

Advanced Manufacturing Office Technical Assistance

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Advanced Manufacturing Office (AMO)

We partner with industry, academia, states, and national laboratories to catalyze R&D and the adoption of advanced manufacturing technologies and practices.



R&D Projects

- Targeted investments for next-generation materials and process technologies that would lead to quantifiable energy and carbon savings

R&D Consortia

- Public-private institutes and hubs that tackle specific technical challenges through major collaborative projects

Technical Partnerships

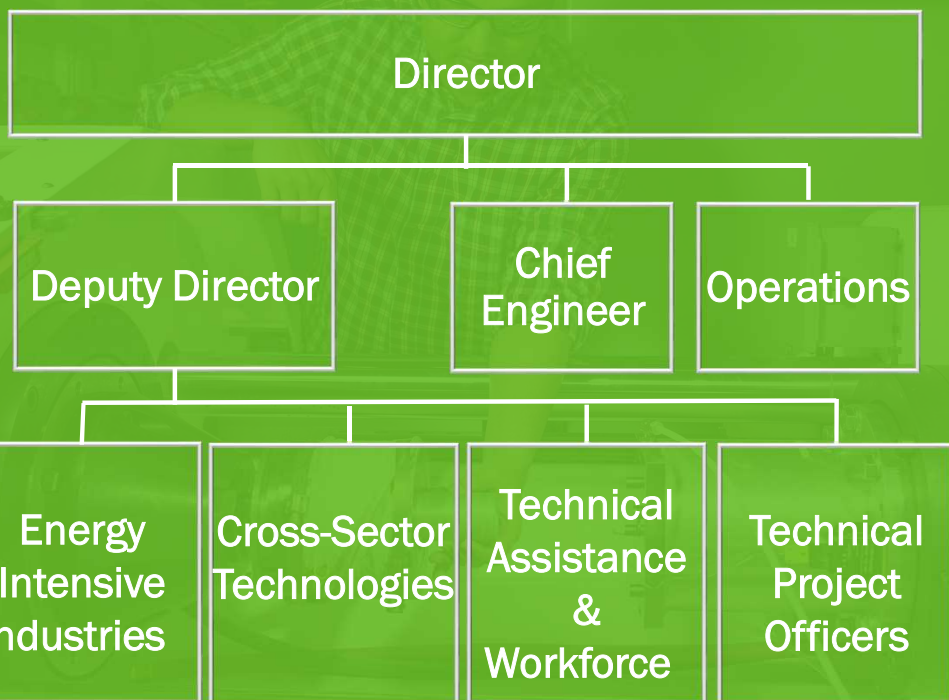
- Direct technical assistance for the U.S. manufacturers through no-cost tools and trainings, knowledge sharing, and technology validation

BUDGET

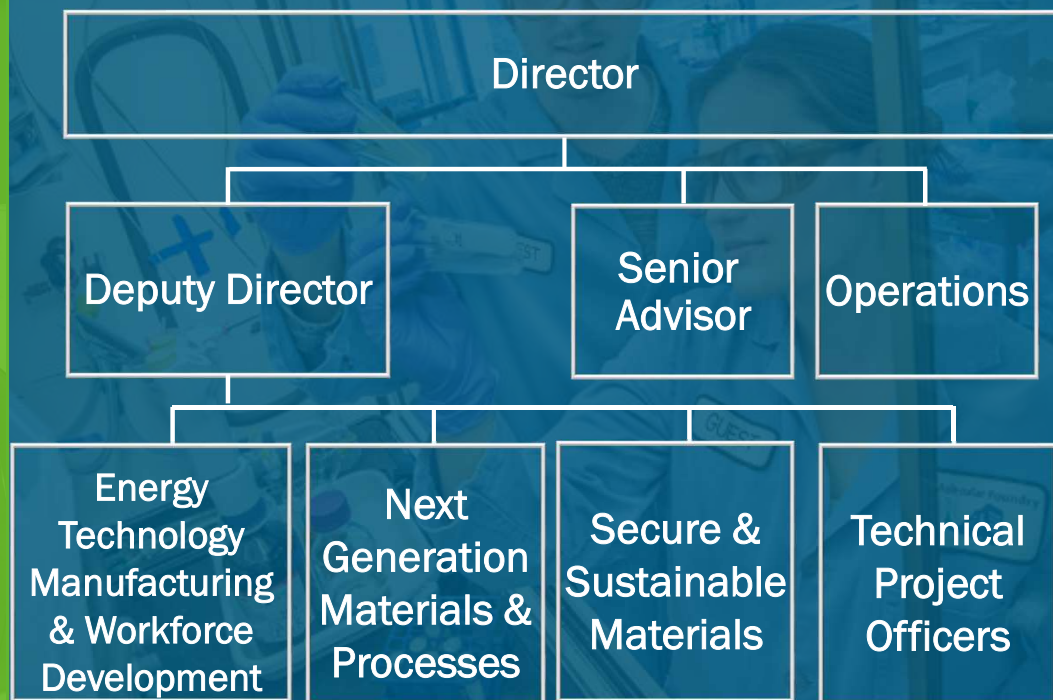
\$416M_{FY22}

Two Planned Offices Beginning October 9, 2022

Industrial Efficiency & Decarbonization Office (IEDO)

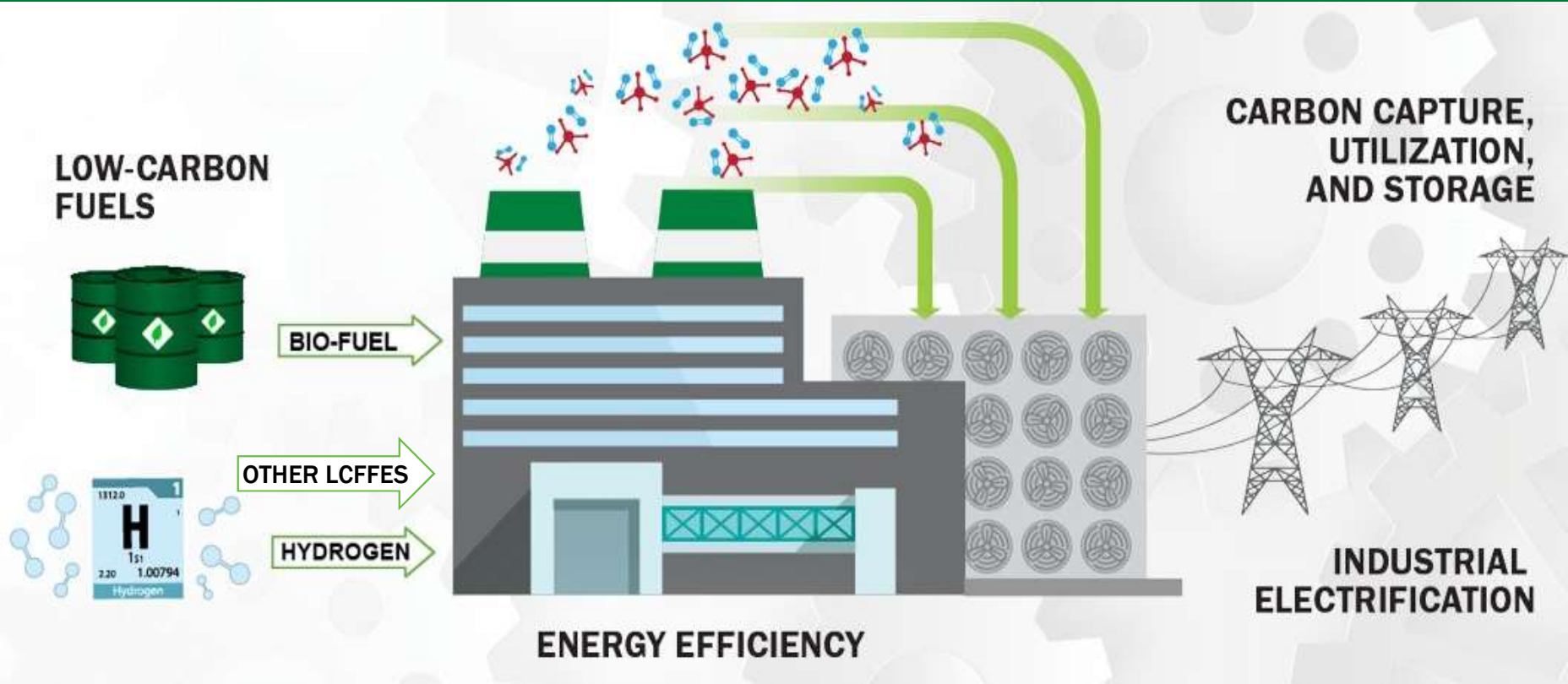


Advanced Materials & Manufacturing Technologies Office (AMMTO)



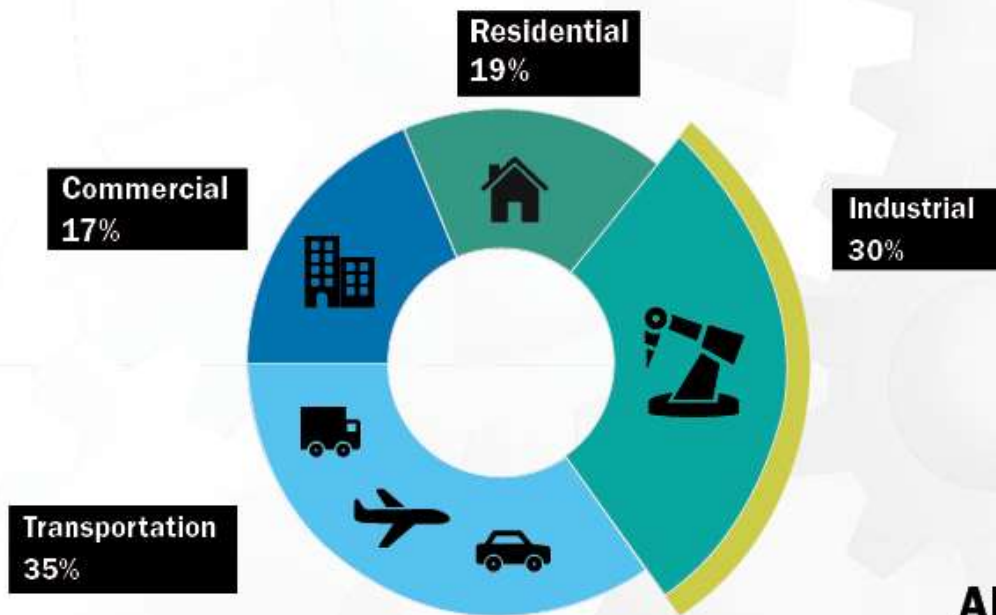
Recent Release: Industrial Decarbonization Roadmap

Four Main Strategies to Decarbonize the Manufacturing Sector

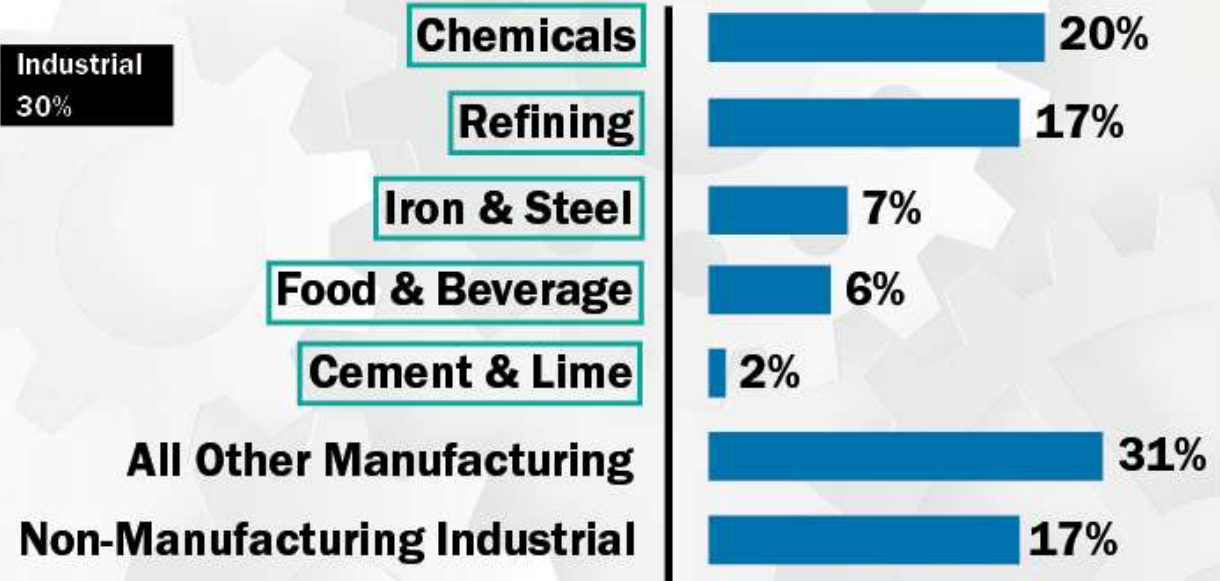


<https://www.energy.gov/eere/doe-industrial-decarbonization-roadmap>

U.S. PRIMARY ENERGY-RELATED CO2 EMISSIONS BY ECONOMIC SECTOR

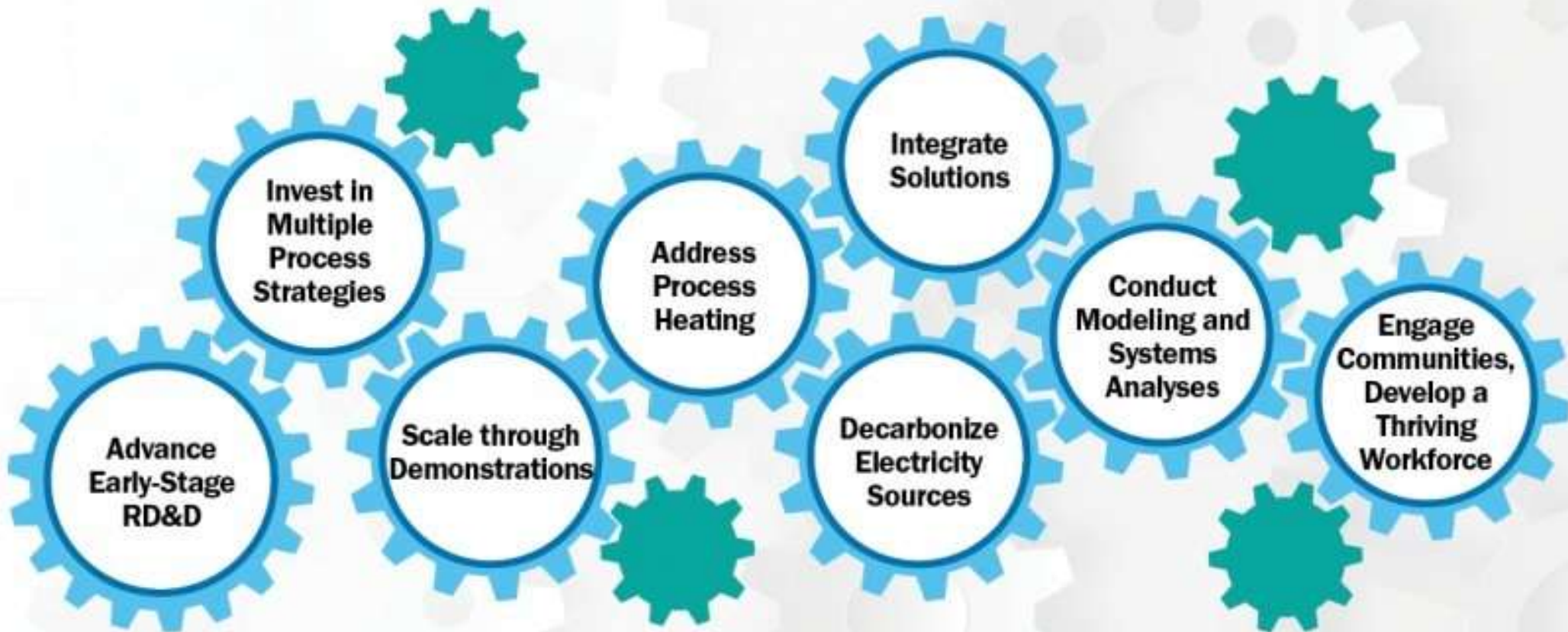


PERCENT OF INDUSTRIAL MMT CO2



**Non-Manufacturing Industrial
(Agriculture, mining and construction)*

KEY RECOMMENDATIONS FROM THE INDUSTRIAL DECARBONIZATION ROADMAP



\$104M Industrial Efficiency and Decarbonization FOA

- Incorporates topics and recommendations identified in the roadmap and from other stakeholder engagement activities, applying the four industrial decarbonization pathways to energy-intensive industries where decarbonization technologies could have the greatest impact.
- Concept papers are due by 5:00pm ET on October 12, 2022; full applications are due December 20, 2022, by 5:00pm ET.
- Learn more and share:
<https://www.energy.gov/eere/amo/industrial-efficiency-and-decarbonization-funding-opportunity-announcement>

FOA Topics

- Decarbonizing Chemicals
- Decarbonizing Iron & Steel
- Decarbonizing Food and Beverage Products
- Decarbonizing Cement and Concrete
- Decarbonizing Paper and Forest Products
- Cross-sector Decarbonization Technologies

Clean Energy Manufacturing Innovation Institutes



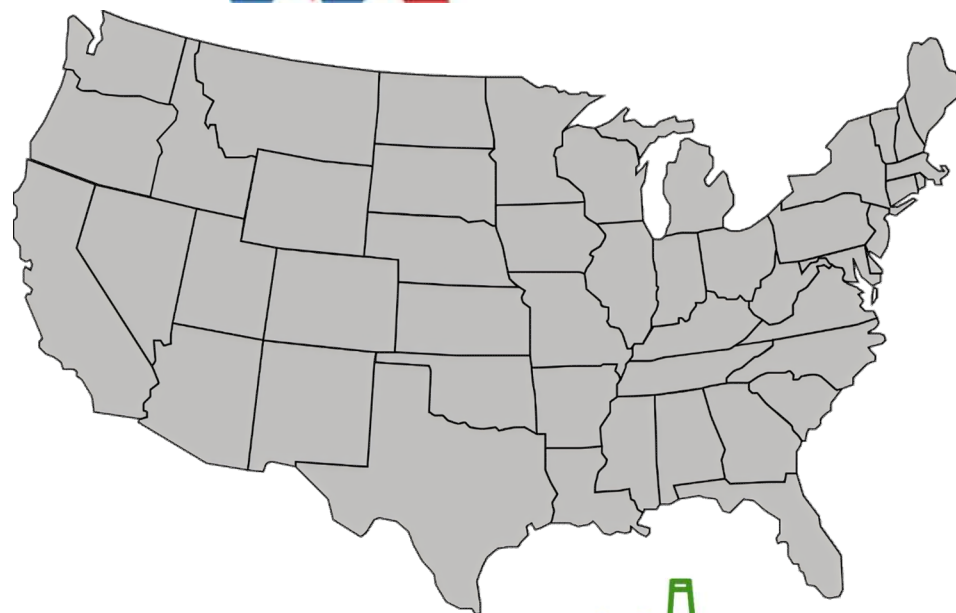
Clean Energy Smart Manufacturing
Innovation Institute (CESMII)



Institute for Advanced Composites
Manufacturing Innovation (IACMI)



The Rapid Advancement in Process
Intensification Deployment (RAPID) Institute



AMO is launching a
7th institute
focused on



Industrial
Electrification



Reducing Embodied Energy and
Decreasing Emissions (REMADE)



Cybersecurity Manufacturing
Innovation Institute (CYMANII)



Better Climate Challenge



PARTNERS

Portfolio-wide reduction in GHG emissions of *at least* 50% in 10 years

- Reduction includes Scope 1 & 2 emissions
- No offsets (RECs allowed)
- Baseline up to 5 years back from join date
- Partners in energy-intensive sectors are asked to set a minimum goal of 25%

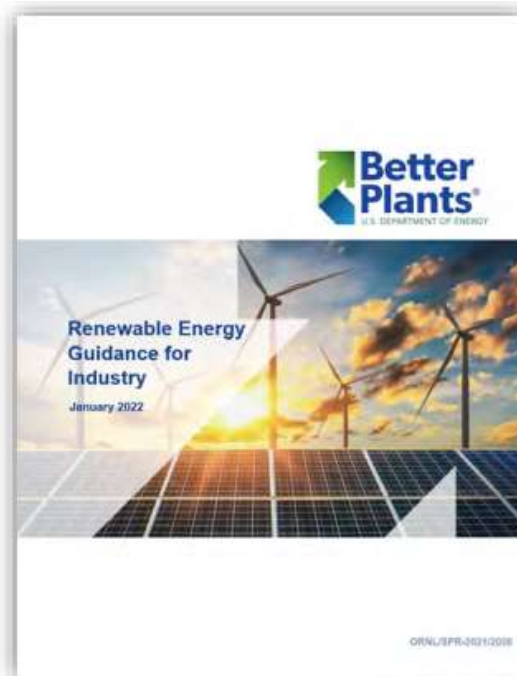
ALLIES

Recruit and support organizations in reducing GHG emissions

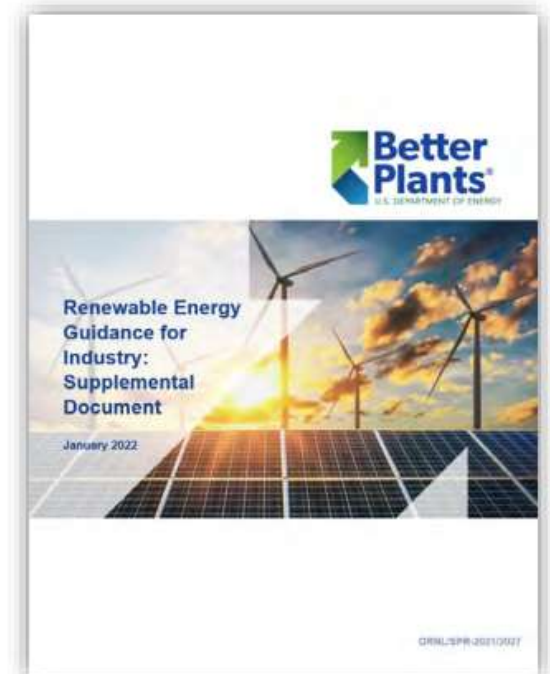
- Engage with members and stakeholders by encouraging them to join BCC
- Participate in at least one activity annually to drive decarbonization and support BCC
- Update DOE on organization's carbon reduction initiatives annually

Renewable Energy Guidance for Industry

- Learn the basics of different renewable technologies
- Find out how you can obtain renewable power for your organization
- Discover tools and resources that can help you evaluate renewable energy systems



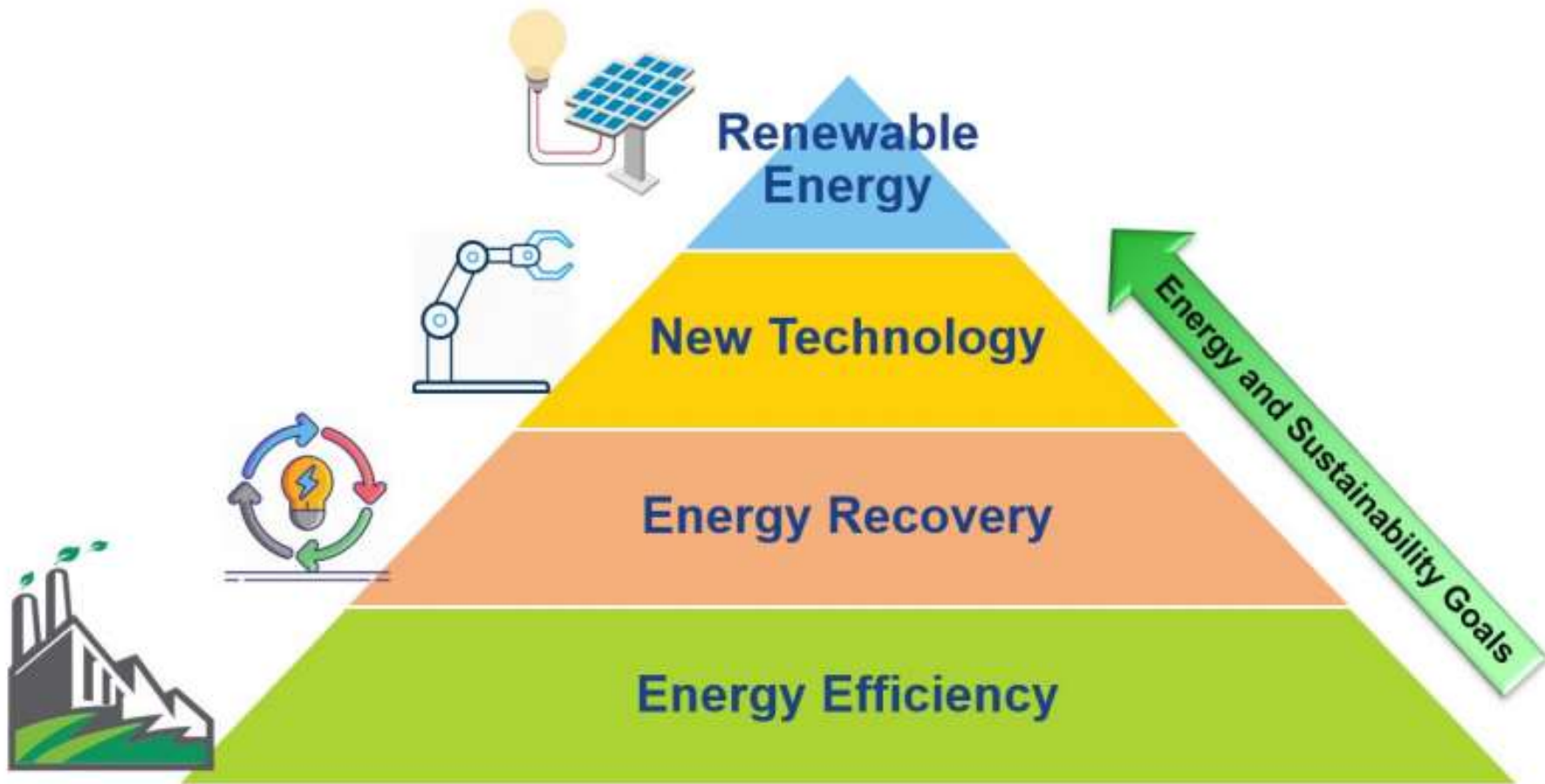
Main Document



Supplemental Document

<https://betterbuildingssolutioncenter.energy.gov/sites/default/files/attachments/Renewable%20Energy%20Guidance%20Document%20January%202022.pdf>

Renewable Energy Guidance for Industry



<https://betterbuildingssolutioncenter.energy.gov/sites/default/files/attachments/Renewable%20Energy%20Guidance%20Document%20January%202022.pdf>

Better Buildings Renewable Energy Resource Hub



<https://betterbuildingsolutioncenter.energy.gov/renewables>

Adapting to Support Partners' Decarbonization Goals

Leverage AMO's CHP program model and expand to include a broad range of clean on-site energy and storage technologies to meet decarbonization goals.

solar PV | wind | solar thermal | bioenergy | geothermal heat pumps | battery storage thermal storage | renewable/net zero CHP | waste heat to power | district energy technologies

Near-Term Goals

- Decrease emissions as quickly as possible
- Minimize the use of fossil fuels
- Complement increased use of wind, solar, and storage
- Provide long-duration resilience

Long-Term Goals

- Use renewable fuels in high-impact applications (hard to decarbonize industries, critical facilities that need long duration resilience and operational reliability), most efficiently
- Support a resilient, renewable energy sector and economy

Onsite Energy Program

Future Focus Areas

- Support deployment of onsite renewable energy and storage technologies
- Assist industry in identifying cost-effective options for achieving RE targets
- Highlight pathways for accelerating the integration of onsite technologies
- Reduce GHG emissions at industrial facilities while prioritizing disadvantaged communities

Key Planning Considerations



Build on existing program models to maintain key components while delivering new, expanded solutions



Ensure resources and technical support are designed to have impact and meet stakeholder needs



Design activities to fill gaps and avoid duplicating what the market is already adequately addressing

Request for Information

Provide input on challenges and opportunities for onsite energy deployment in the industrial sector

Response Deadline:
September 23, 2022

<https://www.energy.gov/eere/amo/request-information-integration-onsite-clean-energy-technologies-industrial-sector>



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

Energy Intensive Industries Pilot

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

Validation of Emerging Industrial Technologies

U.S. DEPARTMENT OF
ENERGY | Office of ENERGY EFFICIENCY
& RENEWABLE ENERGY
ADVANCED MANUFACTURING OFFICE

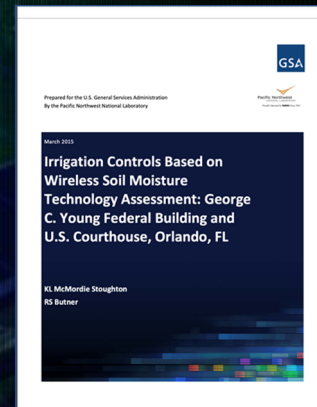
Industrial Technology Validation Pilot

ADVANCING TECHNOLOGIES TO
DECARBONIZE INDUSTRY

Applications for Phase 3 – Coming Soon

Objectives

- Validate the potential of innovative decarbonization technologies
- Verify performance improvement claims
- Project cost savings and scalability
- Produce a publicly available M&V report for each validation



Bipartisan Infrastructure Law: 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 the processing of critical minerals mineral processing
 - Provides an additional \$11.5 billion for industrial emissions reduction programs
 - Provides \$500 million for the Defense Production Act to boost the manufacturing of energy-efficient technologies such as heat pumps.
-
- Clean Manufacturing Investment Tax Credit (48C) (Section 13501)
 - Advanced Manufacturing Production Credit (45X) (Section 13502)
 - \$5.8 billion for Advanced Industrial Facilities Deployment. (Section 50161)
 - \$3 billion for LPO's Advanced Technology Vehicle Manufacturing. (Section 50142)
 - \$2 billion for Domestic Manufacturing Conversion grants. (Section 50143)
 - Defense Production Act (Section 30001)
 - Low-Carbon Materials Investments (Sections 60116, 60503, 60504, 60505, 60506, 70006)



Thank you!

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CHP in Industrial Decarbonization Roadmap

- Industrial CHP can provide significant GHG emissions reductions in the near- to mid-term as marginal grid emissions continue to be based on a mix of fossil fuels in most areas of the country.
- In order to prevent lock-in, **CHP units installed today must have emissions below marginal grid emissions** for the duration of their useful lifetime, including through retrofits to use clean sources of energy where possible.
- **RNG and hydrogen fueled CHP systems can be a long-term path** to decarbonizing industrial thermal processes resistant to electrification because of technology or cost barriers, and for critical operations where dispatchable onsite power is needed for resilience and reliability.



Industrial Decarbonization Roadmap

DOE/EE-2635
September 2022

United States Department of Energy
Washington, DC 20585

[https://www.energy.gov/sites/default/files/2022-09/Industrial Decarbonization Roadmap.pdf](https://www.energy.gov/sites/default/files/2022-09/Industrial%20Decarbonization%20Roadmap.pdf)