



ASessment and **I**mprovement of the **EPBD I**mpact
(for new buildings and building renovation)

www.asiepi.eu

**Impact, compliance and control
of legislation**

Summary report

Main author:

Aleksander Panek

National Energy Conservation Agency, Poland

31 March 2010

ASIEPI is supported by

Intelligent Energy  **Europe**

Disclaimer: ASIEPI has received funding from the Community's Intelligent Energy Europe programme, under the contract EIE/07/169/SI2.466278.

The sole responsibility for the content of this publication lies with the authors. It does not necessarily reflect the opinion of the European Communities. Neither the European Commission nor the authors are responsible for any use that may be made of the information contained therein.

SUMMARY

While the European Energy Performance of Buildings Directive (EPBD) imposes Member States (MS) to set requirements, it does not specify the severity of those requirements, nor the measures to be taken to control implementation. Consequently, MS can fulfil the requirements of articles 4 through 6 without increasing the existing levels of requirement and without carrying out any kind of control. The main goal of this task of the project was to provide a good view about the impact of the present EPBD on the requirements and how MS deal with the respect of requirements. Compliance and control are essential parts of successfully implementing the EPBD. The main recommendations and findings from reports collected vary significantly regarding EPBD implementation, the large potential for further savings, the needs for infringement procedures by the European Commission, the importance of an integrated approach to buildings and their systems, support for innovative technologies, the necessity of investment in awareness and motivation actions.

TABLE OF CONTENTS

SUMMARY	3
TABLE OF CONTENTS	4
PART A: FINAL RECOMMENDATIONS	5
1. INTRODUCTION	5
1.1 Overview	5
1.2 Workshop	5
2. FINDINGS AND RECOMMENDATIONS FOR THE RECAST	6
2.1 General remarks.....	6
2.2 Cost-optimal requirements (article 5 of RECAST March 2010)	6
2.3 Independent control system (article 18 and Annex II)	7
2.4 Penalties (article 24).....	7
3. REFERENCES	8
PART B: BIRD'S EYE VIEW OF THE PROJECT RESULTS	9
4. BIRD'S EYE VIEW OF THE PROJECT RESULTS	9
5. PUBLISHED RESULTS	9
5.1 Country Reports	9
5.2 Synthesis Reports	9
5.3 Workshop	10
PART C: GENERAL PROJECT DESCRIPTION AND ACKNOWLEDGEMENTS	12
6. GENERAL PROJECT DESCRIPTION	12
6.1 Introduction.....	12
6.2 Project materials.....	12
6.3 Project partners	13
7. ACKNOWLEDGEMENTS TO CONTRIBUTORS	14
7.1 Project partners	14
7.2 Subcontractors	17
8. ACKNOWLEDGEMENTS TO SPONSORS, OTHER ASSOCIATES AND FUNDING PARTNERS	18
8.1 Overall project sponsors.....	18
8.2 Partner associations	18
8.3 National cofinancing	18

Part A: Final recommendations

1. INTRODUCTION

1.1 OVERVIEW

While the EPBD imposes Member States to set requirements, it does not specify the severity of the requirements, nor the measures to be taken to control implementation. Consequently, Member States can fulfil the requirements of articles 4 through 6 without increasing the existing levels of requirement and without carrying out any kind of control. The aims of the study were:

1. To obtain a good view on how EPBD implementation has changed (or is changing) the national requirements.
2. To obtain a good overview of the way Member States deal with compliance handling and control measures. This includes not only governmental actions, but also non-governmental actions.
3. Identification of interesting approaches and possible bottlenecks for improved compliance and control.
4. Recommendations regarding independent control systems and penalties, as listed in the proposal by the European Commission for recast of the EPBD.

1.2 WORKSHOP

An international workshop was organised on September 1-2, 2009 in Brussels. This open workshop was attended by around 80 participants from 17 countries. The participants came from industry, research and governmental organisations.

The workshop programme consisted of expert presentations on the issue of impact, compliance and control in 13 Member States (Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Italy, Netherlands, Norway, Poland, Portugal, Spain), -four presentations from European Federations (ES-SO, EuroAce, EURIMA and REHVA) and four synthesis presentations on the previously-mentioned four topics. At the end, there was a brainstorming session regarding pros and cons, as well as concerns regarding the envisaged recast of the EPBD.

This document has been prepared and reviewed by the ASIEPI partners, taking into account suggestions expressed during the workshop. In annex, there is a pdf file containing all final expert reports on each country's status. All country reports, as well as the four synthesis reports, are published as Information Papers and available on www.asiepi.eu and www.buildup.eu.

2. FINDINGS AND RECOMMENDATIONS FOR THE RECAST

2.1 GENERAL REMARKS

The findings below are summarised from presentations and information papers on country status reports that address the control and compliance issues. Full reports are available on (1). The general recommendations reviewed by project partners are as follows:

1. The various reports show significant disparity in EPBD implementation, with big differences in impact, compliance and control. Some variation can be justified because of MS diversity. However, emphasising consistent and sound implementation can or could release the large potential for further savings. The proposed recast may accelerate this process.
2. Several MS have performed lifecycle cost analysis studies before tightening the building code requirements. This is the case in both past and present. Various MS have developed roadmaps for further improving the energy efficiency of new and existing buildings.
3. Not all countries have yet fulfilled all the requirements imposed by EPBD. As guardian of the European Treaty, the European Commission must continue its efforts regarding infringement procedures. (2)
4. It is essential to have an integrated approach that covers all energy-related building components and service systems to achieve cost-efficient (cost-optimised) energy performance targets. Indoor climate aspects must also be taken into consideration.
5. In several MS, innovative compliance and control approaches exist, which do not increase the administrative burden. These approaches depend strongly on cultural aspects.
6. In addition to compliance and control measures, it is also important (to continue) to invest in awareness and

motivation actions, e.g. educational and information campaigns.

7. In several countries, there is a difference between the national requirements and the cost-optimum requirements concerning U-values of the building envelope.
8. There are success stories showing a major change in the energy performances of the new building stock due to the EPBD-related regulations. At the same time, there are also success stories regarding market uptake of innovative systems and technologies, in which the EPBD regulations have had a catalysing effect (3).

2.2 COST-OPTIMAL REQUIREMENTS (ARTICLE 5 OF RECAST MARCH 2010)

The cost-optimal requirements are referred to in the text of RECAST in several places. Provision 10, in box below, describes its meaning. The following, most important aspects have been raised in this regards by project participants:

1. The definition of cost-optimal levels is crucial and requires further discussion.
2. The calculation methodology for determining the cost-optimal levels of energy performance is an essential element of the recast. A consultation with the MS and stakeholders is felt to be important, and the validity of a method should be proven for the intended application(s).
3. Given the importance of guaranteeing good indoor climate conditions, combined with the increasing evidence of poor indoor climate conditions in many buildings, MS are expected to report on the actions undertaken in relation to indoor climate.
4. In order to facilitate an efficient and cost-effective implementation and to allow the various stakeholders to prepare properly, it is very important that each MS develops a detailed

It is the sole responsibility to set minimum requirements for the energy performance of buildings and building elements. The requirements should be set with a view to achieving the cost-optimal balance between the investments involved and the energy costs saved throughout the lifecycle of the building, without prejudice to the right of Member States to set minimum requirements which are more energy efficient than cost-optimal efficiency levels. Provision should be made for the possibility for Member States to regularly review their minimum energy performance requirements for buildings with regard to technical progress. **(Provision 10)**

roadmap for tightening the national requirements.

2.3 INDEPENDENT CONTROL SYSTEM (ARTICLE 18 AND ANNEX II)

The main features foreseen for an independent control system, in line with RECAST, should be characterised by the following.

1. The competent authorities, or the bodies to whom the competent authorities have delegated the responsibility for implementing the independent control system, shall make a random selection of at least a statistically significant percentage of all the energy performance certificates issued annually, and subject these to verification. Given the major differences in regulatory systems, political visions and cultural aspects, alternative approaches should be justified on the condition that the MS can prove that the approach is effective.
2. The effectiveness of any control scheme largely depends on the intrinsic quality of the overall

implementation, i.e. how the criteria are expressed, the unambiguity of the requirements, etc. Therefore, attention should be drawn to the fact that regulations should be thoroughly checked regarding the possibilities for carrying out controls and, if necessary, imposing sanctions.

2.4 PENALTIES (ARTICLE 24)

One of the reasons for RECAST is the lack of execution power for EPBD regulations (Article 24). Two following recommendations are crucial in this case:

1. Additional control activities should not extend the administrative burdens in the MS.
2. Sanctions in the case of non-compliance of building specifications

Member States shall lay down the rules on penalties applicable to infringements of the national provisions adopted pursuant to this Directive and shall take all measures necessary to ensure that they are implemented. The penalties provided for must be effective, proportionate and dissuasive. Member States shall communicate those provisions to the Commission by* at the latest and shall notify it without delay of any subsequent amendment affecting them. **(Article 24)**

can take different forms: financial penalties, the obligation to put the building in-line with the specifications, prohibiting occupancy of the building, withdrawal of professional rights, etc. Allowing a flexible sanction handling in order to best fit the cultural behaviour differences of the MS is advisable.

3. REFERENCES

- (1) materials from Workshop: www.asiepi.eu/wp-3-compliance-and-control/workshop.html
- (2) Identification of interesting approaches and possible bottlenecks for improved compliance and control: <http://www.asiepi.eu/information-papers.html> <http://www.buildup.eu/publications/7126>
- (3) Overview of national approaches for the assessment of innovative systems in the framework of the EPBD: <http://www.asiepi.eu/wp-6-innovative-systems/related-information-and-first-re.html#c82>

Part B: Bird's eye view of the project results

4. BIRD'S EYE VIEW OF THE PROJECT RESULTS

The research on impact, compliance and control of EPBD regulations in Member States (MS) was organised in three steps:

1. One of the main tasks of the research was to determine the state of the art for impact, compliance and control in countries represented by ASIEPI project partners and subcontractors, in the form of country reports. Every report includes the following: the impact of EPBD on national requirements, compliance and control of requirements and certification schemes.
2. Four synthesis reports based on country reports and additional information provided by partners on the following subjects:

- Evaluation of the impact of national EPBD implementation in MS,
 - Evaluation of compliance and control in the different MS,
 - Barriers and good practice examples,
 - Identification of interesting approaches and possible bottlenecks for compliance and control of regulations
3. An international workshop was organised for September 1-2, 2009 in Brussels, with industrial organisations and approximately 80 attendees

5. PUBLISHED RESULTS

5.1 COUNTRY REPORTS

The structure of country reports includes a description of the impact, compliance and control of new, EPBD-related, national requirements and certification schemes. Country reports prepared by ASIEPI partners and subcontractors in Belgium, Czech Republic, Denmark, Finland, France, Germany, Hungary, Greece, Italy, Lithuania, Netherlands, Norway, Poland, Spain are in the form of Information Papers and can be found either on www.buildup.eu or on www.asiepi.eu/wp-3-compliance-and-control/

In addition, two subcontractors, for Hungary and Lithuania, prepared reports that can also be found on the ASIEPI and BuildUp sites.

5.2 SYNTHESIS REPORTS

Additional analysis is provided in the four synthesis reports prepared based on country status reports and additional data collected from ASIEPI partners:

1. Synthesis report on the identification of interesting approaches and possible bottlenecks for compliance and control of regulations.
2. Synthesis report evaluating the handling of compliance and control in the different MS.
3. Synthesis report evaluating the impact of national EPBD implementation on the severity of requirements.
4. Synthesis report on barriers and good practice examples.

The synthesis reports are available under the IP numbers in the table below, on www.asiepi.eu and www.buildup.eu.

5.3 WORKSHOP

The workshop programme consisted of expert presentations on the issue of impact, compliance and control in 13 Member States (Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Italy, Netherlands, Norway, Poland, Portugal, Spain), four presentations from European Federations (ES-SO, EuroAce, EURIMA and REHVA) and four synthesis presentations. At the end, there was a brainstorming session regarding pro and cons as well as concerns regarding the envisaged recast of the EPBD.

The presentations reflect the views of the persons/institutions that have prepared them, but may be not in line with the official position of the MS. The table below presents the programme of the workshop together with references to country reports prepared by 12 project partners and Portugal, and additional contributions from Hungary and Lithuania that were prepared after the workshop.

Introduction	PPT	IP
General welcome INIVE – Presentation of AIVC & ASIEPI by P. Wouters, INIVE	[01]	-
Proof of Performance: Supporting the quest for efficient and effective compliance by A.-G. Sutherland, EACI	[02]	-
Objectives of the workshop by A. Panek, NAPE	[03]	-
The EPBD Concerted Action by E. Maldonado, ADENE	[04]	-
Country presentations	PPT	IP
Belgium by A. Tilmans,	[BE]	P174

BBRI		
Netherlands by M. Spiekman, TNO	[NL]	P169
Greece by M. Santamouris, M. Papaglastra, NKUA	[GR]	P173
Germany by H. Erhorn, H. Erhorn-Kluttig, Fraunhofer IBP	[DE]	P177
Norway by P. Schild, SINTEF	[NO]	P170
Portugal by P. Santos, ADENE	[PT]	-
Italy by M. Zinzi, G. Fasano, M. Citterio, ENEA	[IT]	P168
Spain by J.L. Molina, AICIA	[ES]	P172
Poland by A. Panek, M. Popiolek, NAPE	[PO]	P171
Finland by J. Shemeikka, M. Haakana, VTT	[FI]	P167
Denmark by K. Englund Thomsen, S. Aggerholm, SBi	[DK]	P175
France by R. Carrié, G. Guyot, W. Lecointre, CETE de Lyon	[FR]	P176
Czech Republic by J. Pejter, ENVIROS s.r.o.	[CZ]	P166
Hungary by A. Zöld, Budapest University of Technology and Economics	-	P182
Lithuania by R. Bliudzius, Institute of Architecture and Construction of Kaunas University of Technology	-	P184
Industry point of view	PPT	IP
EURIMA by R. Bowie	[07]	-
ES-SO by D. Dolmans	[12]	-
EuroACE by K.E. Eriksen	[16]	-
REHVA by M. Virta	[21]	-

Lessons learned from country status reviews (syntheses)	PPT	IP
Evaluation of EPBD impact on requirements <i>by M. Papaglastra, NKUA</i>	[22]	P180
Evaluation of compliance and control in Member States <i>by H. Lahmidi, CSTB</i>	[23]	P179
Barriers and good practice examples <i>by M. Papaglastra, NKUA</i>	[24]	P181

Interesting approaches and bottlenecks *by M. Spiekman, B. Poel, L. van den Brink, TNO* [\[25\]](#) [P178](#)

A pdf file with all the presentations is available on www.asiepi.eu.

Part C: General project description and acknowledgements

6. GENERAL PROJECT DESCRIPTION

6.1 INTRODUCTION

ASIEPI is the acronym of the full project name:

Assessment and **I**mprovement
of the **EPBD I**mpact
(for new buildings and building renovation)

The project took two and a half years and was completed in March 2010.

The main objective of the ASIEPI project has been to formulate suggestions to policy makers on how to improve the quality and the impact of the regulations on the energy performance of buildings with respect to 6 specific issues:

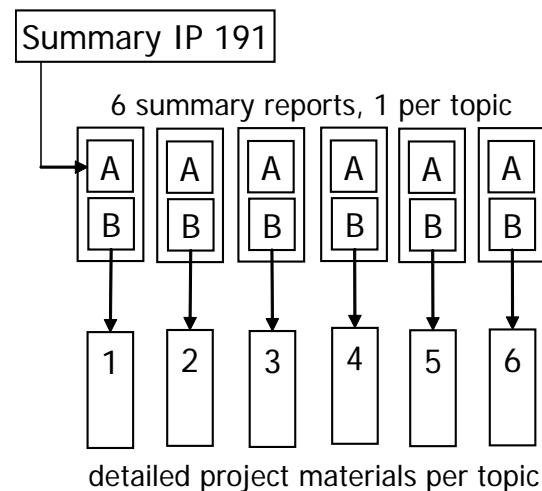
- intercomparison of the levels of the EP-requirements
- impact, compliance and control of legislation
- effective handling of thermal bridges
- stimulation of good building and ductwork airtightness
- support for the market uptake for innovative systems
- stimulation of better summer comfort and efficient cooling

Several major aspects of each of the topics have been analysed. The results are documented in a full suite of project data. Among others, these data provide insight in the potential problems and give guidance with respect to possible solutions. However, as the project had to

conform to the objectives of the IEE-SAVE programme, no new, ready-to-use methods were developed, but instead awareness of the challenges was raised and existing best practice to achieve more effective EPB-regulations were highlighted.

6.2 PROJECT MATERIALS

The ASIEPI project has produced a broad set of dissemination materials.



As illustrated in the figure, the project results are structured as follows:

- An information paper (IP191) briefly summarises the main conclusions and constitutes the gateway to the project.
- The present document is 1 out of the 6 summary reports, each dealing with 1 of the topics listed above. Parts A of these final reports describe the major findings and the final recommendations. Parts B give a synthetic overview of all the other

information that the project has made available on that topic.

- Finally, a wide range of information materials provide a more comprehensive, in-depth coverage of many different aspects of each of the topics.

The different project outcomes come in a variety of electronic formats:

- summary reports
- detailed technical reports
- information papers
- recordings of internet information seminars
- presentations-on-demand
- conference abstracts and papers
- other related material, such as documents supplied by third parties

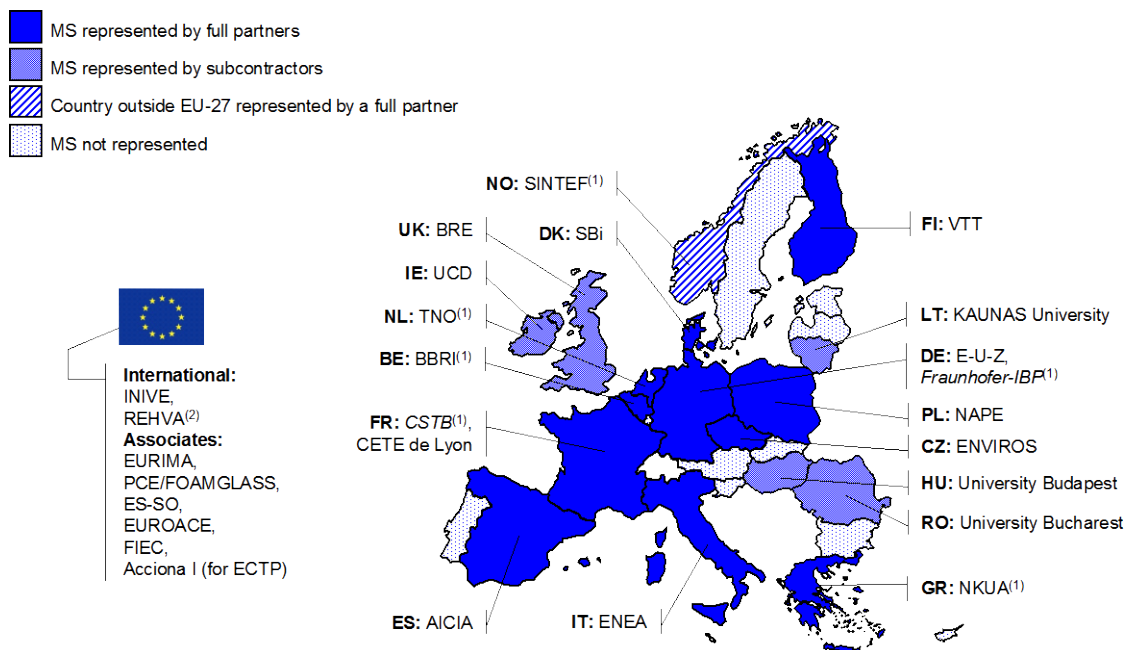
All materials are available on the project website www.asiepi.eu.

6.3 PROJECT PARTNERS

As shown in the figure, the project had full partners in 12 countries and subcontractors in 5 more countries. The chapter "Acknowledgements to contributors" lists all the organisations, together with their contributing collaborators.

Furthermore, there were 6 Europe-wide associations acting as associated partners. These are listed in the chapter "Acknowledgements to sponsors, other associates and funding partners", which also lists the national cofunding agencies.

Through this large number of countries involved, a good reflection was obtained of the EPB-practices across all of Europe at the time of the project. For most topics, surveys have been made in these countries in order to see how the EPB-regulations deal with each of the issues.



(1) INIVE member
In the MS where there are two participants, the national contact point is in *italic*.

7. ACKNOWLEDGEMENTS TO CONTRIBUTORS

This report was produced as part of the ASIEPI project, which was coordinated by INIVE.

National contributions to the project were made by the following partners and subcontractors.

7.1 PROJECT PARTNERS

EUROPE



International Network for Information on Ventilation (INIVE)

www.inive.org

EUROPE



Federation of European Heating, Ventilation and Air-conditioning Associations (REHVA)

www.rehva.eu

Olli Seppänen

Thierry van Steenberghe

BELGIUM



Belgian Building Research Institute (BBRI)

www.bbri.be

Antoine Tilmans

Clarisse Mees

Dirk Van Orshoven

Nicolas Heijmans

Peter D'Herdt

Peter Wouters

Samuel Caillou

Administrative support:

Erika Malu

Stéphane Degauquier

CZECH REPUBLIC



ENVIROS, s.r.o. (ENVIROS)

www.enviros.cz

Jan Pejter

DENMARK



Danish Building Research Institute (SBI)

www.SBi.dk

Kirsten Engelund Thomsen

Jørgen Rose

Søren Aggerholm

FINLAND



VTT Technical Research Centre of Finland (VTT)

<http://www.vtt.fi/>

Jari Shemeikka
Jyri Nieminen
Mikko Nyman

FRANCE



Technical Studies Centre of the Ministry of Equipment of Lyon (CETE de Lyon)

www.cete-lyon.developpement-durable.gouv.fr

Rémi Carrié
Gaëlle Guyot
Whilémine Lecointre

FRANCE



Scientific and Technical Center for Building (CSTB)

www.cstb.fr

Hicham Lahmidi
Jean-Robert Millet
Benoit Vinot
Franck Leguillon

GERMANY



energie + umwelt zentrum

Energy and Environmental Center Deister (EUZ)

www.e-u-z.de

Bernd Rosenthal
Wilfried Walther

GERMANY



Fraunhofer Institute for Building Physics (Fraunhofer-IBP)

www.ibp.fraunhofer.de

Hans Erhorn
Heike Erhorn-Kluttig

GREECE



National & Kapodistrian University of Athens (NKUA) – Group of Building Environmental Studies (grbes)

<http://grbes.phys.uoa.gr/>

Kyriaki Papadopoulou
Marianna Papaglastra
Marina Laskari
Mattheos Santamouris

ITALY



Italian National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA)

www.enea.it

Marco Citterio
Michele Zinzi

THE NETHERLANDS



Netherlands Organization for Applied Scientific Research (TNO)

www.tno.nl

Marleen Spiekman
Dick van Dijk

NORWAY



SINTEF Building & Infrastructure

www.sintef.no

Arild Gustavsen
Peter Blom
Peter G. Schild
Tormod Aurlien

POLAND



National Energy Conservation Agency (NAPE)

www.nape.pl

Aleksander Panek
Andrzej Wiszniewski
Andrzej Rajkiewicz
Joanna Rucinska
Malgorzata Popiolek
Szymon Firląg

SPAIN



Asociación de Investigación y Cooperación Industrial de Andalucía (AICIA)

www.aicia.es

Servando Álvarez
José L. Molina

7.2 SUBCONTRACTORS

HUNGARY



Budapest University of Technology and Economics (BME)

[www.egt.bme.hu](http://www egt.bme.hu)

Andras Zold

IRELAND



University College Dublin Energy Research Group (UCD ERG)

www.erg.ucd.ie

Patxi Hernandez
Vivienne Brophy

LITHUANIA



Institute of Architecture and Construction of Kaunas University of Technology (KTU ASI)

www.asi.lt, www.ktu.lt

Raimondas Bliudzius

ROMANIA



Technical University of Civil Engineering of Bucharest (UTCB)

www.utcb.ro

Octavia Cocora

UNITED KINGDOM



Building Research Establishment Limited (BRE)

www.bre.co.uk

Roger Hitchin

8. ACKNOWLEDGEMENTS TO SPONSORS, OTHER ASSOCIATES AND FUNDING PARTNERS

In addition to the funding by the IEE SAVE Programme (managed by [EACI](#)), the project as a whole was supported by industrial sponsors. There were also 2 partner associations. The contribution of individual project partners was cofinanced by national funding agencies as listed.



www.acciona.com for ECTP

8.1 OVERALL PROJECT SPONSORS



www.euroace.org



www.eurima.org



www.es-so.com



www.foamglas.com

8.2 PARTNER ASSOCIATIONS



www.fiec.eu

8.3 NATIONAL COFINANCING

BELGIUM

BBRI's contribution was cofunded by:



The Federal Public Service Economy, SME's, independent Professions and Energy



The Flemish Region



The Walloon Region



The Brussels-Capital Region

FINLAND

VTT's contribution was cofunded by:



Paroc Oy Ab



Saint-Gobain Rakennustuotteet Oy



Rakennustuteteollisuus RTT ry

FRANCE

CETE de Lyon's contribution was cofunded by:



The French Minister of Ecology, Energy, Sustainable Development and Sea

GERMANY

Fraunhofer-IBP's contribution was cofunded by:



Fraunhofer Institute for Building Physics

LITHUANIA

KTU ASI's contribution was cofunded by:



Ministry of Environment of the Republic of Lithuania



Certification Centre of Building Products

THE NETHERLANDS

TNO's contribution was cofunded by:



Ministry of Housing,
Spatial Planning and the Environment



J.E. Stork Air



GasTerra



TNO

NORWAY

SINTEF's contribution was cofunded by:



POLAND

NAPE's contribution was co-funded and supported by:



National Energy Conservation Agency
(NAPE)

www.nape.pl



Association of Energy Auditors

www.zae.org.pl



Journal Energy & Building

www.energiabudynek.pl