



# Heat Pump R&D in Austria

**René Rieberer, Harald Moser**

Institute of Thermal Engineering (IWT)

Graz University of Technology

[Rene.Rieberer@tugraz.at](mailto:Rene.Rieberer@tugraz.at)

<http://www.iwt.tugraz.at>

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- **IEA Heat Pump Activities @ IWT-TU Graz & AIT**  
(Contributions to Current Annexes)
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**IEA Activities**

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## Current IEA Projects Related to Heat Pumps

**HPP Annex 34: Thermally-Driven Heat Pumps**

**HPP/IETS Annex 35/13: Industrial Heat Pumps**

**SHC Task 44: Solar and Heat Pump Systems**

**Austrian IEA participations are financially supported by**



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## HPP Annex 34 - Thermally-Driven Heat Pumps

Duration: 10/2007 – 11/2009 + optional extension: → 12/2011

### Main Contributions of AIT & IWT:

- State-of-the-art evaluation (AIT & IWT)
- Development of testing and performance evaluation procedures – Subtask lead (AIT)
- Investigation of corrosion and ammonia decomposition phenomena at high temperatures (IWT)
- Demo-Project Gas-AHP (IWT)

### Related National Project

- InnoGEN: Development of a highly efficient direct gas-fired generator for a NH<sub>3</sub>/H<sub>2</sub>O AHP & investigation of corrosion and ammonia decomposition phenomena (AIT, IWT, Heliotherm)



Source: Helioplus, 2008

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## HPP Annex 35 - Industrial Heat Pumps

Duration: 05/2010 – 04/2013

### Main Contributions of AIT & IWT

- Evaluation of HP market and existing application in Austria
- Analysis of available software tools
- Case studies of existing applications
- Participation in meetings and dissemination of findings in Austria

### Related National Project

- Applied for “Promise Demo IF”: Case study - Integration of a high temperature HP in an industrial company (IWT & others)



Source: <http://www.hybridenergy.no>

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## SHC Task 44 – Solar and Heat Pump Systems

Duration: 05/2010 – 04/2013



### Main Contributions of AIT & IWT

- State-of-the-art investigation (AIT & IWT & Others)
- Development of testing and performance evaluation procedures as well as a proposal for labelling schemes – Subtask lead (AIT)
- Analysis of different concepts for the combination HP & Solar (system simulations) (IWT)

### Related National Projects

- WRGpot: Waste water heat recovery in low energy buildings – potential and concepts in combination with solar energy and HPs (AEE Intec, IWT & Others)
- SolPumpEff: Efficient combinations of solar thermal systems and HPs incl. field tests (AEE Intec, IWT, Solution & Ochsner)

## Other Heat Pump Projects @ IWT (1/4)

Title: “ThermoPump“



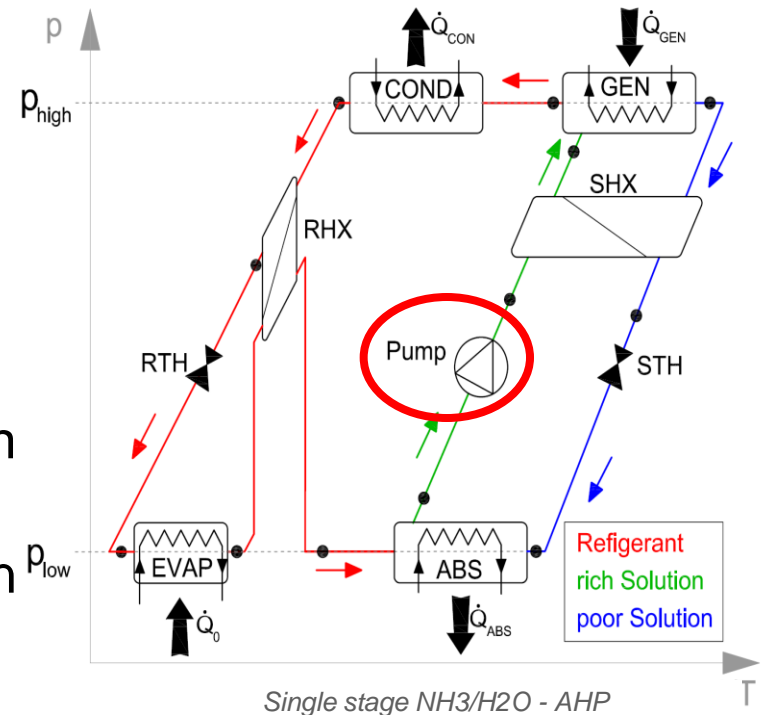
Thermally Driven Solution Pump for Small-Capacity NH<sub>3</sub>/H<sub>2</sub>O-Absorption Heat Pumping Systems (AHPs)

Duration: 05/2010 – 10/2012

Project Partners: IWT + Pink & Heliotherm

Main Contents of the Project:

- Theoretical and experimental analyses of different concepts for “thermally driven” solution pumps
- Development of a cost-efficient thermally driven solution pump for small-capacity AHPs



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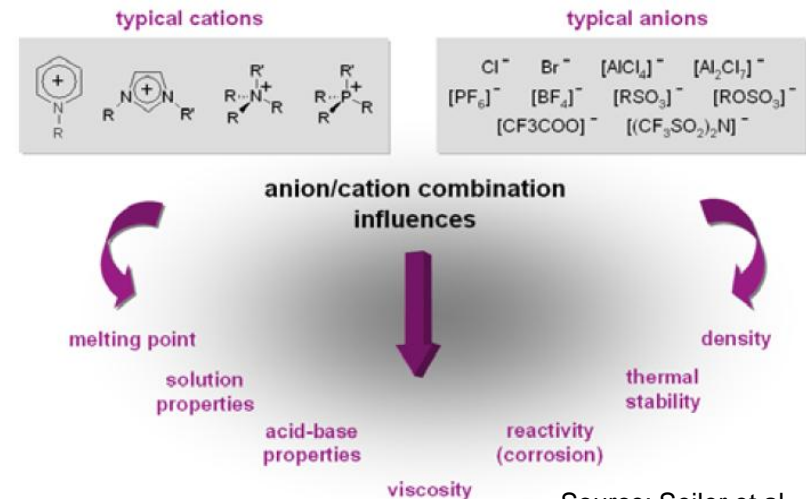
## Other Heat Pump Projects @ IWT (2/4)

### Title: “IonA” – Feasibility Study of Absorption Heat Pumping-Processes with Ionic Liquids

**Duration: 05/2010 – 07/2011**

#### Main Contents of the Project:

- Search for most promising ionic liquids and property data
- Carry out thermodynamic simulations
- Identify possible follow-up projects & partners



Source: Seiler et al., 2008



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## Other Heat Pump Projects @ IWT & AIT (3/4)

**Title: “Solar Cooling Opt” – Primary Energy Optimization of Solar Thermal Cooling Applications with Efficient System Equipment and Innovative Control Strategies**

**Duration: 10/2010 – 12/2013**

**Project Partners: AEE Intec, AIT, IWT... (15 project partners)**

### Main Contents of The Project:

- Development of improved component models for simulation studies
- Generation of load profiles
- Development of optimized system concepts and control strategies



Source: Pink GmbH, 2010 (<http://www.pink.co.at>)

## Other Heat Pump Projects @ IWT (4/4)

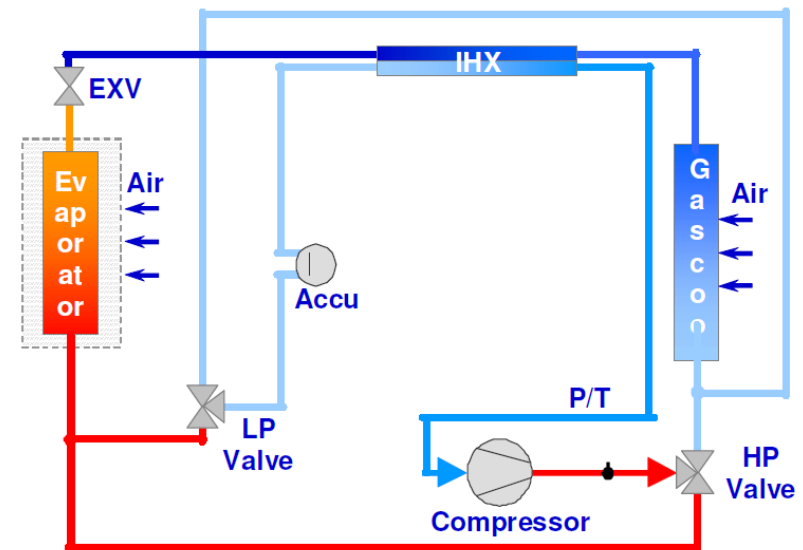
**Title:** HEKH 744 – Highly Efficient A/C & Heating System for Electrical & Hybrid Vehicles

**Duration:** 01/2010 – 12/2011

**Project Partners:** Virtual Vehicle Competence Centre, Obrist, IWT

### Main Contents of the Project:

- Component Development
- System integration & control strategies
- Simulation & experimental analysis (focus on heating mode)





## R & D Needs

- **Alternative Cycles/Systems**
- **Alternative Refrigerants: Low-GWP fluids**
- **High Temperature Applications (industrial, retrofit)**
- **Cost-efficient Heat Source Systems**
- **Low-cost Components**
- **Reduction of Parasitic Power Consumption**
- **Capacity Control**
- ...



## Conclusions

- Austria is participating in several IEA Annexes & Tasks related to Heat Pumping (HPP Annex 34 & 35, SHC Task 44)
- Other R&D projects deal e.g. with thermally driven systems, ionic fluids, mobile applications
- Further R&D topics are defined

# Thank You for Your Attention!