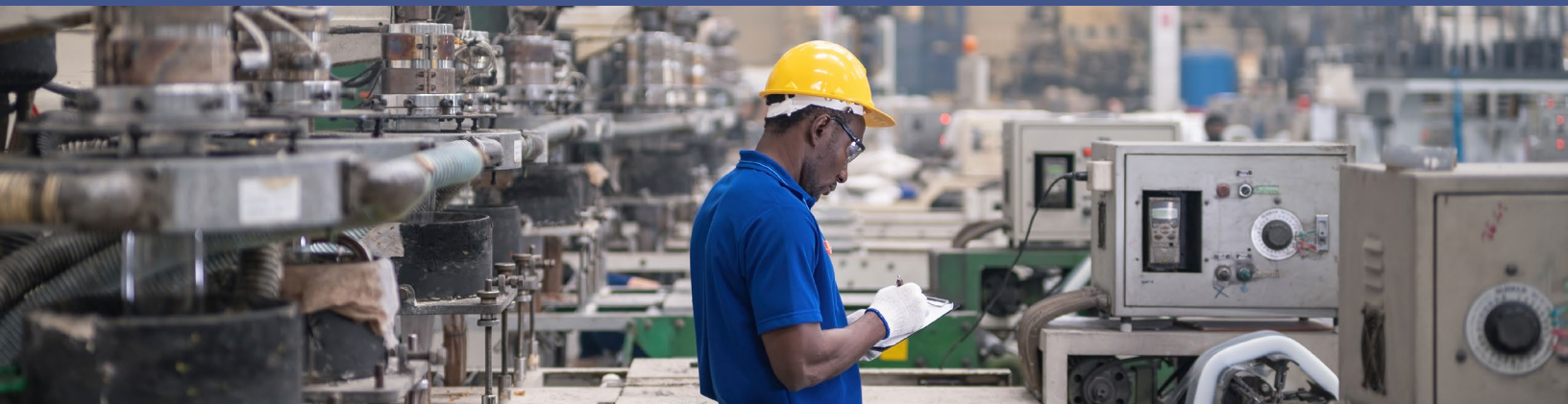


Clean Heating & Cooling Solutions

Heat Pumps for the Industrial Sector



Industrial Heat Pumps: An Efficient Technology for Specialized Industrial Sectors

Nearly all industrial sectors are looking for ways to increase efficiency and reduce costs. Industrial heat pumps (IHPs) are an energy-efficient, advancing technology that may be the right solution. IHPs reduce energy use associated with process heat while supporting corporate sustainability goals. The American Council for an Energy-Efficient Economy (ACEEE), a nonprofit research organization, showed that IHPs can save up to 32% of the source energy for process heat generation; in key industries like food, chemicals, and pulp and paper, ACEEE found IHPs could save the energy equivalent to powering 1.3 million homes and CO₂ emissions equivalent to that of 2.7 million passenger cars.¹

What Are Industrial Heat Pumps?

IHPs are electrically powered active heat recovery systems. By increasing the temperature of waste heat and transferring it, they replace the purchased energy that drives heat-intensive processes.

How Do Industrial Heat Pumps Work?

IHPs operate on basic refrigeration principles; instead of generating heat, they compress it and transfer it from one place to another. An IHP requires an external energy source — either electrical or mechanical — to drive it. The goal is to design an IHP system in which the benefits of reusing waste heat exceed the cost to run the heat pump. IHPs typically transfer two to three times more process heat than the energy required to drive them (this ratio is referred to as the coefficient of performance, or COP), meaning they often outperform even efficient fossil-fuel fired boilers.

Benefits of Industrial Heat Pumps

- Economic viability increasing with payback of under two years in many applications.
- Can remove bottlenecks in processes to increase production at low costs.
- Potential to simultaneously meet process cooling needs.
- Can be sized to match process thermal needs to minimize capital and operating costs
- Save water and other costs by avoiding the need to send waste heat to cooling towers.
- Enable other decarbonization measures and technologies, including thermal storage.
- Operate in conjunction with other transformative technologies and fuels, such as hydrogen and renewable natural gas.
- Eliminate the need for natural gas and/or steam infrastructure at new greenfield facilities that are looking to be powered by 100% carbon free electricity
- In key industrial sectors, reduce the energy use associated with process heat by up to one third and enable CO₂ savings of between 30–43 million tons per year.

¹Rightor, E., P. Scheihing, A. Hoffmeister, and R. Papar. 2022. *Industrial Heat Pumps: Electrifying Industry's Process Heat Supply*. Washington, DC: American Council for an Energy-Efficient Economy. [aceee.org/research-report/ie2201](https://www.aceee.org/research-report/ie2201).



NYS Clean Heat

IHPs reduce operating costs including those associated with boiler fossil fuel and maintenance costs, steam system maintenance, flue gas losses, water use, and commitment of physical space. IHPs do require upfront capital investment and carry risks associated with implementing technologies with limited market commercialization in place. Federal and state-based incentives can help reduce these barriers by allowing IHP manufacturers and end-use customers to access funds together, achieving emissions reductions and long-term cost savings associated with IHP implementations.

Federal Tax Credits and Incentives

Congress has provided the federal agencies with tax credit and co-funding opportunities that industrial customers may be able to pursue to reduce financial risks of implementations. Note that Federal funding vehicles are typically not additive; please see program rules per issuing entity.

- The Inflation Reduction Act (IRA) expanded 48C customer tax credits that will provide \$10 billion in tax credits for specified clean energy projects, including projects installing IHPs, up to 30% of amount invested. The IRS issued 48C program [guidance](#) in February. IRA funded programs are just starting to be announced, so check DOE's [website](#) for program announcements.
- DOE's Manufacturing and Energy Supply Chain (MESCC) office:
 - [Industrial Research and Assessment Center \(IAC\) Implementation Grants](#) will award funds to manufacturers that are looking to equip new facilities or retrofit existing ones with energy saving measures — including IHPs — recommended by IACs or the new onsite Technical Assistance Partnerships
- DOE's Industrial Efficiency and Decarbonization Office (IEDO):
 - Expanded [Technical Assistance Partnerships \(TAPs\) program](#) that includes IHPs.
 - Currently unprogrammed (upcoming) funding for demonstrations
- IHPs are eligible for USDA Rural Energy for America ([REAP](#)) grants and loans, and through rural utility programs accessing Rural Energy Savings Program ([RESP](#)) loans.

New York State and Utility Incentives

- [NYSERDA's C&I Carbon Challenge](#) is a competitive program that provides funding to large commercial and industrial energy users in New York State, including manufacturers, to implement clean energy projects that reduce carbon emissions.
- [NYSERDA's C&I Accelerated Efficiency](#) is a competitive program that provides funding to large commercial and industrial energy users in New York State, including manufacturers, to implement energy efficiency or beneficial electrification projects that reduce net MMBtu and carbon emissions.
- NYSEDA's cost shared technical assistance program, [FlexTech](#), provides cost-share for energy studies, including energy/thermal pinch analysis for IHP projects.
- [NYS Clean Heating and Cooling incentives](#), including utility custom energy efficiency programs

Ready to get started?

Visit nyserdera.ny.gov/flextech to learn how our consultants can help to determine if a heat pump is right for your facility.

