

Mission Critical: Minerals & Materials for the Global Clean Energy Transition

To identify the minerals and materials critical to manufacturing clean energy technologies—such as solar panels, wind turbines, electric vehicles, and hydrogen fuel cells—and secure their supply chains, the U.S. Department of Energy released an updated **Critical Materials Assessment** and its first-ever **list of critical materials**.



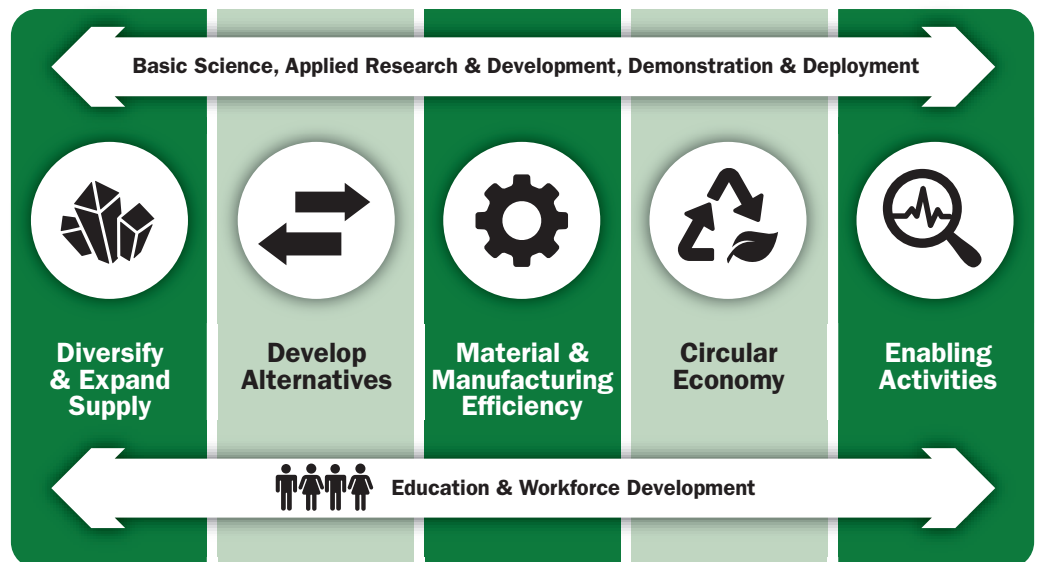
Aluminum | Cobalt | Copper | Dysprosium
Electrical Steel | Fluorine | Gallium | Iridium
Lithium | Magnesium | Natural Graphite
Neodymium | Nickel | Platinum | Praseodymium
Silicon | Silicon Carbide | Terbium

A critical mineral is: Any mineral, element, substance, or material designated as critical by the Secretary of the Interior, acting through the director of the U.S. Geological Survey.

* According to the 2020 Energy Act

A critical material is: Any non-fuel mineral, element, substance, or material that the Secretary of Energy determines (i) has a high risk of supply chain disruption; and (ii) serves an essential function in one or more energy technologies, including technologies that produce, transmit, store, and conserve energy.

DOE invests in critical minerals and materials to ensure *reliable, resilient, affordable, diverse, sustainable, and secure domestic supply chains*.



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In the past few years, we've seen an unprecedented amount of federal investment in critical materials RDD&D operations:

- \$150 million to advance critical mineral innovation, efficiency, and alternatives
- \$6 billion for battery materials processing and battery manufacturing recycling
- \$74 million to advance domestic battery recycling and reuse
- \$107 million to expand critical materials production capacity for lithium-ion batteries
- \$350 million for long-duration energy storage demonstration
- \$30 million lab call for long-duration energy storage
- \$16 million for front-end engineering design studies for the Rare Earth Elements (REE) Demonstration Facility
- \$11 million for lithium extraction and conversion from geothermal brines
- \$39 million for the Mining Innovations for Negative Emissions Resource Recovery program
- \$5.1 million to develop cost-effective and sustainable recycling for wind turbines
- \$17.5 million to commercialize critical material-free permanent magnets
- \$10 million for a critical materials accelerator

After 5 small pilot-scale facilities producing REE and CMM from unconventional resources, DOE is focused on construction and operation of one of the first domestic REE Demonstration Facilities in 2025.



To align these efforts, DOE established a **Critical Materials Collaborative (CMC)**.

Sixteen DOE offices support the CMC to expand the innovation ecosystem, providing RD&D performers access to world-class expertise, capabilities, and facilities:

The Advanced Research Projects Agency-Energy; EERE's Advanced Materials & Manufacturing Technologies Office, Geothermal Technologies Office, Hydrogen and Fuel Cell Technologies Office, Solar Energy Technologies Office, Vehicle Technologies Office, and Wind Energy Technologies Office; and the Office of Electricity, Office of International Affairs, Office of Fossil Energy and Carbon Management, Office of Manufacturing and Energy Supply Chains, Office of Nuclear Energy, Office of Science, Office of Technology Transitions, Office of Policy, and Loan Programs Office.



Critical Materials Innovation Hub

The Department also renewed the **Critical Materials Innovation Hub (CMI Hub)** to **serve as an innovation engine** for the

CMC, convening shared ideas and best practices that ground early-stage science and technology solutions.

The CMI Hub is a public-private collective of national laboratories, universities, and industry partners working to accelerate innovative scientific and technological solutions to develop resilient, secure supply chains for rare-earth and other critical minerals and materials essential to clean energy technologies.

Since its inception in 2013, CMI Hub research has led to 47 U.S. patents, licensing for 20 technologies, 5 Federal Laboratory Consortium awards, and 12 R&D 100 Awards for member institutions.

The Department of Energy's Critical Minerals & Materials Program is vital to the Biden-Harris Administration's target goals to achieve a carbon-pollution-free power sector by 2035 and a net-zero-emissions economy by 2050.



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