# Electrification of Industrial Heat – Opportunities for Renewables

## Workshop

**17th December 2024**
**9:00 – 12:00 CET**
**16:00 – 19:00 CST**

**Virtual**

Draft agenda

International Energy Agency

## Context

The industrial sector accounts for about a quarter of global $CO_2$ emissions, with China responsible for nearly half of these while India, EU28 and the United States contribute an additional quarter of emissions. Slashing $CO_2$ emissions in industry is a necessary condition to achieving net zero emissions globally by mid-century. Previous IEA work on industry decarbonisation has focused especially on steel and cement, where substantial technological breakthroughs and sustained policy support are necessary to achieve significant emissions reductions. At the same time, a significant share of fossil fuels is used to provide low-temperature heat and steam across other industry sectors (e.g. textile, paper, food and beverages). Such energy needs could be supplied from renewable electricity using heat electrification technologies such as heat pumps and electric boilers that are largely commercially available and mature.

The cost of electricity generation from solar PV and wind has plummeted during the last decade and they are today among the cheapest technologies for investing in new electricity generation in most parts of the world. As a result, the cost of renewable heat has also been reduced. However, industrial users lack experience with variable renewables as they have generally relied on dispatchable energy sources. This variability can be buffered with thermal energy storage (TES), a potential key enabling technology to allow larger penetration of renewables in the industrial energy mix. TES can also be built from cheap materials – like water, sand, bricks and steel – with significantly lower costs compared to stationary electricity storage using chemical batteries.

The maturity and cost-competitiveness of such electro-TES (or ETES) systems that couple heat electrification with thermal energy storage vary according to the required temperature levels:

- Solutions for **low-temperature heat** are largely commercial up to 150°C based on highly efficient industrial-scale heat pumps and low-cost hot water storage systems.
- Solutions for **steam and high-temperature heat with storage** require new and innovative systems. Several companies are scaling up their solutions, and end-use experiences from industrial-scale applications are starting to build up.

## Workshop objectives

- Gather input and guidance for the upcoming IEA 2025 report on *Electrification of Industrial Heat – Opportunities for Renewables*.
- Inform about current industrial experiences in heat electrification and thermal energy storage (technologies, costs, policies).
- Discuss the role of innovation and identify technology barriers that need to be overcome to align industrial decarbonisation with the IEA NZE Scenario.
- Clarify the role of thermal energy storage in accelerating industrial heat electrification and its implications for the power system.
- Identify policy gaps and solutions to expand the role of renewables in the industrial energy mix including through ETES technologies.

## Draft Agenda

| **Workshop on Electrification of Industrial Heat – Opportunities for Renewables** | |
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| **9:00 – 9:10** | **Welcome and Opening Remarks** |
| **9:10 – 10:10** | **Session 1: Experiences in Electrification of Low-Temperature Industrial Heat**<br>This session aims to identify the main drivers and barriers to the adoption of industrial heat pumps in different industries and countries, particularly in Europe and China.<br>**Guided questions:**<br>1. *Which industries/countries are leading heat pump adoption in industry?*<br>2. *What economic and regulatory factors have proven effective in accelerating the deployment of industrial heat pumps?*<br>3. *What factors have hindered the adoption of industrial heat pumps?* |
| **10:10 – 10:15** | **Short break** |
| **10:15 – 11:15** | **Session 2: Beyond Heat Pumps: High-temperature heat electrification**<br>This session aims to cover recent innovations in high-temperature heat electrification in industry. It covers emerging technologies, including high-temperature thermal energy storage.<br>**Guided questions:**<br>1. *What are the emerging innovations in high-temperature heat electrification, including thermal energy storage?*<br>2. *Which techno-economic conditions must be met to accelerate their adoption by industries?*<br>3. *What is the additional heat decarbonisation potential that new high-temperature technologies enable?* |
| **11:15 – 11:20** | **Short break** |
| **11:20 – 11:50** | **Session 3: Policy requirements and implications to power systems**<br>This session aims to identify key policy requirements to accelerate the adoption of heat electrification solutions in industry. It also covers possible impacts on power systems and grids.<br>**Guided questions:**<br>1. *What are the key policies required to support heat decarbonisation in the industry?*<br>2. *Are there successful business models that can be adopted from other sectors?*<br>3. *What are the power system impacts of heat electrification and possible requirements for grid infrastructure?* |
| **11:50 – 12:00** | **Closing remarks and key takeaways** |