

CSTB
le futur en construction

ADEME



Agence de l'Environnement
et de la Maîtrise de l'Énergie

EBC



Energy in Buildings and
Communities Programme

Annex 65

Long-Term Performance of Super-Insulating Materials in Building Components & Systems

BUILD-UP WEBINAR
Tuesday 5 of November 2013

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Founded in response to the 1973/74 oil crisis: initial role was to secure oil supply through the release of emergency oil stocks.

Today the IEA works to ensure reliable, affordable and clean energy for its 28 member countries and beyond.

Main areas of focus: energy security, economic development, environmental awareness, and engagement worldwide.

International Collaborative Agreement

Energy Research, Development, Demonstration and
Dissemination

Open Innovation approach

26 Member Countries

Australia, Austria, Belgium, Canada, P.R. China, Czech Republic,
Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan,
Republic of Korea, Netherlands, New Zealand, Norway, Poland,
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1 : Building Concepts and Methodologies

Development & Demonstration of Financial & Technical Concepts for Deep Energy Retrofits of Public Buildings & Building Clusters (Annex 61)

Cost effective Energy and CO2 Optimization in Building Renovation (Annex 56)

Towards Net Zero Energy Solar Buildings (Annex 52)

2 : Integrated Building Systems

Reliability of Energy Efficient Building Retrofitting - Probability Assessment of Performance & Cost (Annex 55)

Prefabricated energy retrofit systems for residential buildings (Annex 50)

3 : Building Services

New Generation Computational Tools for Building & Community Energy Systems Based on Modelica (Annex 60)

High Temperature Cooling & Low Temperature Heating in Buildings (Annex 59)

Integration of Micro-generation & Other Energy Technologies in Buildings (Annex 54)

4 : Building Benchmarking & Measurements

Reliable Building Energy Performance Characterisation Based on Full Scale Dynamic Measurements (Annex 58)

Evaluation of Embodied Energy & CO2 Emissions for Building Construction (Annex 57)

Total Energy Use in Buildings: Analysis & Evaluation Methods (Annex 53)

5 : Integrated Community Systems

Guidelines and Case Studies for Energy-Efficient Communities (Annex 51)

Low-Exergy Systems for High Performance Buildings / Communities (Annex 49)



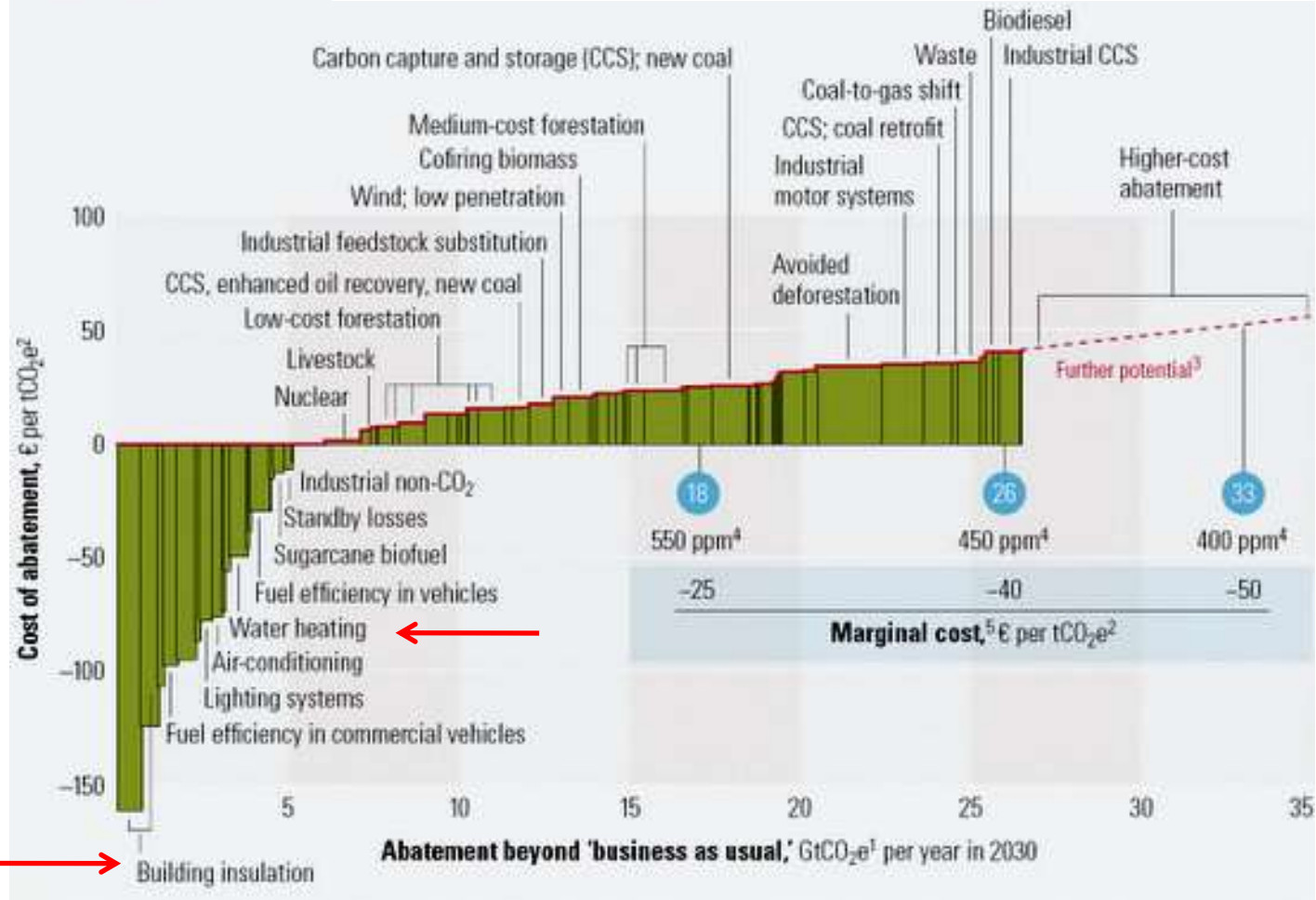
Annex 65

Long-Term Performance of Super-Insulating Materials in Building Components & Systems

Building Insulation & Water Heating Saving are among the most cost-effective carbon abatement measures

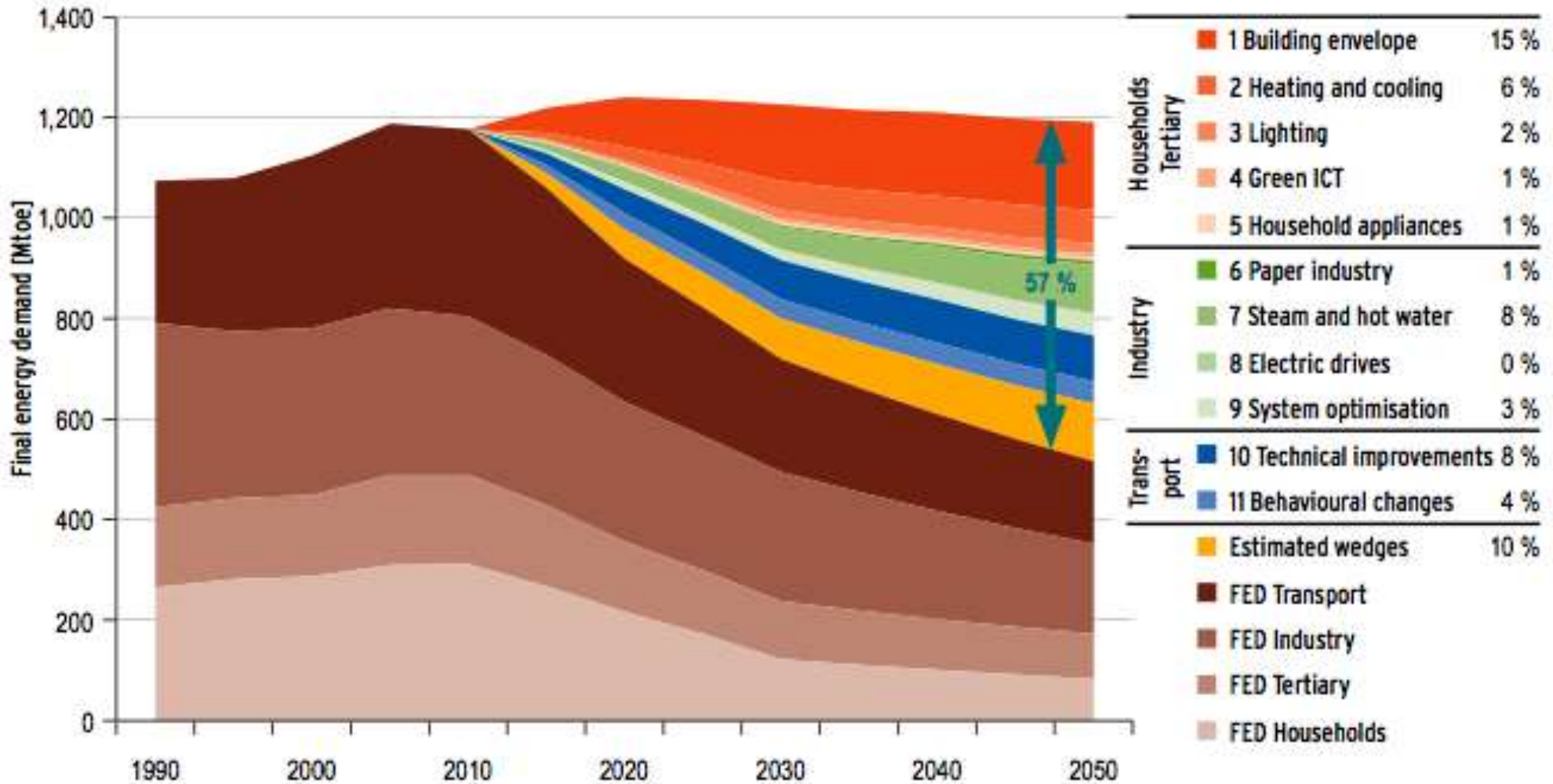
$$\text{Abatement cost} = \frac{[\text{Full cost of CO}_2\text{e efficient alternative}] - [\text{Full cost of reference solution}]}{[\text{CO}_2\text{e emissions from reference solution}] - [\text{CO}_2\text{e emissions from alternative}]}$$

Approximate abatement required beyond 'business as usual,' 2030



Global cost curve for greenhouse gas abatement measures beyond "business as usual".

Thermal performance of the envelope is a top priority





Challenge in the building sector

New Buildings

NZEB (Net Zero Energy Building)

10 % to 20 % of additional energy consumption (2050)

Renovation

Building stock : more than 80% of energy consumption.

75% of current buildings will still be standing in 2050

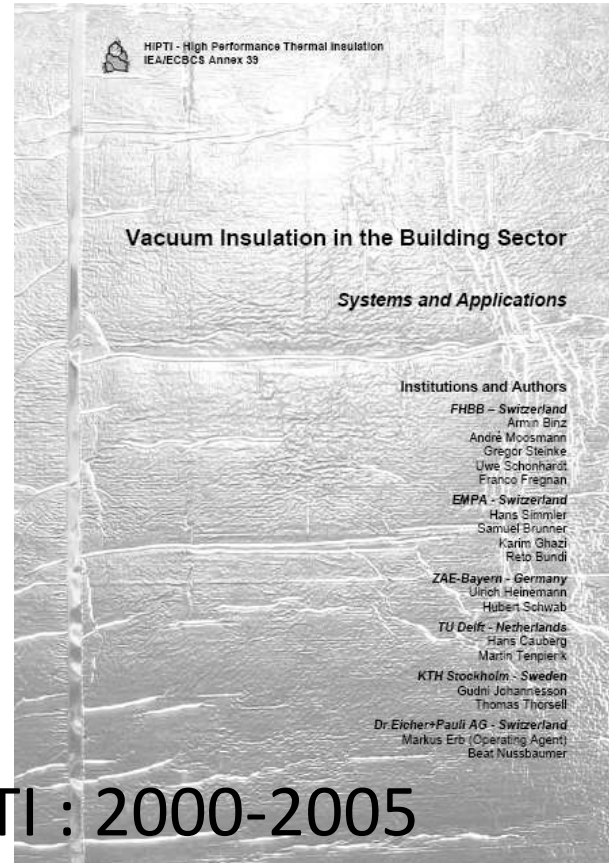
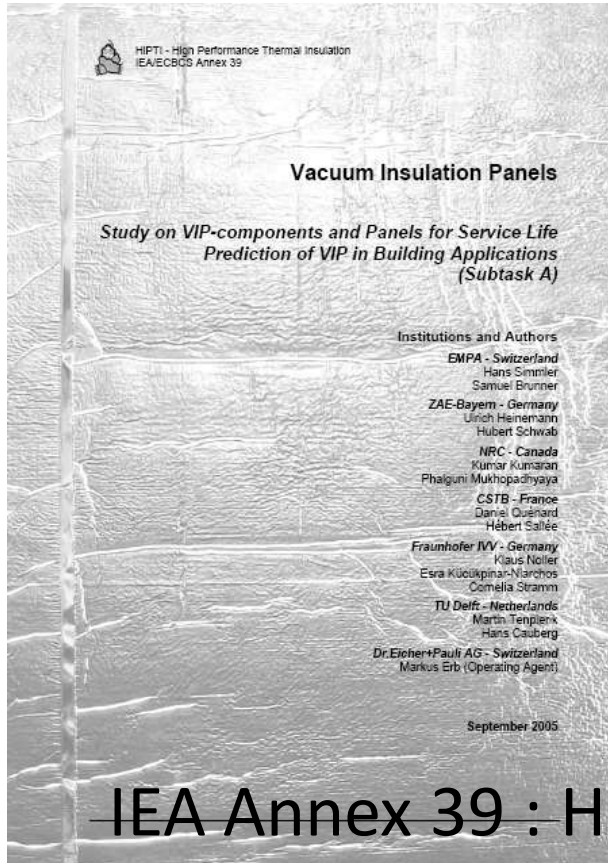
SIM should greatly contribute to this challenge

- Reliable data (properties & durability)
- Secure implementation techniques
- Sustainability Analysis

Main objectives of the Annex 65

- to improve knowledge and confidence of end-users regarding SIM, mainly VIP & Aerogel
- to foster a wider public acceptance of SIM in the future.

Previous Actions



IVIS 2005/Zurich, 2007/Wurzburg – 2009/London
2011/Ottawa – 2013/Zurich – 2015/Nanjing

Super Insulating Materials

Excellent insulation performance / relatively expensive

Only known since a few years (one decade)

New products are introduced to the market

Potential degradation processes could occur

Negative publicity could be detrimental to this sector of emerging products

Long term experience regarding their durability under different thermo-hygric conditions is lacking



Annex 65

Task Description

Task Leaders

TASK 1: State of the Art on Materials & Components - Case Studies

Task Leader: ZAE Bayern (EMPA)

SubTask 1A : Materials & Characterization Methods

SubTask 1B : Components & Systems

SubTask 1C : Case Studies at the Building Scale

TASK 2: Characterization of materials & components - Laboratory Scale

Task Leader: FIW Munich (Chalmers)

SubTask 2A : Materials Testing & Ageing Procedures

(Experiments & Simulation)

SubTask 2B : Components & Systems Testing

(Experiments & Simulation)

TASK 3: Practical Applications – Retrofitting at the Building Scale

Field scale

Task Leader: Chalmers University

SubTask 3A : Mapping of the Use Conditions (Components & Systems)

SubTask 3B : Performance at the Building Scale (Experiments & Simulation)

Subtask 3C : Practical Applications focused on Retrofitting

TASK 4: Sustainability – LCC, LCA, EE – Risk & Benefit

Task Leader : Quantis

SubTask 4A: Life Cycle Assessment (LCA), including Embodied Energy (EE)

SubTask 4B: Life Cycle Cost Analysis (LCC)

State of the Art on SIM

Recommendations on how to characterize SIM

Recommendations on how to perform reliable testing of components and building integrating SIM

Guideline of appropriate applications and installation methods

A synthesis report and a summary for larger dissemination.

Target Audience

ISO, CEN, UEATc, EOTA

The Building Research Community

Material, Component and System : Manufacturers, Suppliers

Engineering offices and consultants

Building designers & software developers

Building contractors with an interest in high performance systems

Energy providers



Participating Countries

- **Strong interest and high probability of funding:**
France, China, Germany, Italy, Korea, Norway, Spain, Sweden, Switzerland, Turkey, UK.
- **Interested and in process to obtain funding:**
Greece, Canada, Belgium
- **Potential observer:**
Israel
- **Participation at the expert-meeting**
Netherlands



Thank You

**You are welcome to
contribute to the Annex**

QUESTIONS ?