



U.S. DEPARTMENT
of **ENERGY**

Office of Critical Minerals
and Energy Innovation

Thermal Energy Storage Testbed (TESbed)

Rebecca Mitchell, Industrial Technologies Office, DOE

Thermomechanical Chemical Energy Storage (TMCES)
Workshop, July 28-29, 2026

ITO's Mission

The U.S. Department of Energy's Industrial Technologies Office (ITO) accelerates the innovation and adoption of cost-effective technologies that position American industry to lead on the competitive stage in evolving domestic and global markets.

Priorities

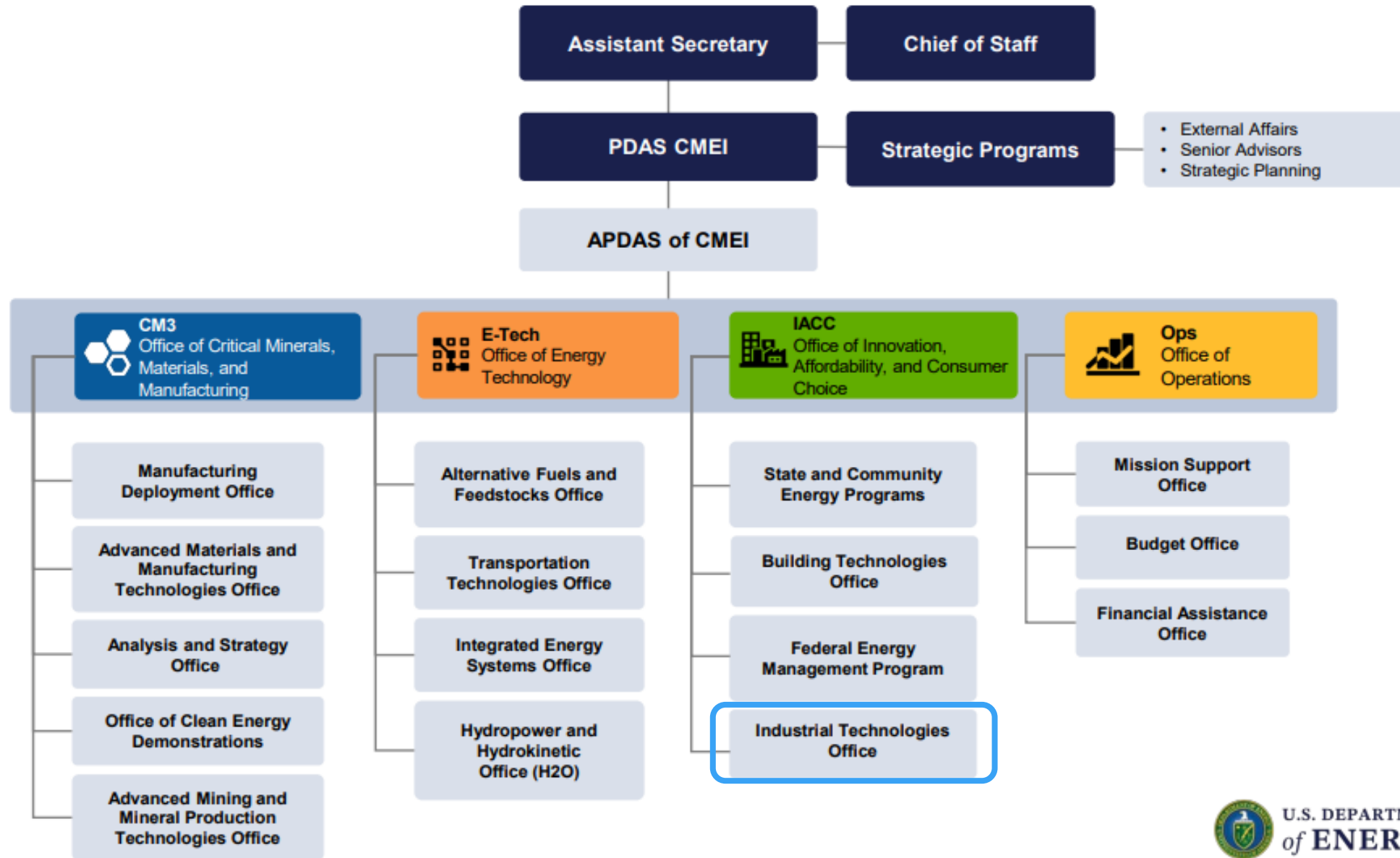
Strengthen the global competitiveness of the U.S. industrial sector by reducing costs and improving product value

Improve the reliability and security of American energy infrastructure by increasing the flexibility and responsiveness of industrial sector demand

Enable energy abundance and industrial growth by reducing the energy intensity of industrial processes and facilities

Secure American supply chains through technical innovation to onshore industrial excellence and ensure domestic availability of critical products

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US industry uses 27% of total national energy



CONTRIBUTES
\$4.8 trillion to the U.S. economy annually ¹

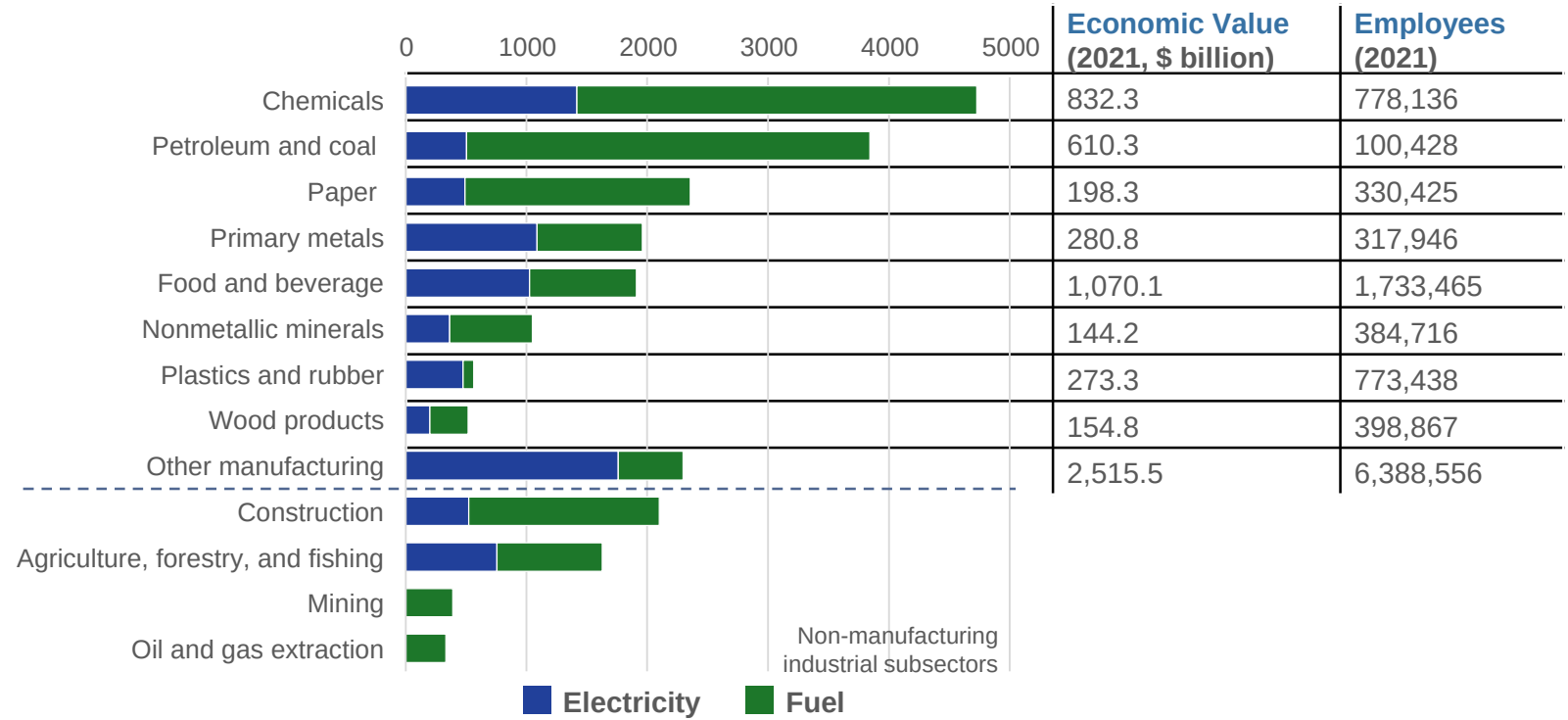


CREATES
21.6 million jobs ²



BOLSTERS
U.S. competitiveness in global markets

U.S. PRIMARY ENERGY CONSUMPTION, 2018



Energy data compiled from multiple EIA sources including [Monthly Energy Review](#) and [Manufacturing Energy Consumption Survey](#); economic value and employee data from U.S. Census Bureau [Annual Survey of Manufactures](#), values for 2021.

Sources:
¹ Data for 2024 from Bureau of Economic Analysis Industry Economic Accounts Data, [Value Added by Industry](#) (sum of agriculture, forestry, fishing, and hunting; mining; construction; and manufacturing). Accessed October 2025.
² Data for May 2024 from U.S. Bureau of Labor Statistics, [Occupational Employment and Wage Statistics](#) [sum of NAICS sectors 11 (agriculture), 21 (mining), 23 (construction), and 31-33 (manufacturing)].
³ National Association of Manufacturers. [Facts About Manufacturing](#).

ITO program structure

Energy Intensive Industries



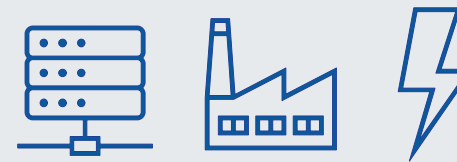
Cross-Sector Technologies



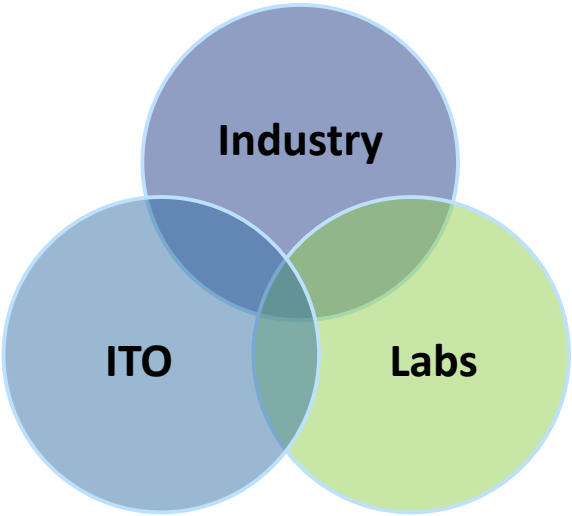
Technical Partnerships and Commercialization



Data Centers & Large Load Energy Systems Integration



ITO Lab Call



Lab Call Objectives	ITO Strategic Goals
1. Convene private-sector stakeholders, including technology developers, end-users, and trade groups	1. Unlock private capital and follow-on funding
2. Provide expedited, cost-effective access for industry and small businesses	2. Accelerate business formation and growth
3. Create tools and resources for industrial sites and workforce training	3. Create jobs in future-focused industries
4. Active participation of industry as partners, advisors, and users	4. Strengthen U.S. key sector competitiveness

16 Projects with a multi-year funding commitment of **\$155 million** to expand lab capabilities that will drive process and technological innovation, reduce costs, and increase prosperity for American workers and consumers.

ITO Lab Call Selections

7 Energy-Intensive Industry Projects

<i>Oak Ridge National Laboratory</i>	Center of Excellence for the Advancement and Acceleration of Cement and Concrete Engineering Technologies (ACCENT)
<i>Lawrence Berkeley National Laboratory</i>	The Food & Beverage Operational Optimization and Deployment Center (FOOD Center)
<i>Lawrence Livermore National Laboratory</i>	Solutions Center for Commercial Advancement of Large-scale Electrochemistry
<i>Pacific Northwest National Laboratory</i>	Advancing U.S. Chemical Production: Catalytic Reactor Technology Innovation
<i>Oak Ridge National Laboratory</i>	Center for Research and Advancement of Forest Product Technologies
<i>Idaho National Laboratory</i>	National Library for Iron Ore and Scrap
<i>National Laboratory of the Rockies</i>	Incubator for Critical Steel Technologies: Tramp Element Removal Innovation (TERI)

9 Cross Sector Technologies Projects

<i>Oak Ridge National Laboratory</i>	Magnetic-Electric Generation for Novel Energy Transformative Systems Center of Excellence (MAGNETS)
<i>Oak Ridge National Laboratory</i>	Thermal Energy Recovery and Management (ThERM) Center
<i>National Energy Technology Laboratory</i>	Burner Laboratories to Advance Fuel Utilization for Thermal Energy (BLAZE)
<i>National Laboratory of the Rockies</i>	Membrane Engineering for Manufacturing, Benchmarking, Research, Analysis, and Next-gen Evaluation (MEMBRANE) Center
<i>Sandia National Laboratories</i>	Thermal Energy Storage Testbed (TESBed)
<i>Lawrence Berkeley National Laboratory</i>	Resource-secure Energy Flexibility (REFLEX): Powering a competitive future for U.S. Industry
<i>Lawrence Livermore National Laboratory</i>	Center for Industrial Modeling and Simulation (CIMS)
<i>Lawrence Berkeley National Laboratory</i>	Data Center Cooling Collaborative (DC COOL)
<i>Idaho National Laboratory</i>	Testbed for Industrial and Manufacturing Users of Power and Heat (TRIUMPH)

Thermal Energy Storage Test Bed (TESbed)

A next-generation facility to allow long-term testing and demonstration of thermal energy storage technologies at industrially-relevant scales and temperatures.

Lead: Sandia National Laboratories (SNL)

Partners: National Laboratory of the Rockies (NLR), Electric Power Research Institute (EPRI)

Award Size: \$15,000,000



Why a test center for Thermal Energy Storage?

American industry needs reliable energy in the face of increasing load demand and energy resource supply chain fluctuations. Thermal Energy Storage can provide **long-term reliability** and **balance energy supply and demand** but is an emerging technology solution without clear **industrial use cases** or standards for **testing and demonstration**.

The **Thermal Energy Storage Testbed (TESBed)** facility will demonstrate the safety, reliability, and controllability of hybrid TES–electric–gas systems and accelerate adoption across American industries to provide energy cost savings and stability.

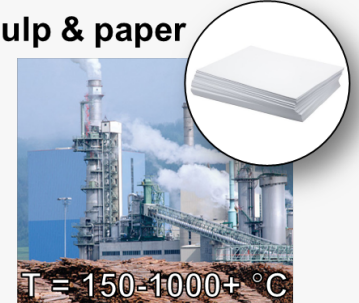
Cement



Iron & steel



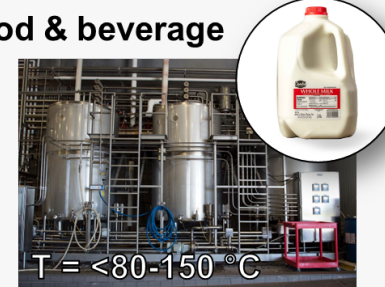
Pulp & paper



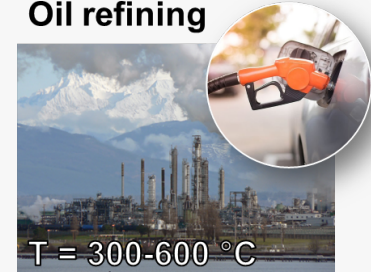
Chemicals



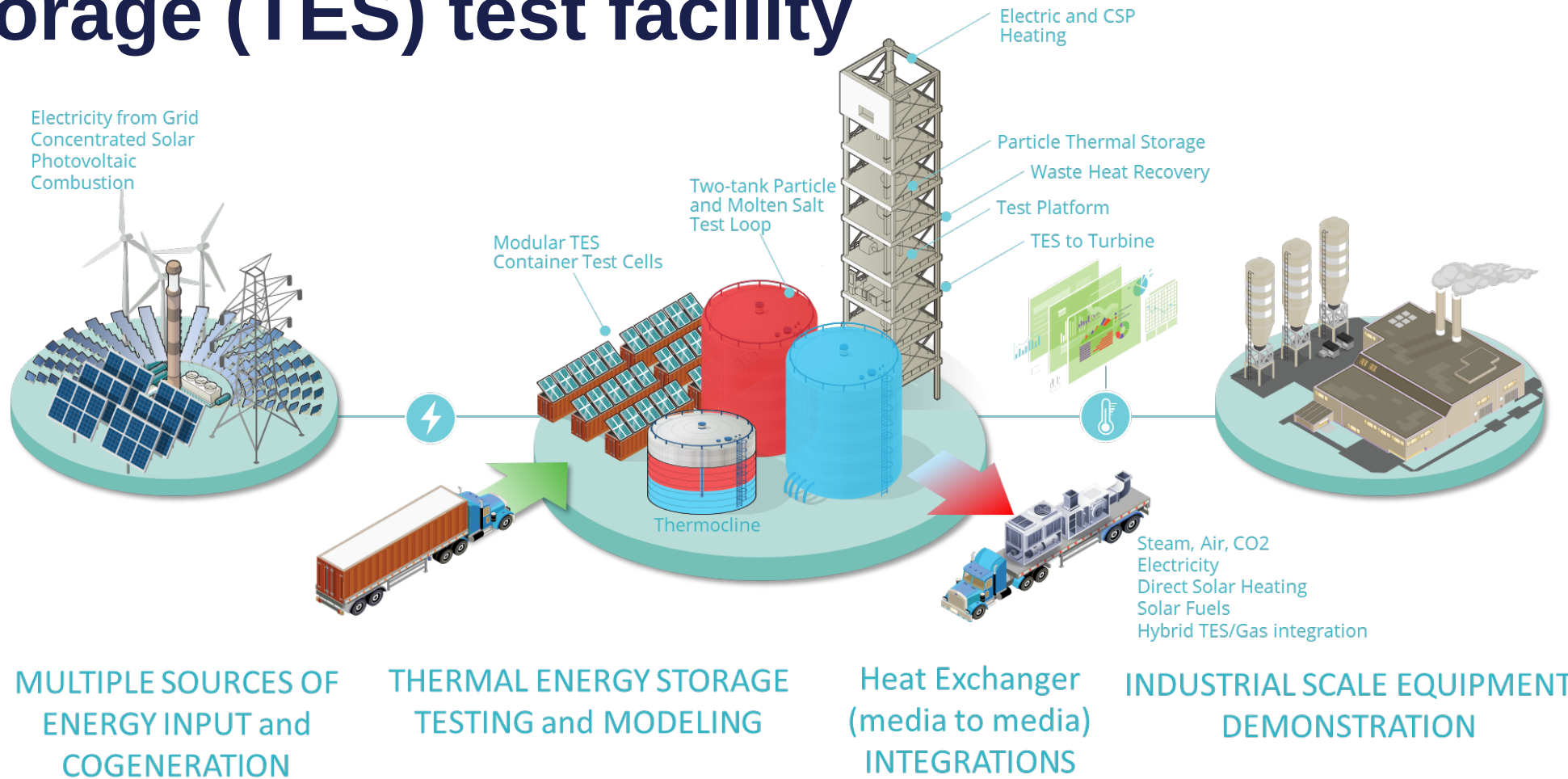
Food & beverage



Oil refining



TESbed is a next-generation thermal energy storage (TES) test facility



TESbed Objectives



Validate performance



Foster a diverse team to address the complexities of industry



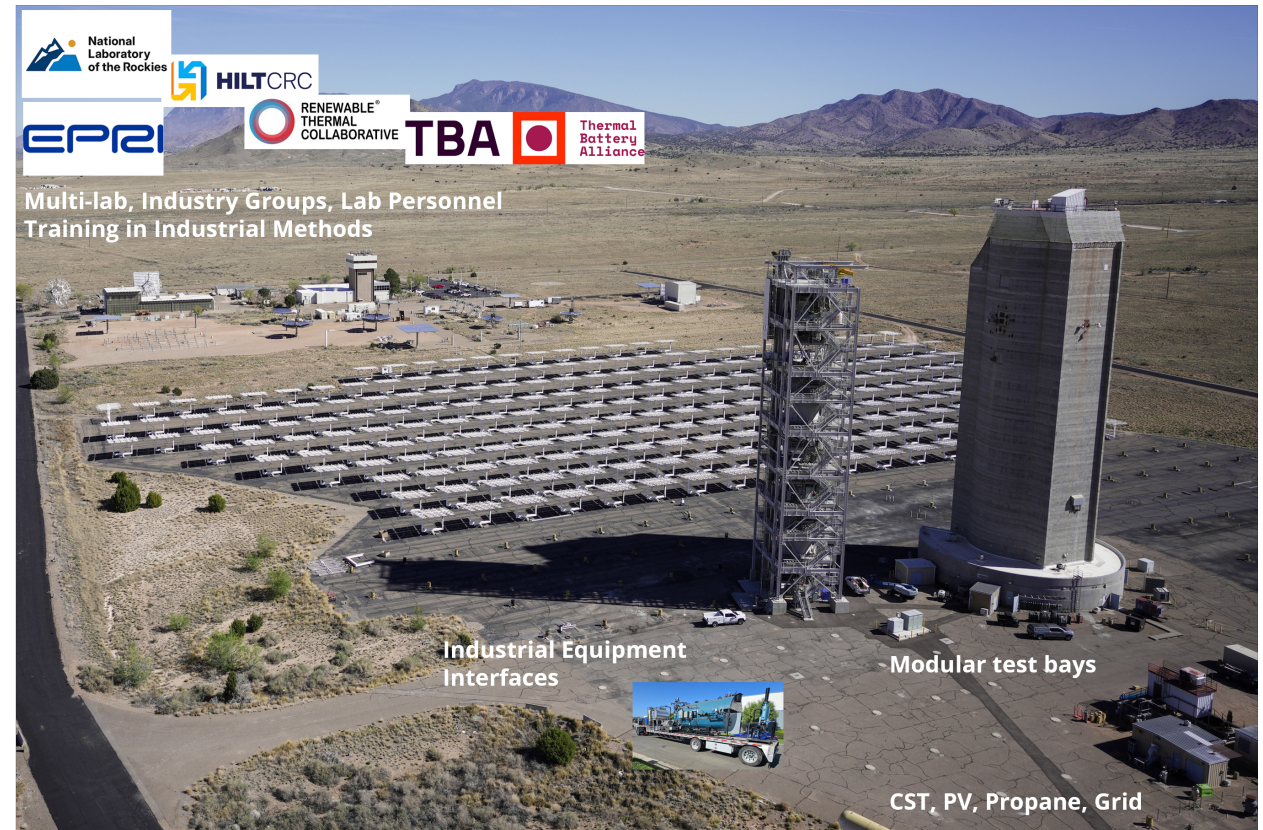
Test standards for regulatory compliance



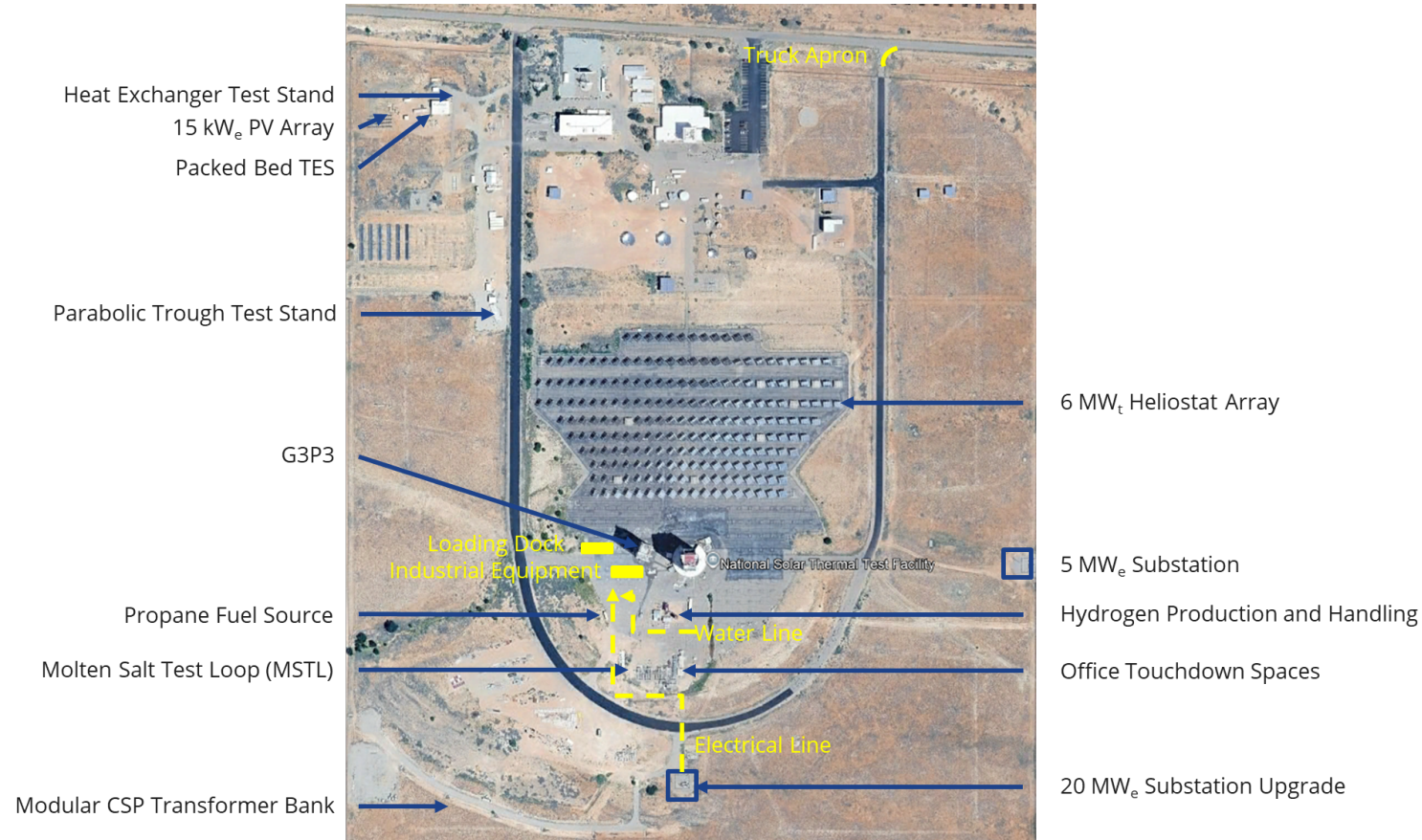
Identify technical, operational, and safety issues



Test, verify, and improve



The TESbed Facility at the National Solar Thermal Test Facility (NSTTF)



TESbed Capabilities and Partners



Computational Modeling



Physical Test Bed



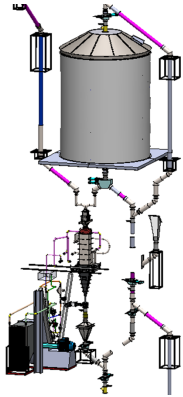
Testing standards and industry engagement



TESbed Development Timeline

Year 1

Industry Outreach & Design



- Form Technology Advisory Groups
- Extensive stakeholder engagement to inform TESBed design
- Complete FEED studies
- Complete Design & Multi-Criteria Design Analysis

Year 2

Procurement & Construction



- Procurement and construction for electric, gas, water, and equipment upgrades
- Installation of equipment & instrumentation

Year 3

TESbed Fully Ready for Users



- Facilities commission with first user
- Transition to sustained operations

Questions for Industry

From industrial heat users, TES developers, and researchers, we want to learn:

- What problem are you trying to solve related to heat, energy, reliability or cost?
- What does your current system look like today, and where does it struggle or create friction?
- What solutions or technologies (TES or otherwise) have you already evaluated, tested, or ruled out?
- What part of this problem has been hardest to de-risk so far?

Get in Touch With Us



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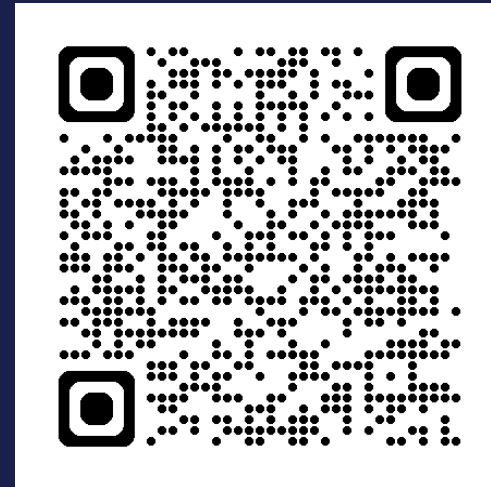
ITO Is Hiring Fellows

Join ITO as an ORISE Science, Technology, and Policy Fellow to contribute to research and development, technical assistance, commercialization, workforce development, and strategic analysis to advance industrial technologies.

ITO will assess applications on a rolling basis through **October 2026**.

Who can apply: US citizens with a bachelor's, master's, or doctoral degree in engineering, natural sciences, economics, public policy, or related field, received within the last 5 years.

Apply here:



Questions?

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