

Task 37:
Advanced Housing Renovation with Solar and Conservation

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- 13:00 **Welcome and introduction – Why Housing Renovation?** Fritjof Salvesen, KanEnergi AS, Norway, Operating Agent task 37
- 13:20 **From demonstration projects to volume market;** Are Rødsjø, The Norwegian State Housing Bank, Norway, leader subtask A
- 13:50 **Lessons learned from 61 demonstration projects;** Robert Hastings, Architecture, Energy & Environment GmbH, Switzerland, leader subtask B
- 14:20 **Advances in Housing Renovation;** Hans-Martin Henning, on behalf of Sebastian Herkel, Fraunhofer Institute for Solar Energy, Germany, leader subtask C
- 14:50 Coffee break
- 15:20 **Renovation in cold climates,** Fritjof Salvesen, KanEnergi AS
- 15:30 **Sustainable Renovation,** Sophie Trachte, Université Catholique de Louvain Belgium, leader subtask D
- 16:00 Comments, discussions and follow up after task 37
- 16:30 End of seminar

Why Housing Renovation

Fritjof Salvesen

Operating Agent IEA SHC Task 37

KanEnergi AS

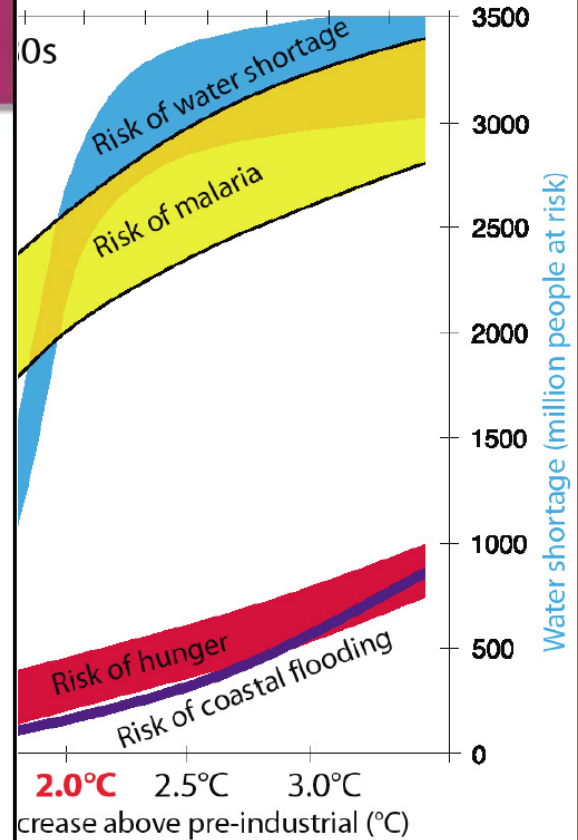
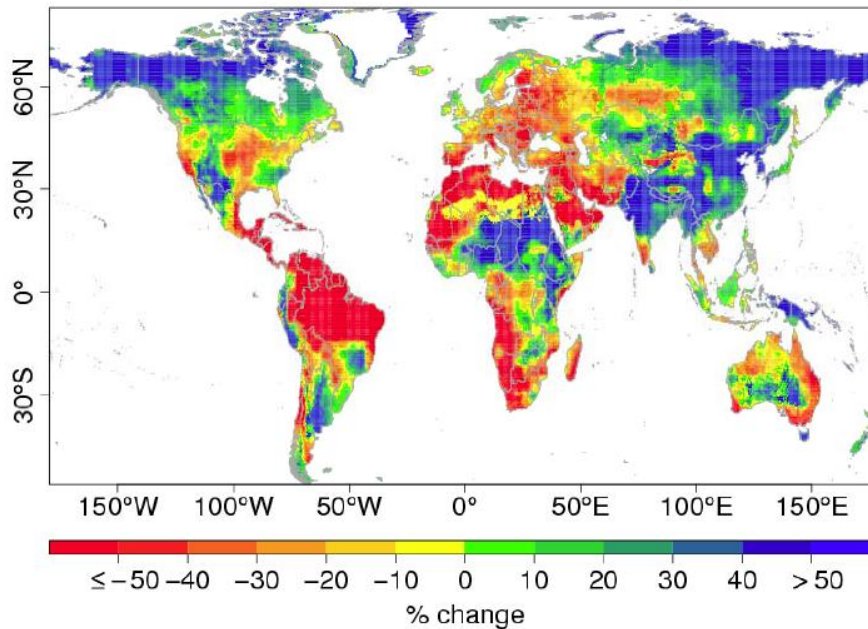
Norway

Global temperature is increasing – why bother?

Water resources

Walker
INSTITUTE

HadCM3 4°C runoff change



IPCC, Nov. 2004
Meehl et al. (1999) not above pre-industrial. The 1961-1990 average is 0.32°C above pre-industrial levels (1861-1880).
Global projected temperature levels in 2100 for different CO₂ emissions (only stabilization scenarios).
For the S1.5 scenario emission path has been about 1.4°C above 1990 (2°C above pre-industrial).

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- The **IPCC** (*Intergovernmental Panel on Climate Change*) conclusion: global emissions must **be reduced by 50% - 85% by 2050** if global warming is to be confined to between 2-2,4 °C.
- The G8 leaders agreed at the Heiligendamm Summit in 2007 to seriously consider a global 50% CO₂ reduction target.
- Energy stands for 69% of all CO₂ emissions and about 60% of all greenhouse gas emissions is related to energy supply and use.
- Building sector used 38% of global final energy consumption in 2005 and 57% of all electricity
- Building sector is dominated by residential and service sectors, accounting for 88% of energy consumption

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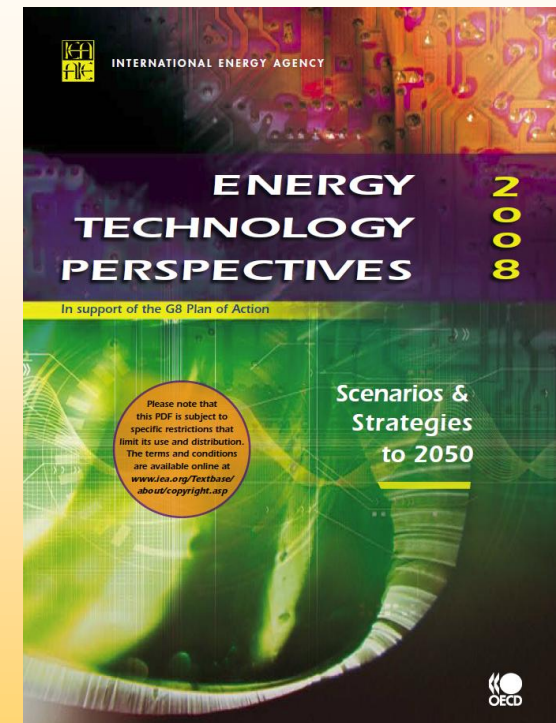
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Energy Technology Perspective 2008

- Request by G8 for "Alternative Scenario and Strategies" Gleneagles summit 2005

The report describes 3 scenarios:

- **Baseline** (Business as usual)
 - **ACT Map** (emission 2050 at 2005 level)
 - **Blue Map** (50% emission reduction in 2050)
-
- How to get there



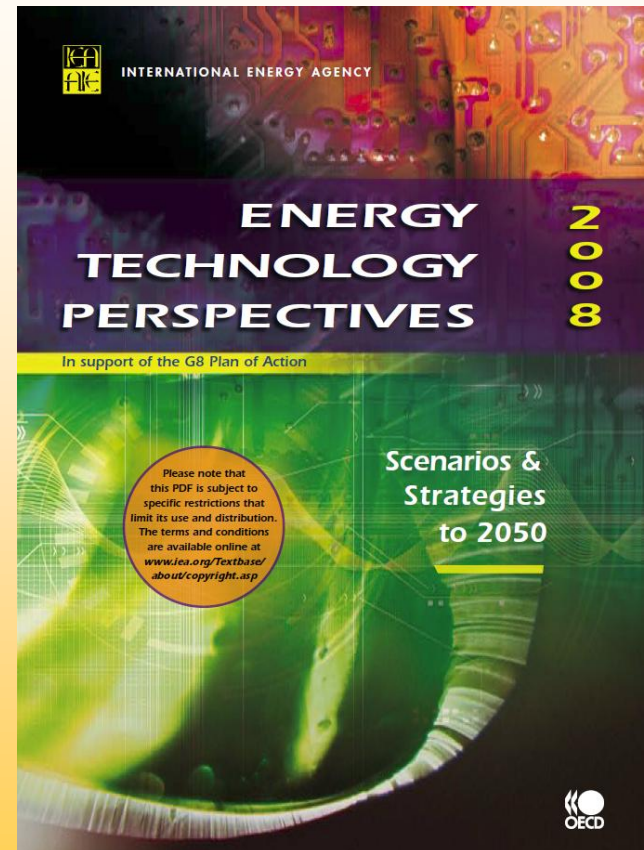
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- Based on optimistic assumptions about the progress of key technologies, **BLUE Map scenario** requires deployment of all technologies involving costs up to **200 USD/ton** of CO₂ when fully commercialized.
- If the progress of these technologies fails to reach expectations, costs may rise to as much as **USD 500 per ton**

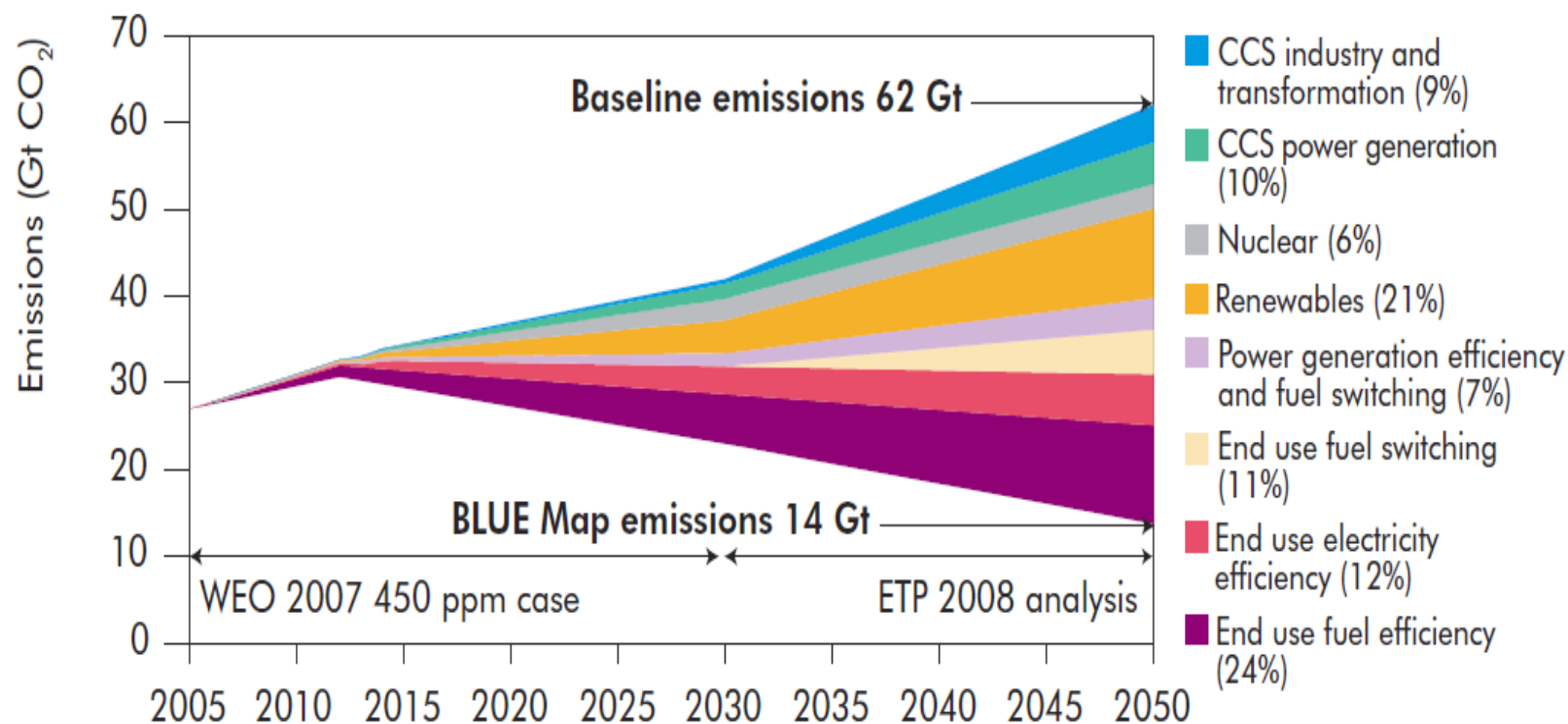
What does these cost levels mean

- CO₂ taxes impact on electricity costs from coal fired power plant:
 - 200 USD/ton => 18 US cent/kWh
 - 500 USD/ton => 45 US cent/kWh



Energy efficiency is important in the Blue Map scenario

Figure ES.2 ▶ Comparison of the *World Energy Outlook 2007* 450 ppm case and the BLUE Map scenario, 2005-2050



Building sector in BLUE Map scenario

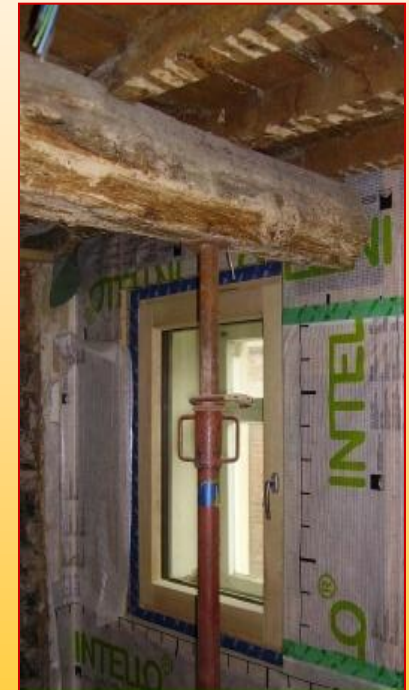
- CO₂ emissions are reduced by 43% below Baseline in 2050 (11,t Gt)
- In BLUE Map scenario the electricity generation is largely decarbonised in 2050
- Accounting for decarbonised electricity use in buildings, emissions from buildings are **85% lower** than Baseline
- This results in buildings sector CO₂ emissions in 2050 being 65% lower than their level in 2005

The BLUE Map scenario

- Widespread conversion of buildings to **very low energy consumption**, and even **“zero” energy buildings** are part of the scenario.

Among key roadmaps:

- Energy efficiency in buildings and appliances
- Heat pumps
- Solar space and water heating



Problem of air tightness on old beam

IEA Energy Technology Perspective 2008:

- More than half of the existing building stock will still be standing in 2050
- Buildings are much more frequently renovated than replaced
- More than 50% of the building stock in many OECD countries built before 1970
- 200.000.000 residential dwellings in OECD countries will **have to be renovated to new energy standards** in the **BLUE** scenario

IEA task 37 has shown:

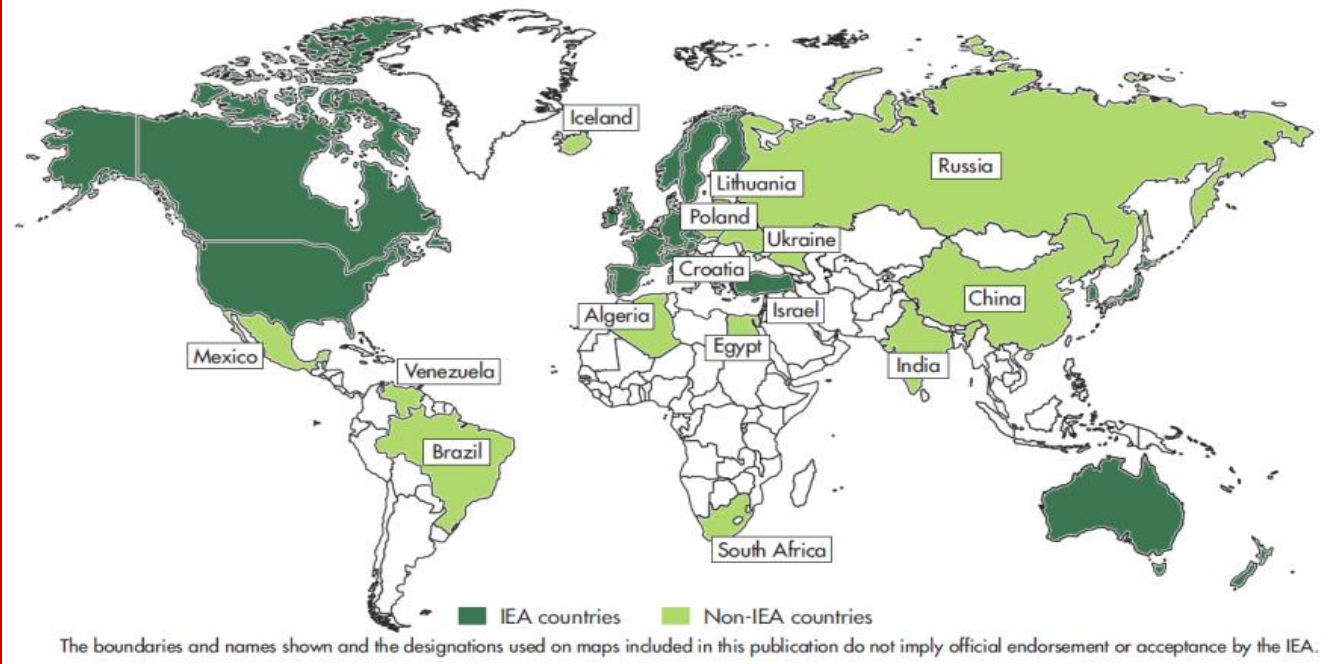
- It is possible for a dramatic decrease in energy demand in existing houses
- Twelve task 37 demo-projects on the web show reductions from 62 - 95% for space heating and DHW, average 75%.

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How can IEA influence

- IEA Implementing Agreements (Programs) provide the framework to advance the most efficient use of energy possible.
- Partnering with industry and non-member countries, the IEA Technology Collaboration is a global network.

Figure A.1 ▶ Global energy technology network



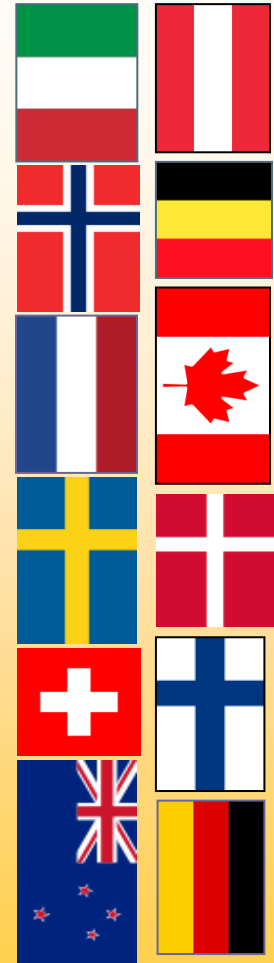
Solar Heating and Cooling Program (SHC)

18 participating countries and 43 projects (tasks) since 1977

<u>Australia</u>		<u>France</u>		<u>Norway</u>	
<u>Austria</u>		<u>Germany</u>		<u>Portugal</u>	
<u>Belgium</u>		<u>Italy</u>		<u>Spain</u>	
<u>Canada</u>		<u>Mexico</u>		<u>Sweden</u>	
<u>Denmark</u>		<u>Netherlands</u>		<u>Switzerland</u>	
<u>Finland</u>		<u>New Zealand</u>		<u>United States</u>	
<u>European Union</u>					

Task 37 "Advanced Housing Renovation with Solar and Conservation".

- Participating countries: Austria, Canada, Belgium, Denmark, Finland, Germany, Italy, New Zealand, Norway, the Netherlands, Sweden, Switzerland
- More than 45 participating experts
- Time schedule 1. July 2006 - 31. Dec.2009
- Task website: www.iea-shc.org/task37



Task 37: Advanced Housing Renovation with Solar and Conservation

Task 37 Objectives:

- Develop solid knowledge base how to renovate housing to a very high energy standard while providing superior comfort and sustainability
- Develop strategies which support market penetration of such renovations explicitly directed towards market segments with high renovation potentials
- Market implementation strategies and technical R&D to be equal priority areas



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PROJECT SUMMARY
Two similar buildings with different ventilation systems:
1st: Mechanical ventilation with heat recovery – 60 kWh/m² heat demand
2nd: Exhaust air ventilation – 55 kWh/m² heat demand

SPECIAL FEATURES
Solar collector, reduction of primary energy: 87 % (calculation)

ARCHITECT
B. Thoma + G. Hentinger – Thoma

HVAC ENGINEER
Ingenieurbüro Lenz

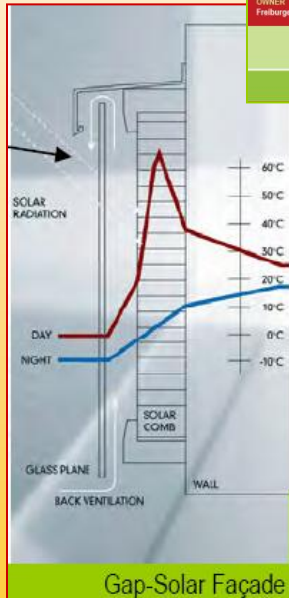
ENERGY CONCEPT
Stahl/Wiesl, Büro für Sonnenenergie

OWNER
Freiburger Stadtbau GmbH

SHC
SOLAR HEATING & COOLING PROGRAMME
INTERNATIONAL ENERGY AGENCY

Apartment Building Rislerstrasse, Freiburg

IEA – SHC Task 37
Advanced Housing Renovation with Solar & Conservation



IEA SHC TASK 37
ADVANCED HOUSING
RENOVATION
WITH SOLAR AND CONSERVATION

SHC
SOLAR HEATING & COOLING PROGRAMME
INTERNATIONAL ENERGY AGENCY

SUBTASK D ENVIRONMENTAL IMPACT ASSESSMENT

SHC-Task 37 Structure:

Subtask A (Norway):
Marketing and Communication Strategies

Subtask B (Switzerland):
Advanced Projects Analysis

Subtask C (Germany)
Analysis and Concepts

Subtask D (Belgium):
Environmental Impact Assessment

Thank you for your attention

www.iea-shc.org/task37

Fritjof Salvesen
KanEnergi AS
Hoffsveien 13, 0275 Oslo, Norway
fs@kanenergi.no