

PROJECT DOCUMENT

Status: PUBLIC

Final report

Workshop CENSE-ASIEPI, February 18, 2009 in Stuttgart

Common workshop of CENSE and ASIEPI

Bjarne Olesen *, Dirk van Orshoven **

*** DTU; ** BBRI**

Email: bwo@byg.dtu.dk; dirk.van.orshoven@bbri.be

CENSE_WP6.4.3_NO3rev01

May 28, 2009

IEE-CENSE

***Leading the CEN Standards on Energy performance of buildings to practice
Towards effective support of the EPBD implementation and acceleration
in the EU Member States***

Supported by

Intelligent Energy  Europe

Contract EIE/07/069/SI2.466698

Contents

1	Executive summary	4
1.1	The CENSE project	4
1.2	The ASIEPI project	4
1.3	Aim and programme of the workshop	4
1.4	Main discussion and results	4
1.5	Conclusions and recommendations	5
2	The CENSE project	6
2.1	The ASIEPI project	6
3	Aim and programme of the workshop	7
3.1	Main topic and objectives	7
3.2	Programme of the workshop	7
4	Content of the workshop	7
4.1	Presentations	7
4.2	Profile of participants	13
5	Main discussion and results	13
6	Conclusions and recommendations	13
	Annex A - Workshop Programme	15
	Annex B – Presentations	16
	Annex C – List of participants	17

NOTE: Annex B is provided as a separate pdf file.

Disclaimer:

CENSE has received funding from the Community's Intelligent Energy Europe programme under the contract EIE/07/069/SI2.466698.

The content of this document reflects the authors view. The author(s) and the European Commission are not liable for any use that may be made of the information contained therein.

Moreover, since this is an interim report: the results are only preliminary and may change in the course of the project based on further feedback from the contributors, additional collected information and/or increased insight.

1 Executive summary

1.1 The CENSE project

The objective of the IEE CENSE project (2007-2010) is to accelerate the adoption and improved effectiveness of EPBD related building energy performance standards from CEN in the EU Member States.

The IEE CENSE project initiates a number of international/regional workshops:

- to present their work plan and the interim results on information on the CEN standards
- to get feedback from the Member States or other target groups on possible obstacles to use of the standards and on good practice examples
- to identify together the ways for an increased convergence

1.2 The ASIEPI project

ASIEPI stands for ASsessment and Improvement of the EPBD Impact (for new buildings and building renovation).

ASIEPI is dealing with the assessment and improvement of the EPBD impact (for new buildings and building renovation) including summer comfort.

1.3 Aim and programme of the workshop

The workshop is held at Fraunhofer IBP at Nobelstr. 12 in Stuttgart.

The aim of the workshop is to present and discuss common issues for the two EU projects which are dealing with the implementation of the EPBD and the use of related CEN-standards.

Members from the two project groups present activities in related work packages. Presentations introducing the CENSE project and the ASIEPI project are followed by presentations on the status and activities concerning four selected topics with mutual interest. The workshop is concluded with common discussions and identification of actions.

1.4 Main discussion and results

Summary of main discussion items and results: stay "to the point", what did we or can we learn.

The discussions are reported under the different sections and at the end a more general discussion. The main issues in this discussion were:

- *How can we optimize a mutual benefit between the ASIEPI and CENSE projects.*
- *What could ASIEPI mean for CENSE? ASIEPI works with national regulations, CENSE with CEN standards. Any information obtained in the ASIEPI work packages that could be interesting for the improvement of the CEN standards and their use, leading to better buildings in Europe, should be sent to CENSE. E.g.: identification of gaps in the CEN standards, alternative national methods that would be interesting to be included in the CEN standards. Vice versa, CENSE can help ASIEPI by promoting and stimulating the use of harmonized methods and input data in the Member States.*

- *ASIEPI is gaining experience with Web-seminars.*
- *CENSE should make sure that ASIEPI members are on the CENSE mailing list and used if needed.*

1.5 Conclusions and recommendations

The workshop was well received by the participants.

On several issues both CENSE and ASIEPI has activities. These issues were identified in the meeting and discussed. An important difference is that ASIEPI is working with the national regulations, while CENSE is working with the CEN-standards.

Often the same persons get questionnaires from CENSE and ASIEPI. It would have been more efficient to combine some of the questionnaires. But this is too late as ASIEPI only has a couple left.

CENSE should make sure that ASIEPI members are on the CENSE mailing list and used if needed.

There was a majority who wanted an additional meeting between the two groups.

2 The CENSE project

The aim of the CENSE project (2007-2010) is to support the EU Member States (MS) and other target groups in achieving better awareness and more effective use of the European (CEN) standards that are related to the EPBD.

The main activities in the project are:

- 1) to communicate the role, status and content of these standards as widely as possible, and to provide guidance on their implementation;
- 2) to collect comments and examples of good practice from the MS, so as to remove obstacles to implementation, and to collect and secure results from relevant SAVE and FP6 projects;
- 3) to prepare recommendations to CEN.

As part of the second type of activities, the IEE CENSE project initiates a number of international/regional workshops.

More information on the project can be found in the Information Paper P86, *The CENSE project. Leading the CEN Standards on Energy performance of buildings to practice. A project (2007-2010) under the Intelligent Energy Europe programme*, one of a series of Information Papers that can be downloaded from the website (www.iee-cense.eu).

2.1 The ASIEPI project

ASIEPI stands for ASsessment and Improvement of the EPBD Impact (for new buildings and building renovation).

ASIEPI is dealing with the assessment and improvement of the EPBD Impact (for new buildings and building renovation) including summer comfort.

The overall objective is help to make the regulations more effective and contribute to the advancement of Energy Performance Regulations in the Member States. This is done by focussing on some critical, difficult issues:

- Compliance issues and the organisation of control,
- Evaluation of innovative systems (equivalence),
- More technical issues:
 - Thermal bridges
 - Building and duct air tightness
 - **Summer comfort & cooling**
- Methodology for the comparison of the EP-requirements levels

3 Aim and programme of the workshop

3.1 Main topic and objectives

The aim of the workshop is to present and discuss common issues for the two EU projects which are dealing with the implementation of the EPBD and the use of related CEN-standards.

3.2 Programme of the workshop

The workshop is held at Fraunhofer IBP at Nobelstr. 12 in Stuttgart.

Summary of the programme:

Members from the two project groups present activities in related work packages.

Presentations introducing the CENSE project and the ASIEPI project are followed by presentations on the status and activities concerning four selected topics with mutual interest:

- Overall issues
- Heat exchange by transmission
- Ventilation systems
- Thermal comfort issues in summer

The workshop is concluded with common discussions and identification of actions.

The full programme is given in **annex A**.

4 Content of the workshop

4.1 Presentations

Short summaries of the presentations (See also **annex B**: copy of the presentations).

Welcome and introduction (Bjarne Olesen-CENSE)

Welcome to the 25 participants, mainly partners from both projects and a few additional persons.(see attendance list, **annex C**). The PowerPoint presentations are included as **annex B** to this report. A public version of the report will also be made publicly available on the CENSE web-site.

Session 1

Presentation CENSE project (Dick van Dijk, 15min)

The CENSE project is more than halfway on producing information papers and related ppt presentations. A little behind on questionnaires and other ways to receive feed back from the target groups. For instance, the organisation of regional/international workshops must be accelerated, but a full plan for 2009 has been made. The synthesis of the feed-back, resulting in recommendations to CEN is just started.

Presentation ASIEPI project (Dirk van Orshoven, 15min)

The ASIEPI project is focusing on the energy performance regulations and some special technical issues (cold bridges, air tightness, summer comfort). ASIEPI has several industrial associations as partners/sponsors. The project will have a seminar in Brussels on September 1-2, 2009. It contains an interesting workpackage (WP6) on equivalence regarding "new" technologies which are not part of the standard EP calculations. For dissemination they also use web-events: like internet conferences, but only partly interactive. Two sessions have taken place which you can find on the web-site. They organise workshops as stand alone events and also give talks at conferences.

Session 2: Status and activities for overall issues:

ASIEPI-WP2 Benchmarking and Inter-comparison (Marleen Spiekman, 15min)

The aim is to develop a methodology to enable, without the need for extensive studies, the comparison of the minimum EP requirements between countries, e.g. at regular intervals. This appears to be not so easy as it looks at first sight: compare kWh calculated energy use per m² floor. In fact, it appears quite difficult, as is explained in the presentation. Two approaches are investigated: using a common reference building with common reference set of measures and comparing the calculated energy performance with the national minimum EP requirements ("route 1"). The calculation is done with the own national methods. Or using a common reference building and for each country a typical set of measures needed to meet the national minimum EP requirements ("route 2"). Testing of both routes shows that the results are very dependent on assumptions which may strongly differ between the countries. Such as the calculation of reference floor area, comfort requirements (temperature, ventilation), assumed use of spaces (e.g. indoor garage or attic), products (brands) that are unknown in different countries (→ low default value instead of true value), differences in which details are taken into account and how (e.g. thermal bridges: explicit, implicit or not considered at all), etc. The project is however still ongoing. Also the use of one reference calculation method for the comparison is investigated. This may resolve the differences in the method, but not the differences in assumptions and input data (e.g. ventilation rates, domestic hot water use, ..). Also: the common method may require certain parameters as input which are not available in certain countries, because no or other parameters are required as input in the national methods.

Question: Does this mean that the likely outcome of the investigations are that only a costly in-depth analysis would provide a meaningful comparison of minimum EP requirements between countries?

Answer: Yes, but it is not expected that resources will be available for such an in depth analysis to monitor the differences at regular intervals. Therefore, in ASIEPI also alternative approaches are being investigated.

Question: Would one European harmonized calculation method help?

Answer: For the comparison of minimum EP requirements there is a clear need for more harmonization. The CEN-standards can help to reduce some of the differences between countries and to make other differences (see above) more transparent. E.g. more standardization of some of the parameters (calculation of conditioned floor area, ...), and more transparency in the calculation methods, e.g. on the indoor environment requirements and on which types of energy use are included in the EP.

Question: What do you think about art. 5 of the EPBD recast (to use cost-optimal criteria for the comparison of minimum EP requirements, using a calculation methodology developed by the Commission):

Answer: To the opinion of the presenter, this would solve one of the problems mentioned in the presentation, but create much more problems.

CENSE WP2 Overall consistency and integration (Jaap Hogeling, 15min)

An inventory of the current or near future implementation of the CEN standards in the Member States revealed that many MS use part of the standards, but in many cases in a practical way, by copying specific options in their national methods (standards or other national documents). The preferred route, to adopt a CEN standard as a national standard (either translated or not and either with or without national annex for

specific national choices) and then refer to this standard in the national building regulations, appears to be hardly used.

It is the aim of CENSE to investigate what are the main reasons (which are different per cluster of standards!) and to come with recommendations to CEN for revision.

Session 3: Status and activities for heat exchange by transmission:

ASIEPI WP4: Thermal bridges (Heike Erhorn-Kluttig& Marco Citterio, 15min)

Thermal bridges are treated very differently in the different countries, also the control on the calculations and the associated sanctions are very different. Some countries have also maximum values for thermal bridges in the building regulations. Again, different parameters are used for these maximum values.

Thermal bridges increase the building energy demand for heating, but also for cooling. The energy loss can even be higher than for example the energy benefit provided by thermal solar collectors for domestic hot water. The public awareness of this fact is however very low.

Therefore, the national EP calculation procedures have to include the impact of thermal bridges (as they include the effect of thermal solar collectors!).

Moreover, best practice examples of advanced solutions or technologies should be widely presented, in order to promote the advantages of a detailed planning of component joints in new and renovated buildings.

Within the ASIEPI project, detailed enquiries are made to learn the situation in the Member States with regard to thermal bridges: on the approach, the effect on energy, software, guides, promotion of good practice, quality control and on innovations.

The rest of the presentation focuses on the results of the enquiry on the impact of thermal bridges on the energy performance in the various countries.

Question: what is the link with CENSE? ,

Answer: The ASIEPI studies reveal among others where the main needs are with respect to calculation procedures and which CEN standards are widely used or could be improved to increase their use. This can be taken into account by CENSE when recommending revision of standards.

CENSE WP3 Building energy performance (Dick van Dijk, 15min)

Following the outcome of the enquiry on the practical use of the CEN standards in the Member States as presented by Jaap Hogeling, this presentation starts by showing the general framework of the energy performance calculations in the CEN standards and the special role of EN 15603, which provides a common, modular structure.

The first priority for CENSE seems to be to promote this common modular structure to be used in all Member States. The next step could then be to replace gradually national modules by CEN modules. The building energy performance is one of these modules.

The presentation shows the position of the calculation of the building energy performance in the set of CEN standards to support the EPBD. The main standard here is EN ISO 13790, calculation of energy use for heating and cooling. This standard is widely used in the countries. It offers different options for national choice: on partitioning of the building into zones, on the interaction with the systems (iterative or simplified) and on the calculation method. The latter can be a monthly or seasonal or a simple hourly method, but the standard also allows the use of detailed simulation tools, as long as the same boundary conditions and calculation rules are applied. It thus intends to create a level playing field for different methods, which is

important in the context of the use for the building regulations (EP requirements, EP certificate). The (national) choices may e.g. depend on the application area and the building type and complexity.

A suite of EN ISO standards are available for calculation the thermal transmission properties of the building elements, including thermal bridges. These standards are a good example of standards of which the output is well suited as input for the EP calculations.

Special attention is paid in the presentation of the thermal transmission through the ground floor (EN ISO 13770), because it is a completely revised method. The main improvements are that the calculation matches better with product data and the monthly output of the calculation procedure can now also be used as input for hourly simulation tools which, until now are highly dispersed in the way ground floors/grounds are modeled.

Question: Is EN ISO 13790 detailed enough on thermal bridges?

Answer: Yes, this standard gives the possibility for detailed calculations of thermal bridges. It references as input the thermal transmission standards which include a detailed thermal bridge calculation method and default values. It is up to the Member States to make use of these standards and, if they do, to organize the control of the calculations.

Question: How to include passive renewables? E.g. calculate the benefit for heating by having more passive load from sunshine?

Answer: EN ISO 13790 provides the calculation method for this, either monthly (energy balance with gain utilization factor), or (simple) hourly method, see above.

Session 4: Status and activities for thermal comfort issues in summer:

ASIEPI- WP7: Summer comfort: (Dirk Van Orshoven, 15min)

The presentation starts with explaining the links with the projects ThermCO and Commoncense.

The presentation continues with summing up some facts: Regulations are limited in the calculation of the cooling load and in defining a maximum allowed energy consumption for cooling. However, when summer performance is evaluated in terms of the 'cooling load', the message given is that the building needs 'cooling / air conditioning'. Alternative methods to express the summer performance of buildings (e.g. balance point temperature) is a fairer and better understood approach.

The objectives of this work package in ASIEPI is to make MS aware of potential problems for a correct assessment of summer comfort conditions and, if applicable, energy use for cooling and to give suggestions about attractive approaches.

This is done by collecting information from MS who already have specifications and to investigate to what extent summer comfort directly or indirectly is taken into account and which are the key parameters.

Information from the Member States is to be obtained via questionnaires. The preliminary analysis of the limited number of replies received reveal that it may be very tricky to draw quick conclusions. The main reason is that there is no history in speaking the same engineering language in the various countries; therefore one very easily misinterprets a question and/or a response.

Question: Concerning renovation, we mainly talk about building renovation to reduce heating need. But what about cooling renovation of buildings?

Answer: Better inspections is a good way of increasing or maintaining the efficiency of cooling systems.

CENSE WP5 Ventilation and Cooling Systems (Gerhard Zweifel, 10min)

The presentation starts with an overview of the CEN standards dealing with calculation and inspection related to ventilation and cooling.

It then focuses on EN 15243, which deals with the cooling/ humidification/ dehumidification calculations. This standard is quite generic (kind of umbrella), because of the extreme variety in cooling systems and combinations of heating and cooling systems in Europe.

One of the problems in getting feedback from the Member States is that the heterogeneity between the countries implies that describing the national situation and needs requires a detailed response. Until now only from a few countries such response could be obtained.

Preliminary conclusions: Some part of the standard are useful/used, others not. No sufficient feedback so far for conclusions on urgent changes of the standard.

ThermCO project (Bjarne Olesen, 5min)

The presentation introduces the project Thermco. The main output of the project are design guidelines, which may be partly suited for REHVA and partly for CEN.

Discussion: The normal approach in the calculations is to consider a heating system as standard and a cooling system as optional. With low energy buildings, also the presence of heating systems should be regarded as optional. This may affect the calculation methods (temperature control) and the assumptions on thermal comfort (how to rate comfort in case of free temperature versus thermostat controlled).

Low performing cooling systems are the biggest problem in existing buildings. What about banning bad split units and such?

Point of attention is that in most regions (even North Italy) the cooling systems are only used for a few days per year, which means that it is more a problem for the capacity of the electric grid than for energy use.

Session 3: Status and activities for ventilation systems:

ASIEPI- WP5: Building- and Duct-Air tightness (Tormod Aurlien, 15min)

The main goal of this work package of ASIEPI is to give a clear picture to policy makers regarding the way better envelope and ductwork airtightness is stimulated in the MS, including indications – where available – on the impact of the measures taken to transform the market.

Infiltration is estimated to cost 10 % of the energy (same magnitude as solar collectors and DHW), leaky ductwork the same. Inspection of the airtightness of ducts costs time, but it is paid by the impact on energy saving.

There is a growing concern for this subject for very-low-energy buildings; combined with rewards for good airtightness there is, consequently, a growing interest for airtightness.

Examples from five specific countries, covering both "technology push", "regulatory push" and "market pull" type of developments will be collected and analyzed as the basis for recommendations.

CENSE - WP5 Ventilation and Cooling Systems (Jean Robert Millet, 15min)

The presentation focuses on the ventilation standards EN 15242 (calculation of air flow rates) and EN 15241 (calculation of energy losses due to ventilation and infiltration) and their position in the set of CEN standards to support the EPBD. In these standards the air infiltration and duct leakage are taken into account. EN 15242 is not only intended as input for the energy calculations, but also as input for indoor air quality and comfort.

The Member States can choose between three methods: an iterative method (detailed), a direct method (simplified) and a statistical method. The latter requires correlation factors to be worked out at national level.

Examples of application in France are given. One of the examples shows that, depending on the climate zone, the fan energy use in case of a heat recovery unit, if expressed as primary energy, can be significant compared to the thermal energy gains by the heat exchanger.

Discussion: the main discussion item is how important are detailed/accurate calculations versus actual inspection/measurements: the statement made by various participants is that (only) with a check at the realized building and ventilation system (measurement plus analysis) a lot of progress in energy saving can be achieved.

Common discussions and new actions

Main items for general discussion: how can we optimize a mutual benefit between the ASIEPI and CENSE projects.

On questionnaires:

Can we combine questionnaires of ASIEPI and CENSE? Too many go to the same persons. How do we get people to respond?

Asiepi has only a few questionnaires left to do. ASIEPI pays partners money for answering questions and to give feed back. Cense has to depend on volunteers, which may be the same persons as ASIEPI is using. CENSE will now also give respondents feed-back on the questionnaire interim results (the final results may take so long that it would discourage the early respondents).

CENSE should make sure that ASIEPI members are on the CENSE mailing list and used if needed.

When results of questionnaires are presented, such as at this workshop, it would be more interesting for the audience to hear what the main results are, instead of the technical details.

In this respect it is also important not to forget that it is not the majority vote that counts: it is vital to identify the good practice cases and striking examples (both positive and negative). The BUILD UP portal will offer possibilities for a more interactive communication.

General:

What could ASIEPI mean for CENSE? ASIEPI works with national regulations, CENSE with CEN standards. Any information obtained in the ASIEPI work packages that could be interesting for the improvement of the CEN standards and their use, leading to better buildings in Europe, should be sent to CENSE. E.g.: identification of gaps in the CEN standards, alternative national methods that would be interesting to be included in the CEN standards.

Vice versa, CENSE can help ASIEPI by promoting and stimulating the use of harmonized methods and input data in the Member States.

ASIEPI is gaining experience with Web-seminars: announced on the web-page and by direct mailing; registration via website; typically 60 participants, often people who do not go to international conferences. The experience is positive, but it is not the same as a physical conference. Improvements are possible. The main risk is technical difficulties (speakers/telephone lines).

Bjarne Olesen closes the workshop by thanking the hosts, the colleagues from Fraunhofer Institute for Building Physics, for the practical organisation and the excellent meeting facilities.

4.2 Profile of participants

About 26 participants are present at the workshop, of which 17 experts active in CENSE, 10 experts active in ASIEPI, of who 5 experts are active in both projects and 5 participants related to neither of these projects, mainly persons who are active in CEN. In total 14 participants are member of the CEN/BT/PC 371, coordination group of CEN-EPBD standards.

The participants come from 12 different EU and EFTA countries.

See also **annex C**: List of participants

5 Main discussion and results

Summary of main discussion items and results: stay "to the point", what did we or can we learn.

The discussions are reported under the different sections and at the end a more general discussion. The main issues in this discussion were:

- *How can we optimize a mutual benefit between the ASIEPI and CENSE projects.*
- *What could ASIEPI mean for CENSE? ASIEPI works with national regulations, CENSE with CEN standards. Any information obtained in the ASIEPI work packages that could be interesting for the improvement of the CEN standards and their use, leading to better buildings in Europe, should be sent to CENSE. E.g.: identification of gaps in the CEN standards, alternative national methods that would be interesting to be included in the CEN standards. Vice versa, CENSE can help ASIEPI by promoting and stimulating the use of harmonized methods and input data in the Member States.*
- *ASIEPI is gaining experience with Web-seminars.*

CENSE should make sure that ASIEPI members are on the CENSE mailing list and used if needed.

6 Conclusions and recommendations

The workshop was well received by the participants.

On several issues both CENSE and ASIEPI has activities. These issues were identified in the meeting and discussed. An important difference is that ASIEPI is working with the national regulations, while CENSE is working with the CEN-standards.

Often the same persons get questionnaires from CENSE and ASIEPI. It would have been more efficient to combine some of the questionnaires. But this is too late as ASIEPI only has a couple left.

CENSE should make sure that ASIEPI members are on the CENSE mailing list and used if needed.

There was a majority who wanted an additional meeting between the two groups

Annex A- Workshop Programme

The workshop is held at Fraunhofer IBP at Nobelstr. 12 in Stuttgart

10:00 Welcome and introductions (Bjarne Olesen-CENSE)

10:15 Session 1

Presentation CENSE project (Dick van Dijk, 15min)

Presentation ASIEPI project (Dirk van Orshoven, 15min)

10:45 Break

11:00 Session 2: Status and activities for overall issues:

[ASIEPI-WP2 Benchmarking and Inter-comparison \(Marleen Spiekman, 15min\)](#)

[CENSE WP2 Overall consistency and integration \(Jaap Hogeling, 15min\)](#)

11:45 Session 3: Status and activities for heat exchange by transmission:

[ASIEPI WP4: Thermal bridges \(Heike Erhorn-Kluttig& Marco Citterio, 15min\)](#)

[CENSE WP3 Building energy performance \(Dick van Dijk, 15min\)](#)

12:30 Lunch

13:30 Session 3: Status and activities for ventilation systems:

[ASIEPI- WP5: Building- and Duct-Air tightness \(Rémi Carrié & Gaëlle Guyot, 15min\)](#)

[CENSE - WP5 Ventilation and Cooling Systems \(Jean Robert Millet, 15min\)](#)

14:15 Session 4: Status and activities for thermal comfort issues in summer:

[ASIEPI- WP7: Summer comfort: \(Marianna Papaglastra & Mat Santamouris, 15min\)](#)

[CENSE WP5 Ventilation and Cooling Systems \(Gerhard Zweifel, 10min\)](#)

[ThermCO project \(Bjarne Olesen, 5min\)](#)

15:00 Break

15:15 Common discussions and new actions

16:00 End

Annex B – Presentations

NOTE: Annex B is provided as a separate pdf file.

Annex C – List of participants

Organisation	Person	Country	Asiepi partner	CENSE partner	CEN/BT/PC 371 member
ENEA	Marco Citterio	Italy	+		
ESD	Robert Cohen	United Kingdom		+	
TNO Built Environment and Geosciences	Dick van Dijk	The Netherlands	+	+	+
CEN Management Centre	Mathieu Denis	Belgium			+
Fraunhofer Institute for Building Physics (IBP)	Hans Erhorn	Germany	+	+	+
CSTB	Claude Francois	France		+	
BRE	Roger Hitchin	United Kingdom	+	+	
ISSO	Jaap Hogeling	The Netherlands		+	+
TNO Built Environment and Geosciences	Berrie van Kampen	The Netherlands		+	
Fraunhofer Institute for Building Physics (IBP)	Heike Erhorn-Kluttig	Germany	+		
CSTB	Hicham Lahmidi	France	+	+	
CSTB	Jean Robert Millet	France	+	+	+
TU Graz, Inst. For Thermal Engineering	Marcus Michlmair	Austria			
DTU	Bjarne Olesen	Denmark		+	+
BBRI	Dirk van Orshoven	Belgium	+		
NAPE	Aleksander Panek	Poland	+		

FAMBSI	Jorma Railio	Finland		+	+
Viessmann Werke	Jürgen Schilling	Germany		+	+
Edilclima	Laurent Socal	Italy		+	+
TNO Built Environment and Geosciences	Marleen Spiekman	The Netherlands	+	+	
Fraunhofer Institute for Building Physics (IBP)	Anna Staudt	Germany		+	
NEN	Klaas de Winkel	The Netherlands			+
BRE	Bruce Young	United Kingdom			+ (representing Brian Anderson)
ECOS	Joachim Zeller	Germany			+
CSTB	Johann Zirngibl	France		+	+
HSLU-T&A	Gerhard Zweifel	Switzerland		+	+