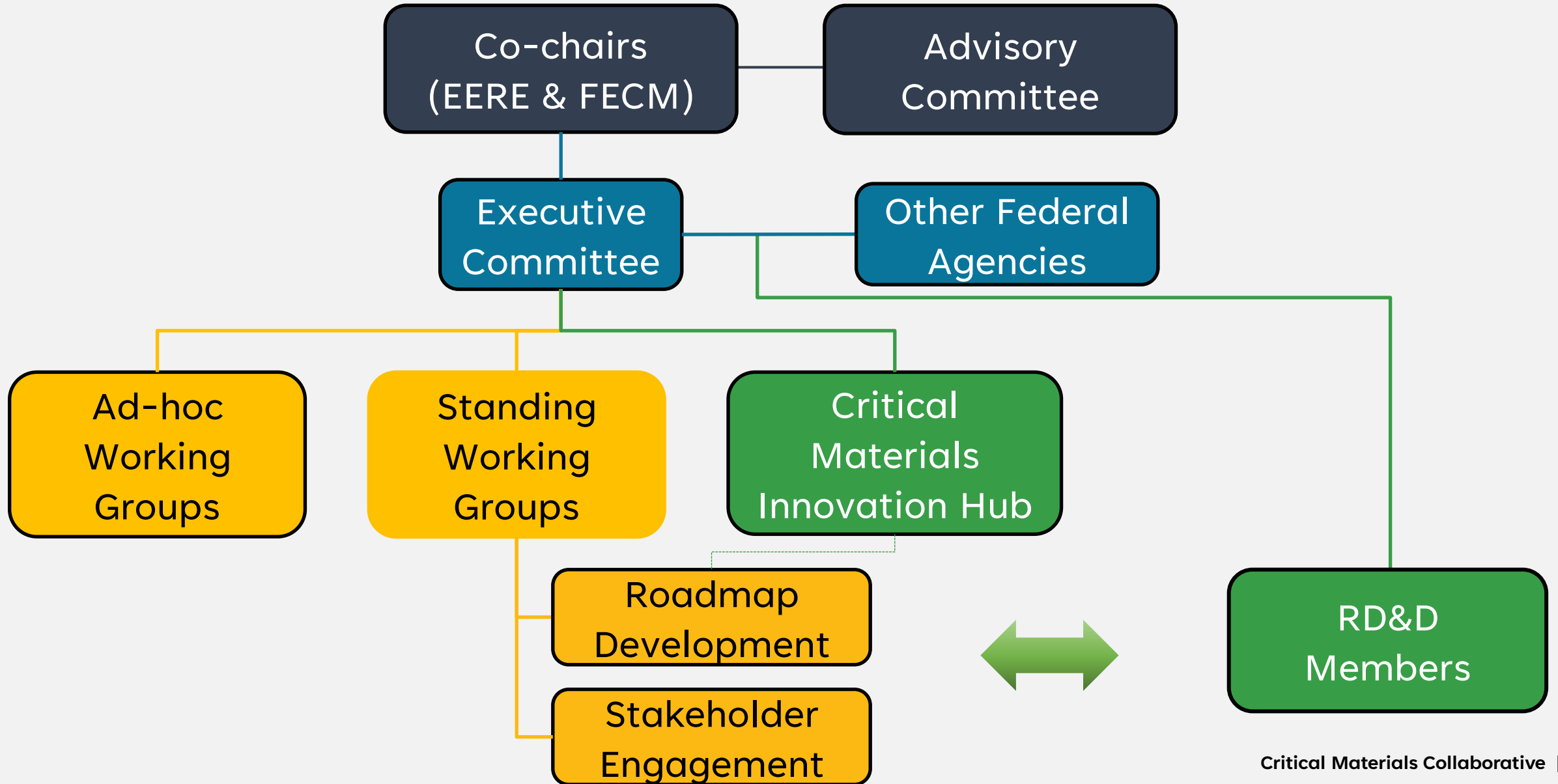
IA
Office of International Affairs

SC
Office of Science

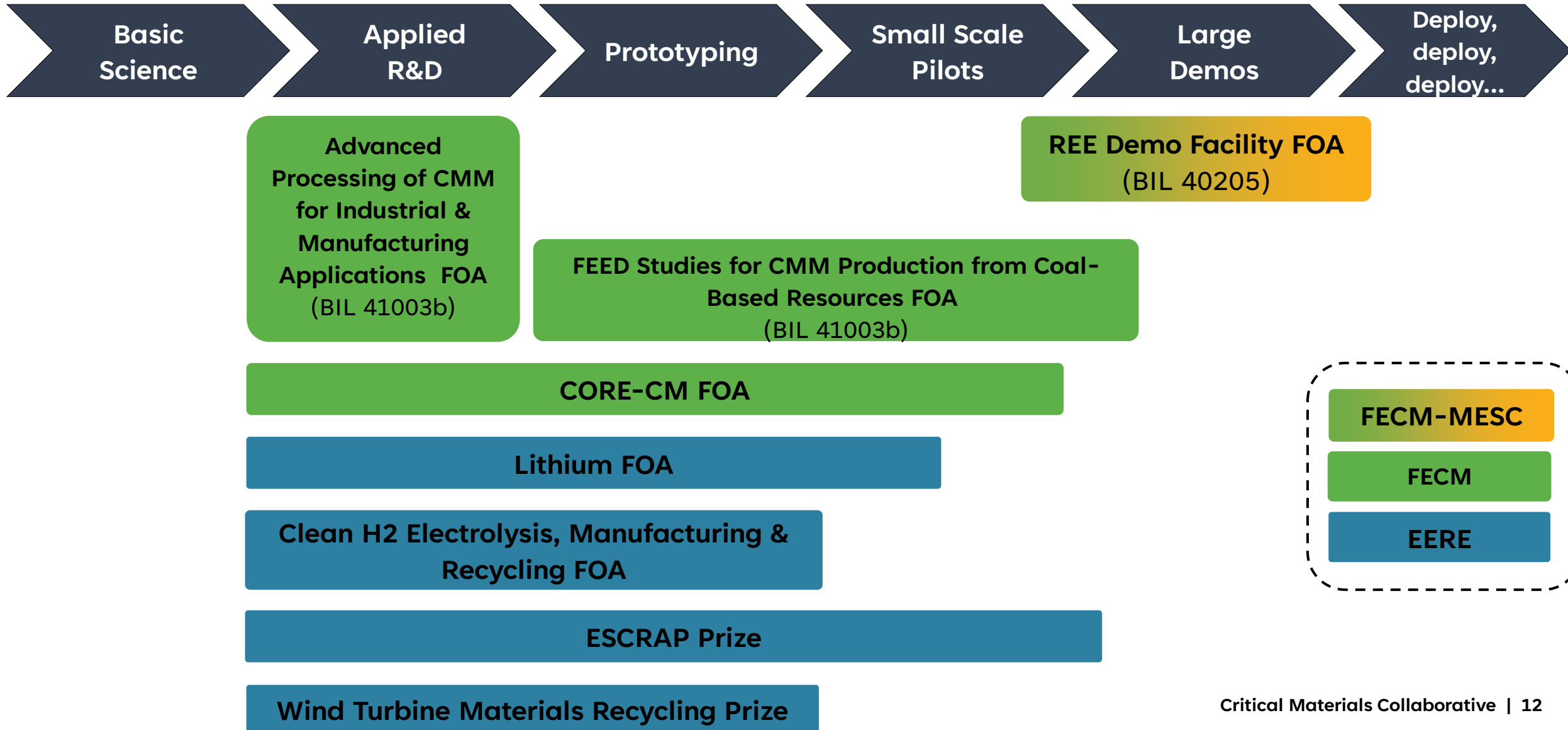
GTO
Geothermal Technologies Office

CMC Co-Chairs

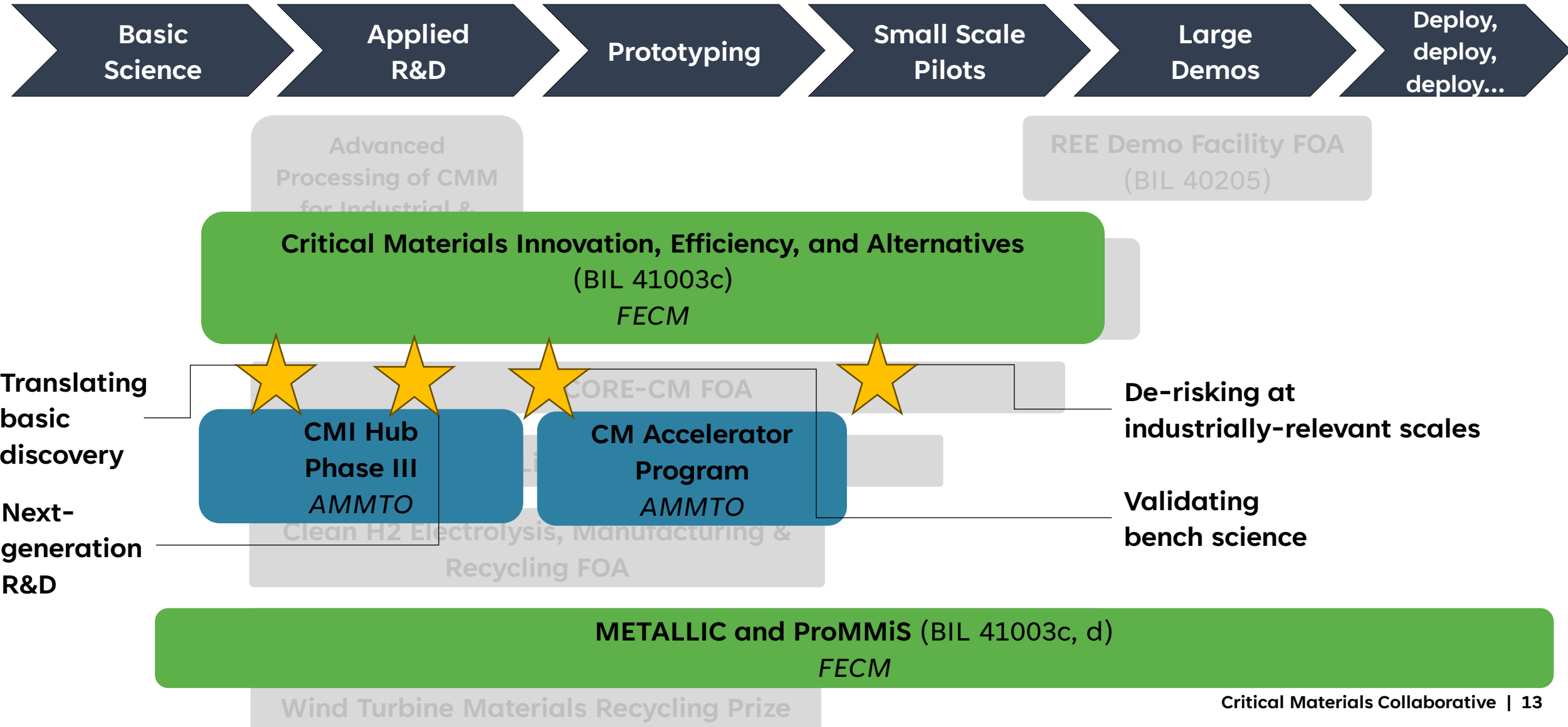
CMC Member Structure



Building the RD&D Member Base

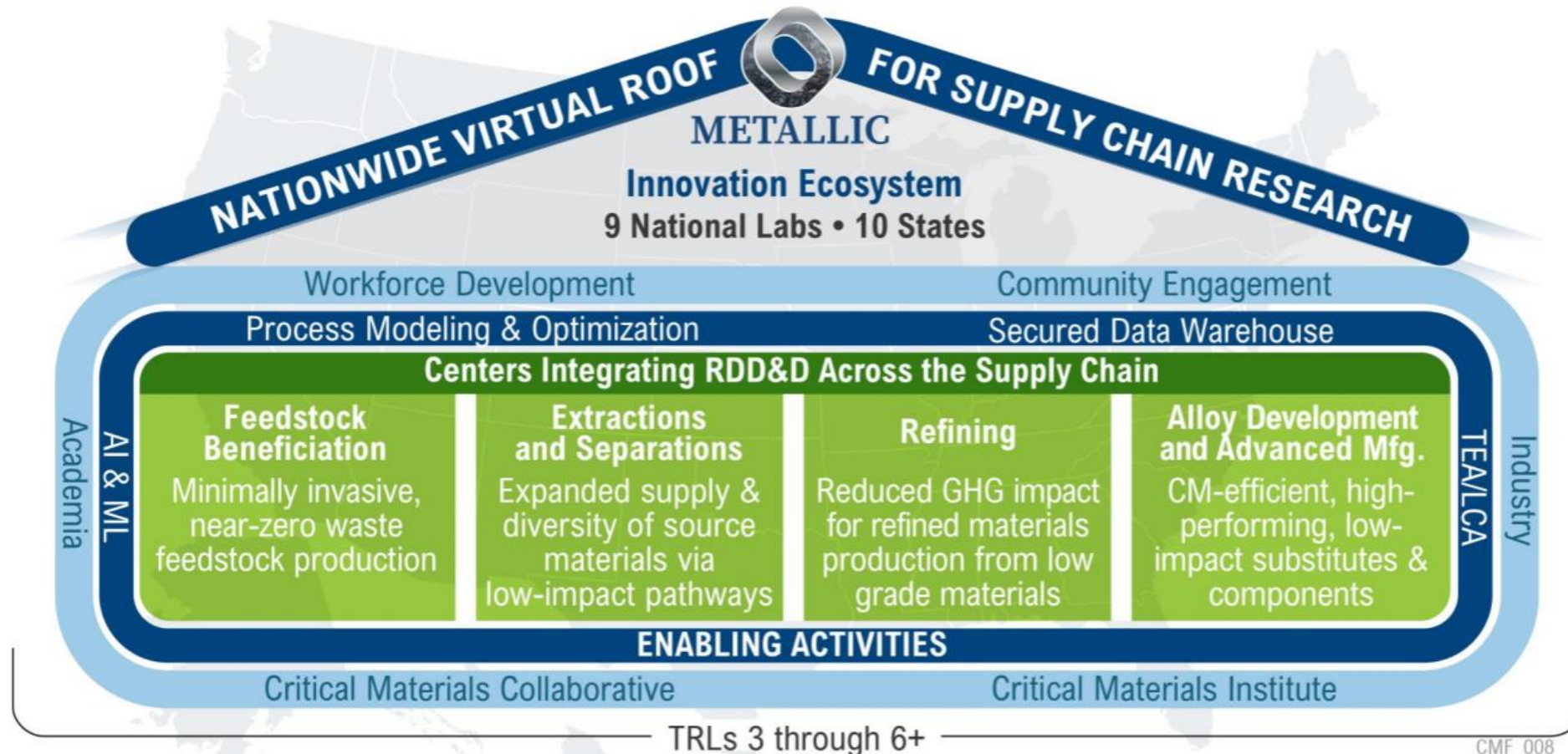


Building the RD&D Member Base



METALLIC Brings Broad Capability Support

Multi-laboratory effort—the Minerals to Materials Supply Chain Facility (METALLIC)—unifying the physical, computational, and data capabilities of nine national laboratories to create a federated, nationwide resource.



Extensive Modeling Support

Process Optimization and Modeling for Minerals Sustainability

PrOMMiS Objective: Accelerate and de-risk scale-up and deployment of innovative Critical Minerals & Materials (CMM) systems by leveraging 10+ years of DOE investment in CMM R&D and advanced modeling frameworks (IDAES, CCSI)

Integrated Modeling Platform, Applied to Real Projects

Framework Capabilities

Process Modeling & Cost Assessment

Multi-criteria process optimization

Flowsheet visualization tools

Advanced design of experiments to guide pilot & demonstration campaigns

Screen & develop conceptual designs

Technical risk reduction for scale-up

Technical Team



Leveraging Existing DOE Investments and Capabilities



Enable Multidisciplinary Collaborations



CMM Matchmaker



[Complete the CM3 survey](#)

- **CM3 Matchmaker Tool (under development)**
 - Serve as a valuable resource for connecting stakeholders across various sectors, from research and development to production and distribution
- **CM3 Survey**
 - Gather information from organizations and facilitate networking and collaboration across industries
 - Organizations can self-identify their current or planned activities related to critical minerals and materials
 - Populate an interactive supply chain map, offering insights into supply chain activities and helping to align industry needs, by supply chain
- [Learn more about the CM3](#)

Get involved!



Become an RD&D Awardee

Join the CMC by being funded through a CMC-coordinated opportunity. Funding opportunities will be continually announced on the CMC website:

www.energy.gov/cmm/critical-materials-collaborative



Contribute to the Research Roadmap

In 2024, the CMC will create a research roadmap for DOE on critical materials plans and focus for the next 10 years. We need to hear from industry, innovators, analysts, and communities on goals and how best to get there! Reach out to cmc@hq.doe.gov to get involved.



Connect

with us on the CMC website

<https://www.energy.gov/cmm/critical-materials-collaborative>



Subscribe

to our CMC quarterly newsletter

<https://www.energy.gov/cmm/critical-materials-collaborative#subscribe>



Learn

more about DOE's Critical Minerals and Materials Program

www.energy.gov/cmm/critical-minerals-materials-program



Reach Out

with questions, comments, or engagement inquiries

cmc@hq.doe.gov





Questions?



CRITICAL MATERIALS COLLABORATIVE

U.S. DEPARTMENT OF ENERGY

www.energy.gov/cmm/critical-materials-collaborative

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