



Co-funded by the Intelligent Energy Europe
Programme of the European Union



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Nearly Zero Energy Hotels

The IEE project neZEH

Contract: IEE/12/829/SI2.644758

Project duration: 01/04/2013 - 31/03/2016

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My name is Andrei Lițiu, I work as project assistant at REHVA and together with Camelia Rață, the executive director of ABMEE (agency of Brasov for energy management and environment protection), we will present you the EC (European Commission) funded project within the IEE (Intelligent Energy Europe) programme called neZEH which stands for Nearly Zero Energy Hotels. I will present general information about the project and key technical information from the work done so far and then I will pass the floor over to Camelia for the status of implementation in Romania.



Because time is short and there are a lot of things to say about neZEH we have made FYI (for your information) slides (with red title) for you to have after the conference when you will get all the presentations. On this slide and the next you have information regarding the consortium.

PARTNER	COUNTRY
Technical University of Crete, Renewable and Sustainable Energy Systems Lab (ENV/TUC)	Greece
United Nations World Tourism Organization (UNWTO)	EU/Int
Network of European Region for a Sustainable and Competitive Tourism (NECSTouR)	EU
Federation of European Heating, Ventilation and Air-conditioning Associations (REHVA)	EU
Agency of Braşov for Energy Management and Environment Protection (ABMEE)	Romania
Creara Consultores S.L. (CREARA)	Spain
ENERGIES 2050 (ENERGIES 2050)	France
Energy Institute Hrvoje Požar (EIHP)	Croatia
Istituto Superiore sui Sistemi Territoriali per l'Innovazione (SITI)	Italy
Sustainable Innovation (SUST)	Sweden



Background

- Buildings account for ≈40% of total energy consumption and 36% of GHG emissions in EU.
- Ambitious EU targets for 2020 and even more for 2050; 90% reduction in domestic GHG emissions by 2050 compared to 1990 levels.
- National roadmaps include measures to challenge nZEBs.
- Large cost saving potential for energy improvements - Retrofit enables 20-50% energy and operating cost savings.
- nZEB concept not well developed in EU; low awareness among the building and hotel sectors' stakeholders about potential and benefits or about suitable technologies.
- Limited experience on the design and implementation of nZEB projects; Limited examples in the private sector to be used as "lighthouse".
- Increasing challenges for energy consumption reduction and competitiveness for the hotels industry.
- Barriers in the bankability of such investments, especially in MS under economic crisis.



Here you have background information regarding the energy performance of buildings in EU (European Union), which you already know.

NEZEH mainly addresses to the EPBD Recast (*Art. 9*), contributing directly to the EU 2020 targets:

- after 31 December 2020, all new buildings are nZEB; and
- after 31 December 2018, new public buildings are nZEB.
- MS shall draw up national plans for increasing the no of nZEB and will develop policies / measures to stimulate the transformation of buildings into nZEB.
- National plans should include:
 - detailed application of the nZEB definition, including a numerical indicator of primary energy use in kWh/m² per year.
 - intermediate targets for improving the energy performance of new buildings, by 2015
 - information on policies and financial or other measures adopted for the promotion of nZEB including measures concerning the use of RES (Article 13(4) of 2009/28/EC and Articles 6 and 7.

nZEB = very high energy performance + on-site or nearby renewables



Another FYI (for your information) slide concerning EU (European Union) policy and targets.

The main drivers behind the idea



The main target group of the project is SME hotels, which represent 90% of the European hospitality market.

An effort to spread the knowledge about the concept of nZEB is required:

- Hotels' guests may experience the comfort of living in nZEB, learning how some architectural and technical solutions could be replicated at home;
- Energy consumption is usually higher in hotels than in residential buildings, so there is a larger margin for energy saving measures;
- As the hotel sector is highly competitive, the competitive advantages gained by some hotels will push others to imitate.



The neZEH project targets SME (small and medium enterprise) hotels which represent 90% of the European hospitality market. This approach will increase the nZEB (nearly zero energy building) implementation due to the competitiveness of the hotel sector by pushing others to imitate and at the same time it will also influence staff and guests to replicate at home or work after experiencing the comfort of living in nZEB.

The major outputs of the project



- An integrated set of decision support tools to assist hoteliers to identify appropriate solutions and to design feasible and sustainable nZEB projects;
- A dynamic communication channel between the building sector and the hotels industry, which will enable the exchanging between demand and supply side and the endorsement of the nZEB concept;
- Demonstration pilot projects in seven (Croatia, France, Greece, Italy, Spain, Sweden, Romania) countries to act as “living” examples, aiming to increase the rate of nZE renovation projects in the targeted countries;
- Practical tools, informational materials, training and capacity building activities to support nationally the implementation and dissemination of neZEH projects;
- Integrated communication campaign and tools to increase awareness for the nZEB benefits, to promote front runners and to foster replication; challenging much more SMEs to invest in refurbishment projects in order to achieve nZE levels.



The project’s outputs are targeting hoteliers as well as building professionals. Both hoteliers and building professionals will benefit of nZEH (nearly zero energy hotel) know how, thus mitigating the technical language gap and fostering better collaboration in the decision making process. A nZEHs network at EU level will be established easing the exchange of experience and best practices between hoteliers, but also creating a bridge between the hotel industry and the building sector (linking demand side with supply side).

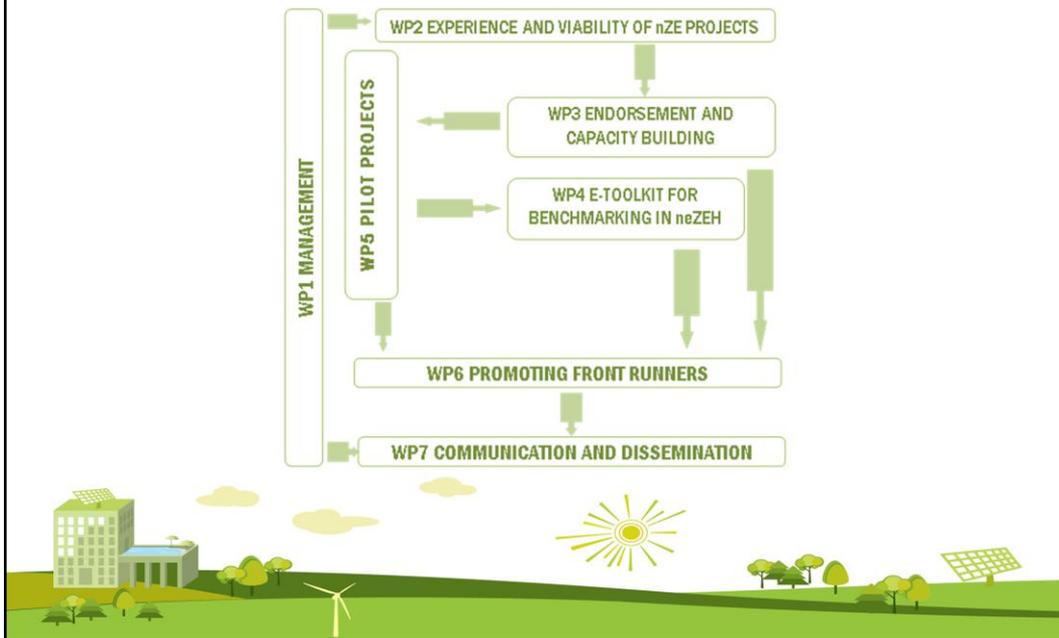
Methodology



- Showcases of existing good practices in the hotels sector.
- Assessment of the national nZEB markets' framework and development.
- Classification of the available solutions and technologies, appropriate for retrofitting SME hotels into neZEH.
- Set up pilot projects in 7 countries to demonstrate their sustainability.
- Development of practical tools, informational materials, training and capacity building activities to support nationally the implementation and uptake of neZEH projects.
- Networking activities to link the supply and demand side.
- Implementation of integrated communication campaigns to increase awareness for the nZEB benefits, to promote front runners and to foster replication.



The methodology is an FYI (for your information) slide.



I prefer to point out the current status of the project on this slide. As you can see the work is split in 7 WP (work packages). We have completed WP2 and it is in revision process at the EC (European Commission). WP3, WP5 and WP7 are ongoing, in parallel, and WP4 will start by the end of this month.

Showcases of existing good practices in the hotels sector



- The aim of this task is to provide hoteliers with the direct evidence that the nearly zero energy level is an achievable and profitable target for hotels.
- To show to potential pilot project's initiators a complete overview of the best practices refurbishment process, information concerning both the economic and technical features are asked to the showcases, structured as a questionnaire for the technical and quantitative questions and as an interview for economical and qualitative aspects.
- The first hotel selected as a showcase was the **Boutiquehotel Stadthalle** in Vienna.
- Please check the **Further information and material** slide.



Before the partner countries pilot projects, showcases of existing nZEHs (nearly zero energy hotels) are prepared. Following a thorough selection procedure, that pointed out that there is a great lack of truly nZEH, 3 case studies have been selected from Austria, Croatia and Spain. Even though the project deliverable containing the showcases is not yet public, an article about the Boutiquehotel Stadthalle in Vienna can be found in the REHVA journal.

Assessment of the national nZEB markets' framework and development



- Data regarding energy performance and nZEB requirements was collected at EU level.
- The review of available national nZEB definitions shows remarkably high variation in nZEB primary energy values being between 20 and 200 kWh/(m²a) in ten countries. The high variation applied even within the same building type in countries with similar climate. It is partly due to different energy uses included and partly due to different level of ambition in the definitions.
- Very limited number of building types used in national nZEB definitions, often just residential and non-residential, was alarming and shows that majority of countries cannot tackle the eight building types specified in EPBD recast Annex.
- It can be concluded that Member States need more guidance in order to set consistent and comparable nZEB values with equal ambition levels.



When the project proposal was approved by the EC (European Commission) it was expected to have the nZEB national definitions available by 2013. This was not the case. The few existing definitions (10) show high variation in nZEB primary energy indicators (20 – 200 kWh/(m²a)). Not only this but most of the existing definitions do not tackle all the eight building types specified in EPBD recast Annex, usually just residential and non-residential. In addition the energy flows taken into consideration are different from country to country.

Assessment of the national nZEB markets' framework and development



Country	nZEB definition	nZEB requirements		Expected date to be ready	Energy performance class A	
		Residential	Non-residential		Residential	Non-residential
Croatia	Yes	Yes	No	2014	Fixed values	Relative values
France	No*	No*	No*	*	Fixed values	Fixed values
Greece	No**	No	No	NA	Relative values	
Italy	No**	No	No	June 2014	Relative values	
Romania	No**	No	No	NA	Fixed values	Fixed values***
Spain	No	No	No	2016-2017	Relative values	
Sweden	No****	No****	No****	NA	Relative values	

* So far, there is not yet a French official definitive definition or requirements for nZEBs, but it is generally agreed that nZEBs will be Low Consumption Energy Buildings (BBC) which are the newly constructed buildings abiding to the latest building codes (thermal regulations) RT2012.

** Only qualitative definition transposed in the national legislation.

*** Only for commercial buildings.

**** Presently, in Sweden, the buildings with an energy performance by 25% higher than that stated in the building codes are referred to as low-energy buildings and those with an energy performance by 50% higher are classified as having very low energy use.



Here you can see the nZEB implementation status for the partner countries. So far, only Croatia has nZEB (nearly zero energy building) definition. Other countries have just transposed in the legislation the qualitative definition or have other names for these high energy performing buildings. Updates are being collected from the partner countries through out the project's duration. The CA (Concerted Action) EPBD (Energy Performance of Buildings) will have its next meeting about national nZEB applications during 15-16 March 2015.

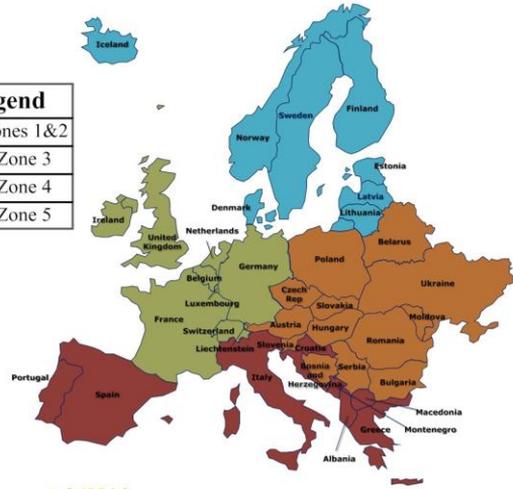
nZEH (nearly zero energy hotels) benchmarks: climatic zones



- The available data of nZEH numerical requirements was grouped according to ECOFYS classification into five European climatic zones as shown in the figure on the right. (indicative illustration of the climatic zones)
- The countries selected for representing the climatic zones were respectively Italy (zone 1 and 2), Slovakia (zone 3), France (zone 4) and Estonia (zone 5).
- Please check the **Further information and material** slide.

Map of European climatic zones

Legend	
	Zones 1&2
	Zone 3
	Zone 4
	Zone 5



Because of this situation nZEH (nearly zero energy hotel) benchmarks had to be defined in order to properly select the pilot projects and set nearly zero energy performance targets that will be valid after the national definitions will come in force. Europe was grouped in 5 climatic zones, following the approach of ECOFYS, and benchmarks were calculated using the existing energy performance requirements as starting point.



- The first issue to be faced was how to define in a hotel the “typical use of the building”, upon which the EPBD is based.
- The approach to the problem chosen was to compare the reference values for primary energy dealing only with the hotels’ energy use for the hosting functions.
- The selection criteria for specifying the hosting functions was suggested by the EPBD (2002), affirming that the energy performance of a building derives from the climatic indoor environmental quality targets set for it.
- Following the EN 15251 the standard zones of a hotel to be considered among the hosting functions were selected: guests’ rooms, reception hall, offices, bar and restaurant, meeting rooms. (**Further information and material** slide)



Before presenting the nZEH (nearly zero energy hotel) benchmarks for the different climatic zones I underline that the primary energy indicators and the RERs (renewable energy ratios) take into consideration the hosting function of the hotel. This let’s say component of the hotel’s energy consumption can be considered constant. Thus the defined targets can be applied for all hotels disregarding the additional offered facilities they might have.

nZEH benchmarks: 75% reduction



- nZEH primary energy indicators
- Existing hotels primary energy indicators (residential buildings stock + additional cooling, ventilation, DHW & appliances)
- For achieving nZEH levels the primary energy use of existing hotels is necessary to be reduce in average by 75%.
- Please check the **Further information and material** slide.

No.	European climate zone	Primary energy indicator [kWh/m ² ·a]	Energy uses/ flows	RER [%]
1	Zone 1	56	Heating, cooling,	50
2	Zone 2	56	domestic hot	50
3	Zone 3	60	water, HVAC	35
4	Zone 4	97	auxiliaries &	35
5	Zone 5	115	lighting	25

Country	Hotels primary energy indicator 2008 level [kWh/m ² ·a]	Energy reduction percentage [%]	Primary energy indicator [kWh/m ² ·a]
Croatia	397,76	80,64	77
France	356,61	67,75	115
Greece	412,61	81,58	76
Italy	221,53	67,95	71
Romania	394,68	79,73	80
Spain	239,99	70,00	72



Starting from the requirements of the previously mentioned countries nZEH (nearly zero energy hotel) primary energy indicators and RERs (renewable energy ratios) were calculated for each climatic zone. These values were verified if feasible by confronting them with the energy consumption of the existing building stock. Based on existing primary energy use for residential buildings primary energy indicators were calculated for hotel buildings taking into consideration additional ventilation, cooling and domestic hot water energy consumption as well as appliances. The primary energy use of existing hotels was necessary to be reduced by factor of 4 in average, which is in line with other EU (European Union) studies.

Appropriate solutions and technologies for retrofitting SME hotels into nZEH.



A practical e-tool, to empower SME hoteliers to assess their energy profile and to choose best technical solutions in order to reach an nZE level.

- The predecessor of the neZEH project was Hotel Energy Solutions (HES). HES developed a practical e-toolkit for giving hoteliers the possibility to assess their hotels' energy performance and recommending possible interventions to improve it.
- The appropriate solutions and technologies for SME hotels were further developed starting from the material developed in the HES project.
- The energy saving technologies and solutions are grouped in 5 categories:
 - Energy management
 - Reduction of heating and cooling demands
 - Equipment efficiency
 - System efficiency
 - Renewable energy



The last thing I would like to talk about is the HES (Hotel Energy Solutions) e-toolkit. This tool is available online for assessing the energy performance of hotels and recommending possible interventions to improve it. The input of information is similar to a questionnaire. I recommend hoteliers and designers to use it for checking how well their hotel is performing and whenever tackling a hotel building refurbishment project and even more for a new built. The current version will be updated with the findings of this project and the EPBD (Energy Performance of Buildings Directive) recast approach.

Further information and material



- www.nezeh.eu
- <http://www.rehva.eu/publications-and-resources/hvac-journal/2014/012014/nearly-zero-energy-hotels/>
- <http://www.rehva.eu/publications-and-resources/hvac-journal/2014/022014/nzeb-definitions-in-europe/>
- <http://www.rehva.eu/publications-and-resources/hvac-journal/2014/032014/an-existing-best-practice-of-nearly-zero-energy-hotel/>
- <http://hotelenergysolutions.net/>
- <http://www.hes-unwto.org/>
- <http://www.rehva.eu/publications-and-resources/hvac-journal/2014/032014/nearly-zero-energy-buildings-nzeb-in-cen-draft-standard/>
- REHVA Report no. 6, REHVA nZEB technical definition and system boundaries for nearly zero energy buildings



I recommend you to read in depth these references for having a better understanding of what I have briefly presented.

THANK YOU FOR YOUR ATTENTION!
We are available for questions during lunch and of
course by e-mail.

For more information you can also contact the project coordinator:



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