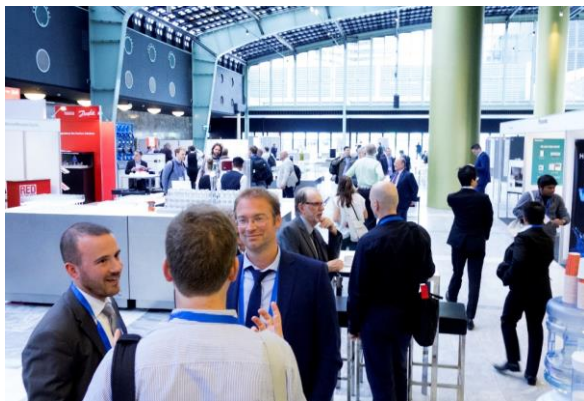


IEA Technology Collaboration Programme on Heat Pumping Technologies (HPT TCP)

How to benefit from global collaboration



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

About Heat Pumping Technologies TCP

A Technology Collaboration Programme (TCP) within the IEA since 1978

An international framework of **cooperation** and **networking**

A contributor to **technology improvements** by RDD&D projects

Collaboration & Communication
A forum to exchange of knowledge and experience



19 member countries

<p>61</p> <p>ANNUAL REPORT 2022 1 January 2022 - 31 December 2022</p> <p>Heat Pumps in Positive Energy Districts This report provides a comprehensive overview of the current state of the art in positive energy districts (PEDs) and their potential for decarbonizing urban areas. It includes a detailed analysis of the challenges and opportunities associated with PEDs and provides a roadmap for their development.</p> <p>DOWNLOAD SHARE</p>	<p>60</p> <p>ANNUAL REPORT 2021 1 January 2021 - 31 December 2021</p> <p>Retrofit Heat Pump Systems in Large Non-Residential Buildings This report provides a comprehensive overview of the current state of the art in retrofit heat pump systems in large non-residential buildings. It includes a detailed analysis of the challenges and opportunities associated with these systems and provides a roadmap for their development.</p> <p>DOWNLOAD SHARE</p>
<p>59</p> <p>ANNUAL REPORT 2020 1 January 2020 - 31 December 2020</p> <p>Heat Pumps for Drying This report provides a comprehensive overview of the current state of the art in heat pumps for drying. It includes a detailed analysis of the challenges and opportunities associated with these systems and provides a roadmap for their development.</p> <p>DOWNLOAD SHARE</p>	<p>58</p> <p>ANNUAL REPORT 2019 1 January 2019 - 31 December 2019</p> <p>High Temperature Heat Pumps This report provides a comprehensive overview of the current state of the art in high temperature heat pumps. It includes a detailed analysis of the challenges and opportunities associated with these systems and provides a roadmap for their development.</p> <p>DOWNLOAD SHARE</p>
<p>57</p> <p>ANNUAL REPORT 2018 1 January 2018 - 31 December 2018</p> <p>Flexibility by implementation of heat pumps in multi-energy systems and district networks This report provides a comprehensive overview of the current state of the art in the implementation of heat pumps in multi-energy systems and district networks. It includes a detailed analysis of the challenges and opportunities associated with these systems and provides a roadmap for their development.</p> <p>DOWNLOAD SHARE</p>	<p>56</p> <p>ANNUAL REPORT 2017 1 January 2017 - 31 December 2017</p> <p>Heat and Cold Storage for Heat Pumps This report provides a comprehensive overview of the current state of the art in heat and cold storage for heat pumps. It includes a detailed analysis of the challenges and opportunities associated with these systems and provides a roadmap for their development.</p> <p>DOWNLOAD SHARE</p>
<p>54</p> <p>ANNUAL REPORT 2016 1 January 2016 - 31 December 2016</p> <p>Heat pump systems with low Global Warming Potential (GWP) refrigerants This report provides a comprehensive overview of the current state of the art in heat pump systems with low global warming potential (GWP) refrigerants. It includes a detailed analysis of the challenges and opportunities associated with these systems and provides a roadmap for their development.</p> <p>DOWNLOAD SHARE</p>	<p>53</p> <p>ANNUAL REPORT 2015 1 January 2015 - 31 December 2015</p> <p>Advanced Cooling/Refrigeration Technologies Development This report provides a comprehensive overview of the current state of the art in advanced cooling/refrigeration technologies development. It includes a detailed analysis of the challenges and opportunities associated with these technologies and provides a roadmap for their development.</p> <p>DOWNLOAD SHARE</p>

ANNUAL REPORT 2020

Heat Pumping Technologies MAGAZINE

Affordable Heating & Cooling

Heat Pumps in Smart Grids

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14th IEA HEAT PUMP CONFERENCE

RENAISSANCE CHICAGO DOWNTOWN HOTEL
MAY 15-18, 2023 | CHICAGO, IL

The 13th International Energy Agency HEAT PUMP CONFERENCE

RAMADA PLAZA HOTEL JEJU, KOREA | APRIL 26-29, 2021

12th IEA HEAT PUMP CONFERENCE

2017 | ROTTERDAM

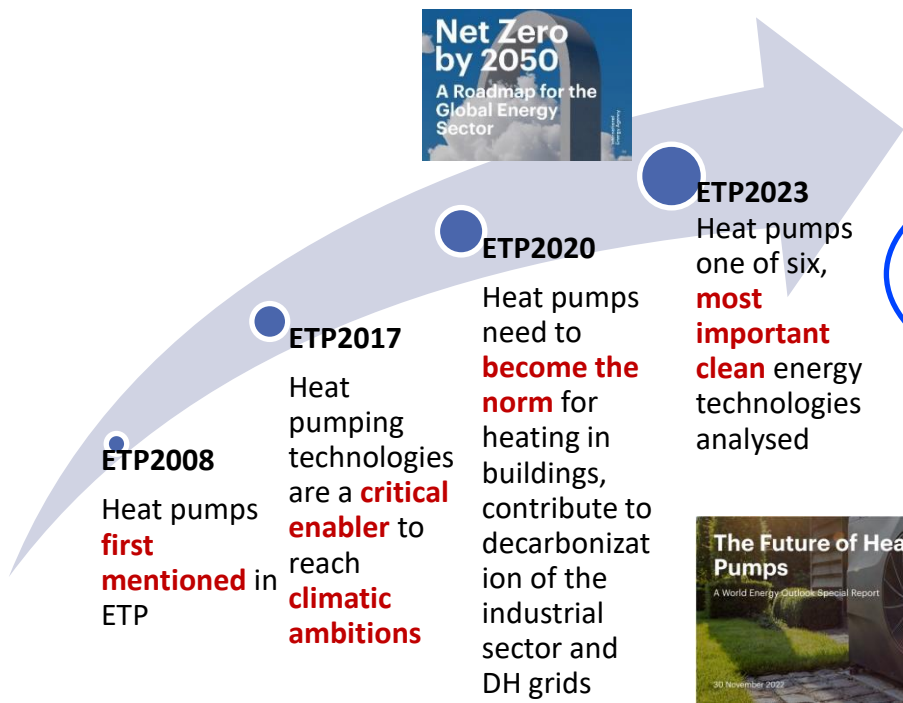


Opening session – 14th IEA HEAT PUMP Conference



Fatih Birol finalized his speech by **thanking the Technology Collaboration Programme on Heat Pumping Technologies (HPT TCP)**, which for more than 40 years has brought together academia, industry, market and policy – *“even in those days when heat pumps were not a star in the energy movie...”* – **for their stubborn and consistent efforts** to make the heat pumps today an important part of the clean energy transition.

PROGRESS OF RECOGNITION OF HEAT PUMPING TECHNOLOGIES



IEAs NZE by 2050 Roadmap:
“In 2045 50% of the heating demand should be met by heat pumps”

IEAs 10-point plan to reduce dependence on Russian gas

Action 7

Speed up the replacement of gas boilers with heat pumps
Impact: Reduces gas use for heating by an additional 2 bcm in one year.

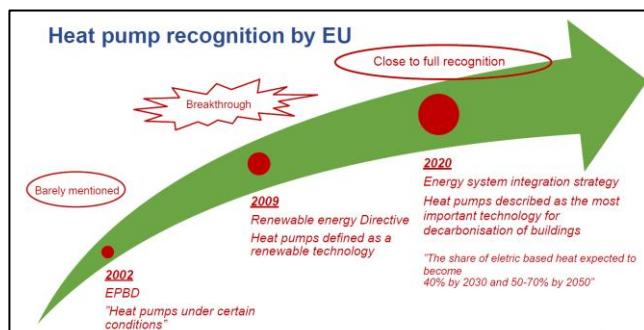
REPowerEU
“Double the planned yearly pace of deployment of heat pumps”

Net Zero Industry Act
Heat Pump Action Plan

Heat Pumps prioritized in US Inflation Reduction Act (IRA) Defence Production Act (DPA)



From Martin Forsén’s (EHPA) plenary lecture at the 13th IEA Heat Pump Conference 2021



Similar trends for recognition of heat pumps in other regions of the world

A 10-Point Plan to Reduce the European Union's Reliance on Russian Natural Gas

Measures implemented this year could **bring down gas imports from Russia by over one-third**, with additional temporary options to deepen these cuts to **well over half while still lowering emissions**.

Action 1



No new gas supply contracts with Russia

Impact: Taking advantage of expiring long-term contracts with Russia will reduce the contractual minimum take-or-pay levels for Russian imports and enable greater diversity of supply.

Action 2



Replace Russian supplies with gas from alternative sources

Impact: Around 30 bcm in additional gas supply from non-Russian sources.

Action 3



Introduce minimum gas storage obligations to enhance market resilience

Impact: Enhances the resilience of the gas system, although higher injection requirements to refill storage in 2022 will add to gas demand and prop up gas prices.

Action 4



Accelerate the deployment of new wind and solar projects

Impact: An additional 35 TWh of generation from new renewable projects over the next year, over and above the already anticipated growth from these sources, bringing down gas use by 6 bcm.

Action 5



Maximise generation from existing dispatchable low-emissions sources: bioenergy and nuclear

Impact: An additional 70 TWh of power generation from existing dispatchable low emissions sources, reducing gas use for electricity by 13 bcm.

Action 6



Enact short-term measures to shelter vulnerable electricity consumers from high prices

Impact: Brings down energy bills for consumers even when natural gas prices remain high, making available up to EUR 200 billion to cushion impacts on vulnerable groups.

Action 7



Speed up the replacement of gas boilers with heat pumps

Impact: Reduces gas use for heating by an additional 2 bcm in one year.

Action 8



Accelerate energy efficiency improvements in buildings and industry

Impact: Reduces gas consumption for heat by close to an additional 2 bcm within a year, lowering energy bills, enhancing comfort and boosting industrial competitiveness.

Action 9



Encourage a temporary thermostat adjustment by consumers

Impact: Turning down the thermostat for buildings' heating by 1°C would reduce gas demand by some 10 bcm a year.

Action 10



Step up efforts to diversify and decarbonise sources of power system flexibility

Impact: A major near-term push on innovation can, over time, loosen the strong links between natural gas supply and Europe's electricity security. Real-time electricity price signals can unlock more flexible demand, in turn reducing expensive and gas-intensive peak supply needs.

RePowerEU
and cut our
dependence on
Russian gas



#EUGreenDeal

- *“REPowerEU will diversify our gas supplies, speed up the renewable roll-out, improve energy efficiency and replace gas in **heating** and power. It can reduce our demand for Russian gas by 2/3 before the end of the year” [Ursula Van der Leyen, EC President]*
- **RePowerEU** coincides well with the **10-point plan** presented by IEA last week.
- **REPowerEU** will also boost renewable technologies – solar energy, heat pumps, geothermal, district heating, hydrogen, biogas, etc....

How to benefit from international collaboration

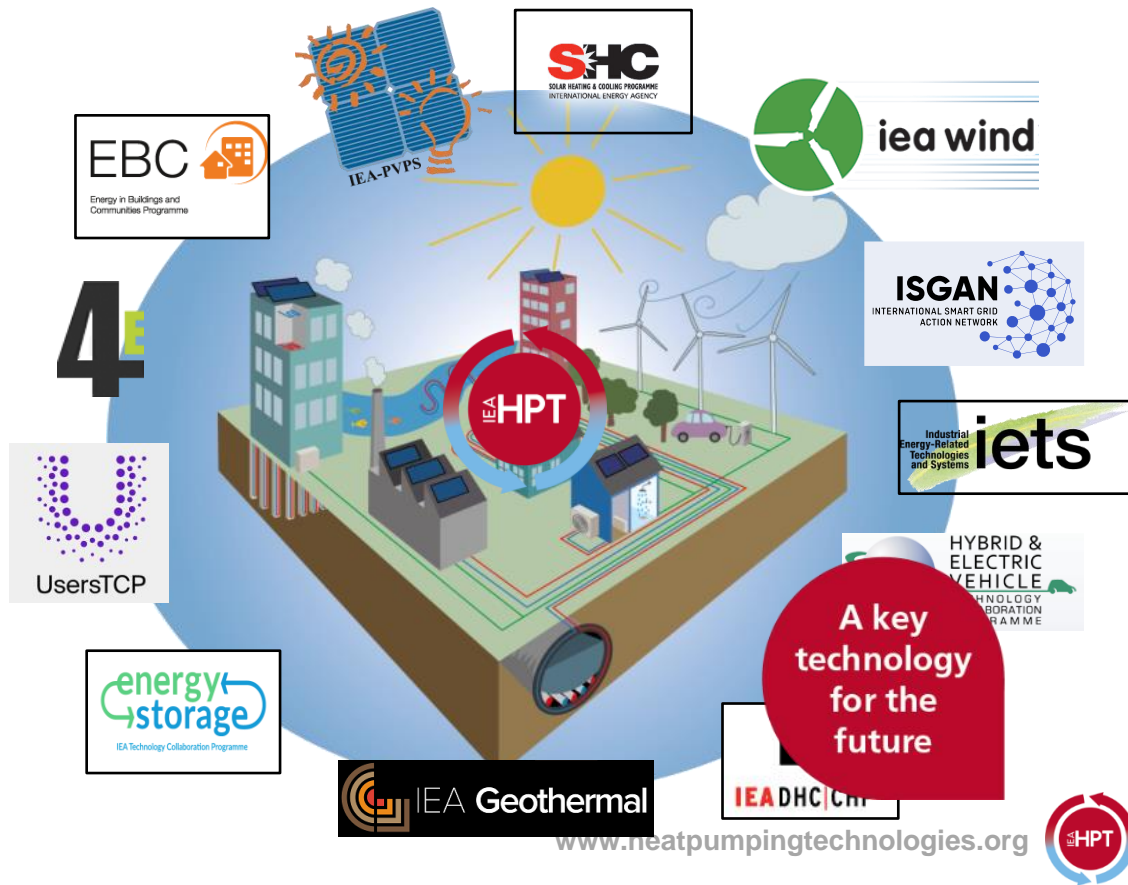
- Participate in an **international network** on Heat Pumping Technologies
- **Exchange knowledge** with other countries
- Participate in **international projects** (HPT TCP Annexes) to increase national knowledge
- **Influence** the work of the HPT TCP
- Access the **worldwide network** for independent information and knowledge of heat pumping technologies
- Be a part of the **meeting place and dialogue platform** for researchers, academia, policy, investors and industry in the field of heat pumping technologies



IEA HPT-Vision *and* Collaboration with other TCPs

“Heat pumping technologies are the cornerstone

- for a secure, affordable, high-efficiency, clean and net-zero energy system
- for heating, cooling and refrigeration across multiple applications and contexts.”



HPT TCP Organization and Management

Executive Committee



National teams



National experts meeting



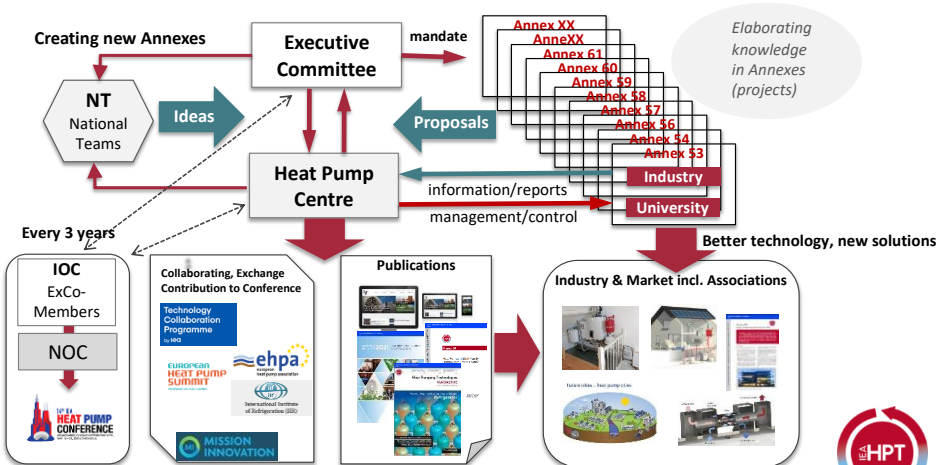
Heat Pump Centre







Annexes



- **Executive Committee:** The board of HPT TCP - one vote per member country
- **National Teams:** Organizations representing national HPT activities. A forum for discussion networking and creation of new ideas. Meet at joint National Experts meetings.
- **The Heat Pump Centre:** The central program office and communication center of HPT TCP
- **Annexes:** Elaborating new knowledge through collaborative RDD&D work



RDD&D Priority Areas 2023 - 2028

System integration	Robust, sustainable and affordable value chains	Extending operation range and applications	New technologies and refrigerants
			
<p>Sector coupling, energy efficiency, flexibility, resilience, storage, digitalization, positive energy districts</p>	<p>Improving affordability, securing value chains, circular economy, removing barriers for mass deployment</p>	<p>To fulfill demand from all climate zones, new markets, new applications and new demand. Refrigeration in emerging countries.</p>	<p>Non-traditional heat pumping technologies (for heating and cooling) Refrigerants (low GWP, safety etc.)</p>
<ul style="list-style-type: none"> ● Annex 56: IoT for Heat Pumps ● Annex 57: Heat pumps in multi-vector energy systems ● Annex 61: Heat Pumps in Positive Energy Districts NEW ● CCB for cooling and dehumidification ● Sector Coupling - Survey of practical examples ● Digital Services for Heat Pumps 	<ul style="list-style-type: none"> ● Annex 63 Placement Impact on Heat Pump Acoustics NEW ● Heat Pumps in a Circular Economy ● New or alternative business models for heat pumps 	<ul style="list-style-type: none"> ● Annex 60: Retrofit Heat Pump in Larger Non-domestic Buildings ● Annex 58: High Temperature Heat Pumps ● Annex 59: Heat Pumps for Drying ● Annex 62 Heat Pumps in residential multifamily buildings in cities NEW 	<ul style="list-style-type: none"> ● Annex 53: Advanced cooling and refrigeration technology development ● Annex 54: Heat Pump Systems with low GWP Refrigerants ● Annex 64: Safety Measures on Flammable Refrigerants NEW

Ideation according to the Strategic Work Plan of HPT TCP

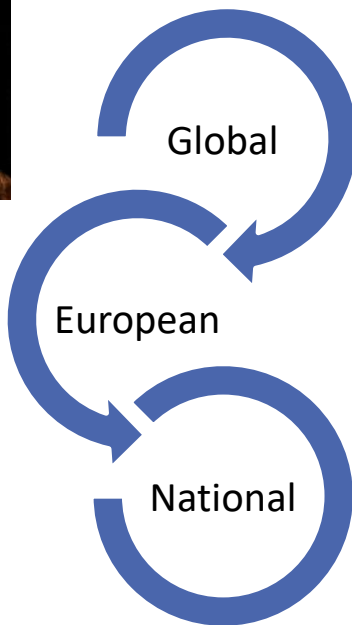
Outcome from last National Experts Meeting

The image displays several strategic work plan templates, each structured with sections for Present Status, Aspirations, Challenges, Solutions, and Activities. The topics covered include:

- Alternative and new business models**: Focuses on Topic Proposals for new Annexes/Projects, with sections for Present Status, Aspirations, and Challenges.
- Heat Pumps for Circular Economy**: Includes Present Status and Challenges sections.
- Safety Measures**: Focuses on Topic Proposals for new Annexes/Projects, with sections for Present Status, Aspirations, Challenges, Solutions, and Activities.
- Sector Coupling**: Includes Present Status, Aspirations, and Challenges sections.
- Solutions where both the cold and the warm sides of the thermodynamic cycle are used**: Includes Present Status, Aspirations, and Challenges sections.
- Digitalization for heat pumping technologies**: Includes Present Status, Aspirations, Challenges, Solutions, and Activities sections.
- Topic Proposals for new Annexes/Projects**: Multiple templates with sections for Present Status, Aspirations, Challenges, Solutions, and Activities.

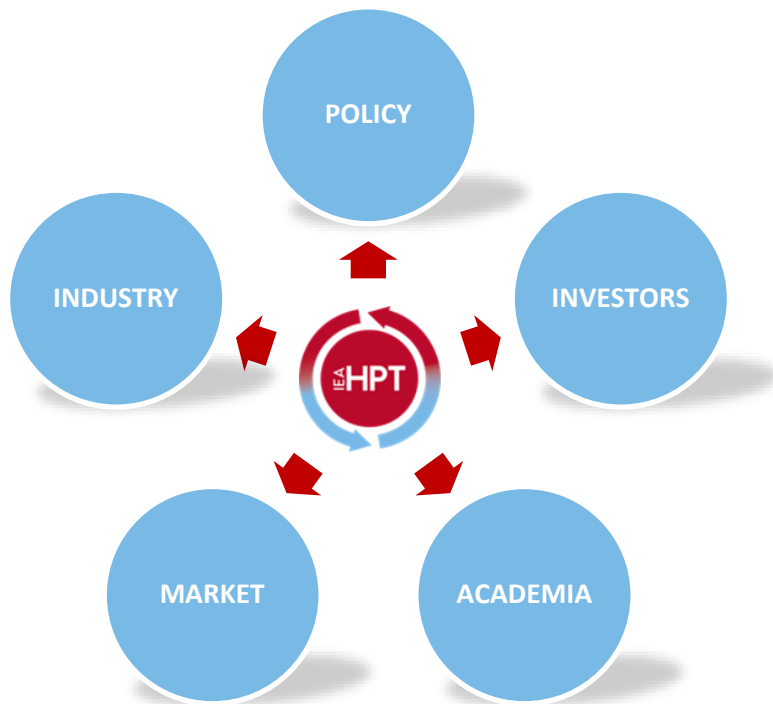


How to benefit from international collaboration



- ✓ Contribute to IEA reports based on HPT TCP network knowledge and outcome from projects
- ✓ Collaborate with EC and contribute to EC Policy
- ✓ Knowledge sharing and learning on global, European and national level
 - Policy, research, innovation and deployment
- ✓ Standardisation

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