Member Country Report 2023

Christian Köfinger, Thomas Fleckl, AIT Austrian Institute of Technology GmbH




Overview

- **Policy**
- **Market statistics**
- **Research overview**

Climate and Energy Strategy

- Austrian Climate and Energy Strategy "Mission 2030":
  - The strategy formulates a goal of 100% renewables in the power sector by 2030. This ambitious goal requires additional production capacities of renewable power of 20-25 TWh, mainly achieved by wind, photovoltaic and hydro power.
  - Also **heat pumps** will play an important role (e.g. in balancing the grid). For the total end energy consumption Austria is aiming at 46-50% of renewables by 2030. A 36% reduction of greenhouse gas emission (compared to 2005) is targeted by 2030.
- International R&D Initiative "Mission Innovation":
  - Austria and Australia have launched the Mission Innovation mission "Net-zero industries" at the Global Clean Energy Action Forum in Pittsburgh, USA, in September 2022

Climate and Energy Strategy

- Austrian “Renewable Heat Law- Erneuerbare-Wärme-Gesetz (EWG)”
  - Aim: ban of fossils for heating and domestic hot water in buildings
    - Phase-out of oil, liquefied natural gas and coal by 2035
    - Phase-out gas by 2040
  - Proposed version did not receive the required 2/3 majority➔revision necessary
  - Funding schemes for exchange of existing systems between 75 and 100%
  - Erneuerbaren-Wärme-Paket: Förderung für Heizungstausch wird massiv erhöht – BMK INFOTHEK
  - ~~Decarbonisation of space heating by the year 2040.~~
  - ~~In new buildings, central oil and coal heating systems have already been banned since 2020. From 2023, no central or decentralised heating systems that can be operated with fossil fuels may be installed in new buildings in Austria.~~
  - ~~There are exceptions for buildings that have already been approved/planned/constructed.~~
  - ~~From 2023, broken oil and coal heating systems may only be replaced by climate-friendly heating systems.~~

Climate and Energy Strategy

- Austrian “Renewable Heat Package- Erneuerbare-Wärme-Paket (EWP)”
  - Funding schemes for exchange of existing systems between 75 and 100% depending on income

Technology	Funding
District heating connection	15.000 €
Pellet or wood chip boiler	18.000 €
Log boiler	16.000 €
Air/water heat pump	16.000 €
Brine/water or water/water heat pump	23.000 €

  - Plus regional funding

Climate and Energy Strategy

- Funding schemes
  - Several schemes on different level available (national, counties, cities, utilities) for companies and private households
  - Get out of oil and gas -„Raus aus Öl und Gas“
    - For single and multifamily houses
    - Shift to district heating (efficient and climate friendly), biomass and heat pumps
    - Heat pump funding criteria:
      - EHPA quality label
      - Refrigerant with GWP< 1500
      - Supply temperatures <40°C → should be replaced by at least 55°C
      - No district heating available

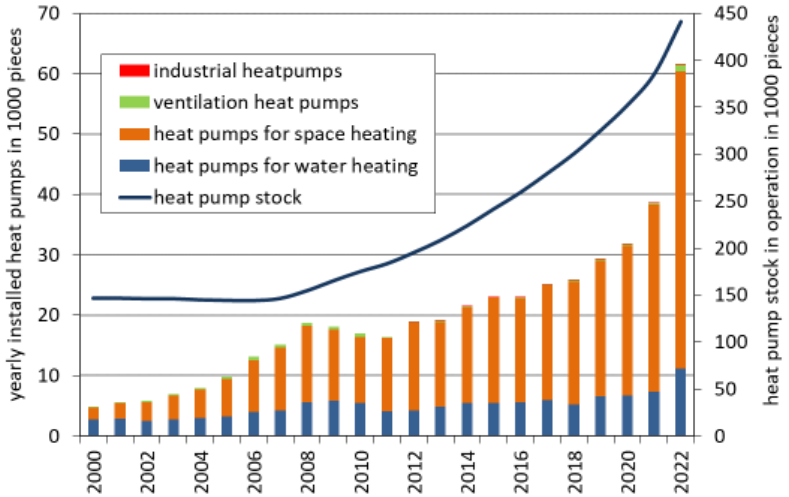
Policy and Quality Support

- **National Heat Pump Assocation**
  - **“Wärmepumpe Austria” (WPA)** is an industry association based in Linz that covers the entire value chain. At present, over 90% of all heat pump manufacturers in Austria, all electricity supply companies via the Austrian energy association “Österreichs Energie” and suppliers and drilling companies are organised by the WPA.
- **Training for Installers:**
  - The Austrian installers are educated in three steps called “Lehrling”, “Geselle” and Meister”. During their education they have to participate in trainings including exams to reach the next step. Within this, the installers get the basic knowledge of all heating technologies. If they want to specialize in the field of heat pumps manufacturer offer trainings on their products connected to some marketing activities.
- **Quality Label and Keymark**
  - On the Austrian market the **EHPA-Quality label** is used in almost every funding scheme. It covers beside some minimum requirements on the product efficiency also some customer aspects, for example to guaranty the support or the availability of spare parts and so on. The label is also strongly used in Germany, Switzerland, the Czech Republic and some other countries.
  - **EHPA Heat Pump Keymark** is recognized in Austria and can be used as the basis to apply for the EHPA-Quality label, therefor it replaces the test report. In addition, some Austrian companies use the EHPA Heat Pump Keymark to obtain subsidies in export countries when no more than the Keymark is required.

Market Statistics

- Data from **47 Austrian** heat pump producers and heat pump distributors
- Heat sources for domestic applications:
  - Air: 88,6%
  - Brine: 9,9%
  - Water/direct expansion: 1,5%

Results	Heatpumps
Home market 2022	61,677 pieces
Change 2021→2022	+59.9 %
In operation 2022	441,068 pieces
Export rate of technology production 2022	24 %
Energy production 2022[3]	5,892 GWh
CO_{2eq} – net savings[1]	1.002 Mio. t
Sector turnover 2022[5]	1,437 Mio.€
Jobs 2022	3,104 FTE



Market development of heat pumps in Austria until 2021 (Biermayr et.at., 2023)

R&D in Austria

- The **main research topics** are the development of **heat pumps** for use in buildings, in district heating and cooling systems and in industrial processes, the coupling of heat pumps to smart grids and the use of low-GWP refrigerants.
- The topics were summarized in the national technology and implementation roadmap. National research programmes such as "**Energieforschung**" and the "**Basisprogramm**" of the Austrian Research Promotion Agency offer appropriate funding depending on the Technology Readiness Level (TRL).
- **Heat pump research** is carried out at universities (Graz University of Technology, Vienna University of Technology, Innsbruck University, University of Natural Resources and Applied Life Sciences Vienna), Universities of applied sciences (Pinkafeld University of Applied Sciences) and applied research institutes (AIT Austrian Institute of Technology GmbH) addressing both national and in the European calls (H2020).
- AIT operates the only **accredited laboratory** for heat pumps in Austria covering the main technologies used in Europe. The laboratory provides the ability test and investigate air/water-, brine/water-, water/water- and DX (direct expansion)/water-heat pumps.

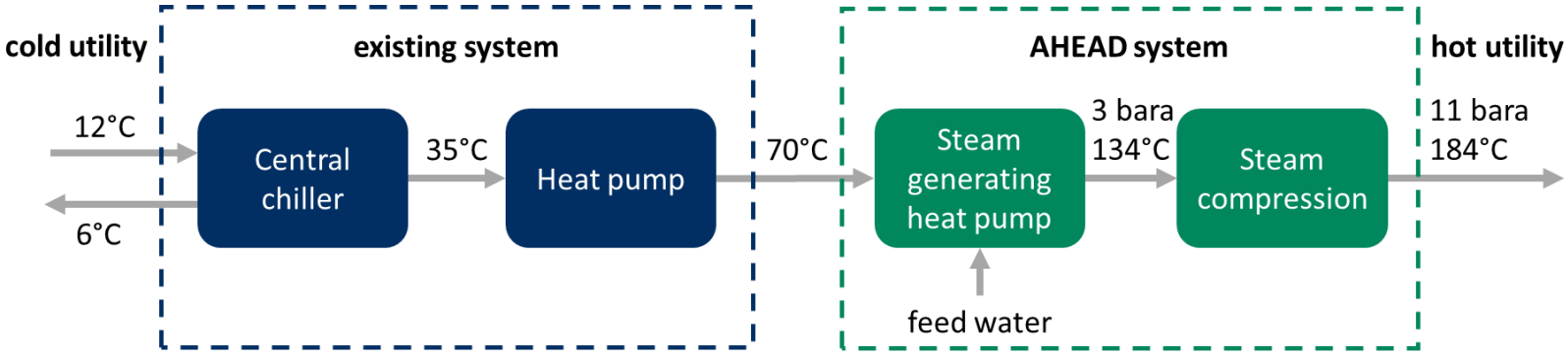
AHEAD: Advanced heat pump demonstrator

- steam production at 11 bar (184 °C) based on heat pumps
- integrated at a production site of Takeda in Vienna
- scientific monitoring and optimisation for more than 4000 h planned
- reduction of CO_2 emissions by 90%
- CO_2 free production for >7 months a year

This project is supported with the funds from the Climate and Energy Fund and implemented in the framework of the RTI-initiative "Flagship region Energy"

AHEAD: Advanced heat pump demonstrator

- steam generating heat pump by SPH using butane as refrigerant
- combined with MVR to reach 11 bar (184 °C) with 1.7 MW heating capacity
- heat and cold supply based on natural refrigerants only



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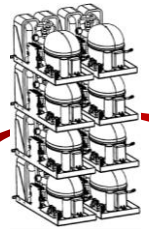
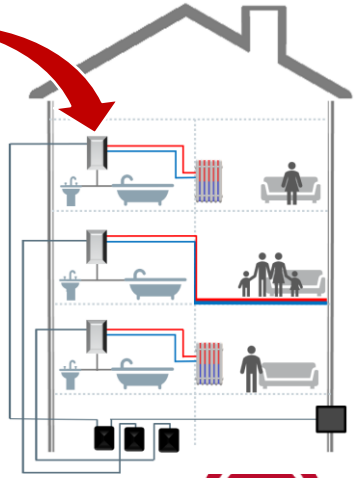
„Gasthermenersatz“ - Gasboiler replacement

- Modular heat pump for individual residential units in large multi-family houses
- Heat pump operation independent of renovation degree of the individual apartments and of the temperature level of the energy source
- Optimized operation at heating flow temperatures of 35, 50 and 65 °C
- Environmentally friendly refrigerant
- Minimum noise emissions

AIT AUSTRIAN INSTITUTE OF TECHNOLOGY

OCHSNER WÄRMEPUMPEN | 150 JAHRE





- Development Prototype 1.0
- Numerical investigation of system components

2021 — Project Begin

2022

2023

2024

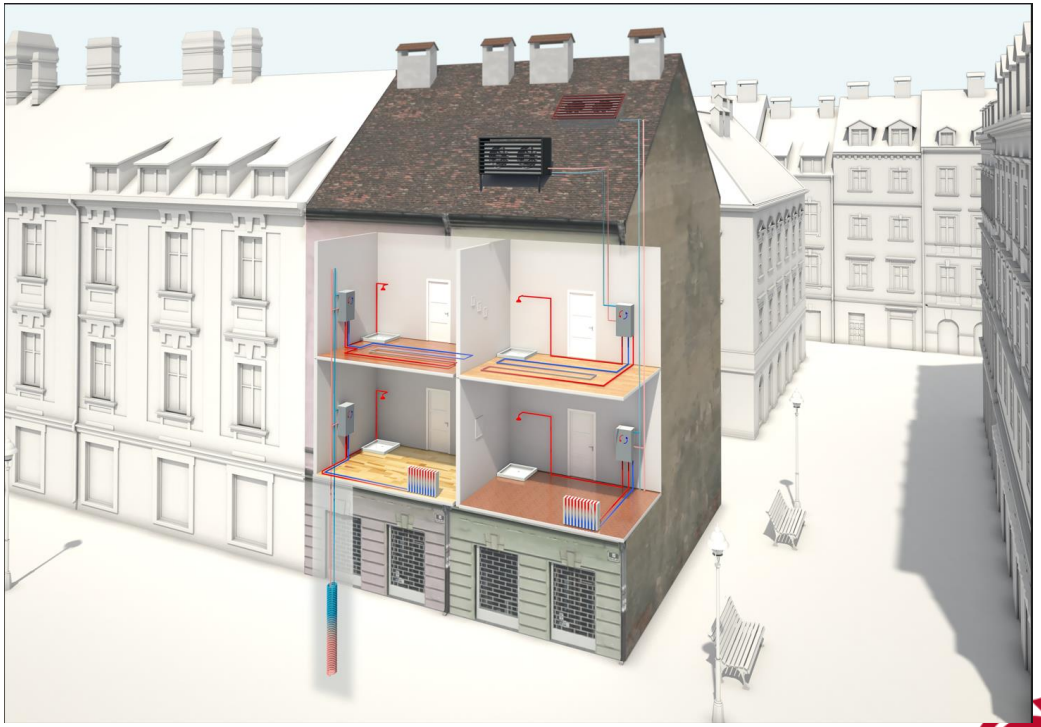
- Labory testing of Prototype 1.0
- Development and testing of optimised prototype versions

www.heatpumpingtechnologies.org

IEA HPT

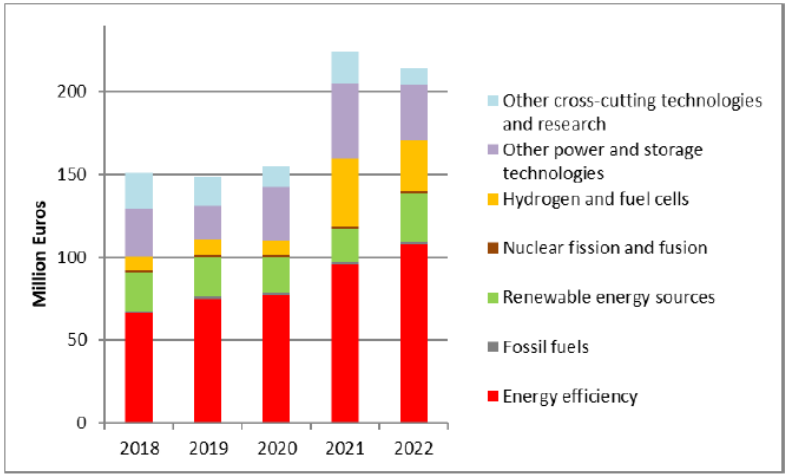
„Gasthermenersatz“ - Gasboiler replacement

- Appartments can be renovated individually
- No central heat pump necessary
- Intelligent energy management
- Multiple source system possible



Monitoring energy R&D

- Austria has established a **monitoring system** to yearly record all energy related research, development and first-of-its-kind demonstration projects and financed by means of public funds.
- In 2022, Austria's public expenditures for energy-related research and development amounted to **224,4 Million Euros**.
- Decrease of 9,6 millions or 4,3% compared to 2021
- Public funded R&D research **on heat pumping technologies** and cooling devices amounts to appr. **3,7 Mio €** in 2022.



Public energy R&D expenditures in Austria 2018–2022 – Topics according to IEA Code (Indinger et. al, 2023)

Summary

- Heat pumps are a relevant part of the Austrian Climate and Energy Strategies
- Austrian “Renewable Heat Law- Erneuerbare-Wärme-Gesetz (EWG)” is not implemented and will be replaced by the “Renewable Heat Package- Erneuerbare-Wärme-Paket (EWP)”
- Austria has established different quality measures (also in the European context)
- Good framework for research to establish new fields of applications, stable budgets and highlighting industrial demonstrators for high temperature heat pumps
- Growing markets over the last years, outlook?
- Challenges are how to fulfill the steep implementation curves for decarbonization (not only a heat pump topic)

References

- Andreas Indinger et al., 2023, Berichte aus Energie- und Umweltforschung 40/2023, „Energieforschungserhebung 2022“
- Peter Biermayr et al, 2023, Berichte aus Energie- und Umweltforschung 36a/2023 “Innovative Energietechnologien in Österreich Marktentwicklung 2022“