



List of hotels categories reflecting climate regions and customer requirements

WP2 Experience and viability of nZE refurbishment projects, D2.5

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THE EU INITIATIVE NEARLY ZERO ENERGY HOTELS (neZEH)

neZEH's scope is to accelerate the rate of refurbishment of existing hotels into Nearly Zero Energy Buildings (nZEB), providing technical advice to hoteliers for nZEB renovations, demonstrating the sustainability of such projects, challenging further large scale renovations through capacity building activities, showcasing best practices and promoting the front runners. The project covers seven (7) EU countries: Greece, Spain, Italy, Sweden, Romania, Croatia, France and has a wide EU level impact.

The expected results are:

- An integrated set of decision support tools to assist hoteliers in identifying appropriate solutions and designing 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 7 countries to act as "living" examples; aiming to increase the rate of nZE renovation projects in the participating countries
- Practical training, informational materials and capacity building activities to support nationally the implementation and uptake of nZEB projects;
- Integrated communication campaigns 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.

In the long term, the project will assist the European hospitality sector to reduce operational costs, to improve their image and products and thus to enhance their competitiveness; contributing in parallel to the EU efforts for the reduction of GHGs.

neZEH started at May 2013 and will end at April 2016 and is co-financed by the Intelligent Energy - Europe (IEE) programme.

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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
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1. Introduction

The purpose of this deliverable is to define different categories of hotels which reflect different climatic regions and different customer requirements to be used by hoteliers and integration in the update of the HES e-toolkit in WP4.

Data and experience from the Hotel Energy Solutions project¹ showed that there is no harmonized European or global typology for hotels. neZEH team decided to use a typology based on the HES e-toolkit data and experience. REHVA listed the available nearly zero energy buildings (nZEB) technologies and solutions and allocated them to those categories of geographical area and customer needs.

nZEB technologies and solutions are categorised and assessed in a different way in D2.4 (List and classification of all the appropriate technologies and solutions available for SME hotels) considering the climatic zone, the size of the financial investment, the potential energy savings and the inherited return on investment (ROI) period.

The recent document on selection of technologies and solutions listed for each hotel category represents only a starting point and for the use of adapting the HES e-tool in consistency with the categories already included at the existing databases at the e-tools back end. For further narrowing of the technologies and solutions the most appropriate criteria: climatic zone and ROI presented in D2.4 (List and classification of all the appropriate technologies and solutions available for SME hotels) are to be taken into account if a hotelier wishes to have a picture about energy refurbishment in order to become nZEH. Of course these suggestions are general advices only, for a proper decision about energy refurbishment of a hotel building it is necessary to consult with a specialised engineer who can provide adequate, tailor made information.

¹ The **Hotel Energy Solutions** is an UNWTO-initiated project in collaboration with a team of United Nations and EU leading agencies in Tourism and Energy. The project delivers information, technical support & training to help Small and Medium Enterprises (SMEs) in the tourism and accommodation sector across the EU 27 to increase their energy efficiency and renewable energy usage. <http://hotelenergysolutions.net/en>

2. Hotel categories reflecting climate regions and customer requirements

Hotel accommodations are usually guest rooms with a bathroom, flanked on both sides by other guest rooms. But, the offered facilities depend greatly on the hotel category. Multipurpose subsidiary facilities range from conference rooms and meeting halls to kitchens, restaurants, lounges, indoor and outdoor wellness areas, etc. Due to the climate features, some of the hotel categories have seasonal operation (in summer or winter time), but most of them have year round operation in every climatic zone.

2.1 Hotel categories in the HES e-toolkit

There is no general hotel typology available for the purpose of ranking energy efficient solutions, so neZEH team decided to use the typology based on experience of the HES e-toolkit. Based on the HES project data and experience the following 4 main categories were used based on geographical area, where the hotel is situated:

- **Urban:** hotels in an urban environment, available in all 5 climate zones;
- **Rural:** hotels in remote, countryside areas, available in all 5 climate zones;
- **Coastal:** hotels on sea shores, available in all 5 climate zones;
- **Mountain:** hotels in the mountains, available in all 5 climate zones, however due to the high altitude this is a category, where the cold climatic aspects can be taken into account.

2.2 Hotel types in the HES e-toolkit

The H.E.S. tool also defines the following 4 hotel types according to customer needs and main activities characteristic for a hotel. These types are available in each geographical category.

- **Business hotels:** focus on attracting business by satisfying all the requirements of business trips and are usually located in the centre or business district of urban or rural settlements. They typically have conference rooms, auditoriums, several meeting rooms, kitchen and restaurant. They also offer facilities such as business centre with access to personal computers, Wi-Fi, phone & fax, scanners and printers.
- **Spa/ Wellness** hotels guarantee relaxation, recreation and healthcare for guests. Hotels from this category offer a wide range of recreation and healthcare services e.g. hydro massage baths, bath with mineral water, sauna, massage, therapeutic muds, wrapping in leaves of herbs, acupuncture, peeling, special diets, aromatherapy, yoga. They usually have large public areas, indoor/ outdoor swimming pools, fitness room, spa complex, kitchen and restaurant.
- **Resort hotels** are found located near the sea, mountain and other areas having an attractive landscape and healthy climatic condition. They target holiday makers, tourists

and those who need a change in the atmosphere by offering all inclusive properties. These hotels provide enjoyable and memorable guest experiences through entertainment and recreational facilities, scenery, golf, tennis, sailing, skiing and swimming. They have a comprehensive infrastructure for all types of activities that might characterise them as mini cities. They have large public areas, indoor sports, kitchen and restaurant, conference and meeting rooms, lounges, shopping arcade and entertainment areas.

- **Hotels B&B** usually have limited public areas than the categories mentioned before and no offered facilities, except maybe kitchen and restaurant and sometimes outdoor swimming pool, thus they satisfy the basic needs of the guests.

All relevant nZEB technologies and solutions were selected, listed and allocated to hotel categories and types of the above described typology as shown in Appendixes 1 – 5.

3. Conclusions

- > The geographical categories and customer types from the HES e- toolkit can be located in whatever climate zone, e.g. see coasts are situated in hot, in mild and in cold climatic zone as well. For this reason the majority of the technologies can be allocated to all hotel types/categories from HES.
- > For an appropriate selection of the solutions the most important criteria is the climatic zone, the 2nd most important is the ROI, which can be estimated based on efficiency and availability of a technology in a certain climatic zone. For a more appropriate selection of technologies a more sophisticated, but simple ranking is necessary as described in D2.4. This ranking can't be reflected in the Appendix tables based on HES hotel categories.
- > For the above reasons it is impossible to allocate the technologies to one or two specific hotel type. The only few distinctions could be made mainly in the mountain area (being more like the cold climatic zone) and to some content in the RES technologies. For a more sophisticated allocation of the technologies the ranking methodology described in D2.4 has to be considered.
- > This document only shows a general list of nZEB technologies linked to the HES hotel categories and types.

4. References

- HES project, <http://hotelenergysolutions.net/en>;
- <http://setupmyhotel.com/about-hotel-industry/classification-of-hotels-by-there-type.html>;
- <http://www.city-of-hotels.com/168/hotel-types-en.html>;
- <http://www.managementparadise.com/forums/service-sector-management/204712-hotel-its-typology.html>;

Appendix 1 Selection of relevant solutions, from the energy management group, for achieving nZEH primary energy indicator levels by hotel category

No.	Technologies and solutions group	Technology and solution	Urban				Rural				Coastal				Mountain			
			Business	Spa/Wellness	Resort	Hotel B&B	Business	Spa/Wellness	Resort	Hotel B&B	Business	Spa/Wellness	Resort	Hotel B&B	Business	Spa/Wellness	Resort	Hotel B&B
1	Energy management	Energy use monitoring	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
2		Energy audit	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
3		EU Eco-label for tourist accommodation service	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
4		Staff training	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
5		Information to guests	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Appendix 2 Selection of relevant technologies and solutions, from the reduction of heating and cooling demands group, for achieving nZEH primary energy indicator levels by hotel category

No.	Technologies and solutions group	Technology and solution	Urban				Rural				Coastal				Mountain			
			Business	Spa/Wellness	Resort	Hotel B&B	Business	Spa/Wellness	Resort	Hotel B&B	Business	Spa/Wellness	Resort	Hotel B&B	Business	Spa/Wellness	Resort	Hotel B&B
1	Reduction of heating and cooling demands	Windows changing	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
2		Inflector window insulator	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
3		Building insulation	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
4		Building envelope air tightness	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
5		Prevention of high unnecessary air change rate	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
6		Installation of sun shading devices	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
7		Exterior works to improve summer comfort (green roof, trees, etc.)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				

Appendix 3 Selection of relevant technologies and solutions, from the energy efficiency group, for achieving nZEH primary energy indicator levels by hotel category

No.	Technologies and solutions group	Technology and solution	Urban				Rural				Coastal				Mountain			
			Business	Spa/Wellness	Resort	Hotel B&B	Business	Spa/Wellness	Resort	Hotel B&B	Business	Spa/Wellness	Resort	Hotel B&B	Business	Spa/Wellness	Resort	Hotel B&B
1	Equipment efficiency	Energy saving light bulbs	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
2		Energy efficiency rating of electrical appliances	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
3		Energy efficient motors in HVAC applications	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
4		High efficiency boilers	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
5		Efficient solutions for active space cooling	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
6		Micro CHP	✓	✓	✓	✓	✓	✓	✓	✓					✓	✓	✓	✓
7		Efficient ventilation system (min. 70% energy recovery)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
8		Water saving taps (to reduce water and DHW consumption)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Appendix 4 Selection of relevant technologies and solutions, from the system efficiency group, for achieving nZEH primary energy indicator levels by hotel category

No.	Technologies and solutions group	Technology and solution	Urban				Rural				Coastal				Mountain			
			Business	Spa/Wellness	Resort	Hotel B&B	Business	Spa/Wellness	Resort	Hotel B&B	Business	Spa/Wellness	Resort	Hotel B&B	Business	Spa/Wellness	Resort	Hotel B&B
1	System efficiency	Key card systems to switch off electricity in guest rooms	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
2		Lighting controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
3		Thermal insulation of boilers, domestic hot water tanks and pipes	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
4		Balancing of heating, cooling and air conditioning systems	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
5		Regulation of space heating and cooling	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
6		Free cooling (including night cooling)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
7		Utilize waste heat of chiller	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
8		Hybrid ventilation system	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
9		Low temperature heating (including acceptable heating energy generation)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
10		High temperature cooling	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				

Appendix 5 Selection of relevant technologies and solutions, from the renewable energy group, for achieving nZEH primary energy indicator levels by hotel category

No.	Technologies and solutions group	Technology and solution	Urban				Rural				Coastal				Mountain			
			Business	Spa/Wellness	Resort	Hotel B&B	Business	Spa/Wellness	Resort	Hotel B&B	Business	Spa/Wellness	Resort	Hotel B&B	Business	Spa/Wellness	Resort	Hotel B&B
1	Renewable energy	Geothermal energy (heat pump)	✓	✓	✓	✓	✓	✓	✓	✓					✓	✓	✓	✓
2		Aerothermal energy (heat pump)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
3		Hydrothermal energy (heat pump)		✓			✓	✓	✓		✓	✓	✓	✓				
4		Solar powered absorption chiller	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓				
5		Micro hydropower					✓	✓	✓									
6		Wind energy (small scale wind turbines)					✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓
7		Biomass boiler					✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓
8		Solar thermal	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
9		Solar thermal for swimming pool		✓	✓			✓	✓			✓	✓					
10		Photovoltaic panel	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

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