



## The IEA Heat Pump Programme

Research, Development, Demonstration and  
Promotion of Heat Pumping Technology

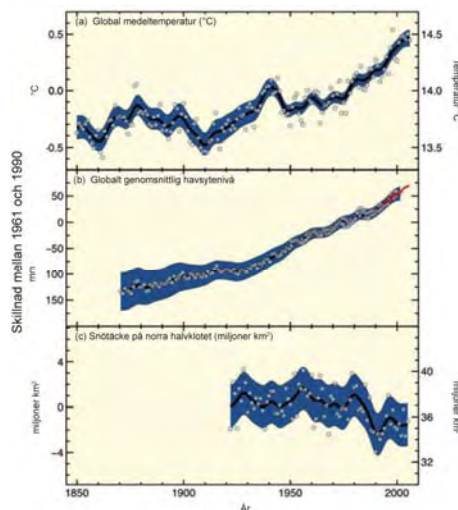
**IEA ETP 2010**  
– Huge Potential for heat pumps!

**Monica Axell**  
IEA HPC, General Manager

[www.heatpumpcentre.org](http://www.heatpumpcentre.org)

IEA Heat Pump Programme – Workshop – Vienna, Austria, November 9, 2010

## Climate change



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## Energy Technology Perspectives 2010 (ETP 2010)



- **Main goals / subjects / challenges treated**
  - Energy security
  - Climate change
  - Growing energy needs of the developing world
- **ETP 2010 report**
  - Provides IEA's perspective on how to decrease CO<sub>2</sub>
  - Lists costs and benefits
  - Target year: 2050
- **How to meet challenges**
  - Make better use of existing technologies
  - Develop new technologies

IEA Source: Energy Technology Perspectives 2010 © OECD/IEA, 2010 November 9, 2010

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## Two main scenarios in ETP 2010

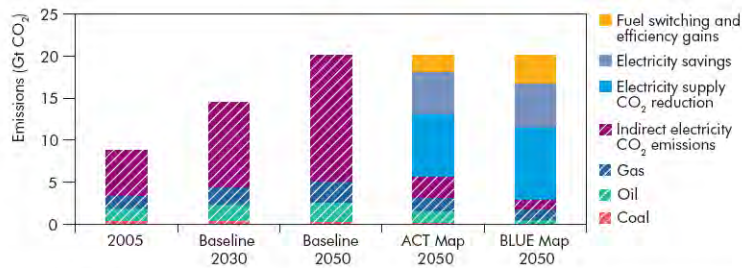


- **Baseline scenario**
  - No new energy and climate policies introduced
  - Builds on *WEO 2009 Reference* scenario
- **Blue Map scenario (with variants)**
  - Target-oriented:  
global energy-related CO<sub>2</sub> emissions halved by 2050
  - Optimistic for all technologies
- **ETP scenarios present options rather than forecasts**
- **Reminder: the world is moving, at an accelerated pace, in the wrong direction**

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## IEA Energy Technology Perspectives 2008



Note: Emission reductions due to increased use of heat pumps are considered part of fuel-switching and efficiency gains.

### Key point

Electricity savings dominate CO<sub>2</sub> reductions.

**Fuel switching is vital when we move from ACT to BLUE. Massive switch to *heat pumps*, solar hot water heating, solar PV and electrification in general where possible**

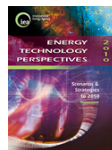
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## IEA Publications



- IEA Energy Technology Perspectives 2010



- IEA Road Map energy efficient/low-carbon buildings: heating and cooling, to be published
- IEA Building Sector Book, to be published

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# IEA Energy Technology Perspectives 2010



## Increase in building area

- Residential buildings, 67 %
- Services buildings, 195 %.



Electricity is "green" 2030 and is defined as an flexible and efficient energy carrier.



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# Need urgent policy measures



Table 6.1: Priority policy actions needed to deliver the outcomes in the BLUE Map scenario

	Overall savings potential	Policy urgency	Bulk of savings available
<b>Energy efficiency</b>			
Lighting	Medium	Average	Quickly
Appliances	Large	Average	Short- to medium-term
Water heating systems	Medium to large	Urgent	Short- to medium-term
Space heating systems	Medium to large	Urgent	Short- to medium-term
Cooling/ventilation systems	Medium to large	Urgent	Short- to medium-term
Cooking	Small	Average	Quickly
<b>Fuel switching</b>			
Water heating systems	Medium to large	Urgent/average	Short- to long-term
Space heating systems	Medium to large	Urgent/average	Short- to long-term
Cooking	Small	Average/urgent	Short to medium-term
<b>Building shell measures</b>			
New residential buildings	Medium to large	Average/urgent	Medium- to long-term
Retrofit residential buildings	Large	Urgent	Medium- to long-term
New commercial buildings	Large	Urgent	Medium- to long-term
Retrofit commercial buildings	Medium to large	Average	Medium- to long-term

Note: Overall savings potential is relative to their contribution to total savings in the building sector. Where two policy urgency ratings are given, it is for OECD/non-OECD.

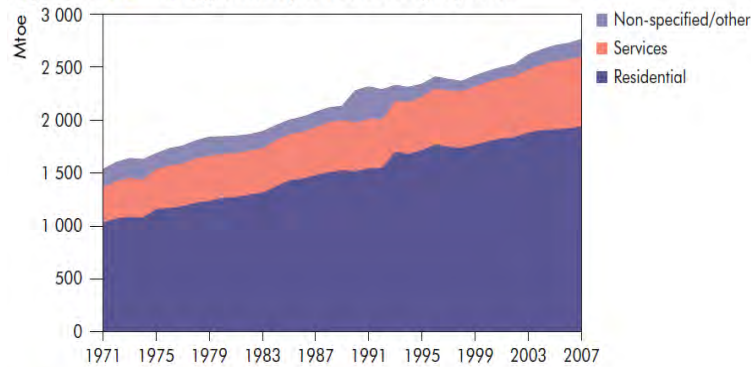
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## Residential sector is important



**Figure 6.4** ▶ Energy consumption of buildings by sector



**Key point**

The residential sector dominates total buildings sector energy consumption at a global level.

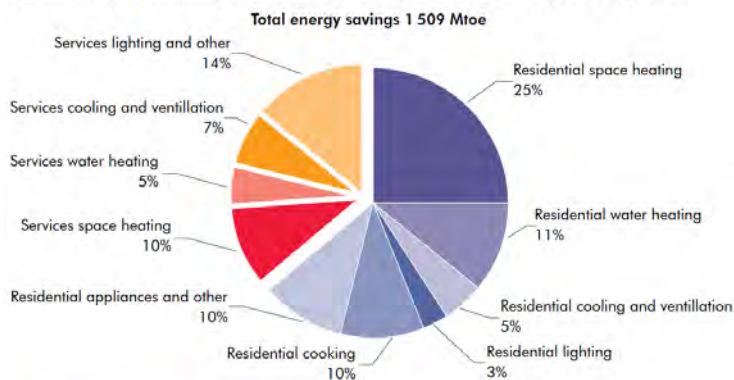
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## Heat pumps (heating, cooling & DHW)



**Figure 6.14** ▶ Buildings sector energy savings by sector and by end use, 2050



**Key point**

Two-thirds of the energy savings in the BLUE Map scenario come from the residential sector.

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## Heat pumps play a critical role in reducing CO2 emissions



Source: Energy Technology Perspectives 2010 © OECD/IEA, 2010

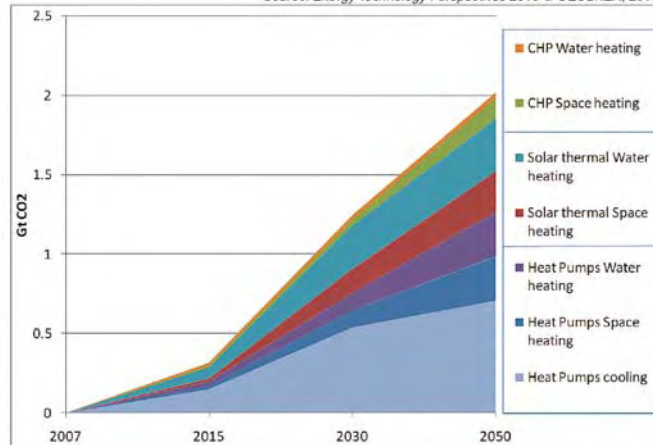


Figure 4: CO2 emissions reductions in buildings from heating and cooling systems in the BLUE Map scenario (reduction below the Baseline)

Key point: Heat pumps play a critical role in reducing CO2 emissions from heating and cooling equipment in the buildings sector

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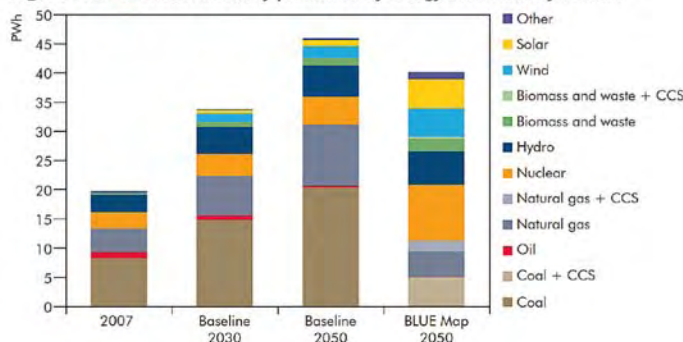
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## Heat pumps benefits from greening of the grid



Source: Energy Technology Perspectives 2010 © OECD/IEA, 2010

Figure 3.4 ▶ Global electricity production by energy source and by scenario



Note: Other includes electricity generation from geothermal and ocean technologies.

### Key point

There is a major shift from fossil fuels to low-carbon alternatives in the BLUE Map scenario.

Figure 5. Global electricity production by energy source and by scenario.

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## Conclusions



- The potential energy and CO<sub>2</sub> savings from wider use of heat pumps are substantial.
- AC efficiency is considerably higher
- Heat pumps with storage can avoid peak load
- Heat pumps can reduce costs when intermittent renewables are introduced in the grid
- Heat pump efficiency for space heating and DHW is increased
- Greening the grid until 2050. Nearly 100% in 2050. Heat pumps benefit the most by greening the grid.
- Needs for further R&D

**Heat pumps can play an important role both in industry and buildings**

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## For forthcoming ETP publications



- Comprehensive market development data.
- Better cost and life time data.
- A common view on the seasonal/annual performance of heat pumps
- **The work has started in IEA HPP**

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## The 10th IEA Heat Pump Conference, 2011



### Heat Pumps – The Solution for a Low Carbon World

**Date:** May 16-19, 2011

**Location:** Tokyo, Japan

#### Topics

- Environmental-friendly Technology
- Systems and Components
- Applications
- Research and Development
- Policy, Standards and Market Strategies
- Markets
- International activities



#### Workshops

#### Exhibition

**Regional Coordinators:** Dr Monica Axell - [Monica.axell@sp.se](mailto:Monica.axell@sp.se)  
[www.hpc2011.org](http://www.hpc2011.org)

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## Further information



### Talk to us now

Contact the Heat Pump Centre  
Look at the website  
[www.heatpumpcentre.org](http://www.heatpumpcentre.org)

Contact your delegate and alternate delegate  
Prof. Herman Halozan

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