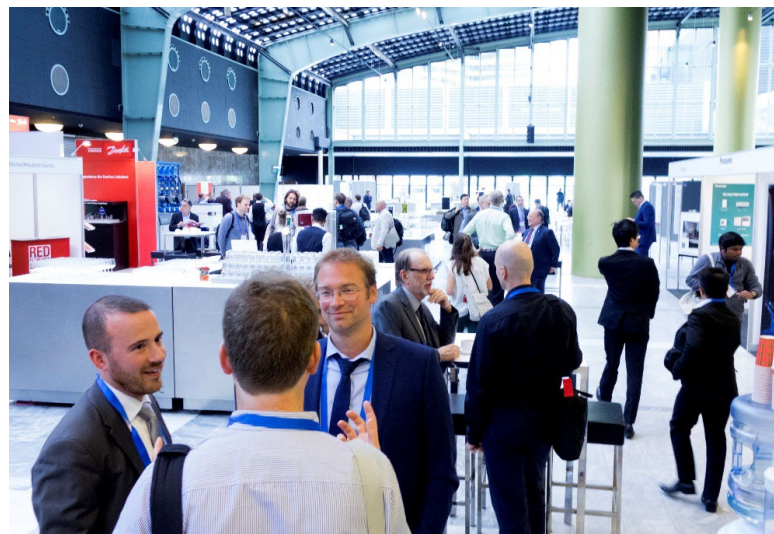


# IEA HPT TCP

## Comfort and Climate Box

– Roadmap for scaling and replication



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

Caroline Haglund Stignor, Heat Pump Centre, HPT TCP, c/o RISE Research Institutes of Sweden

# Heat Challenge – the Needs

## End-user

- A comfortable home
- Hot showers
- Reasonable energy bills
- A compact plug & play solution
- Environmental awareness

## Policymakers

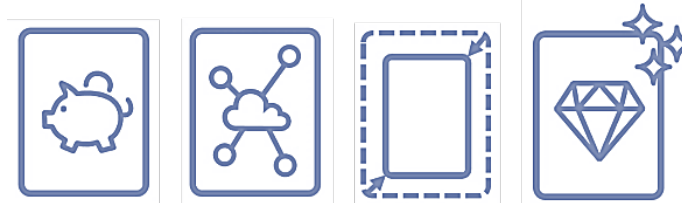
- Reach climatic targets
- Ensure security of supply
- Reasonable energy bills for the population

## Utilities and grid owners

- Acceptable return on investments
- Reaching emission targets
- Flexibility providers to ensure the security of supply and optimize investments

## Implementation strategies

- Differ between markets



Affordability Flexibility Compactness Efficiency



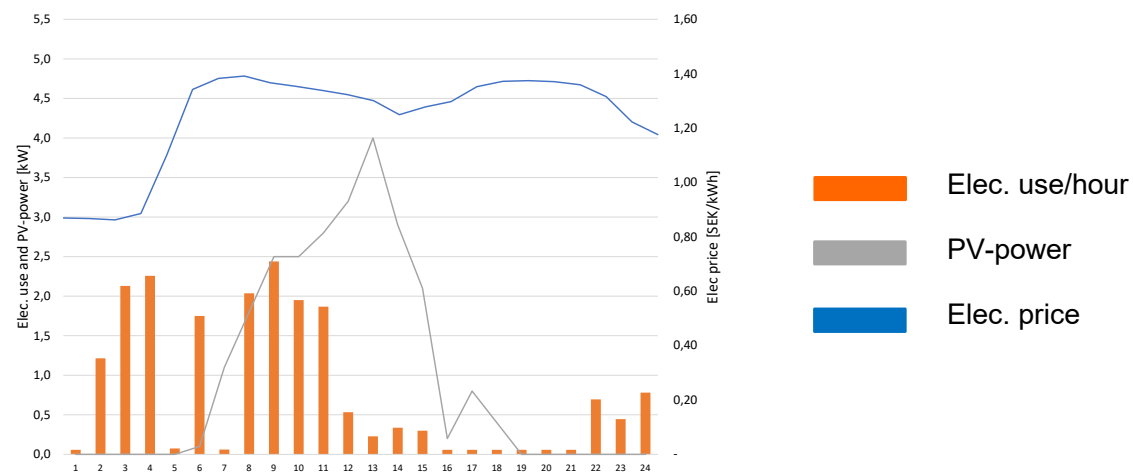
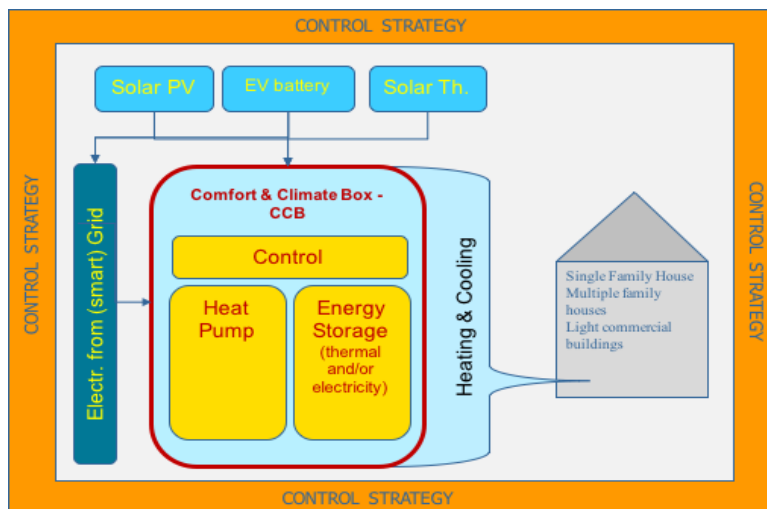
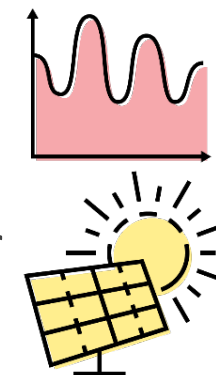
# A solution – Comfort and Climate Box (CCB)

Integrated solutions of heat pump, energy storage and control – in a virtual box

A prototype developed within HPT Annex 55/ ES Task 34 in collaboration with MI IC7

## Two “Smart control functions”

- Price: Minimize the electricity cost
- Sun: Maximizing self-consumption of PV-power
- **Combination of above**





# Recommendations for accelerated deployment of CCB

Policy	Utilities and aggregators	Manufacturers
<ul style="list-style-type: none"> <li>• Promote and prioritize <b>heat pumps</b> and <b>energy storage</b> in policies – a comprehensive approach needed</li> <li>• Promote <b>standards</b> and <b>communication protocols</b> for <b>smart, flexible</b> combinations of heat pump and energy storage – <b>CCBs</b></li> <li>• Develop and revise <b>labeling schemes</b> that promote <b>clean heating solutions</b> which could <b>balance the electricity grid</b></li> <li>• Ensure <b>capacity building</b>, to educate installers as well as others in the value chain of CCBs.</li> <li>• Invest in <b>electric infrastructure</b> – both grid and production facilities of renewable electricity</li> </ul>	<ul style="list-style-type: none"> <li>• Offer <b>alternative business models</b> (leasing, rental, heat as a service, etc) for using a <b>heat pump</b> or a <b>CCB as main heating equipment</b></li> <li>• <b>Implement tariffs</b> that stimulate <b>off-peak-hour</b> operation of the heating system</li> <li>• Inform the end users how they can <b>influence their energy bill</b> by being a part of the electricity capacity market and incentivize flexibility</li> <li>• Be stable in time and use <b>harmonized price structures</b> (over regions and countries)</li> </ul>	<ul style="list-style-type: none"> <li>• Make the products <b>“sufficient efficient”</b>, avoid additional features and focus on mass production of a limited number of models.</li> <li>• <b>Make control strategies</b> for CCB for combinations with solar PV, EV, and energy storage</li> <li>• Make your <b>communication protocol</b> standardized and open</li> <li>• Make the products <b>“plug-and-play”</b> to minimize installation and maintenance costs.</li> <li>• Design the CCB as <b>compact</b> as possible and <b>“boxify”</b> the products</li> <li>• Keep the volume of the <b>energy storage limited</b> and utilize the possibility of using the <b>building construction</b> as heat storage</li> </ul>

Continued research and innovation needed

# Innovation and Policy Measures to Solve the Heat Challenge

Global Clean Energy Action Forum  
September 22, 2022  
Pittsburgh, PA, USA



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