



Electrified Processes for Industrial eXcellence

EPIX – the U.S. Department of Energy's seventh Energy Manufacturing Innovation Institute – is a public-private partnership aimed at securing U.S. manufacturing competitiveness in a global economy by improving energy efficiency and utilizing the abundantly available energy resources in the U.S.

The institute will develop the technologies and workforce required to deploy efficient and cost competitive solutions for process heating.

EPIXC.org

The industrial sector accounts for more than 30% of the nation's primary energy use. Process heating – the application of thermal energy to convert feedstock into interim and finished products – accounts for 63% of all energy use in manufacturing, according to the U.S. Department of Energy.

Vision

Our vision is that U.S. energy intensive industries can have the lowest energy operating costs in the world.

Mission

Our mission is to develop and scale innovative electric and hybrid heating concepts for advanced manufacturing to improve production flexibility, enhance the energy efficiency and reduce emissions.

EPIXC will provide cost-effective and scalable solutions through research, development, education and workforce development programs. These solutions will enhance the competitiveness of energy intensive U.S. industries.

Focus sectors

Industrial partners in critical support sectors – including equipment suppliers, simulation software developers, and engineering, procurement and construction

companies – have committed to EPIXC. They aim to contribute to the research, development, demonstration and deployment and adoption of electrified process heating technologies.

Headquartered at Arizona State University and with the National Renewable Energy Laboratory, the Idaho National Laboratory and the National Energy Technology Laboratory engaged as lab partners and we have secured the participation of key industry-university consortia. Each consortium has broad participation from industrial stakeholders and runs established, industry-relevant test beds.

Core Team

- Arizona State University
- Idaho National Laboratory
- Missouri University of Science and Technology
- National Energy Technology Laboratory
- National Renewable Energy Laboratory
- Navajo Technical University
- North Carolina State University
- Stanford University
- Texas A&M University
- Tuskegee University
- University of Texas at Austin

Technology challenges

will span multiple time and space scales. At the systems level, all forms of energy will be considered. This includes renewable sources such as geothermal and hydro-electric power, nuclear energy alongside natural gas. This presents a challenge as industry requires low cost energy levels to be available at any given time and location.

Large-scale energy storage may be required to supply the necessary operational energy to industrial customers. Longer term, electrified heating may require novel, highly flexible process designs that can respond reliably to such fluctuations by altering their operating levels and production rates.

At the process unit level, nascent electric pathways for heat delivery, such as radiation, induction, plasma, resistance and microwave, require careful validation and scalability. Electric heating must be as productive as combustion heating for many applications such as drying, melting and chemical reactions.

It is important that products exhibit similar or improved quality and performance compared to those made by conventional fossil fuel-based processes. In many cases, electric heating pathways could revolutionize product quality and production economics.

EPIXC membership

- **Bronze at \$15,000 per year**
- **Silver at \$50,000 per year**
- **Gold at \$200,000 per year**

All members can respond to request for proposal and workforce development opportunities issued by EPIXC. Silver and Gold tiers offer increased access to intellectual property and institute governance. Gold-level members have priority access to the institute's unique test beds for electrification technologies.

Workforce and education

Overcoming technical challenges and implementing relevant solutions underscores a critical need to train and recruit the future manufacturing and installation workforce.

These workers will install, operate and maintain next generation electric heating technologies. They will also need to understand the power grid integration issues posed by increases in power demand and high levels of variable renewable generation.

The new workforce will require interdisciplinary training, wherein expertise in electrified heating technologies is supported by knowledge of power systems and manufacturing processes in industries of high economic and environmental impact.

EPIXC is a unique ecosystem for transforming industrial heating complemented by transformative education and workforce development.

EPIXC will be comprehensive, aiming to integrate research for doctoral and master's degree students and experiential learning opportunities for undergraduate and associate degree seeking students and continuing education learners.

Partnership

The EPIXC innovation ecosystem offers industry and other key stakeholder constituency members affordable opportunities to participate actively and derive commensurate benefits.

EPIXC offers industry partners a clear path to derisking electrified heating technology while reducing emissions.

The institute also offers industry members flexibility in energy usage, potential new product lines and a platform for training current and new employees. EPIXC provides unique test beds in chemical processing, iron and steel, paper and pulp, and cement to evaluate electric heating technologies at scale.

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