

INTELLIGENT HEAT PUMPS FROM AUSTRIA



Research at iDM

TFO Department – Research Projects

- Since 2022
- 5 people
- Execution and project management of research projects
- Close cooperation with specialist departments
- **Research projects**
  Funded projects and collaborative projects with universities, universities of applied sciences, research institutes, etc.
- **Research**
  Trends, conferences, networks, student research projects



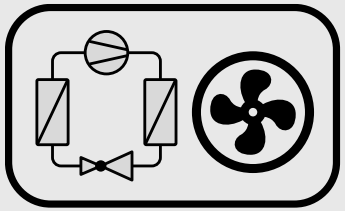
Research topics

Research topics

iDM Energiesysteme GmbH

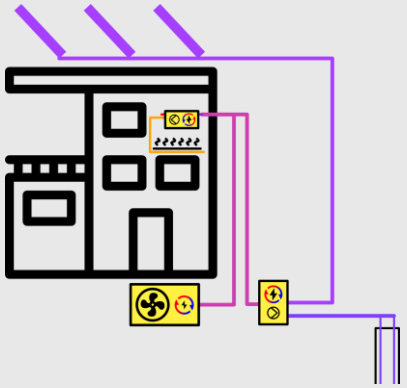
research projects

Heat pump



- Natural refrigerants
- Components
- Noise/Vibrations
- State-of-the-art test bench technology
- Integrated development: simulation + testing, Software-in-the-Loop, Hardware-in-the-Loop

Heat pump applications



- Retrofit concepts
- Integration of building services
- Heat source concepts
- Building and system simulation

Energy management & optimisation



- PV self-consumption optimisation
- Heat pumps as a source of flexibility in the electricity market
- Model predictive control
- System identification



Research projects

research projects

Heat pump

Heat pump applications

Energy management & optimisation

METABUILD (Horizon Europe)
Retrofitting of a multi-family dwelling with an R290 brine heat pump, probe field and additional air source
Optimisation of heat pump operation in multi-family dwellings

PhaseOut (FFG Stadt der Zukunft)
Concepts for the retrofit of multi-family houses using heat pumps as a replacement for gas boilers
Nano heat pump for apartments

DSM (internal)
Optimisation of heat pump schedule

Retune (FFG Energieforschung)
Optimisation of ventilator + evaporator subsystem

COOL-KIT (FFG Energy Model Region)
Cooling in Gründerzeit buildings

DaMo-TL (BMWK DE)
Trained building models using transfer learning

AIrFoil
AI-based optimisation of a rectifier for air-to-water heat pumps

Fit4geoHEAT (FFG Energieforschung)
Training of installers and planners
Train the trainer concept

Sunne (FFG Energy Research)
Comparison of building models generated using different methods

Josef Ressel Centre (CDG)
For vibration acoustics

DyTEG (FFG Energieforschung)
Dynamic pricing for energy communities

research projects

(Concluded Projects since 2016)

Heat pump

PhaseOut (FFG Stadt der Zukunft)
Concepts for the retrofit of multi-family houses using heat pumps as a replacement for gas boilers
Nano heat pump for apartments

BlackVibDesign (FFG BRIDGE)
Vibration-damping metamaterials

LCR290 (BMWK DE)
Filling volume reduction, refurbishment with R290 heat pumps, safety concepts

Heat pump applications

NECST (FFG Zero Emission Mobility)
Waste heat utilisation from charging points

Energy management & optimisation

Flex+ (FFG Energy Research)
Flexibility through heat pumps
day-ahead and short-term

Energy Sponge (FFG EdZ)
PV-as-heat storage in buffer stores and buildings

Miscellaneous

MINKT (FFG)
Inspiring pupils to take an interest in STEM subjects through creativity

Student research projects
Bachelor's/Master's/Diploma theses

Events
Long Night of Research, STEM Festival, Next Generation Day, conferences

Research partners (selection)

- Graz University of Technology
- TU Dresden
- Technical University of Munich
- University of Innsbruck
- Management Center Innsbruck
- Vienna University of Applied Sciences
- University of Applied Sciences Vorarlberg
- Rosenheim University of Applied Sciences
- EPU Athens
- …

- AIT – Austrian Institute of Technology
- Fraunhofer ISE
- Fraunhofer IBP
- AEE INTEC
- Vorarlberg Energy Institute
- EURAC Research
- …



Results

Research Results (1)

iPump Nano domestic heat pump

- R290
  - <150g, no safety regulations
- Up to 6kW
  - SCOP up to
- All-in-one
  - Changeover valve
  - Expansion tank
  - Pumps
  - …
- Ceiling-mounted, 80x46x46cm

Result from the PhaseOut project

2022–2026



Research Results (2)

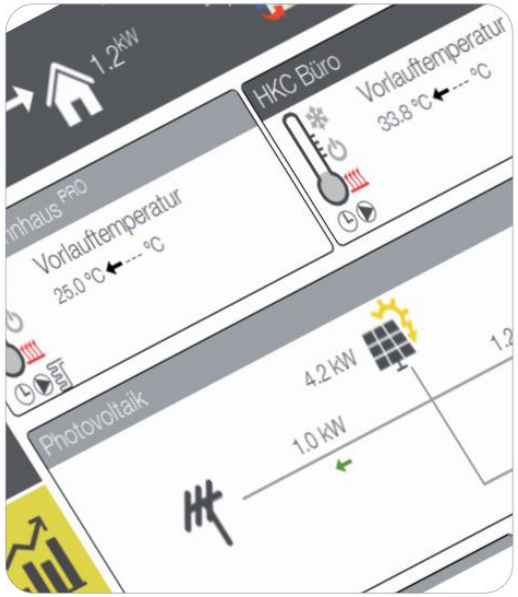
PV Overheating

- Increase in storage and building temperatures during periods of surplus PV generation
- Communication with all common inverter types

Results from the Energieschwamm project

2017–2022





Research Results (3)

Model Predictive Controller iON

- Optimal operating strategy based on forecasts (weather, energy prices, surplus PV, etc.)
- In operation since 2025

Result of the Flex+ project and further research collaborations

2018–2025



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