

Energy Earthshots – U.S. Department of Energy Industrial Heat Shot™

Overview

The U.S. Department of Energy's (DOE's) Energy Earthshots™ Initiative aims to accelerate breakthroughs of more abundant, affordable and reliable clean energy and climate solutions within the decade.

Achieving the Energy Earthshots™ will help America tackle the toughest remaining barriers to addressing the climate crisis and reach the U.S. Government's goal of net-zero carbon emissions by 2050 while creating good-paying jobs and growing the economy.

The Opportunity

In an effort to drastically reduce emissions from the energy-intensive process of industrial heating, DOE launched the Industrial Heat Shot™, a Department-wide initiative to develop cost-competitive industrial heat decarbonization technologies with at least 85% lower greenhouse gas emissions by 2035. This achievement would put the American industrial sector on course to reduce its carbon-equivalent emissions by 575 million metric tons by 2050, which is roughly equal to the emissions generated by all passenger cars on the road in 2020.

Industrial heating refers to the many methods by which heat is used to transform materials into useful products. Heat is used to remove moisture, separate chemicals, create steam, treat metals, melt plastics, and much more. Industrial heating accounts for about 9% of the entire U.S. emissions footprint.

In 2020, the industrial sector accounted for 33% of the nation's primary energy use and 30% of energy-related carbon dioxide emissions. The industrial sector is uniquely

difficult to decarbonize, due in part to the variety of energy sources powering its vast array of industrial processes and operations.

Impact

Successful implementation of the Industrial Heat Shot™ will position the United States as a world leader in the development of low-carbon products, massively reduce the American carbon footprint, deliver cost savings to American companies through improved energy efficiency, and provide energy security by reducing exposure to volatile energy markets. The Industrial Heat Shot™ will also deliver environmental and energy justice. Reducing air pollution associated with burning fossil fuels will improve the health of communities living in proximity to manufacturing facilities. Improving the efficiency of industrial processes allows for more specialized manufacturing on different scales, which in turn allows smaller factories to thrive. This dynamic creates job opportunities, stimulates competition, and revitalizes local economies that have been affected by factory closures.

Goal: The Industrial Heat Shot™ is a Department-wide initiative to develop cost-competitive industrial heat decarbonization technologies with at least 85% lower greenhouse gas emissions by 2035.



85% Reduction



2035

DOE has identified three key methods to decarbonize industrial heat and achieve the target:



ELECTRIFICATION
of heating operations



**INTEGRATION OF
LOW-EMISSIONS HEAT
SOURCES** (such as geothermal
energy, concentrated solar power,
or nuclear energy)



INNOVATIVE
low- or no-heat process
technologies

Alignment of Resources

Resources for the Industrial Heat Shot™ come primarily from current and planned appropriations for DOE's Office of the Undersecretary for Science and Innovation. Portions of the \$500 million Bipartisan Infrastructure Law provision 41008 (Industrial Emissions Demonstrations) provide additional support, as well as funding for the Office of Clean Energy Demonstrations through the Inflation Reduction Act. DOE will continue to partner with other Federal Agencies such as the National Science Foundation to advance the state of the art for manufacturing and develop the workforce needed to support the clean energy transition.

Work in the Industrial Heat Shot™ builds on the estimated ~\$300 million in FY22 and ~\$385 million requested in FY23, distributed across multiple DOE Offices. Pending appropriations, DOE anticipates funding opportunities and other activities to help advance progress toward meeting the Industrial Heat Shot™ target, which supports the overarching strategy detailed in DOE's Industrial Decarbonization Roadmap ([Energy.gov/eere/doe-industrial-decarbonization-roadmap](https://www.energy.gov/eere/doe-industrial-decarbonization-roadmap)).