Technology Collaboration Programme
by IEA

Heat Pumping Technologies
Driving Transition Through Innovation

Research, Development, Demonstration, and Deployment of Heat Pumping Technologies

The HPT TCP is part of a network of autonomous collaborative partnerships focused on a wide range of energy technologies known as Technology Collaboration Programmes or TCPs. The TCPs are organized under the auspices of the International Energy Agency (IEA), but the TCPs are functionally and legally autonomous. Views, findings, and publications of the HPT TCP do not necessarily represent the views or policies of the IEA Secretariat or its individual member countries.

heatpumpingtechnologies.org

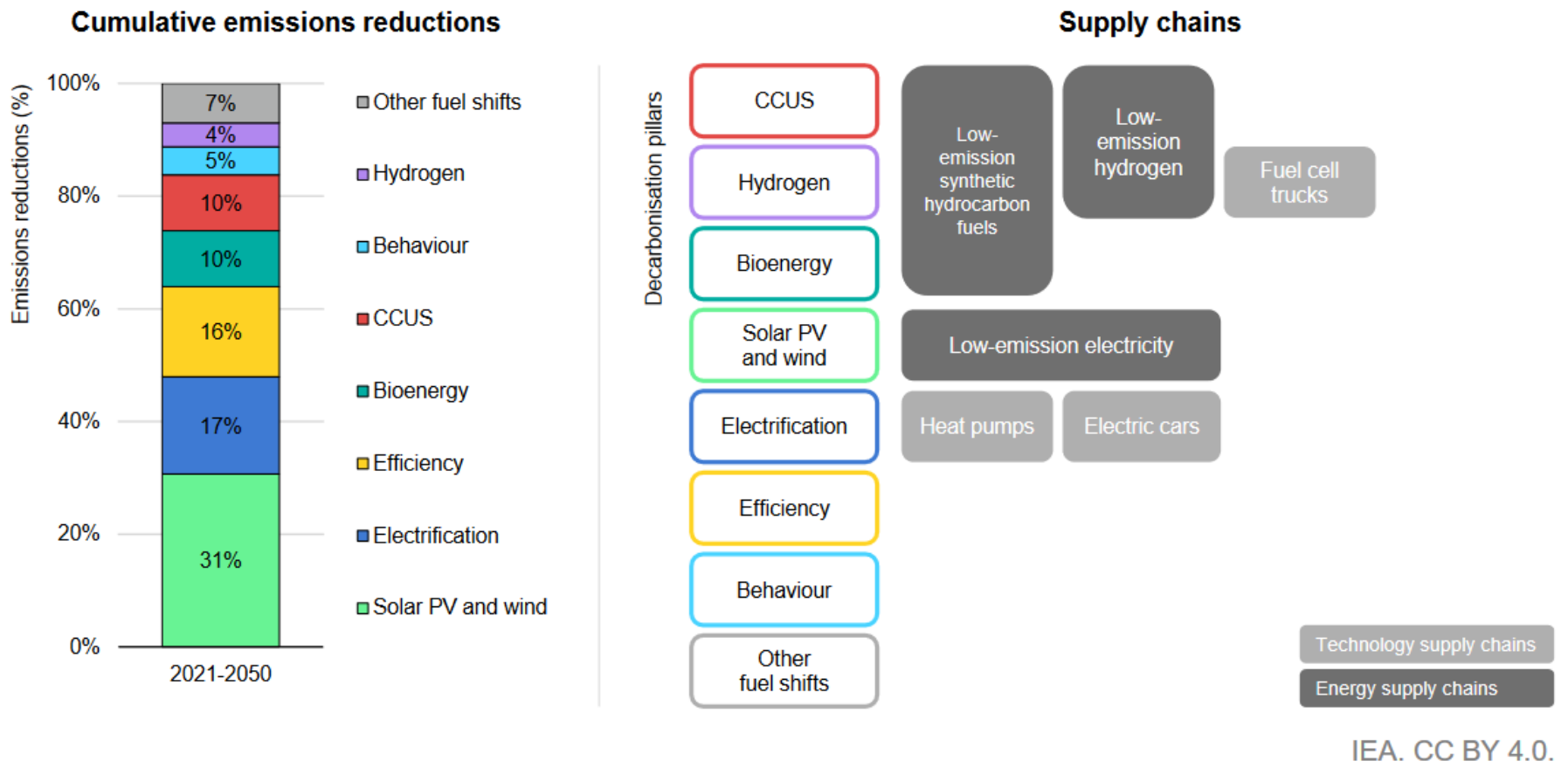
Heat pumps for hydrogen and carbon capture

A new project in IEA HPT

Veronika Wilk

27.10.2026, National Experts Meeting

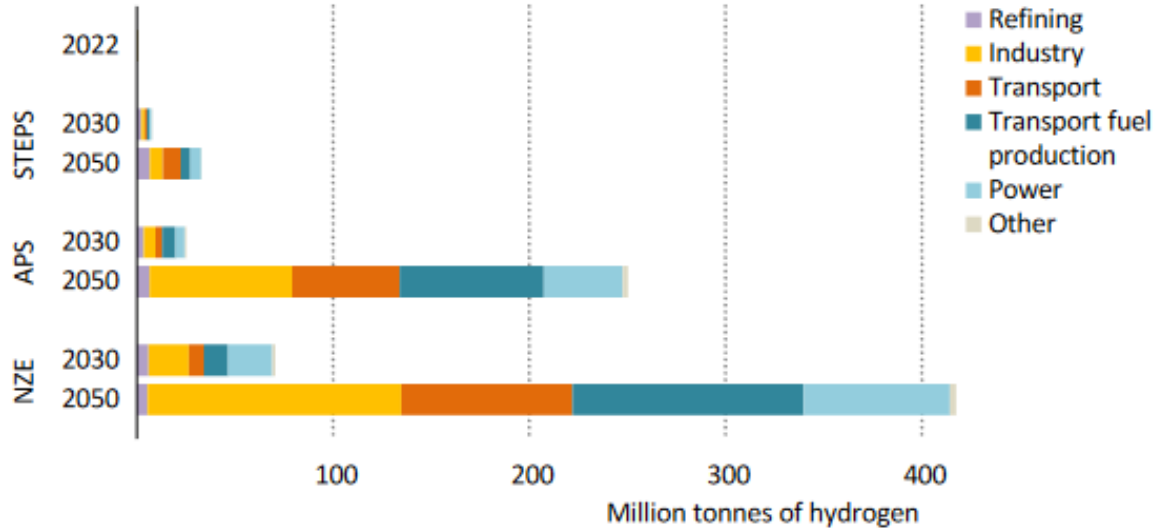
Net Zero by 2050 scenario: H_2 and CCUS



IEA Energy Technology Perspectives, 2023: Global cumulative energy sector CO_2 emission reduction by decarbonisation pillar and clean energy and technology supply chains studied in ETP-2023, 2021 - 2050

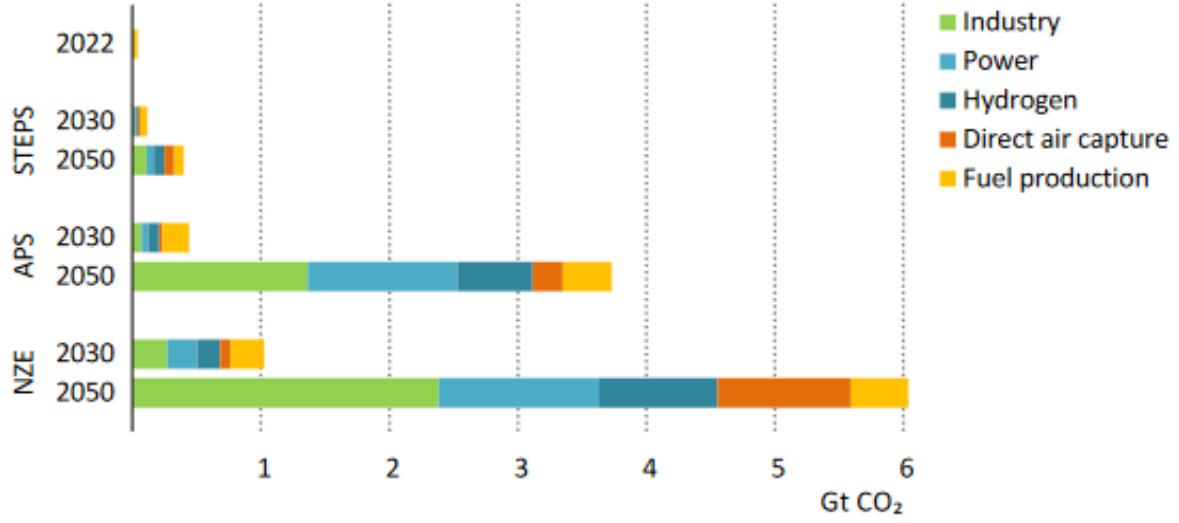
Expected growth until 2050

Figure 3.36 ▷ **Global hydrogen demand by sector and scenario, 2022-2050**



IEA. CC BY 4.0.

Figure 3.37 ▷ **Global CO_2 captured by source and scenario, 2022-2050**

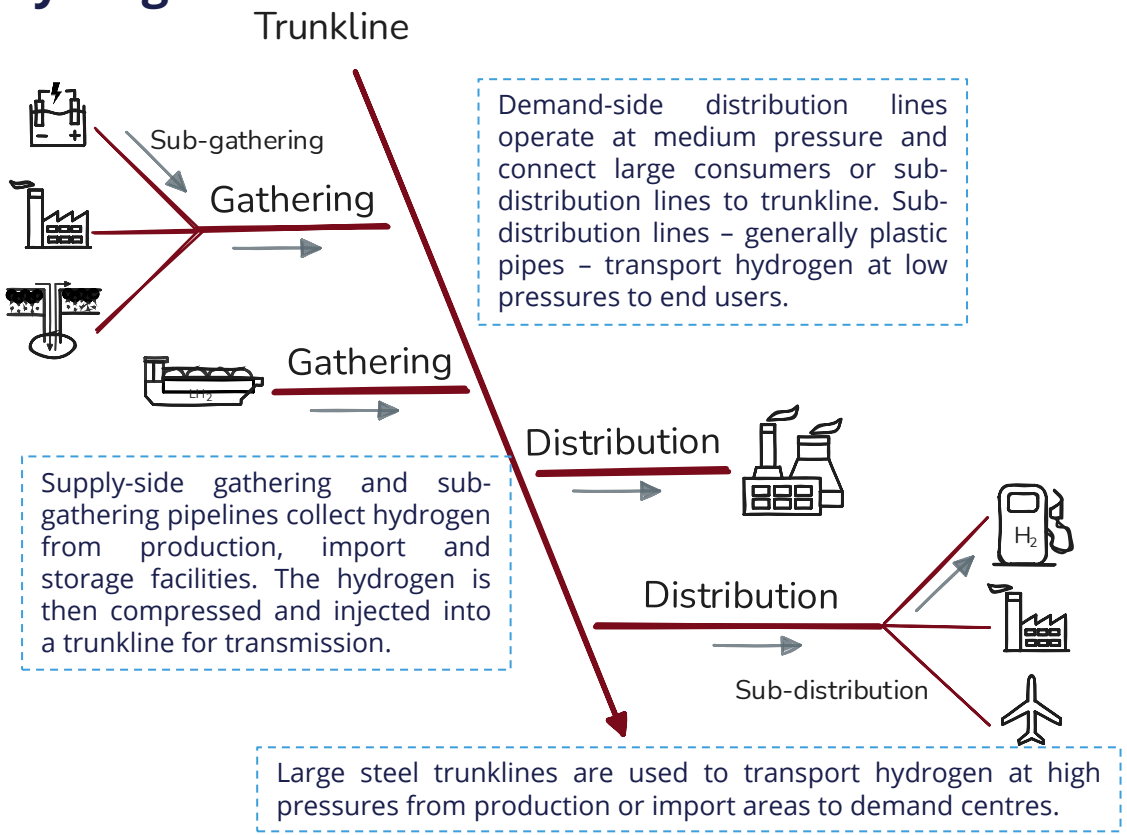


IEA. CC BY 4.0.

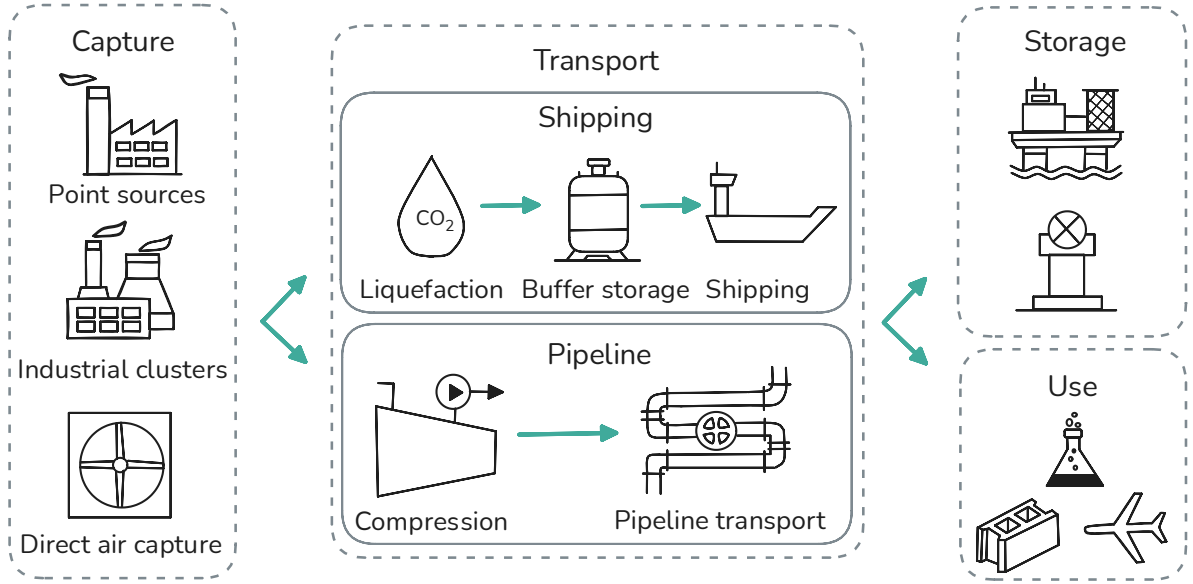
Global hydrogen demand and CO2 capture according to IEA's World Energy Outlook 2023.

Hydrogen and CO_2 infrastructure

Hydrogen



CO_2



IEA Energy Technology Perspectives, 2023 (adapted)

Heat pumps for hydrogen and carbon capture

- Heat integration for new infrastructure, new processes and plants
  - Hydrogen production by e.g. electrolysis
  - Carbon capture processes such as chemical absorption
  - Gas compression, cleaning and storage
- Increases overall efficiency
- Internal use vs. external heat customers

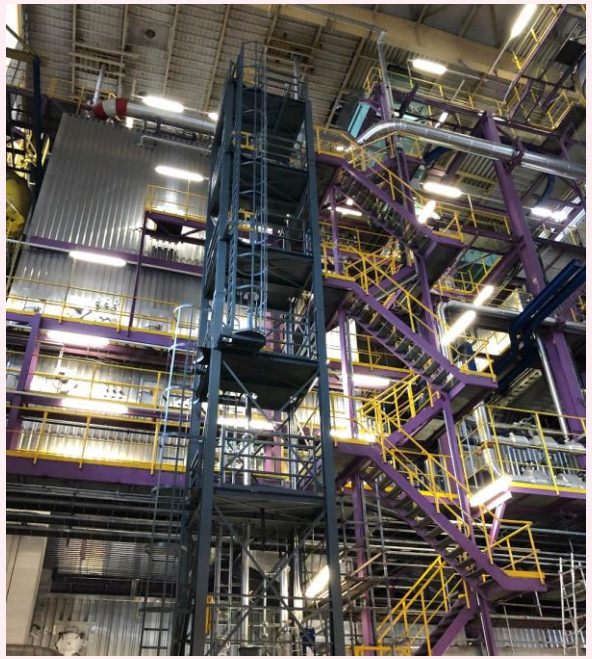
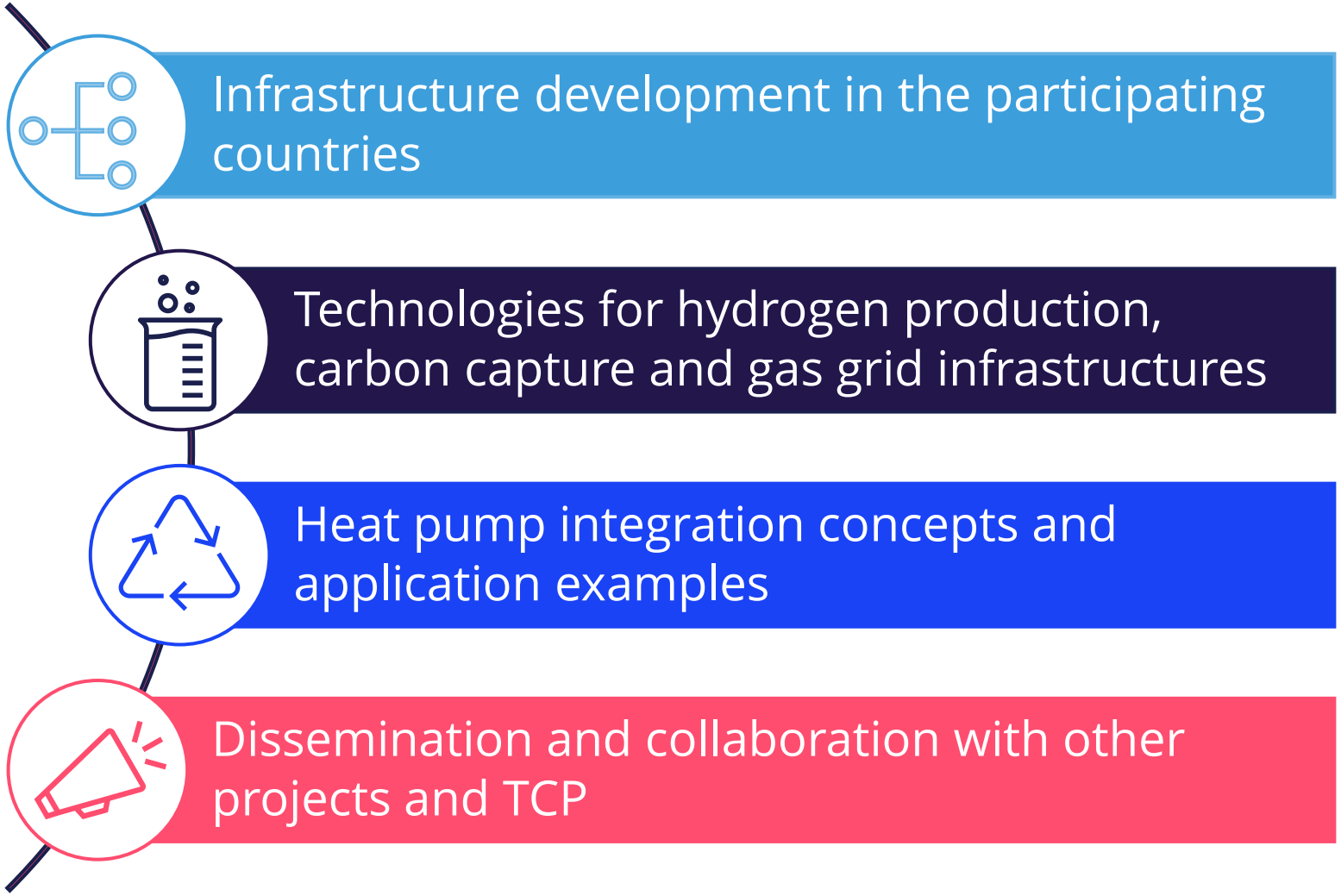


Photo: ANDRITZ

Objectives and scope of the new project

- The project aims to investigate heat integration with heat pumps in hydrogen and carbon capture processes and infrastructure.
- The project covers the most relevant technologies for hydrogen production, carbon capture and gas grid infrastructures, such as electrolysis, chemical absorption, gas compression and gas cleaning.
- The project is not restricted to specific industrial sectors, nor to high temperature heat pumps only.
- By combining hydrogen and carbon captures, synergies are created: both technologies have similar timelines for infrastructure development and roll out and lead to similar research questions.

Work plan


Infrastructure development in the participating countries
Technologies for hydrogen production, carbon capture and gas grid infrastructures
Heat pump integration concepts and application examples
Dissemination and collaboration with other projects and TCP

Workshop at 15th IEA Heat Pump Conference

Interactive group work with ca. 50 participants on

- Stakeholders
- Ongoing and planned H_2 and CO_2 projects
- Heat integration potentials

Project Management

Participants:

- Austria (project manager)
  - AIT
  - WIVA P&G
  - Technical University of Leoben
  - AEE INTEC
- Denmark
  - DTU
  - SDU

Timeline:

- Start in 07/2026
- Duration of 3 years

Project Fee:

- A project fee will be charged

The project is open for participation ☺

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