

U.S. DEPARTMENT OF
ENERGY

Office of
ENERGY EFFICIENCY &
RENEWABLE ENERGY

Technical Assistance for Energy Intensive Manufacturers

Zachary Pritchard, Industrial Efficiency and Decarbonization Office, DOE

Senthil Sundaramoorthy, Oak Ridge National Laboratory



Agenda

- Objective of the Pilot: Get feedback from companies to understand how we can best serve companies within energy intensive sectors.
- **Agenda:**
 - Introduction of IEDO
 - Goals of the pilot
 - Technical Assistance offerings
 - Outreach approach
 - Connection to DOE R&D
 - Feedback and Discussion

DOE Priorities: Catalyze Economy-Wide Decarbonization

BIDEN ADMINISTRATION CLIMATE GOALS

A carbon pollution-free power sector by 2035

Net-zero emissions by 2050



Make basic and applied research breakthroughs



Turn that research into deployable technologies

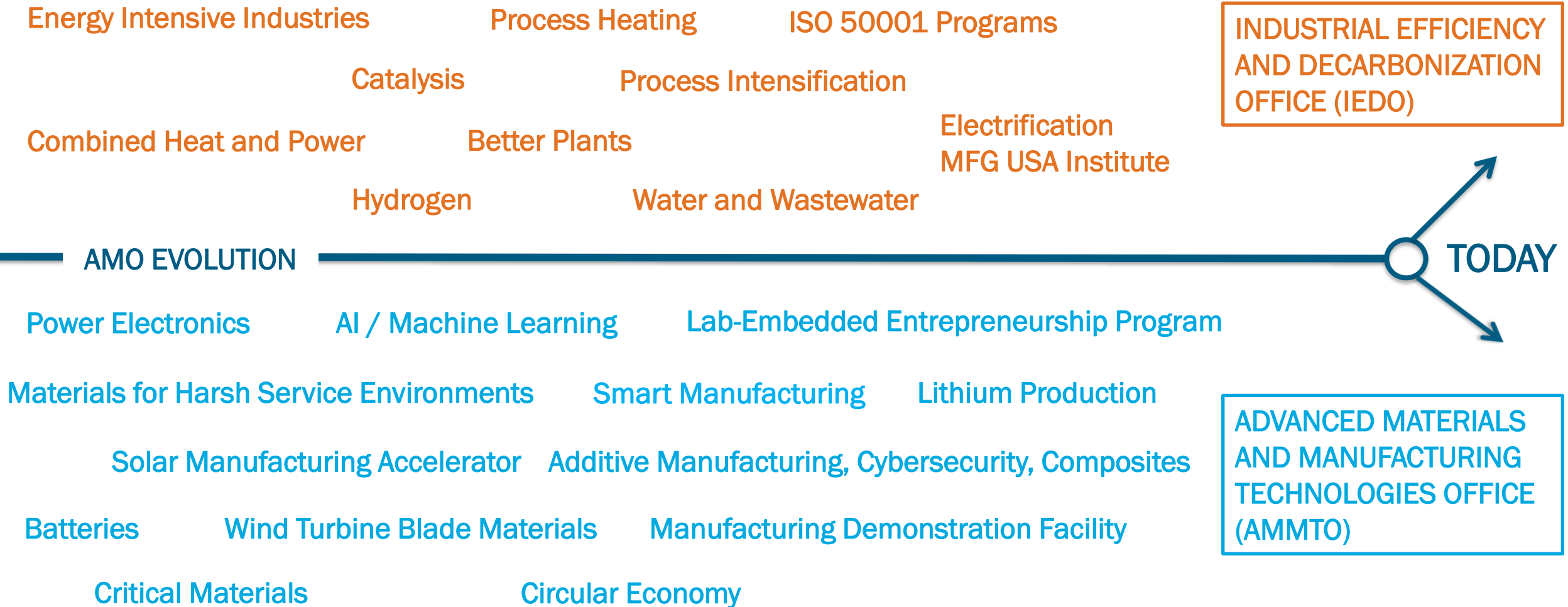


Catalyze deployment of clean energy and decarbonization technologies

- **CREATE GOOD-PAYING JOBS**
associated with the fast-growing global market for products that reduce carbon emissions
- **PURSUE ENVIRONMENTAL AND ENERGY JUSTICE**
and target disadvantaged communities for new clean energy investments, jobs, and businesses
- **COLLABORATE ROBUSTLY**
across the federal government, the fifty states, and the private sector

Evolution of the Advanced Manufacturing Office

AMO's mission space covered two strategic areas that will now both be fully developed.



Who we are: Industrial Efficiency and Decarbonization Office (IEDO)

IEDO works to increase energy efficiency in manufacturing to drive energy productivity, economic growth, and decarbonization

MANUFACTURING

Uses roughly 25% of the nation's primary energy



Accounts for one quarter of the U.S.'s greenhouse gas emissions



Represents nearly 80% of energy use in energy-intensive sectors



Generates 11% of the U.S. GDP and 12 million jobs



Incurs \$150 billion in energy costs annually



IEDO GOALS

- Improve the **productivity, competitiveness, energy efficiency, and security** of U.S. manufacturing
- Reduce the **life cycle energy and resource impacts** of manufactured goods
- Leverage diverse **domestic energy resources and materials** in U.S. manufacturing, while strengthening environmental stewardship
- Transition **DOE-supported innovative technologies and practices** into U.S. manufacturing capabilities
- Strengthen the **U.S. manufacturing workforce**
- Accelerate emerging and transformative technologies needed to **approach net-zero greenhouse gas emissions** in the industrial sector by 2050

IEDO Technical Partnerships Programs & Resources

Direct engagement with industry to drive the widespread adoption of proven technologies and practices to improve energy performance and reduce GHG emissions



Support the deployment of energy efficiency and decarbonization technologies and practices



Foster feedback from stakeholders on critical technology challenges that may be addressed through RD&D

IEDO offers no-cost tools/programs to improve energy efficiency, competitiveness, & sustainability:



- Expert technical assistance and trainings
- Facilitated peer-to-peer knowledge sharing
- National recognition for achievements



- *No-cost energy assessments for small- to medium-sized manufacturers*
- *Assessments typically identify >\$130,000 in potential annual savings opportunities*



- Tools, guidance and recognition for facilities that implement an ISO 50001-based energy management system
- No-cost, self-paced, audit-free



- **Advanced technical assistance for CHP, microgrids, and district energy**
- **No-cost resources and training webinars**
- **Packaged CHP system eCatalog**

NO-COST TOOLS & SOFTWARE

MEASUR Software Suite

50001 Ready Navigator Tool

REopt Web Tool

Financing Navigator

Low Carbon Action Plan Tool

Carbon Inventory Calculator

Electrification Impact Calculator

Emerging Focus Area: Energy Intensive Sectors

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- Energy intensive sectors offer significant potential to save energy
- DOE would like to engage with more energy intensive manufacturers to develop resources that are relevant to them
- Energy intensive manufacturers are well-positioned to implement decarbonization technologies

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- Support energy intensives sectors to save energy and decarbonize by facilitating collaboration with DOE
- Support energy intensives sectors with range of tools, solutions and resources
- Establish feedback loop to inform DOE R&D priorities
- Develop voluntary program structure that addresses the unique needs of energy intensives sectors

Why focus on energy intensive sectors?

- **Energy intensive sectors account for a substantial share of the energy use and emissions in the industrial sector.**
 - This energy intensity means that even small reductions on a percentage basis yield substantial absolute savings
- **They have historically not participated at a high rate with existing TA programs.**
 - Big opportunity area for IEDO to increase impact
- **Some of these sectors are well-positioned to apply emerging decarbonization technologies along with existing energy efficiency measures.**
 - Building close relationships with these sectors today can help facilities plan and facilitate greater uptake of decarbonizing technologies as they mature.

Goals of the Energy Intensive TA Pilot

Understand the TA needs of energy intensive sectors and determine a programmatic structure that addresses those needs.

Increase IEDO Engagement with Energy Intensive Sectors

- Engage a cohort of energy intensive manufacturers and assess energy efficiency/decarbonization potential
- Generate feedback loop between R&D and TA efforts for energy intensive manufacturers
- Develop a program structure that addresses the unique needs of energy intensive manufacturers
 - Determine whether assistance should be segmented by industry, process, or another determinant
 - Establish realistic, voluntary energy or carbon saving targets for energy-intensives
 - Integrate activities with technology verification, validation, and deployment work
 - Identify unique opportunities, such as whether energy-intensives would be candidates to generate cleaner, alternate fuels such as hydrogen or biofuels
 - Increase cross-IEDO collaboration, as well as collaboration with OCED and other DOE demonstration efforts as they are launched

Energy Intensive TA: What's in It for You?

Get Free Support

- Receive unbiased technical assistance on energy efficiency and decarbonization
- Peer-to-peer networking opportunities through working groups, workshops, conferences and benchmarking activities

Technical Assistance Resources:

- Energy and decarbonization assessments
- Customized training on industrial systems
- Technology demonstrations of energy-saving technologies and/or materials



Customized TA through ORNL

1. Engage with EIs to learn about their needs
2. Trial a range of tools, solutions, and resources over a two-year period to determine what will offer the most value

A. Energy Assessments, Training & Education

- Perform energy/decarbonization assessments and trainings
- Perform technology demonstrations of energy-saving technologies and/or materials
- Identify methods to generate clean, alternate fuels and carbon capture & usage

B. Potential Resources

- Develop tools, solutions and resources
- Generate new trainings and knowledge-sharing platforms
- Generate case studies, white papers, webinars, social media content to communicate success and lessons learned

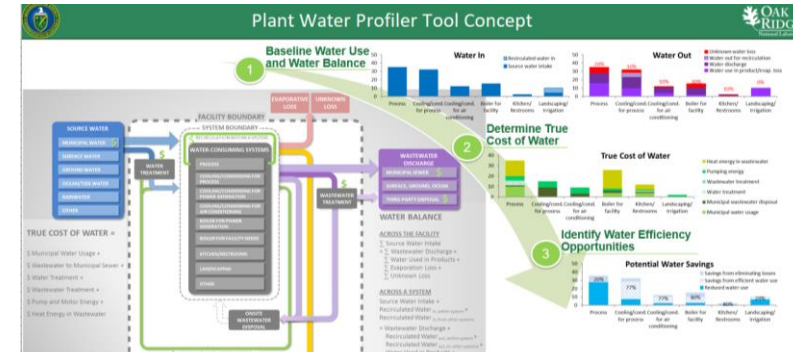
Assessments by Subject Matter Experts

- Assessments performed by Subject Matter Experts (SMEs) with 30+ years experience in industrial energy management
- Industrial system assessments
 - Compressed air, process heating, steam, pumps, fans, and process cooling
- Decarbonization assessments
 - Alternate technology and fuels, thermal process intensification
- Process- specific assessments
 - Energy efficiency and/or decarbonization as focus
- Onsite Generation/CHP assistance (turbines, fuel cells, microgrids, TES etc.)
 - Onsite generation screening and feasibility analysis, engineering support, multiple fuels and technology options



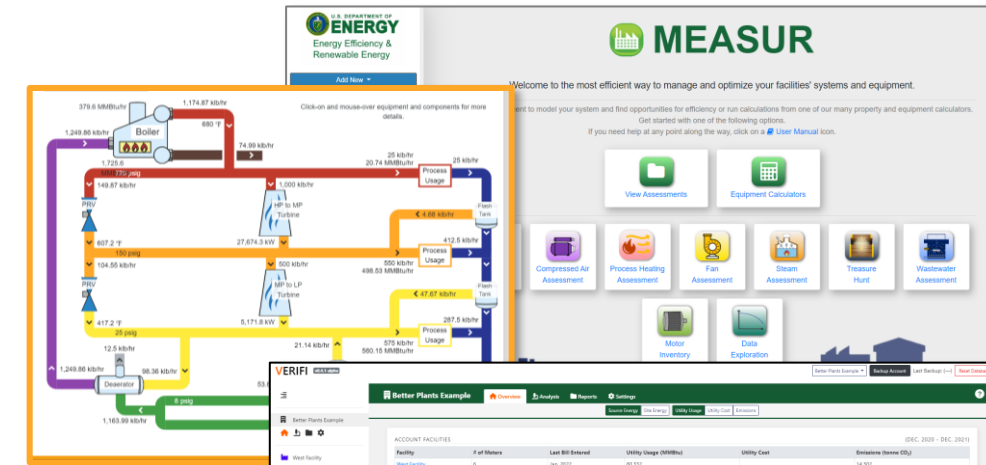
Assessments by Subject Matter Experts

- Water efficiency improvement assessments
 - Water-energy nexus assessments
 - Water management best practices
- Waste reduction assessments
 - Waste reduction best practices
 - Waste to energy opportunities
- Plant-wide assessments
 - Multi-system assessment
 - Small and medium sized facilities
 - Access to implementation grant



Software Tools

- Energy System Optimization Tools
 - Profile industrial energy systems for energy savings
- Utility Dashboard Platform
 - Corporate and facility level utility bill analysis
 - Track energy and carbon reduction
- Water Efficiency Improvement
 - Facility level water assessment
 - True cost of water
- Decarbonization Tools
 - Determine facility carbon footprint
 - Decarbonization roadmap
- **MUCH MORE !!!!**



Workforce Development

- In-Plant Trainings (INPLTs)
 - Learn how to conduct assessments from SMEs
 - Utilize various free tools available
 - Implement projects



In-Plant Training Topics:

- Pumping Systems
- Fans
- Compressed Air
- Motors
- Processed Heat
- Steam Systems
- Industrial Refrigeration
- Water/Wastewater Treatment
- Water Efficiency
- Energy Treasure Hunt
- 50001 Ready

Energy Treasure Hunts



- A 2 or 3-day training focused on:
 - Low-cost/No-cost actions to reduce energy consumption
 - Learning ways to continuously improve
 - Cross-functional teams brainstorming
 - Teams identify, analyze, and evaluate energy savings opportunities
 - Identified opportunities quantified

Observing the Idle Facility

- Energy Treasure Hunts usually start on Sunday or periods of reduced production

Employee Engagement

- Cross-functional team of employees conduct the Treasure Hunts and have ownership of the ideas / opportunities

Expert Facilitation

- Outside experts / participants are there to facilitate the process, generate discussion, and help quantify opportunities

Leverage Local Personnel Knowledge

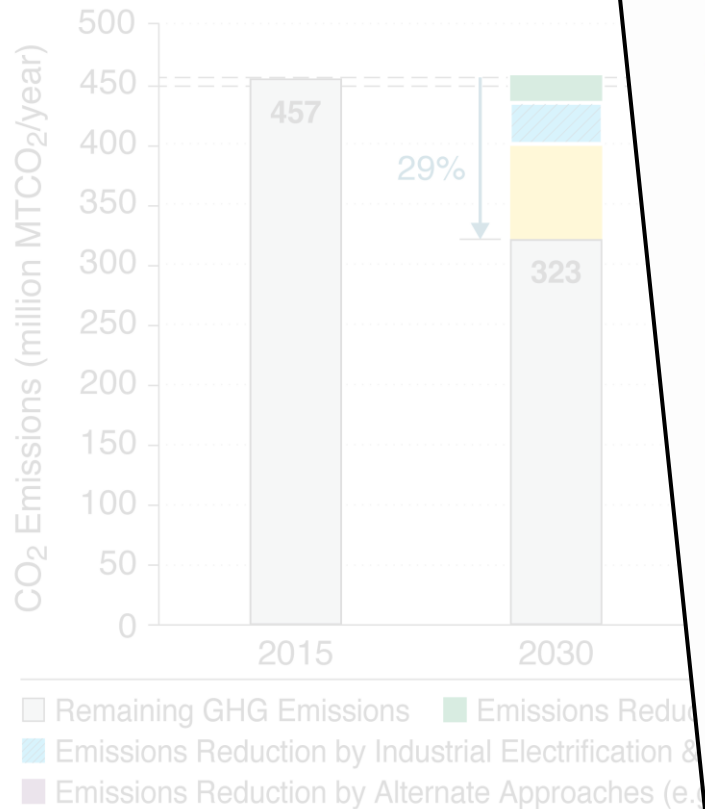
- Local personnel will have the most expertise on optimizing facility production and operational changes

Technology Deployment Assistance



- Technology demonstrations at National labs across the nation
 - Tour state of the art facilities
 - First-hand demonstrations of innovative technologies
 - Leverage research and technologies through lab-industry partnerships
- Teaming support for RD&D efforts

DOE Strategy on RDD&D for Decarbonizing Industry



Carbon Capture, Utilization, and Storage (CCUS)

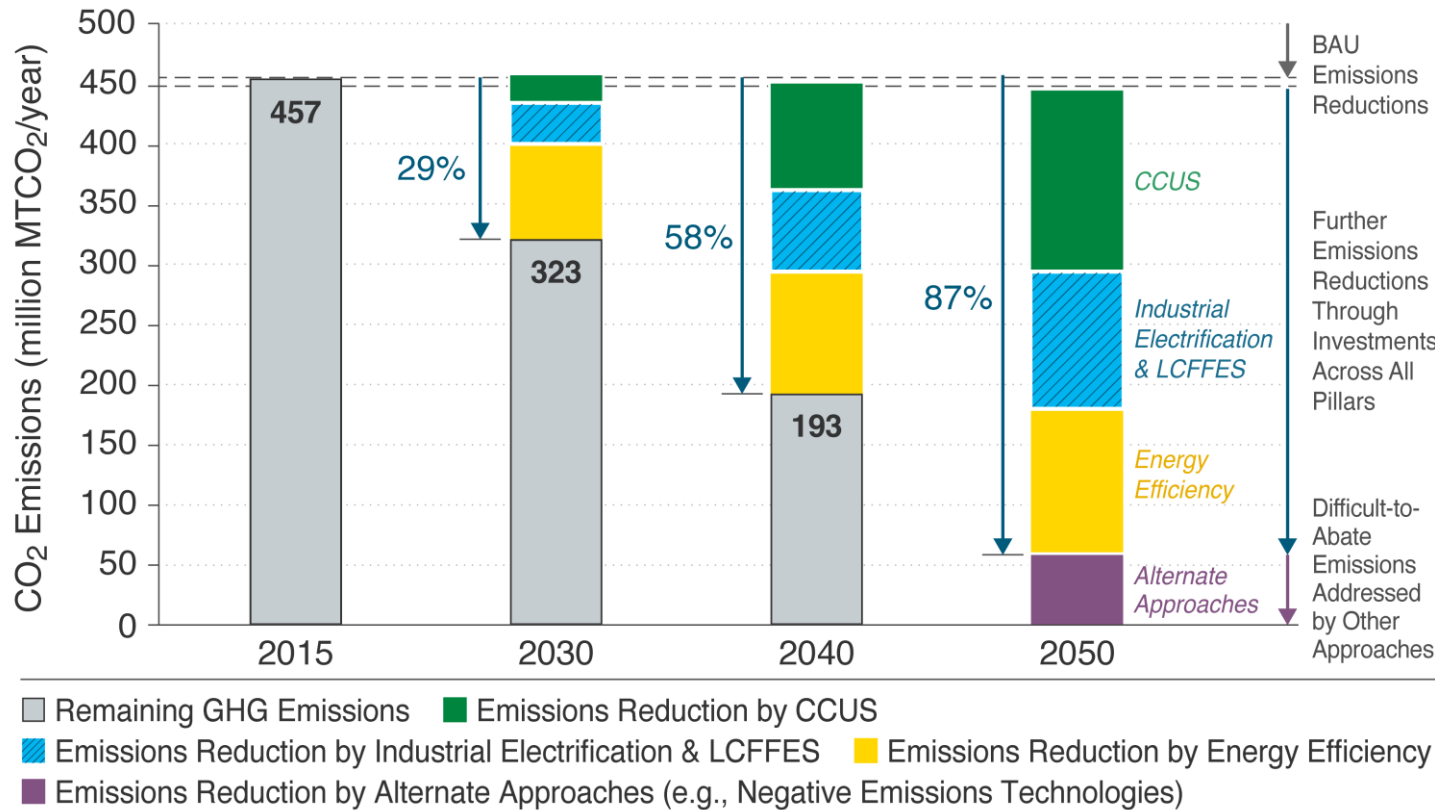
Industrial Electrification

Low-Carbon Fuels, Feedstocks, and Energy Sources (LCFFES)

Energy Efficiency

Manufacturing Technology Innovation

DOE Strategy on RDD&D for Decarbonizing Industry



Carbon Capture, Utilization, and Storage (CCUS)

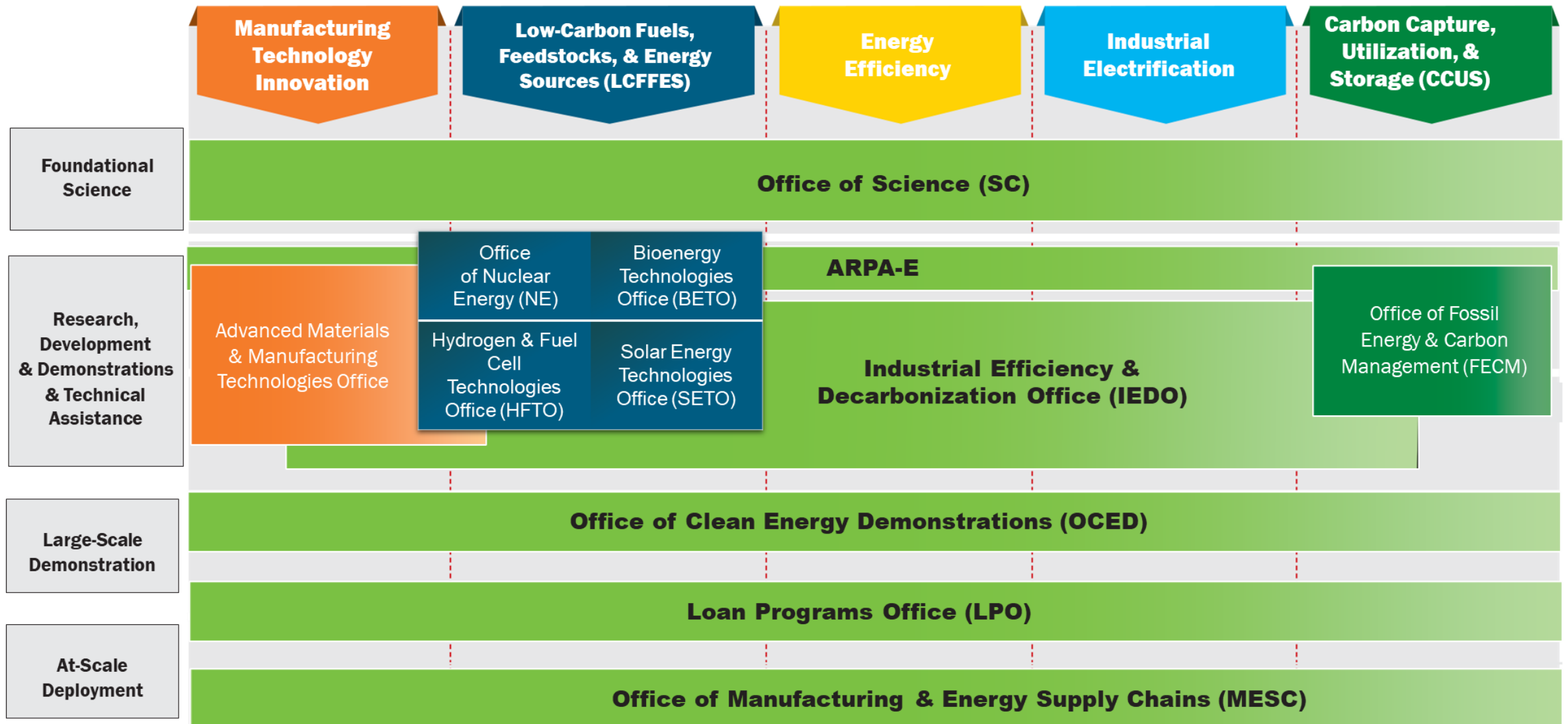
Industrial Electrification

Low-Carbon Fuels, Feedstocks, and Energy Sources (LCFFES)



Energy Efficiency

Manufacturing Technology Innovation

DOE Strategy on RDD&D for Decarbonizing Industry



IEDO Research, Development, & Demonstration Programs

<i>Energy- and Emissions-Intensive Industries</i>	<i>Cross-Sector Technologies</i>
<p>Supporting RD&D for technologies that dramatically reduce energy use and emissions from energy-intensive industries. Industrial subsectors of focus initially include:</p> <ul style="list-style-type: none">• Chemicals• Iron & Steel• Food & Beverages• Cement• Paper & Forest Products 	<p>Supporting RD&D of technologies that address emissions across a broad range of industries, such as electrification of process heat and waste heat utilization. Decarbonization solutions that will be investigated include:</p> <ul style="list-style-type: none">• Hydrogen and other low carbon fuels and feedstocks• Thermal processes and systems• Emerging and enabling technologies• Combined heat and power• Water and wastewater treatment 

➔ Stay on top of upcoming funding opportunities by subscribing to the [IEDO newsletter](#) and monitoring [EERE Exchange](#) ➔

Ongoing stakeholder engagement through workshops, roundtables, and requests for information (RFIs)

Upcoming workshops include:

- The Industrial Heat Shot Summit
- Sustainable Chemistry in RD&D to Transform the Chemicals Industry

IEDO Industrial Funding News

- **\$156 million for Industrial Decarbonization RD&D**
 - Notice of Intent: March 2, 2023 ([link](#))
 - Announcement: March 2023 (planned)
 - Advance DOE’s shared strategic framework: energy efficiency; industrial electrification; low-carbon fuels, feedstocks, and energy sources; carbon capture, utilization, and storage; and manufacturing technology innovation
 - Cross-sector technologies: low-carbon thermal processes, hydrogen utilization, thermal storage
 - Energy- and emissions-intensive industries: chemicals, iron and steel, food and beverage, cement and concrete, forest products
- **\$23 million for Onsite Energy Technical Assistance Partnerships**
 - Announcement: February 3, 2023 ([link](#))
 - Application Due Date: April 21, 2023
 - Establish Onsite Energy TAPs to help facilities integrate onsite energy technologies through specialized TA, from initial site screenings to advanced analysis that supports project installations

DOE Industrial Funding News

- **\$6.3 Billion in Demonstration Funding – Office of Clean Energy Demonstrations (OCED)**
 - Announcement: March 8, 2023 ([link](#))
 - Concept Paper Submission Deadline: 4/21/2023
 - Focus on the highest emitting and hardest to abate industries
 - Projects that test and validate emissions-reducing technologies
 - First-of-a-kind, facility infrastructure projects, resulting in significant emissions reductions up to net-zero operations;
 - Facility-level overhaul retrofits for existing facilities
 - Upgrades and retrofits to target deep decarbonization and validate technologies within critical unit operations or single process lines
 - Multi-facility retrofits utilizing a common technology base or approach, or utilizing common infrastructure (e.g., electrical or thermal inputs, storage).
- **\$10 Billion in Tax Credits – 48C**
 - Initial Guidance: Feb. 13, 2023 ([link](#))
 - Industrial decarbonization projects
 - New clean energy manufacturing or recycling facilities
 - New critical materials facilities

Energy Intensive Pilot: What Are We Asking?

Before Technical Assistance

- Submit online **Request for Technical Assistance**
- Participate in **30-minute interview** on energy and decarbonization priorities and goals

Receive Technical Assistance

After Technical Assistance

- **Provide feedback** on technical assistance offerings
- Consider participating in **future opportunities**, including peer-based trainings, scenario planning, and technology demonstrations

Fill out the survey and let us know how we can help!



Energy Intensive Pilot: How can You get Started?

Program Contacts



Robert Bruce Lung
Senior Technical Advisor
U.S. Department of Energy
robert.lung@ee.doe.gov



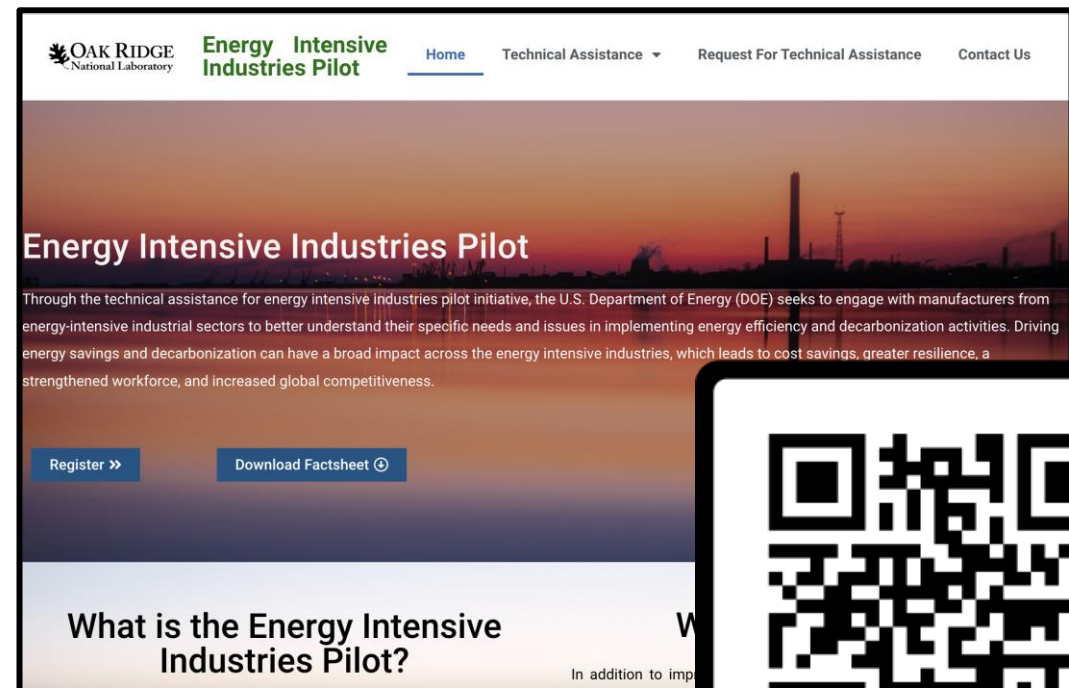
Senthil Sundaramoorthy
R&D Associate Staff
Oak Ridge National Lab
sundaramoors@ornl.gov



Zach Pritchard
AAAS Science & Technology Policy Fellow
U.S. Department of Energy
Zachary.Pritchard@ee.doe.gov

Submit a Request for Technical Assistance:

<https://eiipilot.ornl.gov/>



Back-up slides

Emerging Focus Area: Energy Intensive Industries

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Energy intensive industries (EII) offer significant potential to save energy and reduce GHGs

Food | Cement and Lime | Iron and Steel | Chemicals | Glass and Ceramics | Aluminum | Paper

They account for a substantial share of the energy use and emissions in the industrial sector

EIIs are poised to rely on maturing decarbonization technologies (e.g. hydrogen, high-temperature heat pumps, CCUS, etc.) along with energy efficiency measures in a net-zero economy

DOE is currently recruiting participants for the Energy Intensive Industries (EII) Pilot

Energy
Intensive
Industries
Pilot

**Systems Assessments | Advanced Technology Deployment
Workforce Development | Tools | Webinars | Other Resources**

If you are interested in participating or learning more, contact Bruce Lung at Robert.lung@ee.doe.gov

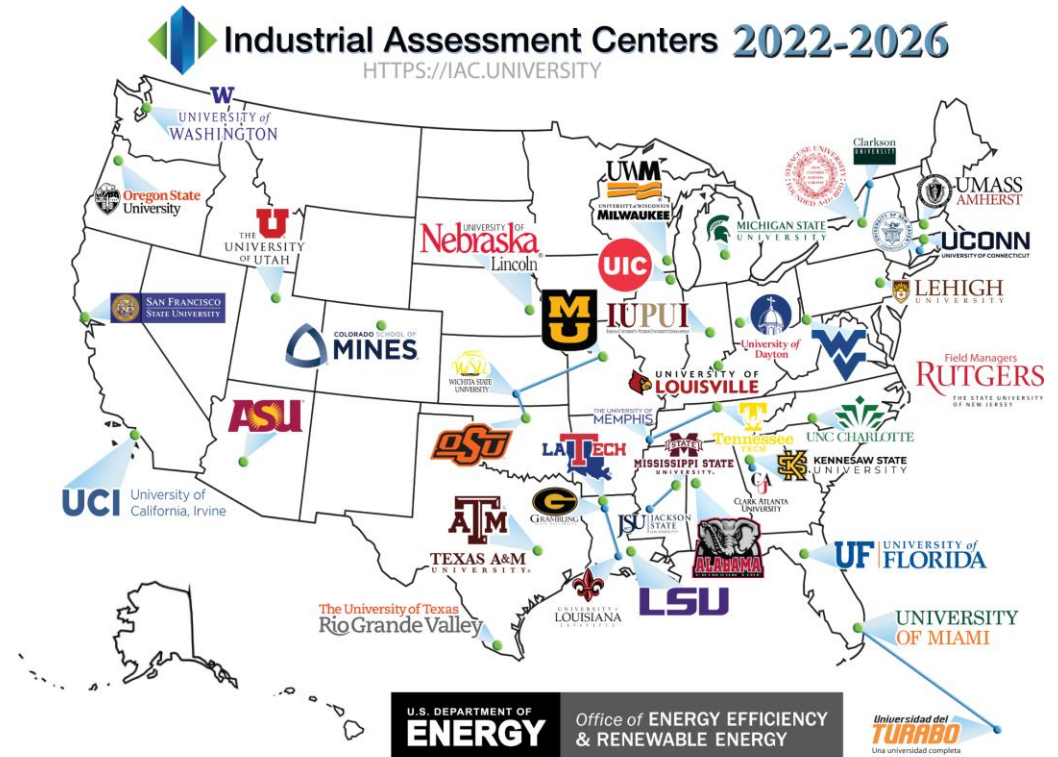
Emerging Focus Area: Diversity, Equity, Inclusion, Belonging

Justice40 Initiative

A plan to deliver 40% of the overall benefits of climate investments to disadvantaged communities and inform equitable research, development, and deployment within the DOE.



“\$16 million for community-driven clean energy transition technical assistance to low-income, energy-burdened communities that are also experiencing either direct environmental justice impacts, or direct economic impacts from a shift away from historical reliance on fossil fuels.”



Bipartisan Infrastructure Law (BIL) : Key Manufacturing Provisions

40521 Industrial Research & Assessment Centers

Expand the reach and impacts of the Industrial Assessment Centers:

- Expand IACs to community colleges, technical schools, and union programs
- Create an internship/apprenticeship program
- Coordinate with critical stakeholders & resources
- Expanding activities within disadvantaged communities

A complementary grants program will provide implementation funds for small & medium manufacturers.

\$150M | \$400M (grants)

40209 Advanced Energy Mfg & Recycling Grant Program

Focus on entities in regions with coal mine or coal fired electricity unit closures to:

- Build new or expanded small-to medium-manufacturing facilities to make or recycle clean energy products
- Install energy or emissions reducing projects at existing manufacturing facilities

\$750M

40534 State Manufacturing Leadership

Financial assistance to states to establish programs that:

- Support implementation of smart manufacturing technologies in the industrial sector
- Provide access to the high-performance computing resources at the National Laboratories

\$50M

Inflation Reduction Act: Key Manufacturing Provisions

Provides \$50 billion in tax incentives to boost domestic clean energy manufacturing of solar panels, wind turbines, batteries, and processing critical minerals, and \$11.5 billion for industrial emissions reduction programs

Tax Credits

- **§48 Investment Tax Credit (ITC) and §48E Clean Electricity ITC:** Credit for specific technology investments until 2025 and then for zero emitting technologies after 2025.
- **§45 Production Tax Credit (PTC) and §45Y Clean Electricity PTC:** Credit for electricity production from specific technologies until 2025 and then from zero emitting technologies after 2025
- **§45X Advanced Manufacturing Production Credit:** Credits for specific components produced domestically to support clean energy supply chains

Grant and Loan Programs

- **Advanced Industrial Facilities Deployment (\$5.8B):** Creates a new program office to invest in reducing emissions from energy-intensive industries.
- **Advanced Technology Vehicle Manufacturing (\$3B):** Loans for new, re-equipped, or expanded manufacturing facilities for vehicles.
- **Domestic Manufacturing Conversion (\$2B):** Grants for domestic production of hybrid / electric vehicles
- **Defense Production Act (\$500M):** Funding for production of heat pumps and processing critical minerals.

Cross-agency collaboration on industrial sector initiatives

Advanced Materials and Manufacturing Technologies Office (AMMTO)

Focuses on RD&D and workforce development related to advanced materials and manufacturing technologies

Office of Fossil Energy and Carbon Management (FECM)

Focuses on RD&D related to low carbon supply chains, carbon capture and storage (CCS) technologies, critical minerals production, carbon dioxide removal, and other efforts

Office of Manufacturing & Energy Supply Chains (MESOC)

Supports modernization, scale-up, and deployment of manufacturing facilities critical to the Energy Supply Industrial Base through targeted investments and workforce programs

Office of Clean Energy Demonstrations (OCED)

Focuses on large, major demonstrations of clean energy and industrial decarbonization technologies at production scale or systems integration level