neZEH
NEARLY ZERO ENERGY HOTELS

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Nearly Zero Energy Hotels
The IEE project neZEH

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ABMEE

REHVA
3E
Federation of European Heating, Ventilation and Air-conditioning Associations

neZEH 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 competiveness for the hotels industry.

- Barriers in the bankability of such investments, especially in MS under economic crisis.

neZEH supports EU policy and targets

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/m^2 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

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.
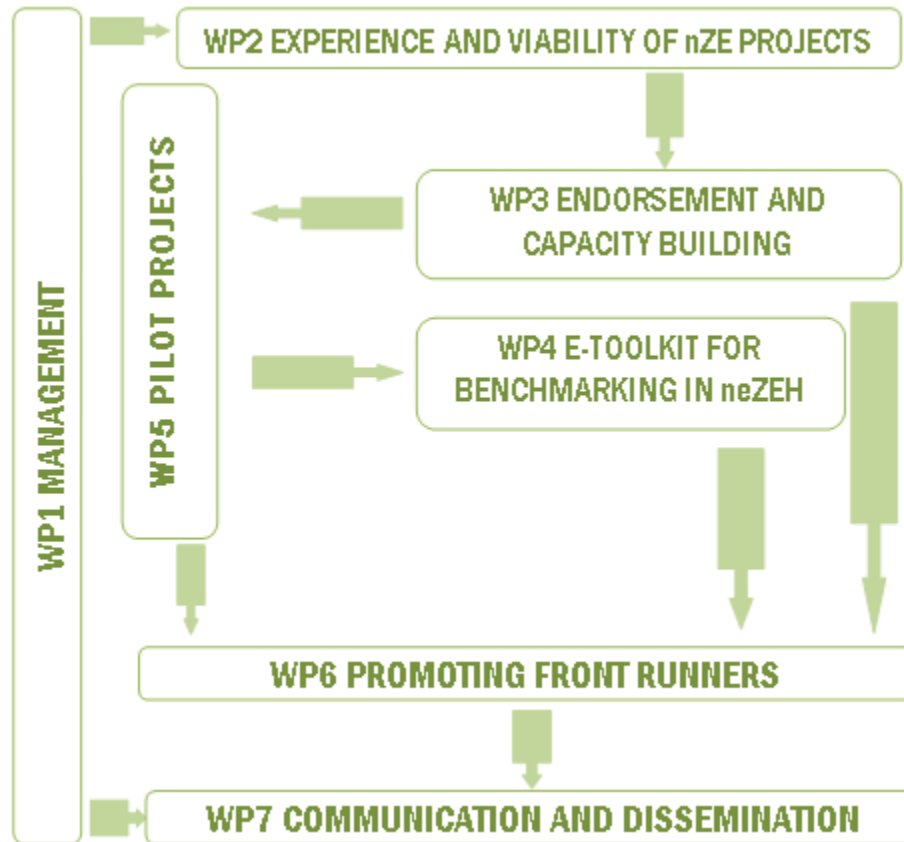
The major outputs of the project

• 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.

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.

neZEH Action Plan

WP1 MANAGEMENT

WP5 PILOT PROJECTS

WP2 EXPERIENCE AND VIABILITY OF nZE PROJECTS

WP3 ENDORSEMENT AND CAPACITY BUILDING

WP4 E-TOOLKIT FOR BENCHMARKING IN neZEH

WP6 PROMOTING FRONT RUNNERS

WP7 COMMUNICATION AND DISSEMINATION

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.

- 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.

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.

nZEH (nearly zero energy hotels) benchmarks: climatic zones

• The available data of nZEB 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

nZEH benchmarks: hosting function

nZEB

nZEH
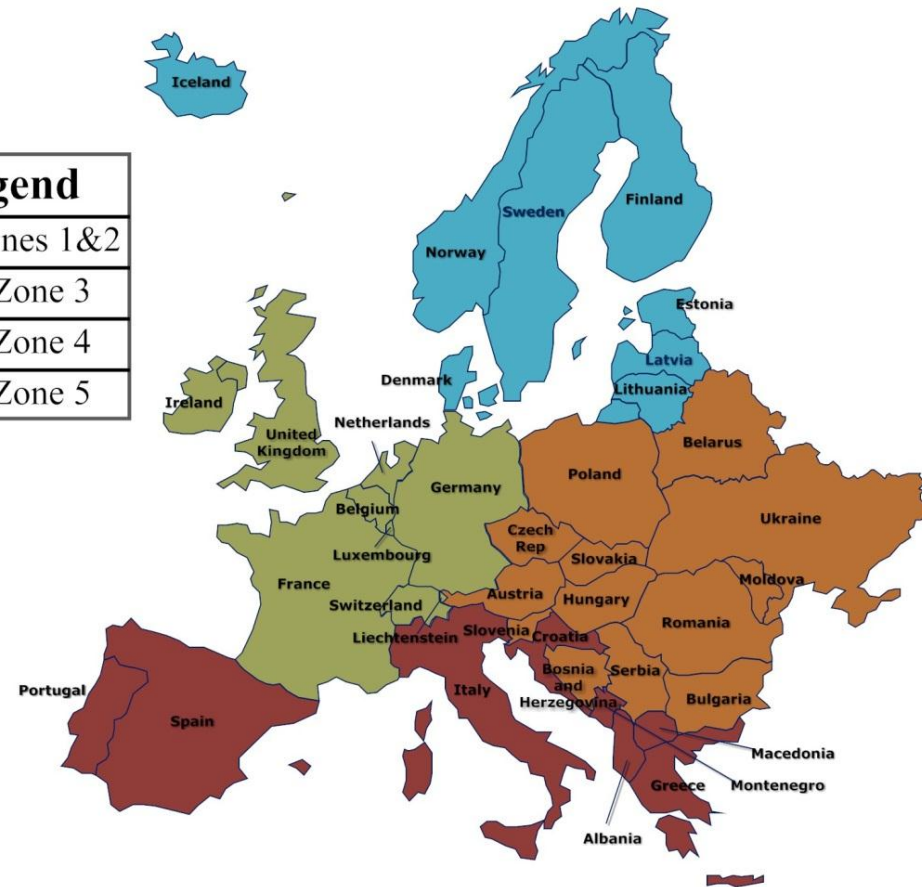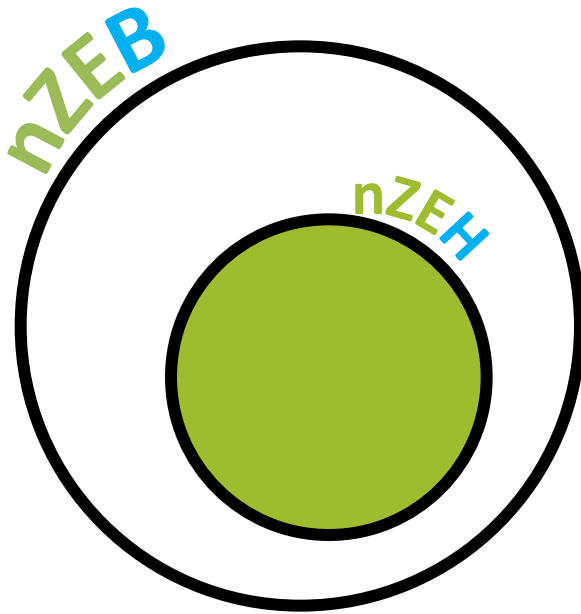
- The first issue to be faced was how to define in a hotel the "typical use of the building", upon which the EPBD is based.

- 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)

- 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/m²·a)]	Energy uses/ flows	RER [%]
1	Zone 1	56	Heating, cooling, domestic hot water, HVAC auxiliaries & lighting	50
2	Zone 2	56		50
3	Zone 3	60		35
4	Zone 4	97		35
5	Zone 5	115		25

Country	Hotels primary energy indicator 2008 level [kWh/m²·a)]	Energy reduction percentage [%]	Primary energy indicator [kWh/m²·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

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

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

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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