MESC

OFFICE OF MANUFACTURING AND ENERGY SUPPLY CHAINS

INAUGURAL ANNUAL REPORT

FY23

DIRECTOR'S NOTE

The Department of Energy's (DOE) **Office of Manufacturing and Energy Supply Chains (MESC)** is focused on building the strong, secure supply chain foundation our nation's energy system needs. In 2023, MESC launched an extraordinary range of investments in American energy manufacturing, positioning the nation to lead in this essential sector.

MESC identifies critical dependencies in energy supply chains and targets manufacturing capacity and workforce training investments to build a more robust energy system. MESC operates at the frontline of clean energy capital deployment, de-risking private sector investment and attracting capital to under-invested or unrepresented domestic supply chain segments. In fact, MESC's funding catalyzes nearly $3 of private sector funding for every $1 of government investment in manufacturing projects.

We bring energy justice to the fore of our investing approach, recognizing the important role America's historic energy communities have always had in driving American energy sector innovation and leadership. As small- and medium-sized manufacturers are the backbone of the U.S. energy manufacturing sector, MESC also recognizes their importance and supports manufacturers of all sizes through its programs.

Learn more about MESC's work: **www.energy.gov/mesc**.

> For decades, manufacturing has been encouraged to go overseas, taking American jobs and energy security with it. At MESC, we believe that a 21st-century industrial strategy can instead make America's energy future more just, circular, and far more reliable and resilient. Our strategy is to invest in all of America and build toward a more secure U.S. energy economy, from critical minerals to clean energy products.

Giulia Siccardo, Director
Office of Manufacturing and Energy Supply Chains

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2023 MESC HIGHLIGHTS

Awarding DOE's First Bipartisan Infrastructure Law (BIL) Funding

On October 19, MESC became the first office in the Department of Energy to deploy a new program under the Bipartisan Infrastructure Law (BIL). The initial funding selections MESC announced at that time culminated in awards for 15 new and expanded critical battery components and materials facilities across 11 states. These projects will supply enough critical battery materials for up to 1.3 million electric vehicles (EVs) annually.

Deploying DOE's First Ever Defense Production Act Program to Advance a More Secure, Reliable Energy System

On November 17, MESC announced historic awards under the Defense Production Act: $169 million for nine projects to accelerate electric heat pump manufacturing at 15 sites across the country. These selections are the first to result from President Biden's Defense Production Act (DPA) authorization to increase domestic production of five key clean energy technologies: solar; transformers and grid components; heat pumps; insulation; and electrolyzers, fuel cells, and platinum group metals. Increasing deployment of heat pumps and lowering their costs bolsters national security by reducing dependence on foreign energy and energy equipment, lowering energy costs, improving energy efficiency, and mitigating the climate crisis. This portfolio will boost manufacturing of electric heat pumps (air-to-air, geothermal, and air-to-water) and key heat components (compressors and refrigerants).

Investing in America's Energy Future in the Heart of Coal Country

MESC is investing in coal communities: $275 million for seven coal community projects supporting key materials and components for energy storage. These projects will serve grid and transportation uses, wind energy, and energy efficient solutions for buildings across seven states. In Pennsylvania, MESC is retrofitting an existing facility in Vandergrift to produce ultra-thin, triple and quad-pane insulated glass units (IGUS) for windows, and is enabling the conversion of a former coal-fired power plant in Pittsburgh into a facility for melting and casting advanced magnetic amorphous alloys for grid components. In Weirton, West Virginia, we are funding a new facility to produce critical materials needed for clean power, fuel cells, and green steel supply chains. Each of these facilities will be the first of their kind in the U.S.

Expanding Equitable Access to Energy Workforce Development

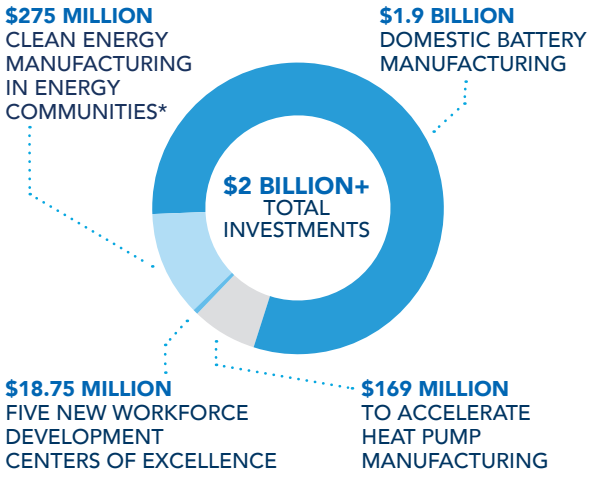
MESC's 2023 actions will create nearly 2,000 permanent jobs and over 5,000 construction jobs. Americans need to be equipped with the right skills to lead in the energy future. For the first time in 40 years, MESC has significantly expanded DOE's existing workforce development program network, going beyond four-year universities to enhance training access for minority and underserved communities by including community colleges, technical schools and union training programs.

FISCAL YEAR 2023 IN REVIEW

In just its second year, the U.S. Department of Energy's Office of Manufacturing and Energy Supply Chains (MESC) emerged as a driving force in building a secure, reliable and sustainable foundation for America's energy system. With a mission focused on transformative manufacturing and workforce investments, MESC achieved many significant milestones in 2023.

MESC MILESTONE METRICS

INVESTMENT OVERVIEW



AWARDED PROJECTS

$1.9 Billion
Strengthening domestic battery manufacturing

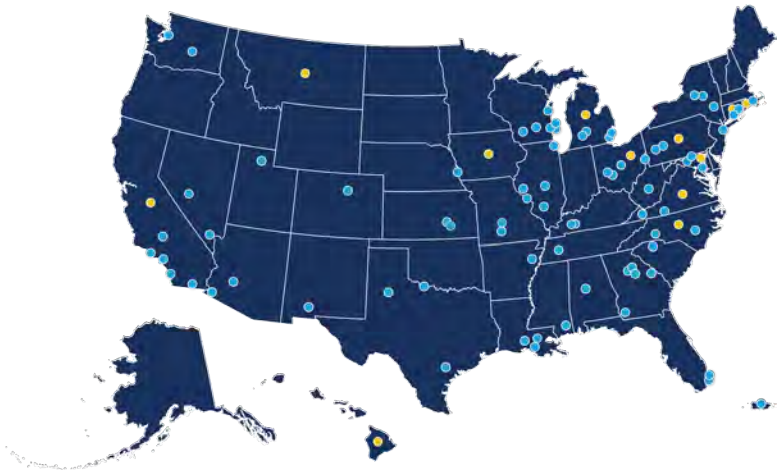
$18.75 Million
Five new Workforce Development Centers of Excellence, enhancing and expanding the Industrial Assessment Center (IAC) Program

SELECTED PROJECTS

$275 Million
Strengthening clean energy supply chains and manufacturing in energy communities

$169 Million
Accelerating domestic heat pump manufacturing

SELECTED PROJECTS MAP



71 PROJECT LOCATION SELECTIONS ACROSS 38 STATES & PUERTO RICO

- PROJECT SELECTIONS
- STATE MANUFACTURING LEADERSHIP SELECTIONS

IMPACT OVERVIEW

APPROX. $7B
COMMITTED TO INVESTING IN AMERICAN ENERGY MANUFACTURING (FEDERAL & INDUSTRY)

2,600
PERMANENT JOBS CREATED

6,230
CONSTRUCTION JOBS CREATED

34%+
INVESTED IN ENERGY JUSTICE COMMUNITIES*

1.3M+
EVS ENABLED

**Energy Communities under BIL 40209 are census tracts in which, or adjacent to tracts in which, either coal mines closed after Dec. 31, 1999, or coal-fired electricity-generating power plants closed after December 31, 2009.*

A mapping tool showing eligible communities is available at https://arcgis.netl.doe.gov/portal/apps/experiencebuilder/experience/?id=09457c326145417595287951ed376a29.

MESC SUCCESSES

To secure American supply chains, the Office of Manufacturing and Energy Supply Chains works alongside private capital as a force multiplier.

Manufacturing Investing

We're investing in domestic manufacturing—identifying dependencies and directing energy supply investments where they are needed most—**to secure the nation's energy infrastructure and support a clean and equitable energy transition**.

Rapidly increasing U.S. energy manufacturing deployment is critical. The direct manufacturing deployment funding we initiated in FY 2023 includes:

- Over **$275 million for seven small- and medium-sized manufacturer projects** in communities impacted by coal facility closures across seven states, with over **$600 million in private sector investments leveraged and nearly 1,500 good-paying jobs created.**
- Through the State Manufacturing Leadership program, **investing $22 million across 12 states to enable over 3,500 small and medium-sized manufacturers** to access smart manufacturing technologies and high-performance computing.
- With the **Department's first Defense Production Act** funding opportunity announcement, MESC led the way to accelerate electric heat pump manufacturing in America through $169 million awarded at 15 sites across the country.
- MESC mobilized its partnerships with the U.S. Department of Treasury and the IRS to initiate **$4 billion in 48C tax credits** that will expand clean energy manufacturing and recycling; critical materials refining, processing, and recycling; and greenhouse gas emission reduction projects at industrial facilities.
- Supporting a just transition to EVs, MESC released **$2 billion in Domestic Manufacturing Conversion Grants** to convert domestic conventional vehicle production facilities to efficient hybrid, plug-in electric hybrid, plug-in electric drive, and hydrogen fuel cell electric vehicle production.

With **$6 billion announced to invest in building and accelerating advanced domestic battery and critical materials manufacturing**, we're supporting:

- 15 battery material processing, battery manufacturing, and recycling projects catalyzing over $5.8 billion in combined public/private investment.
- Continued domestic production expansion of advanced batteries and battery materials nationwide, with $3.5 billion released in a second funding round.
- Efforts to create, expand and enhance local government and retailer programs to collect spent batteries for recycling and reprocessing.

Secretary Jennifer Granholm visits Georgia Tech University.

Workforce Investing

We are expanding the Industrial Assessment Center (IAC) network with clean energy workforce centers across the country, providing hands-on training to students that simultaneously helps small- and medium-sized manufacturers achieve energy savings and greenhouse gas reductions.

We are also enhancing the IAC network by establishing regional hubs ("Centers of Excellence") that can assist other IACs with deploying and adapting best practices developed across the network.

Supply Chain Modeling, Mapping and Analysis

MESC's Analysis and Strategic Investment team serves as DOE's in-house experts on energy sector supply chains. Through the consortium it developed with the Department's 17 National Labs and other experts, MESC conducts cutting-edge economic and technical analyses to identify the gaps and growth opportunities across the nation's energy supply chains, from raw materials to processing and manufacturing. These analyses inform investment and program implementation, guide programmatic priorities, and contribute to development of new policies to ensure resilient, domestic energy manufacturing capabilities.

FISCAL YEAR 2023 PORTFOLIO

Manufacturing Investment

BATTERIES AND CRITICAL MATERIALS PROJECTS

MESC-funded projects demonstrate new manufacturing and critical material processing approaches, such as integrating recycled materials, in new and expanded commercial-scale domestic production of lithium, graphite, and other battery materials and components.

Workforce Investment

INDUSTRIAL ASSESSMENT CENTER EXPANSION & REGIONAL CENTERS OF EXCELLENCE PROJECTS

For over 40 years, the Department of Energy has been operating a network of Industrial Assessment Centers (IACs) across the country. To train engineering and other STEM students in energy efficiency and sustainability, MESC is expanding the IAC network beyond four-year colleges and universities to increase equitable access to skills training, with an emphasis on Minority-Serving Institutions, by including community colleges, vocational programs, and other training institutions. IACs give students hands-on experience in providing on-site technical assistance to small and medium-sized manufacturers. In-depth facility evaluations, conducted by students with faculty support, are at no cost to these manufacturers. These assessments provide specific energy, carbon and waste reduction recommendations, with estimates of costs, performance, and payback times.

MESC has also established leading IACs as Centers of Excellence. These Centers of Excellence serve as regional IAC hubs, accelerating regional clean energy workforce development while identifying best practices and opportunities for small- and medium-sized manufacturers to save energy, improve productivity, and reduce waste. The Centers of Excellence also lead the network's collaboration with local government, nonprofit, labor, and industry.

MESC's IAC network expansion, together with the five new Regional Centers of Excellence launched in FY 2023, brings the total IACs portfolio to 37 locations across the country.

Secretary Jennifer Granholm and MESC Director Giulia Siccardo at the Cirba Solutions, LLC groundbreaking.

Manufacturing

BATTERIES AND CRITICAL MATERIALS

Cathode Active Materials

Company: 6K Inc.
Location: Jackson, TN
Total Award Value: $177 million
Federal Share: $50 million
Recipient Cost Share: $128 million
Projected Initial Operation Date: 2025
Projected Completion Date: 2026

By 2025, 6K Inc. will demonstrate 3,000 tonnes per annum (tpa) production of cathode active materials (CAM) for NMC and LFP battery chemistries in a sustainable, cost-effective manner, using the company's novel Unimelt® microwave plasma processing technology, and will scale to 10,000 tpa in 2026.

Lithium Materials

Company: Albemarle U.S., Inc.
Location: Kings Mountain, NC
Total Award Value: $394 million
Federal Share: $150 million
Recipient Cost Share: $244 million
Projected Initial Operation Date: 2028
Projected Completion Date: 2028

Albemarle U.S., Inc. will construct a new commercial-scale lithium materials processing plant at Kings Mountain, North Carolina, using sustainably-extracted spodumene minerals.

Battery-Grade Lithium Hydroxide

Company: American Battery Technology Company
Location: Tonopah, NV
Total Award Value: $115 million
Federal Share: $58 million
Recipient Cost Share: $58 million
Projected Initial Operation Date: 2027
Projected Completion Date: 2028

American Battery Technology Company will build and operate a facility to demonstrate its novel process for manufacturing battery-grade lithium hydroxide from a previously untapped Nevada resources, at low cost and with low environmental impacts.

Synthetic Graphite

Company: Anovion, LLC
Location: Bainbridge, GA
Total Award Value: $417 million
Federal Share: $117 million
Recipient Cost Share: $300 million
Projected Initial Operation Date: 2027
Projected Completion Date: 2028

Using a fully domestic supply chain, Anovion, LLC will build new synthetic graphite anode material capacity of 35,000 tpa for lithium-ion batteries used in electric vehicles and critical energy storage applications.

Integrated Sustainable Battery Active Material Production Plant

Company: Ascend Elements, Inc.
Location: Hopkinsville, KY
Total Award Value: $372 million
Federal Share: $164 million
Recipient Cost Share: $208 million
Projected Initial Operation Date: 2025
Projected Completion Date: 2026

Ascend Elements, Inc. will establish industrial-scale U.S. production capacity of sustainable, low-cost precursor cathode active materials, the highest value component in lithium-ion batteries, by integrating the separation of critical cathode materials from spent lithium-ion batteries with the production of both precursor cathode active materials and metal salts.

Integrated Sustainable Battery Precursor

Company: Ascend Elements, Inc.
Location: Hopkinsville, KY
Total Award Value: $645 million
Federal Share: $316 million
Recipient Cost Share: $329 million
Projected Initial Operation Date: 2025
Projected Completion Date: 2026

Ascend Elements, Inc. will plan, design, and construct a sustainable plant at a greenfield site in Hopkinsville, Kentucky, to convert precursor materials into cathode active materials.

Lithium-Ion Battery Recycling

Company: Cirba Solutions, LLC
Location: Lancaster, OH
Total Award Value: $235 million
Federal Share: $75 million
Recipient Cost Share: $160 million
Projected Initial Operation Date: 2024
Projected Project Completion Date: 2026

Cirba Solutions, LLC will expand and upgrade its existing lithium-ion recycling facility in Lancaster, Ohio, where it will collect, disassemble, shred, and upgrade the critical minerals in tens of thousands of tons of lithium-ion batteries for re-use in new lithium-ion batteries.

Silicon Anode Material

Company: Group14 Technologies, Inc.
Location: Moses Lake, WA
Total Award Value: $591 million
Federal Share: $100 million
Recipient Cost Share: $491 million
Projected Initial Operation Date: 2025
Projected Completion Date: 2025

This project will enable commercial-scale manufacturing of Group14's next-generation silicon-carbon composite, a sustainable material that can displace graphite in lithium-ion battery anodes, facilitating dramatic reductions in battery cost and carbon footprint on a per-unit basis.

Lithium Ion Phosphate Cathode Powder

Company: ICL Specialty Products Inc
Location: St. Louis, MO
Total Award Value: $494 million
Federal Share: $197 million
Recipient Cost Share: $297 million
Projected Initial Operation Date: 2027
Projected Completion Date: 2028

ICL Specialty Products Inc will build a plant to produce high-quality lithium iron phosphate cathode powder for the global lithium battery industry, using a primarily domestic supply chain.

Electrolyte Salt (LiPF6)

Company: Mexichem Fluor Inc. dba Koura
Location: St. Gabriel, LA
Total Award Value: $385 million
Federal Share: $100 million
Recipient Cost Share: $285 million
Projected Initial Operation Date: 2027
Projected Completion Date: 2027

Koura, a global leader in the development, manufacture, and supply of fluoroproducts, will build the first U.S. manufacturing plant for lithium hexafluorophosphate on the grounds of the company's existing fluorochemical production site in St. Gabriel, Louisiana.

Binder Material (PVDF) Manufacturing

Company: Solvay Specialty Polymers USA, LLC
Location: Augusta, GA
Total Award Value: $517 million
Federal Share: $178 million
Recipient Cost Share: $339 million
Projected Initial Operation Date: 2026
Projected Project Completion Date: 2026

Solvay Specialty Polymers USA, LLC will build a new battery-grade polyvinylidene fluoride facility in Augusta, GA, to supply the North American electric vehicle and stationary energy storage markets.

Workforce Development

CENTERS OF EXCELLENCE

Great Plains Center of Excellence

Lead IAC: Oklahoma State University

Partner IACs: Northern Oklahoma University, Wichita State University, University of Nebraska, Hamm Institute of American Energy Center for Educational Research and Evaluation

Total Award Value: $7 million

Federal Share: $4 million

Recipient Cost Share: $3 million

Projected Project Commencement Date: 2024

Great Plains Center of Excellence will serve as a regional workforce training hub for DOE and its strategic partners in the Great Plains, from Oklahoma to Minnesota. The project will develop, deploy, and test the next generation of integrated assessment tools and technologies and associated workforce training to allow virtual/remote data collection in the form of smartphone apps, drones, and virtual/augmented reality.

Gulf Coast Center of Excellence

Lead IAC: Texas Engineering Experiment Station (Texas A&M University)

Total Award Value: $5 million

Federal Share: $4 million

Recipient Cost Share: $1 million

Projected Project Commencement Date: 2024

Texas A&M University will develop an Industrial Assessment Center of Excellence that will serve the Gulf Coast region and surrounding states. This Center of Excellence will focus on enhancing industrial performance of manufacturers for the region, coordinating and supporting the efforts of regional stakeholders, and leading teaching training and workforce development efforts.

Mid-Atlantic Center of Excellence

Lead IAC: Lehigh University

Partner IAC: West Virginia University

Total Award Value: $4 million

Federal Share: $4 million

Recipient Cost Share: 0

Projected Project Commencement Date: 2024

The Mid-Atlantic Regional IAC Center of Excellence (MARICE), led by Lehigh University IAC and West Virginia University IAC, will focus on identifying new assessment technologies, tools, and practices for application in the region. MARICE will coordinate with regional stakeholders, utility providers, and private industry for maximum energy efficiency and management benefits.

Southeastern Center of Excellence

Lead IAC: Georgia Tech Research Corporation (Georgia Tech University)

Partner IACs: Clark Atlanta University, Florida A&M University, Kennesaw State University

Total Award Value: $4 million

Federal Share: $4 million

Recipient Cost Share: 0

Projected Project Commencement Date: 2024

The Southeastern Center of Excellence will serve as a regional and national enrichment resource, advancing identification of technologies and approaches that increase energy efficiency, decarbonization and productivity in cost-effective manner, providing exemplars that facilitate networking and leveraging between IACs and other stakeholders, and equitably develop the clean energy workforce of the future – in part via the leadership roles of two Historically Black Colleges and Universities (HBCUs) and the expansion of the Technologies for High Efficiency Realization via Minority Scholars (THERMS) program.

Western Center of Excellence

Lead IAC: San Francisco State University

Partner IACs: San Jose University, San Diego State University, Laney College, Cuyamaca College

Total Award Value: $4 million

Federal Share: $4 million

Recipient Cost Share: 0

Projected Project Commencement Date: 2024

San Francisco State University, along with its partners at Laney College, Cuyamaca College, San Jose State University, and San Diego State University, will establish and operate a new Western Region Center of Excellence covering a multi-state region across the western U.S., ranging from Hawaii and Alaska. This new hub will involve numerous other manufacturers, regional IACs, community colleges and industry training programs, as well as additional stakeholders across the region—both as project partners and as member organizations for the center's advisory board.

Secretary Jennifer Granholm announces IAC Centers of Excellence at Oklahoma State University on April 7, 2023.

INITIATIVES UNDERWAY

MESC strategic investments in critical materials, workforce, and essential manufacturing enable the success of many of the Department of Energy's other major project offices. Our work de-risks supply chains for transmission, hydrogen, carbon capture, and other deployment priorities of the Office of Clean Energy Demonstrations (OCED), the Grid Deployment Office (GDO), and many other offices.

Qualifying Advanced Energy Project Credit (48C) Program

In 2023, the Treasury Department and IRS, in partnership with DOE, announced the intent to release approximately $4 billion in tax credits for U.S. supply chains for clean energy technologies and their critical materials, as well as for industrial facility greenhouse gas emission reduction projects. Projects in coal communities are allocated approximately $1.6 billion of the total. The program provides investment tax credits for certified projects, with those meeting prevailing wage and apprenticeship requirements eligible for up to 30% of qualified investments.

Industrial Assessment Center Program

MESC is overseeing a $24 million funding opportunity to enhance access to high-quality jobs and strengthen manufacturers, operating through an expansion of the Industrial Assessment Center (IAC) program.

Under MESC leadership, the program is growing beyond four-year institutions for the first time in the history of this 40-year-old network. This new funding will broaden training opportunities for students and incumbent workers, enhancing equitable access and incorporating a special focus on Minority-Serving Institutions, and unlock high-quality careers in clean energy, energy efficiency and advanced manufacturing. The program also helps small- and medium-sized manufacturers save money, reduce energy waste, and improve productivity.

IAC implementation funds from the Bipartisan Infrastructure Law (BIL) and other sources help domestic businesses, including small- and medium-sized manufacturers, move forward in the clean energy transition. Overall, the program introduces new ways of awarding federal grants that simultaneously accelerate clean energy improvements and build America's skilled energy workforce.

FUTURE IMPACTS

MESC's rapid impact on the nation's domestic energy landscape has just begun.

This past year alone, MESC enabled:

- $2.4 billion in manufacturing investments
- Over $60 million in workforce investments
- Almost $3 in private and state investments for every $1 of its own manufacturing funding

In creating more than 10,000 high-quality jobs and providing more than $5 billion in funding, MESC is shaping the foundation for a more equitable, sustainable, and resilient energy future for the nation. MESC is building on these milestones for even greater successes, helping ensure the strong supply chain foundation America's energy system needs to power the economy for decades to come.

In 2024, MESC will deploy nearly $20 billion of capital to create more jobs, larger investments in disadvantaged communities, and more secure clean energy supply chains. Through cutting-edge analyses that guide these transformative manufacturing investments and target its workforce development funding, MESC is maximizing the impact of every dollar it spends to help assure long-lasting energy security and the success of the nation's clean, equitable energy transition. See how MESC is investing in America's energy future: **www.energy.gov/mesc**.

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