

## Economical heating and cooling systems for low energy houses



### IEA HPP Annex 32 Publications

Publications of Annex 32 workshops (papers and presentations), Reports and Journal articles.

### Reports

#### Interim Report Annex 32



**Carsten Wemhoener (editor)**

Low energy buildings and systems, Interim report Annex 32, Muttenz, October 2008

#### Country reports on Task 2/3



**Andreas Heinz, René Rieberer**

System assessment and field monitoring, Country report Austria Task 2 and Task 3, Graz, April 2008



**Vasile Minea**

System assessment and field monitoring, Country report Canada Task 2 and Task 3, Shawinigan, April 2008



**Carsten Wemhoener, Ralf Dott, Thomas Afjei**

System assessment and field monitoring, Country report Switzerland Task 2 and Task 3, Muttenz, April 2008



**Marek Miara, Thomas Kramer, Jakub Wojciech Wewiór**

System assessment and field monitoring, Country report Germany Task 3, Freiburg, April 2008



**Katsunori Nagano**

System assessment and field monitoring, Country report Japan Task 3, Sapporo, May 2008



**Jorn Stene**

IEA HPP Annex 32: Economical heating and cooling systems for low energy houses  
1) Analysis of CO2 Heat pump system for low-energy and passive houses, 2) Field test of an integrated propane heat pump system in a passive houses Country report Norway Task 2 and Task 3, SINTEF Technical Report TR-A6676, Trondheim, May 2008



**Van D. Baxter, Dr. C. K. Rice, Dr. R. W. Murphy**

Small integrated heat pumps (IHP) for net zero energy homes (ZEH) - development status, Country report USA Task 2, Oak Ridge, May 2008

**Country reports on Task 1****Andreas Heinz, René Rieberer, Thomas Mach**

IEA HPP Annex 32: Task 1: State-of-the-art analysis, Country report Austria, Graz, June 2007

**Vasile Minea**

IEA HPP Annex 32: Task 1: State-of-the-art analysis, Canada report, Shawinigan, June 2007

**Carsten Wemhoener, Thomas Afjei**

IEA HPP Annex 32: Task 1: State-of-the-art analysis, Country report Switzerland, Muttenz, November 2007

**Andreas Bühring, Christian Bichler, Martina Jäschke**

IEA HPP Annex 32: Task 1: State-of-the-art analysis, Country report Germany, Freiburg, Feb. 2007

**Katsunori Nagano, Hirofumi Ida**

IEA HPP Annex 32: Task 1: State-of-the-art analysis, Country report Japan, Sapporo, Nov. 2006

**Onno Kleefkens**

IEA HPP Annex 32: Task 1: State-of-the-art analysis, Draft country report Netherlands, Utrecht, August 2007

**F.W. Den Dulk**

Development of installation technology in houses with ultra-low energy consumption, Country report Netherlands Task 1, Utrecht, Feb. 2008

**Jorn Stene**

IEA HPP Annex 32: Task 1: State-of-the-art Report Norway, SINTEF Technical Report TR-A6506-07, Trondheim, April 2007

**Arun Vohra**

IEA HPP Annex 32: Task 1: State-of-the-art analysis, US team report, Washington, Nov. 2006

**Status reports for the Executive Committee**

102 kB

**Carsten Wemhoener**

ExCo Status report IEA HPP Annex 32 autumn meeting, Seoul, Nov. 2008

79 kB

**Carsten Wemhoener**

ExCo Status report IEA HPP Annex 32 spring meeting, Zurich, May 2008

92 kB

**Carsten Wemhoener**

ExCo Status report IEA HPP Annex 32 autumn meeting, Brussels, Nov. 2007

33 kB

**Carsten Wemhoener**

ExCo Status report IEA HPP Annex 32 spring meeting, Paris, May 2007

**Status reports for the Executive Committee**

2.4 MB

**Ralf Dott, Thomas Afjei, Arthur Huber**

Heizen und Kühlen mit erdgekoppelten Wärmepumpen, final report of SFOE research project, Muttenz, Aug. 2007



**Jørn Stene**

List of Norwegian reports and publications in the frame of the IEA HPP Annex 32 project










## Presentations/Workshop papers

---

### Joint IEA EEWP/EUWP Workshop "Towards Zero Energy Buildings"

- 3.0 MB   **Carsten Wemhoener**  
Strategies and system concepts from IEA HPP Annex 32,  
Joint IEA EEWP/EUWP Workshop "Towards Zero Energy Buildings", Paris,  
April 2009



### Workshop on the 9th IEA HP conference Zurich 2008

- 2.2 MB   **Carsten Wemhoener**  
Introduction to low energy houses and building systems  
Institute of Energy in Building, University of Applied Sciences Northwestern  
Switzerland,  
Workshop IEA HP Conference 2008, Zurich, May 19, 2008
- 2.9 MB   **Onno Kleefkens**  
Low energy houses in the Netherlands  
SenterNovem, the Netherlands,  
Workshop IEA HP Conference 2008, Zurich, May 19, 2008
- 0.7 MB   **Andreas Heinz, René Rieberer**  
System layout, cycle evaluation and system simulations of an integrated  
heat pump prototype for the capacity range of 3-5 kW  
Institute of Thermal Engineering, Graz Technical University, Austria,  
Workshop IEA HP Conference 2008, Zurich, May 19, 2008
- 1.7 MB   **Thomas Afjei, Ralf Dott**  
Cosy Place: Demonstration of an Energy-efficient Heating and Cooling  
system?  
Institute of Energy in Building, University of Applied Sciences Switzerland  
Workshop IEA HP Conference 2008, Zurich, May 19, 2008
- 0.8 MB   **Melissa V. Lapsa, Van D. Baxter**  
Integrated Heat Pump System Technology Development for Net Zero  
Energy Home (ZEH) Applications  
Oak Ridge National Laboratory, Oak Ridge, Tennessee, USA  
Workshop IEA HP Conference 2008, Zurich, May 19, 2008
- 0.3 MB   **Svein Ruud**  
New building regulations boosts the redesign/development of heat pumps  
for low energy buildings  
SP Energy research, Technical Research Institut of Sweden  
Workshop IEA HP Conference 2008, Zurich, May 19, 2008
- 2.0 MB   **Sayaka Takeda Kindaichi, Hirofumi Ida**  
Optimization of Japanese heat pump systems in the moderate climate  
region  
University of Tokyo, Japan  
Workshop IEA HP Conference 2008, Zurich, May 19, 2008
- 1.1 MB   **Jørn Stene**  
High-Efficiency Heat Pump Water Heater (HPWH) System for Apartment  
Buildings of Passive House Standard  
SINTEF Energy research, Norway  
Workshop IEA HP Conference 2008, Zurich, May 19, 2008
- 1.6 MB   **Marek Miara**  
Performance/optimization of state-of-the art residential heat pump









Fraunhofer Institute of solar energy systems (ISE), Germany  
Workshop IEA HP Conference 2008, Zurich, May 19, 2008

















- 6.3 MB   **José Candanedo, Vasile Minea and Andreas Athenitis**  
Low energy houses in Canada: National Initiatives and achievements  
Concordia University, Montreal, Canada  
Workshop IEA HP Conference 2008, Zurich, May 19, 2008
- 1.0 MB   **Jørn Stene**  
Field Test Results for a Novel Water-to-Water Propane Heat Pump System  
Installed in a Passive House  
SINTEF Energy research, Norway  
Workshop IEA HP Conference 2008, Zurich, May 19, 2008
- 1.6 MB   **Katsunori Nagano**  
Field test of ground-coupled heat pump for cold climate region of Japan,  
First and Second demonstration project heat pump system in the Low  
Energy House.  
University of Hokkaido, Japan  
Workshop IEA HP Conference 2008, Zurich, May 19, 2008
- 0.3 MB   **Carsten Wemhöner**  
Workshop conclusions  
Institute of Energy in Building, University of Applied Sciences Switzerland  
Workshop IEA HP Conference 2008, Zurich, May 19, 2008

#### Contribution from Session low energy houses at 9th IEA HP conference Zurich 2008



- 5.1 MB   **Daniel Ellis**  
Field Experience with Ground-Source Heat Pumps in Affordable Low Energy  
Housing  
ClimateMaster, Inc., Oklahoma City, U.S.A  
Presentation on the 9th IEA HP Conference 2008, Session low energy  
houses, Zurich, May 22, 2008

#### Workshop on the 4<sup>th</sup> IEA HPP Annex 32 working meeting



- 1.1 MB   **Carsten Wemhoener**  
IEA HPP Annex 32: Research for heat pumps in low energy houses,  
Institute of Energy in Building, University of Applied Sciences Switzerland,  
IEA HPP Annex 32 Workshop, Kyoto, Dec. 2007
- 1.0 MB   **Takao Sawachi**  
Dependency of COP of air-conditioners on actual environmental parameters  
in residential buildings, National Institute for Land and Infrastructure  
Management (NILIM), Japan, IEA HPP Annex 32 Workshop, Kyoto, Dec.  
2007
- 0.4 MB   **V.D.Baxter, Arun Vohra**  
Integrated Heat Pump System Technology Development for Near Zero  
Energy Home (ZEH) Applications U.S. Department of Energy, USA, IEA HPP  
Annex 32 Workshop, Kyoto, Dec. 2007
- 1.1 MB   **Kouhei Hasegawa**  
Introduction of residential hot-water heating system with heat pump, and  
duct-type air conditioning system for a whole house, Mitsubishi Electric  
Corporation, Japan , IEA HPP Annex 32 Workshop, Kyoto, Dec. 2007

- 1.2 MB   **Takao Katsura**  
Performance prediction and feasibility study of heat pump systems for an actual low energy house, Fujiwara Environmental Science Institute Ltd, Japan, IEA HPP Annex 32 Workshop, Kyoto, Dec. 2007
- 0.7 MB   **Katsunori Nagano**  
Outlines of new actual low energy house and its facilities Hokkaido University, Japan, IEA HPP Annex 32 Workshop, Kyoto, Dec. 2007
- 0.9 MB   **Jørn Stene**  
CO<sub>2</sub> Heat pump systems for low-energy houses and passive houses, SINTEF Energy Research, Norway IEA HPP Annex 32 Workshop, Kyoto, Dec. 2007
- 3.4 MB   **Achim Zeller**  
Heat pumps for private residential buildings, Daikin Europe N.V.-Brussels office, Japan  
IEA HPP Annex 32 Workshop, Kyoto, Dec. 2007
- 4.3 MB   **Teruo Yamamoto**  
System Efficiency Analysis of a CO<sub>2</sub> Heat Pump Water Heater by Numerical Simulation Using Thermal Network Models Matsushita Electric Industrial Co., Ltd., Japan IEA HPP Annex 32 Workshop, Kyoto, Dec. 2007
- 0.3 MB   **René Rieberer**  
Developments within Building Technology & Heating Systems in Austria, Institute of thermal engineering, Technical University Graz, Austria  
IEA HPP Annex 32 Workshop, Kyoto, Dec. 2007
- 1.6 MB   **Yasukazu Kawaraguchi**  
The current Japanese house and preference  
Architech Consulting Co., Ltd., Japan  
IEA HPP Annex 32 Workshop, Kyoto, Dec. 2007
- 0.8 MB   **Sayaka Takeda Kindaichi et al.**  
Annual energy consumption of an actual low energy house in the cold region of Japan, University of Tokyo, Japan  
IEA HPP Annex 32 Workshop, Kyoto, Dec. 2007

## Workshop: Energy Conservation in buildings and heat pump use, Technical Briefing IEA ECBCS and HP Program

- 3.9 MB   **Carsten Wemhoener**  
IEA HPP Annex 32: Economical heating and cooling system for low energy houses, Brussels, Nov. 2007 Task 3 - Field testing of integrated heat pump systems



## Workshop HPP ExCo meeting

- 1.4 MB   **Carsten Wemhoener**  
IEA HPP Annex 32 - Project introduction and results Task 1, Paris, June 2007



## Articles

---



The IEA Heat Pump Centre Newsletter 3/2008 is dedicated to the 9<sup>th</sup> IEA heat pumps conference which took place in Zurich in May 2008



120 kB   **Summary Workshop Annex 32 on the 9<sup>th</sup> IEA HP Conference**  
HPC Newsletter Volume 26, No.3/2008, p.13-14

The IEA Heat Pump Centre Newsletter 2/2008 is dedicated to heat pumps for low energy buildings

4.1 MB   **Heat pumps for low energy buildings**  
Topical articles on the Annex 32 national contribution and related international projects on heat pumps in low energy houses, HPC Newsletter Volume 26, 2/2008, p. 19-47

Article on the IEA HPP Annex 32 in newsletters and journals

0.3 MB   **Multifunctional heat pump system for low energy houses**  
Article on the Annex 32 and the kick-off meeting in IEA HPC Newsletter volume 24, No.2/2006, p. 14-15

3.2 MB   **Entwicklung läuft weiter**  
Article on the Annex 32 and the kick-off meeting, HK Gebäudetechnik 08|2006

Articles on national contributions to IEA HPP Annex 32

2.4 MB   **Wärmepumpen im Feldtest**  
Article on the German national project, KI Luft Kälte Klimatechnik, September 2007, p. 24-27

---

### IEA HPP Annex 32

IEA HPP Annex 32 is a corporate research project on technical building systems with heat pumps for the application in low energy houses.

The project is accomplished in the Heat Pump Program (HPP) of the International Energy Agency (IEA).

Internet: <http://www.annex32.net>

