

PROJECT DOCUMENT

Status: Public

Final report

Workshop:

**CENSE – Ministry of Environmental Protection,
Physical Planning and Construction
Directorate for Construction**

**8th and 9th December 2009
Zagreb, Croatia**

Johann Zirngibl

CSTB Energy Environment Development and Prospective
Email: johann.zirngibl@cstb.fr

CENSE_WP6.4.14_N01

January 21, 2010

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	3
1.1	Main discussion and results	3
1.2	Conclusions and recommendations	3
2	The CENSE project	4
3	Aim and programme of the workshop	4
3.1	Main topic and objectives	4
3.2	Programme of the workshop	4
3.3	Profile of participants	6
4	Main discussion and results	6
4.1	Context	6
4.2	Practical follow ups - opportunities	6
5	Conclusions and recommendations	8
	Annex A - Workshop Programme	9
	Annex B – Presentations	11
	Annex C – List of participants	12
	Annex D – Summary of evaluation by the participants	14
	Annex E – Evaluation Form	16

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, if 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

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

The 8th and 9th of December a workshop has been organized in Zagreb by the IEE - CENSE project in cooperation with Croatian Ministry of Environmental Protection, Physical Planning and Construction, Directorate for Construction, who is responsible for building regulations.

The objective of the workshop was to exchange on how Croatia could adopt and adapt the EPBD - CEN standards in their building regulation and software.

1.1 Main discussion and results

The following priorities have been defined by the organisers for the workshop:

- context of Croatian Building regulation;
- the use of EPBD - CEN standards in the Croatian calculation methods;
 - general structure -overall energy use (EN 15603)
 - building needs (EN 13790, EN 15316-3.1)
 - heating system losses (EN 15316 series)
 - ventilation (EN 15242, EN 15241)
- operational rating;
- certificates (EN 15217);
- software tools.

Lino Fučić, Director for Construction, opened the meeting and welcomed the participants. He underlined the interest for Croatia to have the possibility to exchange with experts from other countries, who have already implemented EPBD-CEN standards, on their experience, difficulties and solutions found.

Johann Zirngibl, for the IEE - CENSE project, pointed out that the feedback from Croatia will be useful for the revision of the standards. He then detailed the draft agenda and the organisation of the meeting.

For each topic the experts had prepared a short presentation focusing more on their experience with the standards (problems, solutions, choices made, etc) than explaining the standards itself (the participants knew the standards already). The experts explained how they applied the EPBD - CEN standards (national annexes, why they have chosen this or this option).

1.2 Conclusions and recommendations

The Croatian authorities decided to use the experience of other countries and to adopt the EPBD – CEN standards.

Croatia will focus on the development on national annexes like climate data and boundary conditions. Through application of European standards, Croatian experts are provided with the possibility of using software which supports the same set of European standards.

Software will have prescribed obligatory control of their applicability under Croatian regulations. Software applicability control shall be carried out using an algorithm - a tool

planned to be developed and which will contain all national additions necessary for the application of European standards.

The Directorate for Construction will also support Croatian experts to participate actively to EPBD - CEN standardization work to bring in their experience directly.

By sticking very close to the EPBD-CEN standards Croatian authorities do not need to finance software. This work can be done by the professionals (software companies).

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:

- to communicate the role, status and content of these standards as widely as possible, and to provide guidance on their implementation;
- 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;
- 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).

3 Aim and programme of the workshop

3.1 Main topic and objectives

Croatia will adopt EPBD - CEN standards, but there are some difficulties in determination of national annexes. All national annexes will be prescribed as a part of the building regulations.

The aim of the project IEE-CENSE is to increase the awareness and effective use of the EPBD - CEN standards. The main activities in the IEE CENSE project are:

- communicate the content of the standards and provide guidance on implementation;
- collect comments and good practice examples;
- prepare recommendations to CEN for the revision of the standards.

3.2 Programme of the workshop

The program of the workshop was structured as follows:

1. Opening of the meeting (Lino Fučić, Director of the Directorate for Construction)

- Objective of the meeting (Johann Zirngibl)
- Presentation of the participants (each)
- Agreement of the agenda
- Context of Croatian Building Regulation (stage, time schedule, main topics; Nada Mardjetko Skoro)

Discussion implementation of EPBD in Croatia compared with some countries in face of:

- design documentation for building permit
- energy certification of buildings

2. The calculation method (new, existing buildings, residential, non residential)

2.1 General structure (overall energy use)

(uses taken into account, zoning, calculation steps, recovered gains and losses, from the needs to primary energy, primary energy factors, etc)

- Croatian calculation structure (Igor Balen)
- EN 15603 - overall energy use (**P88**) (Johann Zirngibl)
Starting point for EPBD-CEN standards integration (**P87**)
Definitions and symbols (**P154**)

Discussion, exchanges of experiences (Croatia, Italy, France, Slovakia, Slovenia)

2.2 Building needs (space heating, DHW)

- Croatian calculations (Igor Balen, Zelko Stromar)
- EN 13790 (**P92**) (Matjaž Zupan, Jana Bendzalova)
- EN 15316 – 3.1 (**P99**) (Claude François)

Discussion, exchanges of experiences

2.3 Heating system losses

Common structure - Multiple generators

- EN 15316-1 (**P96**) (Johann Zirngibl)

Emission

- Croatian calculations (Damir Dović)
- EN 15316-2.1 (**P97**) (Claude Francois)

Discussion, exchanges of experiences

Distribution (space heating, DHW)

- Croatian calculations (Damir Dović)
- EN 15316-2.3 (**P98**) (Hicham Lahmidi)
- EN 15316-3.2 (**P100**) (Claude François)

Discussion, exchanges of experiences

Generation

- Croatian calculations (Damir Dović)
- EN 15316-3.3 (**P101**) (Claude Francois)
- EN 15316-4.1 (**P102**) (Laurent Socal)
- EN 15316-4.2 (**P103**) (Laurent Socal)
- EN 15316-4.4 (**P105**) (Johann Zirngibl)

Discussion, exchanges of experiences

District heating

- Croatian calculations (Damir Dović)
- EN 15316-4.5 (**P106**) (Johann Zirngibl)

Discussion, exchanges of experiences

2.4 Ventilation

- Questions and remarks (Igor Balen)
- EN 15242 and others (**P110, P111**) (Hicham Lahmidi)

Discussion, exchanges of experiences

3. Software tools

- Croatian context, software structure (input, equations), databases (climatic, product data) (Željko Štromar, Igor Balen)
- Experiences from other countries (Socal, Zupan, Bendzalova, Lahmidi)

Discussion software validation

4. Operational rating

- Croatian experiences and views
- EN 15603 – operational rating (Jana Bendzalova)

Discussion, exchanges of experiences

5. Certificates

Discussion about EN 15217 (**P155**), EP indicators, energy requirements, energy classes, reference values, building with mixed use, Experiences from other countries

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

3.3 Profile of participants

In order to enable fruitful detailed technical discussions, only participants involved in the application of EPBD - CEN standards in building regulations has been invited. About 20 experts representing the:

- Croatian Directorate for Construction;
- Universities acting as technical advisers for the public authorities;
- Educational institutes responsible for the training of Croatian certicators;
- Building test institutes;
- Building professionals;

were participating.

Experts from Slovenia, Slovakia and Italy also attended, and therefore an exchange of experiences in the region was possible.

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

4 Main discussion and results

4.1 Context

The evolution of the Croatian building regulation is quite comparable to the evolution of the building regulation in the most advanced European countries [**Annex B-1**]. It started in 1970 with thermal transmittance requirements and now moves towards the overall energy use of buildings, expressed for example in primary energy. For apartments built between 1988 and 1994 the heating needs are about 180 kWh/m²a. The requirements for new buildings are about 50 up to 90 kWh/m²a ! To reach these ambitious targets and to upgrade the Croatian building stock of nearly 2 millions apartments, performant tools are needed.

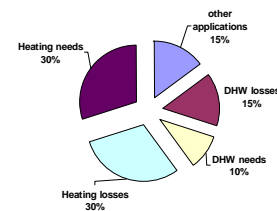
The EPBD and the related CEN standards are requiring a holistic approach of the building. The use of the EPBD - CEN standards in building regulations should start by adopting the same general calculation structure. EN 15603 was presented and it was explained how this standard could be used as a starting point for EPBD–CEN standards integration [**Annex B-2**].

4.2 Practical follow ups - opportunities

The EPBD and the related CEN standards are requiring a holistic approach of the building. The use of the EPBD - CEN standards in building regulations should start by adopting the same general calculation structure. EN 15603 was presented and it was explained how this standard could be used as a starting point for EPBD–CEN standards integration [**Annex B-2**].

The holistic calculation begins with the calculation of the buildings needs (thermal needs of the building envelope, domestic hot water needs, lighting, etc). The workshop focused on the building needs and the domestic hot water needs. After the presentation from Croatia and their choices made in EN ISO 13790 [Annex B-3], the experiences from Slovenia [Annex B-4] and Slovakia [Annex B-5] in the transposition of EN ISO 13790 were presented. The national decisions taken, the problems encountered were detailed and the questions from Croatia were answered. The EBPD – CEN standard EN 15316-3.1 about DHW needs was presented and discussed [Annex B-6].

In the past, often building regulations were limited to the building needs calculated according EN ISO 13790. The losses of the technical building systems were often underestimated or neglected. Indeed they can account for about 50% of the building needs in existing residential buildings (see figure for French building stock).



When the houses become better and better insulated, the performance of the technical building systems become more and more important in the overall energy use and they can no longer be neglected.

For example in well-insulated houses the consumption of the heating circulation pump could represent up to 10 % of the overall energy consumption. All parameters influencing the overall energy use have to be taken into account in the calculation methods, otherwise the potential of upgrading the building stock will not be used efficiently. An important part of the workshop was dedicated to the heating system loss calculation [Annex B-3], [Annex B-7], [Annex B-8]. An example about a typical Italian collective building clearly highlighted the energy saving potential in the building stock.

Ventilation system calculation has also been discussed during the meeting [Annex B-3], [Annex B-9]. The use of the related standards causes some difficulties.

The Croatian building authorities were also interested in the experiences from other countries on operational rating, for example for public buildings. EN 15603 deals with operational rating too. An interesting experience with operational rating has been presented by Slovakia [Annex B-10].

After having discussed the calculation methods in details, some participants wondered if it would be possible to ask for so many detailed information for the building permit, for the use permit, for the certificates in new and existing buildings? Should the calculation method for these applications be the same or different (detailed, simplified methods)?

It was recalled that the stake in energy efficiency is in the building stock. The certificates (and the inspection reports) are meant to be a trigger for upgrading the building stock through effective advice. Unfortunately today the certificates are often based on simplified tools as many countries are still in the starting phase with the certificates. The advices are often very basic. Better tools are needed for better advices to upgrade the energy efficiency of the building stock in a cost efficient way. The participants agreed that the calculation methods should be the same.

During the meeting it was pointed out that for the certicators it would be difficult to read the hundreds of pages of the standards and to apply the standard without help. But there is no need for the certicator to read the standards if he could use high quality software tools.

By using a software tool the calculation method could be the same. The simplification will not be on the calculation method itself but on the interface between the user (certicator) and the calculation method. Each user can decide how deep he wants to go into the details. Default values, pre-calculated values based on the typology of buildings and technical systems will help to reduce the input data.

The investments needed to develop high quality software tools (e.g.: integrated tools for design and energy calculation, graphical interfaces) are only justified for a significant market

having the same rules. The significant market is Europe; the same rules for the calculation method are established by the EPBD - CEN standards.

5 Conclusions and recommendations

The Croatian authorities decided to use the experience of other countries and to adopt the EPBD – CEN standards.

Croatia will focus on the development on national annexes like climate data and boundary conditions.

Through application of European standards Croatian experts are provided with the possibility of using software which supports the same set of European standards.

The software will have prescribed obligatory control of their applicability under Croatian regulations. Software applicability control shall be carried out using an algorithm - a tool planned to be developed and which will contain all national additions necessary for the application of European standards **[Annex B 11]**.

The Directorate for construction will also support Croatian experts to participate actively to EPBD - CEN standardization work to bring in their experience directly.

Annex A - Workshop Programme

Workshop: CENSE – Directorate for Construction
Ministry of Environmental Protection, Physical Planning and Construction
Zagreb, Croatia 8th and 9th December 2009

Meeting venue:

Directorate for Construction
Ministry of Environmental Protection, Physical Planning and Construction
Republike Austrije 14
Zagreb

The time schedule of the agenda may be submitted to changes depending on the time needed for each topic

Tuesday 8th of December 2009 / Start: 10h00

1) 10h00: Opening of the meeting (Lino Fučić, Director of the Directorate for Construction)

- Objective of the meeting (Johann Zirngibl)
- Presentation of the participants (each)
- Agreement of the agenda
- Context of Croatian Building regulation (stage, time schedule, main topics Nada Mardjetko Skoro)

Discussion implementation of EPBD in Croatia compared with some countries in phase of:

- design documentation for building permit
- energy certification of buildings

11h30-11h45 coffee break

2) 11h45: The calculation method (new, existing buildings, residential, non residential)

2.1 General structure (overall energy use)

(uses taken into account, zoning, calculation steps, recovered gains and losses, from the needs to primary energy, primary energy factors, etc)

- Croatian calculation structure (Igor Balen) (20 min)
- EN 15603 - overall energy use (**P88**) (Johann Zirngibl) (20 min)
Starting point for EPBD-CEN standards integration (**P87**)
Definitions and symbols (**P154**)

12h30: Lunch break

Discussion, exchanges of experiences
(Croatia, Italy, France, Slovakia, Slovenia)

(5 min)

2.2 13h30: Building needs (space heating, DHW)

- Croatian calculations (Igor Balen, Zelko Stromar) (20 min)
- EN 13790 (**P92**) (Matjaž Zupan, Jana Bendzalova) (2x 20 min)
- EN 15316 – 3.1 (**P99**) (Claude François) (15 min)

14h45-15h00 coffee break

Discussion, exchanges of experiences

(60 min)

17h00 Closure first day

Wednesday 9th of December 2009 / **Start: 9h00**

2.3 Heating system losses

Common structure - Multiple generators

EN 15316-1 (**P96**) (Johann Zirngibl) (15 min)

Emission

- Croatian calculations (Damir Dović) (5 min)
- EN 15316-2.1 (**P97**) (Claude Francois) (5 min)

Discussion, exchanges of experiences (5 min)

Distribution (space heating, DHW)

- Croatian calculations (Damir Dović) (10 min)
- EN 15316-2.3 (**P98**) (Hicham Lahmidi) (10 min)
- EN 15316-3.2 (**P100**) (Claude François) (10 min)

Discussion, exchanges of experiences (15 min)

10h45-11h00 Coffee break

Generation

- Croatian calculations (Damir Dović) (10 min)
- EN 15316-3.3 (**P101**) (Claude Francois) (5 min)
- EN 15316-4.1 (**P102**) (Laurent Socal) (10 min)
- EN 15316-4.2 (**P103**) (Laurent Socal) (5 min)
- EN 15316-4.4 (**P105**) (Johann Zirngibl) (5 min)

Discussion, exchanges of experiences (10 min)

District heating

- Croatian calculations (Damir Dović) (5 min)
- EN 15316-4.5 (**P106**) (Johann Zirngibl) (5 min)

Discussion, exchanges of experiences (5 min)

2.4 Ventilation

- Questions and remarks (Igor Balen) (10 min)
- EN 15242 and others (**P110, P111**) (Hicham Lahmidi) (10 min)

Discussion, exchanges of experiences (10 min)

12h30: Lunch break

3) 13h30: Software tools

- Croatian context, software structure (input, equations), databases (climatic, product data) (Željko Štromar, Igor Balen) (15 min)
- Experiences from other countries (Socal, Zupan, Bendzalova, Lahmidi) (30 min)

Discussion software validation (freeware software not complete, incorrect result) (15 min)

4) 15h00: Operational rating

- Croatian experiences and views (?) (10 min)
- EN 15603 – operational rating (Jana Bendzalova) (10 min)

Discussion, exchanges of experiences (10 min)

5) 15h45: Certificates

Discussion about EN 15217 (**P155**), EP indicators, energy requirements, energy classes, reference values, building with mixed use, Experiences from other countries (45 min)

6) 16h45: Future cooperation

7) 15h15: Closure of the meeting (not later than 15h30)

Annex B – Presentations

- [1] Harmonisation of legal system in the field of energy efficiency in buildings in the Republic of Croatia, Nada Marđetko Škoro, Directorate for Construction; Department for system and programs, Croatia
- [2] P87 How to integrate the CEN – EPBD standards in national building regulations, Johann Zirngibl, CSTB, France
- [3] Energy performance calculation structure in Croatia, Igor Balen, Faculty of Mechanical Engineering and Naval Architecture, Croatia
- [4] EN ISO 13790 – Slovene ways and sideways, Matjaž Zupan, Fibran Nord d.o.o, Slovenia
- [5] Calculation of heat need for heating and cooling (EN ISO 13790:2008), Jana Bendžalová, BUILDING TESTING AND RESEARCH INSTITUTE, Slovak Republic
- [6] P99 Information paper on EN 15316-3.1, Hans van Wolferen, TNO, Netherlands, Claude François, CSTB, France
- [7] HRN EN 15316 series, Space heating and domestic hot water systems – energy requirements and efficiencies, Damir Dović, Faculty of Mechanical Engineering and Naval Architecture, Croatia
- [8] P98 Information paper on EN 15316-2.3 – Space heating distribution systems, Laurent Socal, Edilclima, Italy
- [9] P110 Information paper on EN 15242 - Calculation methods for the determination of air flow rates in buildings including infiltration, Hicham Lahmidi, CSTB, France
- [10] Measured energy rating, Jana Bendžalová, BUILDING TESTING AND RESEARCH INSTITUTE, Slovak Republic
- [11] Software tools, Željko Štromar, INSTITUT IGH d.d., Croatia.

(see <http://www.epbd-s.eu> and <http://www.iee-cense.eu>):

Included as pdf's (available as ppt's at private part of website, for CENSE partners only)
If it concerns standard CENSE: ppt's also at public part of website

Annex C – List of participants

CENSE - Workshop EU standards for defining a national calculation methodology in Croatia

8th and 9th December 2009

Zagreb, Croatia

Attendance list

Name (first name, family name)	organisation	position	country
Lino Fučić	Directorate for Construction	Director	Croatia
Mirjana Cubric Štefok	Sector for Construction	Head of Sector	Croatia
Nada Marđetko Škoro	Department for system and programs	Head of Department	Croatia
Slavica Radic Vukovic	Section for Energy Efficient, Accessible and Sustainable Construction	Senior Adviser	Croatia
Željko Štromar	INSTITUT IGH d.d.	Director	Croatia
Damir Dović	Faculty of Mechanical Engineering and Naval Architecture	Assist. Prof.	Croatia
Igor Balen	Faculty of Mechanical Engineering and Naval Architecture	Professor	Croatia
Johann Zirngibl	CSTB, Energy Environment Development and Prospecting	Head of Division	France
Claude François	CSTB, Energy Environment Development and Prospecting	Senior Scientist	France
Hicham Lahmidi	CSTB Division Energie	Scientist	France
Jana Bendzalova	TSUS, VVUPS-NOVA	Head of energy and thermal protection department	Slovakia
Laurent Socal	Edilclima	Scientist	Italy
Matjaž Zupan	FIBRAN NORD	Quality Assurance Manager	Slovenia
Dunja Mikulic	Faculty of Civil Engineering	Professor	Croatia

**CENSE - Workshop EU standards for defining
a national calculation methodology in Croatia**8th and 9th December 2009

Zagreb, Croatia

Attendance list

Name (first name, family name)	organisation	position	country
<i>Continued:</i>			
Marina Malinovec Pucek	Energy Institute Hrvoje Pozar	Professional Adviser	Croatia
Ivan Cetinic	Faculty of Architecture	Professor	Croatia
Kresimir Kasic	URSA	Technical Trade Agent	Croatia
Toni Borkovic	Energy Institute Hrvoje Pozar	Professional Adviser	Croatia
Bojan Milovanovic	Faculty of Civil Engineering	Professional Collaborator	Croatia
Branimir Pavkovic	Technical Faculty Universities in Rijeka	Professor	Croatia
Tomislav Mrakovcic	Technical Faculty Universities in Rijeka	Professor	Croatia
Kristian Lenic	Technical Faculty Universities in Rijeka	Professor	Croatia

Supported by



Annex D– Summary of evaluation by the participants

**Event title: EU standards for defining a national calculation methodology in Croatia
CENSE-Workshop 8th and 9th of December 2009, Zagreb, Croatia**

Overall event evaluation	is of high actual priority	will have priority in the future	is irrelevant for me, but possibly interesting for others	is irrelevant at all
The subject of the workshop...	83 %	17 %		

Actions and outcomes	100%	90%	75%	65%	50%	40%	25%	15%	0%
This event fulfilled my objectives		88 %							
I can apply what I learnt in this event		89 %							
Was there enough space for discussion		92 %							
Was the workshop moderated/coordinated effectively		90 %							
Was the announcement of the workshop well addressed	98 %								
Did the workshop clarify the relation between the EPBD and EU-projects			83 %						

The things I found most useful to me in this event were:

I hear the experience from different countries, it is most useful for me

Experience of other countries in certifying buildings

Discussions and PowerPoint about software

Calculation procedures, software examples

Discussions about standards EN 15316 series

Possibilities of communication with CENSE experts

The things I found less useful to me in this event were:

Additional comments:

Supported by

Intelligent Energy  **Europe**

Annex E – Evaluation Form

**Event title: EU standards for defining a national calculation methodology in Croatia
CENSE-Workshop 8th and 9th of December 2009, Zagreb, Croatia**

Occupation:

**Please tick the appropriate box. If you cannot answer a question then leave it blank.
Thank you! We value your opinion!**

Overall event evaluation	is of high actual priority	will have priority in the future	is irrelevant for me, but possibly interesting for others	is irrelevant at all
The subject of the workshop...				

Actions and outcomes	100%	90%	75%	65%	50%	40%	25%	15%	0%
This event fulfilled my objectives									
I can apply what I learnt in this event									
Was there enough space for discussion									
Was the workshop moderated/coordinated effectively									
Was the announcement of the workshop well addressed									
Did the workshop clarify the relation between the EPBD and EU-projects									

The things I found most useful to me in this event were:

The things I found less useful to me in this event were:

Additional comments:

Supported by

