



ACHEMA 2012

Application of Industrial Heat Pumps

Improving energy – efficiency of industrial processes

H.J. Laue
Information Centre on Heat Pumps and Refrigeration
IZW e.V.



Welcome

**Achema Congress 2012
Session**

Application of Industrial Heat Pumps

Improving energy – efficiency of industrial processes

Organised by

**German Information Centre on Heat Pumps and Refrigeration - IZW e.V.
International Energy Agency (IEA) - Agreements
"Heat Pump Programme"
"Industrial Energy-related Technologies and Systems"**



**Annex (R&D project)
„Application of industrial Heat Pumps“**

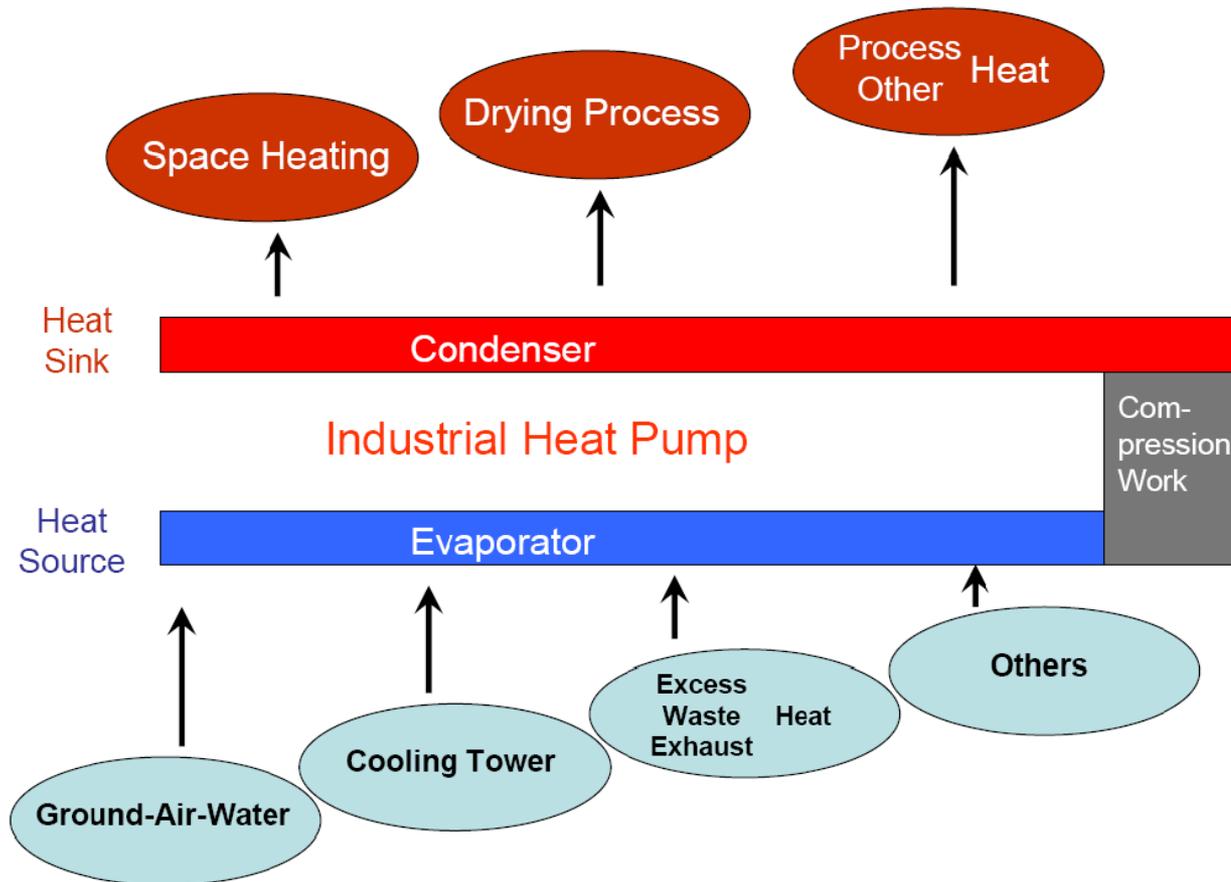
of the
International Energy Agency (IEA)
Implementing Agreements
Heat Pump programme
and
Industrial Energy-related Systems and
Technologies
with
12 participating organisations from 9 countries



“Industrial Heat Pumps”

- Heat pumps have become increasingly important in the world as a technology to improve energy efficiency and reduce CO₂ emissions.
- Heat pumps should therefore more increasingly used for heat recovery and temperature rise in industrial processes but also for cooling of industrial processes and heating and cooling of industrial buildings

Heat Source and Heat Sink in industrial Heat Pumps ("Summary")



Advantages of Industrial Heat Pumps

compared with

Residential Heat Pumps

- **High energy efficiency = high coefficient of performance (COP) (e.g. low temperature lift and or high temperature levels)**
- **long annual operating time**
- **relatively low investment costs, due to large units and small temperature difference between heat source and heat sink**
- **waste heat production and heat demand occur at the same time**



Present disadvantages

- **lack of refrigerants (with low GWP and /or relevant properties) in the interesting higher temperature range**
- **lack of experimental and demonstration plants**
- **uncertainty by potential users as to heat pump reliability**
- **lack of necessary knowledge of heat pump technology and application by industrial process designers and planers**



IEA Project focus on

- **Reduction of energy costs, fossil energy consumption and CO₂-emissions in industrial and commercial heat generation**
- **Constraints related to medium and high temperature refrigerants (low GWP, ODP = 0)**
- **adapted compressors for high temperature**
- **Process methodology for integration of HPs in industrial processes**

PROGRAMME

- Introduction.
H.J. Laue, Information Centre on Heat Pumps and Refrigeration - IZW e.V., Germany
- **10.30**
Dave Pearson, Director of Innovation, Star Refrigeration Ltd;
Philippe Nellissen, Product Manager Industrial Applications Emerson climate Technologies GmbH
Proven applications in 2012 for Megawatt+ Heatpumps within a technical, commercial and sustainable framework
- **11.00**
M. Sc. Stefan Wolf, Dipl.-Ing. Jochen Lambauer, Dr. rer.pol. Ulrich Fahl,
Dr.-Ing. Markus Blesl, Prof. Dr.-Ing. Alfred Voss, Institute for Energy Economics and the Rational Use of Energy (IER), University of Stuttgart, 70565 Stuttgart, Germany:
Industrial Heat Pumps in Germany – Potentials, technological development and application examples
- **11.30**
Dipl.-Ing. Bjarke Paaske, Dipl.-Ing. Christian Heerup, M. Sc. Lars Reinholdt; The Danish Technological Institute (DTI) 8000 Aarhus C, Denmark,
Heat pumps in industrial cleaning applications
- **12.00**
Dipl.-Ing. Wolfgang Dietrich, Dr.-Ing. Ole Fredrich, GEA Refrigeration Germany GmbH Berlin, Germany
Heat pumps using Ammonia – the megawatt range
- **12.30**
J-L Peureux, Sapora Eugénio, Damien Bobelin: EDF R&D, Eco-efficiency and Industrial Processes department
Centre des Renardières 77818 Moret sur Loin
Very high-temperature heat pumps applied to energy efficiency in industry