

PtH4GR²ID

Power to Heat for the Greater Region's Renewables Integration and Development

Main conclusions

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- Flexibilization of Heat Pumps in Buildings **is possible**
- **MPC** (Modell predictive control) have been **developed** and their functionality has been proven by simulations and by tests in a lab building.
- Simulation / Potential analysis have been done for the **situation today** and further time horizons **2030** and **2050**

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- The analysis of HP with MPC shows:
 - **Time shift** of electricity demand as reaction on price signals **is achieved**
→ better **integration of fluctuating renewable energies** (if price signals reflect share of renewables)
 - it can be used **to serve the grid**
 - it can lead to energy cost savings for **the end user**
 - Flexible HP with MPC can be used in **new and refurbished** buildings. A thermal storage is required.
 - **Thermal comfort** in the buildings is not negatively affected.

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- Requires flexible price structures down to the end user:
However also in this case, the **economical benefits for the final client are rather low if considering today's market price variations**
(esp. in the case of energy efficient buildings).

Fluctuations on energy prices must be significantly higher and be also reflected on the tariffs for the end user to make it attractive.

- **Grid assessment:**
 - Grids are generally not the limiting factors for the next 10 years: some issues may occur – region and gridtype dependant - in low voltage grids due to high EV and/or PV penetration
 - Flexibilization of HP does not fundamentally change the maximum load case on cold winter days

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- Other achievements
 - collection of **status information** on building stock, on heat pumps market and grid situation in the GR
 - **development of simulation tools/models and testing environments**
 - **scientific publications and doctoral theses**
 - reinforcing **collaboration** between the different partners in the GR
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Power to Heat for the Greater Region's Renewables
Integration and Development

Thanks to all contributors
Thanks to today's audience



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