

IEA TECHNOLOGY COLLABORATION PROGRAMME ON HEAT PUMPING TECHNOLOGIES (HPT TCP)

Research, Development, Demonstration and
Deployment of Heat Pumping Technology



www.heatpumpingtechnologies.org



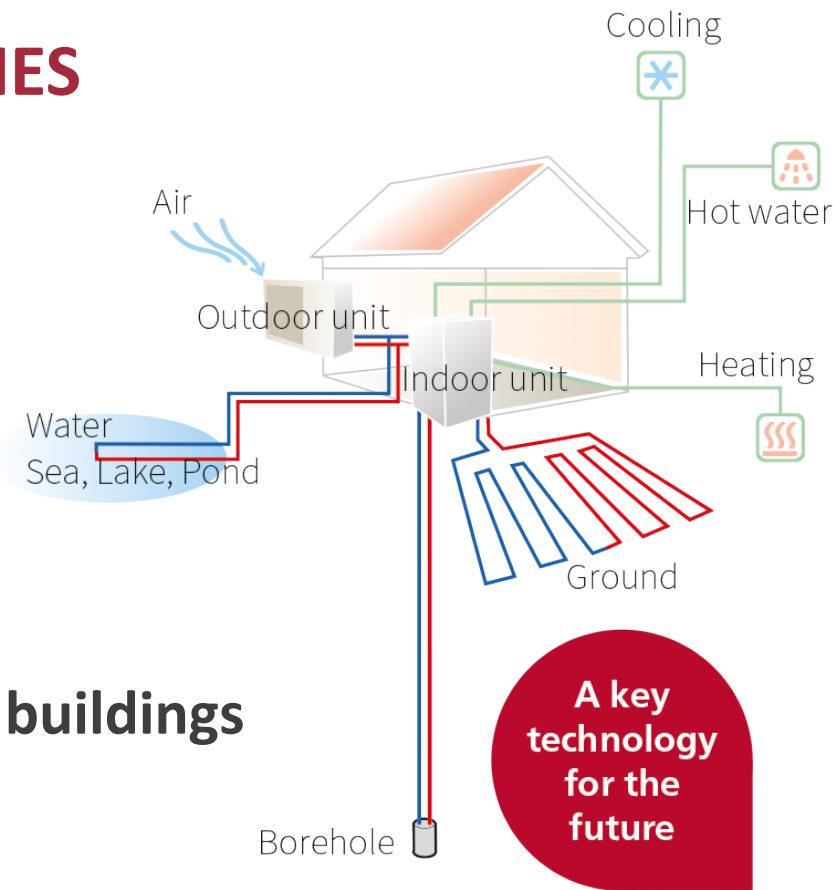
HEAT PUMPING TECHNOLOGIES

Includes

- Heating
- Air conditioning
- Refrigeration

Covers applications in

- Residential and commercial buildings
- Industry



CURRENT PARTICIPATING COUNTRIES



Austria
Belgium
Canada
Denmark
Finland
France

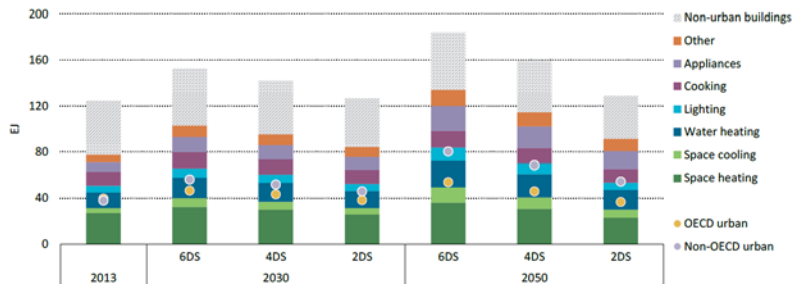
Germany
Italy
Japan
Netherlands
Norway
South Korea

Sweden
Switzerland
United Kingdom
United States

TO REACH THE "WELL BELOW 2D" CHALLENGE

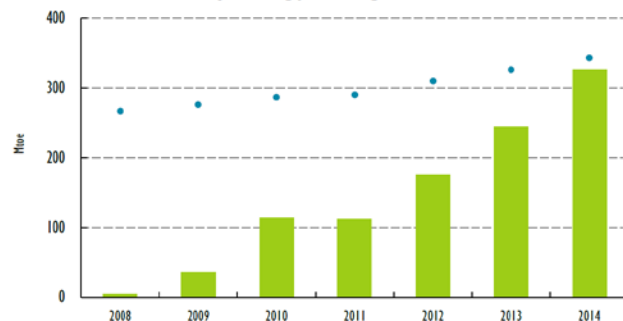
- Energy efficiency measures are necessary
- Fossil fuels must be replaced by renewable energy

Urban buildings energy demand and savings potential to 2050



Urban building energy consumption could increase as much as 70% by 2050.
Under the 2DS, urban building energy demand is cut by 1/3 in 2050.

Primary energy savings since 2000 in China



Dramatic progress on energy efficiency saved 350 Mtoe in 2014. Energy savings are as large as China's renewable energy supply.



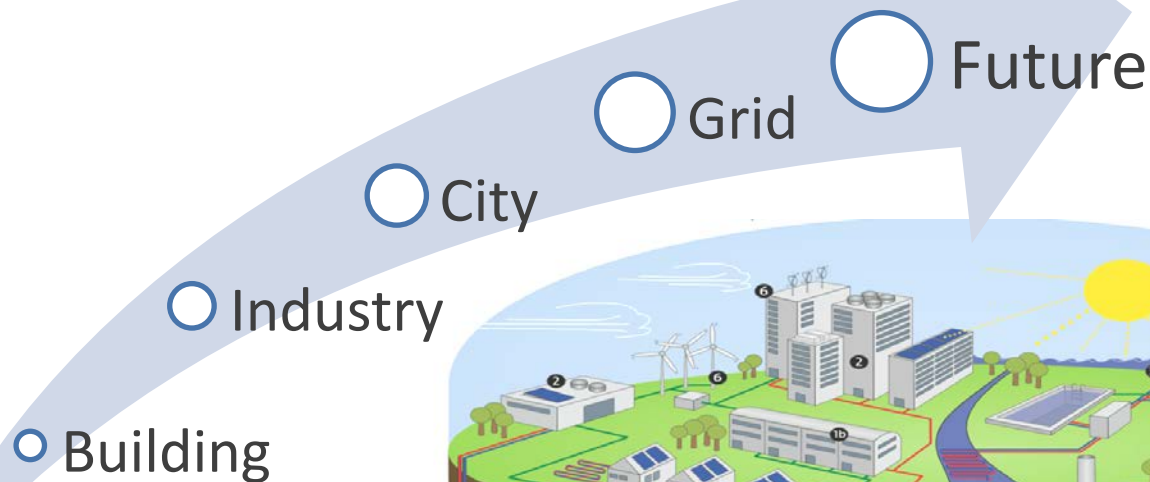
Heat pumping technology can contribute to both!

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HEAT PUMPS ARE ENERGY EFFICIENT AND RENEWABLE!

SUSTAINABLE AND SMART ENERGY SYSTEMS:



Source: EHPA (2010)

11 ONGOING ANNEXES

- Annex 51 **Acoustic Signature of Heat Pumps**
- Annex 50 **Heat Pumps in Multi-Family Buildings for space heating and DHW**
- Annex 49 **Design and integration of heat pumps for nZEB**
- Annex 48 **Industrial heat pump, second phase**
- Annex 47 **Heat pumps in District heating and cooling systems**
- Annex 46 **Domestic hot water heat pumps**
- Annex 45 **HYBRID heat pumps**
- Annex 44 **Performance indicators for Energy efficient Supermarket buildings**
- Annex 43 **Fuel-driven sorption heat pumps**
- Annex 42 **Heat Pumps in Smart grids**
- Annex 41 **Cold climate heat pumps**



HOW DO WE WORK?

Executive Committee

The board of HPT TCP - one vote per member country



National Teams

Organisations representing national HP activities.
A forum for discussion networking and creation of new ideas.



The Heat Pump Centre

The central information activity of HPT TCP



THE HEAT PUMP CENTRE

Information dissemination

- Publications (e.g. project reports)
- HPT Magazine (digital publishing)
- Website
www.heatpumpingtechnologies.org
- Social media: LinkedIn and Twitter
 - Heat Pumping Technologies – HPT TCP
 - @heatpumpingtech

Program Support

- to ExCo, NTs and Project leaders

And

- Generation of new activities
- National Teams meetings



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ANNEX 40 HEAT PUMP CONCEPTS FOR NEAR ZERO-ENERGY BUILDINGS – MAIN OUTCOME



“Case studies and technology comparison for HVAC systems in **nZEBs** across different countries and regions in **Europe**, **Canada**, and **Japan** have been performed. The results regarding **system performance** and **cost** show that **heat pump** range among the **most energy-efficient and cost-effective system solutions** in this type of buildings. These findings confirm that **heat pumping technologies** is a **key technology for the future.**”



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ANNEX 51 ACOUSTIC SIGNATURE OF HEAT PUMPS



The issue

How can we reduce acoustic emissions to minimize noise annoyance and increase the acceptance of heat pumps.



Work to do

The main influencing factors on the acoustic signatures of hp units will be identified on component, unit and application level.



Results & benefits

Research results on the different implementation levels → directions for improved components, units and control strategies including guidelines, training, and inputs to future standards.

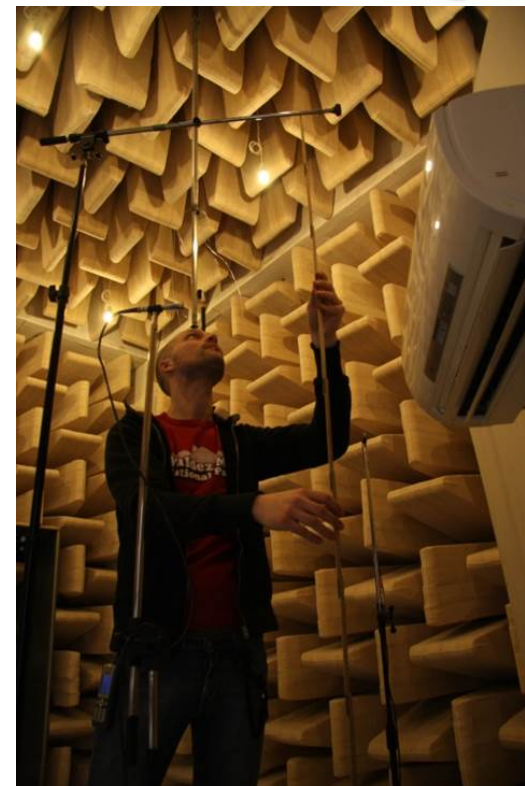


Image source: RISE Research Institutes of Sweden

ANNEX 50 HEAT PUMPS IN MULTI-FAMILY BUILDINGS FOR SPACE HEATING AND DHW



The issue

How can we increase the use of heat pumps in multi-family buildings?



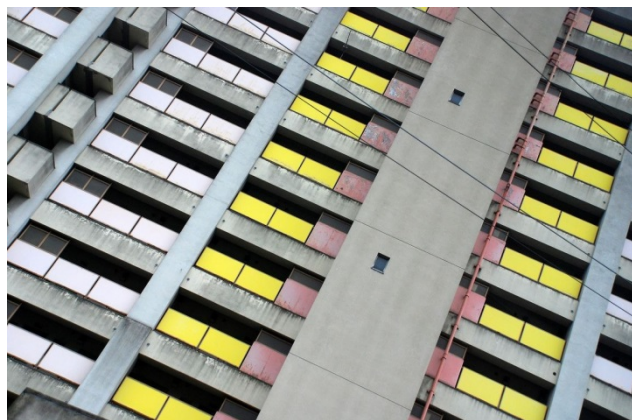
Work to do

Identify barriers for heat pumps on these markets and how to overcome them. Enhancement of heat pump systems and/or heat pump components for their adaptation in multi-family buildings.



Results & benefits

Demonstration of possible energy savings and the utilisation of renewable energy by means of heat pumps in buildings retrofitted with heat pumps without improving the building envelope.



ANNEX 49 DESIGN AND INTEGRATION OF HEAT PUMPS FOR NZEB



The issue

Find criteria for further developments of current marketable heat pump systems to exploit specific performance opportunities in nZEB and nZE neighbourhoods.



Work to do

Investigation of heat pump integration options (e.g. solar PV) for nZEBs and nZE neighbourhoods. Design and control for heat pumps in nZEB and the integration into energy systems.



Results & benefits

Groups of buildings open up opportunities for load balancing between different use patterns and energy needs. Recommendations on design and control of heat pump system will be presented.

The Annex 49 is a follow-on of the work in Annex 40 on heat pump concepts for nZEB, with an **extended scope**, e.g. regarding the balance of single buildings and groups of buildings/neighbourhoods.



ANNEX 47 HEAT PUMPS IN DISTRICT HEATING AND COOLING SYSTEMS



The issue

How can heat pumps in DHC systems be implemented in the best way?



Work to do

Mapping existing solutions, develop new ones, and study market and energy reduction potential and implementation barriers.



Results & benefits

Suggest how heat pumps can be implemented in both new and old district heating systems in the best way and describe the different types of integration.

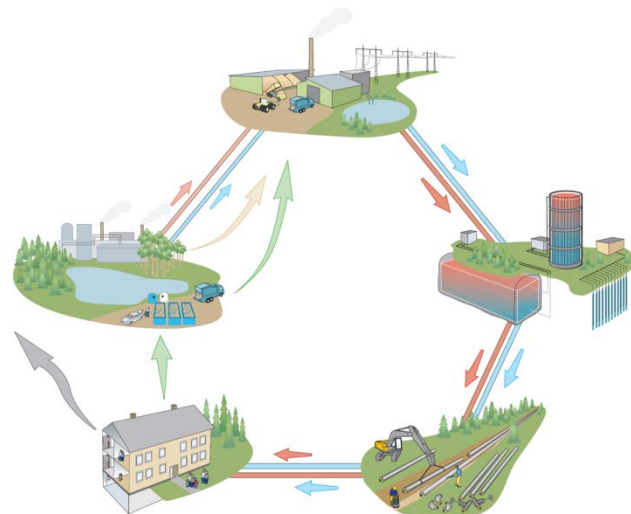


Image source: RISE Research Institutes of Sweden

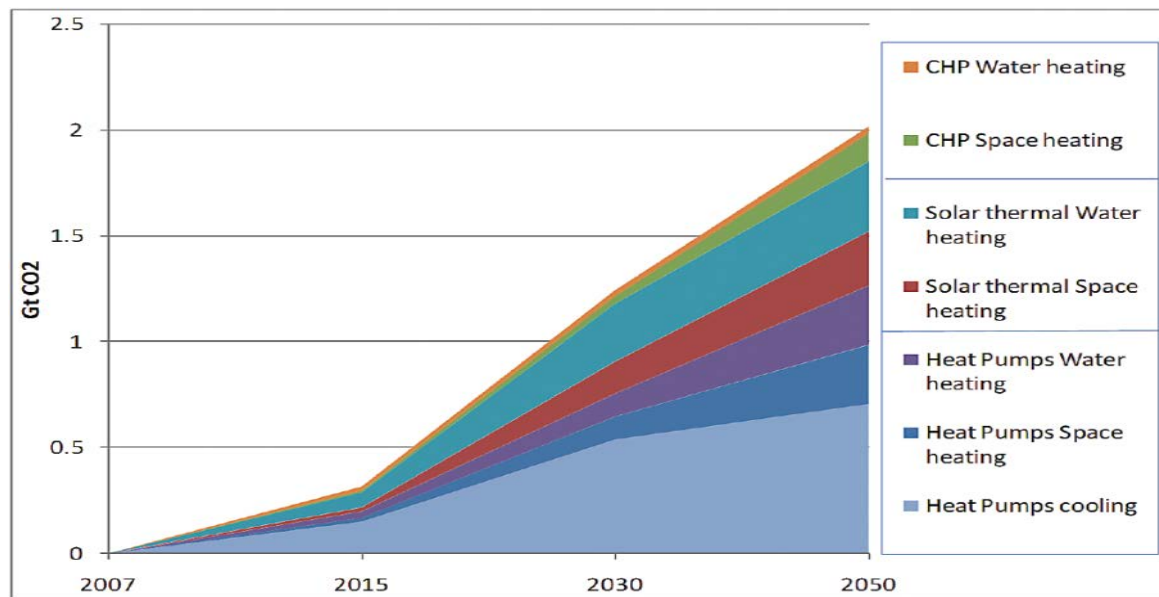
IEA ROAD MAP KEY ACTIONS – TRANSFORM THE FUTURE HEATING AND COOLING MARKET

- Increase R&D effort
- Implement new policies to transform the market for heating and cooling technologies.
- Address policy and industry needs at a national or regional level.
- Improve data collection, metrics and standards.

A photograph of a baby with light hair, wearing a white shirt with green trim, lying on a light-colored carpet. The baby is focused on a small green toy train engine on a wooden track. The photo is framed with a thick red border.

**Heat Pumps –
A key technology
for the future**

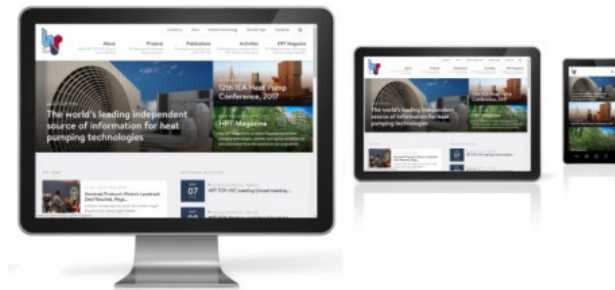
HEAT PUMPS WILL PLAY A MAJOR ROLE IN TARGETING GHG REDUCTIONS!



CO₂ emissions reductions in buildings from heating and cooling
- ETP 2010 from International Energy Agency

RENEWAL - COMMUNICATION

- New website
 - New database
 - Easier to search for and find Annex information and publications, e.g by **Google**
 - Better readability in **Smart Phones** and **Tablets**



- Social Media



- Heat Pump Centre Newsletter → **HPT Magazine**
 - Published on an electronic platform issuu
 - News transferred to website and social media (RSS-feed)



- Revision of layout of Annual Report
 - Improved description of the Annexes



HEAT PUMPING TECHNOLOGIES IN THE FUTURE

- Heat pumping technology can significantly contribute to reduction of CO₂-emissions
- The future green electricity grid must be able to handle intermittent production – heat pumping technologies is as excellent electricity sink in order to balance the grid
- Greening the grid makes heat pumping technologies even greener!



12TH IEA HEAT PUMP CONFERENCE 2017

Rethink Energy – Act NOW!

In the city of Rotterdam, 15th-18th of May, 2017

www.hpc2017.org

The 12th IEA Heat Pump Conference aims to cover all aspects of heat pumping technologies in the various markets ranging from domestic buildings to industrial processes.

The Conference will have invited speakers as well as speakers in a call for papers, where researchers are encouraged to give their opinions and show their latest developments.



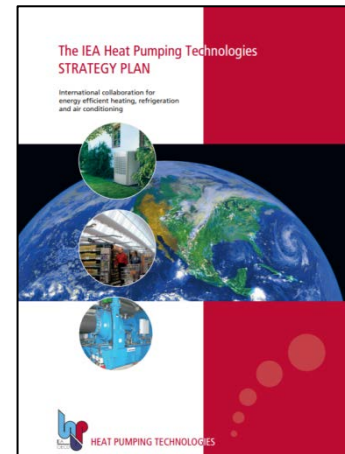
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REQUEST FOR EXTENSION OF HPT TCP 2018-2023

Direction of future strategy

- Technology scope for future research
 - **Cooling and air conditioning** - how to make consumers in developing countries investing in energy efficient technology
 - **Electrifying the heating market** - storage, smart grid
 - **Waste heat recovery** and combinations with district heating or **thermal (neutral) networks**
 - Applications of “new” or natural **refrigerants**
 - New or special markets and applications
- The programme should attract new member countries that are **key partners** or **associate members** of IEA
- The programme should address **new markets, more climates**
- The programme wants to reach and affect **policy makers**



WELCOME TO CONTACT US

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