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

Stephan Renz, Chairman IEA HPT TCP

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

18 member countries
“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.”

IEA HPT-Vision and Collaboration with other TCPs
HPT TCP Organization and Management

- **Executive Committee**: The board of HPT TCP - one vote per member country
- **The Heat Pump Centre**: The central program office and communication center of HPT TCP
- **National Teams**: Organizations representing national HPT activities. A forum for discussion networking and creation of new ideas. Meet at joint National Experts meetings.
- **Annexes**: Elaborating new knowledge through collaborative RDD&D work
RDD&D Priority Areas 2018 – 2023: Applications

**Affordable and competitive technologies for heating**
- Annex 46: Domestic hot water heat pumps
- Annex 50: Heat Pumps in Multi-Family Buildings for heating +DHW
- Annex 51: Acoustic Signature of Heat Pumps
- Annex 52: Long-term performance of GSHP Systems
- Annex 55: Comfort and Climate Box – Mission Innovation
- Annex 60: Retrofit Heat Pump in Larger Non-domestic Buildings
- Heat Pumps in residential multifamily buildings in cities

**More efficient cooling and air-conditioning**
- Annex 53: Advanced Cooling/Refrigeration Technologies
- CCB for warm and humid climates

**Flexible, sustainable, and clean system solutions**
- Annex 47: Heat Pumps in DHC systems
- Annex 49: Design and integration of heat pumps for nZEB
- Annex 57: Heat pumps in multi vector energy systems
- Heat Pumps for Positive Energy Districts
- Sector Coupling - Survey of practical examples

**Digitalisation and Internet of Things**
- Annex 56: Internet of Things for Heat Pumps
- Common communication protocols for heat pumps
- Using data to improve technology

**New or special markets and applications**
- Annex 48: Industrial Heat pumps – second phase
- Annex 58: High Temperature Heat Pumps
- Annex 59: Heat Pumps for Drying

**New, alternative or natural refrigerants with lower global warming potential**
- Annex 54: Heat Pump Systems with low GWP Refrigerants
- Safety Measures on Flammable Refrigerants

**Horizontal themes**
- Placement Impact on Heat Pump Acoustics
- Heat Pumps in a Circular Economy
- New or alternative business models

Annex = Project with international collaboration of member countries. Duration is typically 3 - 4 years
# RDD&D Priority Areas 2023 - 2028

<table>
<thead>
<tr>
<th>System integration</th>
<th>Robust, sustainable and affordable value chains</th>
<th>Extending operation range and applications</th>
<th>New technologies and refrigerants</th>
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<tbody>
<tr>
<td>Sector coupling, energy efficiency, flexibility, resilience, storage, digitalization, positive energy districts</td>
<td>Improving affordability, securing value chains, circular economy, removing barriers for mass deployment</td>
<td>To fulfill demand from all climate zones, new markets, new applications and new demand. Refrigeration in emerging countries.</td>
<td>Non-traditional heat pumping technologies (for heating and cooling) Refrigerants (low GWP, safety etc.)</td>
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- 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  

- Annex 63 Placement Impact on Heat Pump Acoustics NEW  
- Heat Pumps in a Circular Economy  
- New or alternative business models for heat pumps  

- 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  

- 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 October 2021 in Nuremberg

Next meeting in October 2023
IEAs NZE by 2050 Roadmap: “In 2045 50% of the heating demand should be met by heat pumps”

ETP2023
Heat pumps one of six, most important clean energy technologies analysed

IEAs 10-point plan to reduce dependence on Russian gas

ETP2020
Heat pumps need to become the norm for heating in buildings, contribute to decarbonisation of the industrial sector and DH grids

ETP2017
Heat pumping technologies are a critical enabler to reach climatic ambitions

ETP2008
Heat pumps first mentioned in ETP

Heat pumps

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

Progress of Recognition of Heat Pumping Technologies

IEAs 10-point plan to reduce dependence on Russian gas

Heat Pump Action Plan

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