Block 5: FEEDSCHOOLS applications

5.3 Best practice database

FEEDSCHOOLS, by ENEA (Maria-Anna Segreto)

Learning Objective: In last years nZEB number buildings is growing fast both for existing buildings and new construction ones. The identification of best practices, performance targets, technology solution sets and the definition of design guideline represent strategic actions that can support the designers in planning new nZEBs. The aim of the block is to show the FEEDSCHOOLS Database on nZEB best practices in the countries partner of the project.

5.2.1
Best Practices in Europe

(link)

5.2.2
FEEDSCHOOLS Database on Best Practices

(link)

5.1.1

Best Practices in Europe

5.1.1 objective

This unit aims to show how Best Practices in nZEB can help the designers in planning new nZEBs.

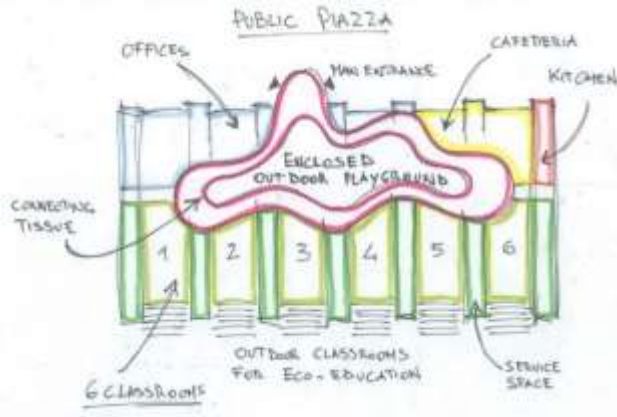
The technologies for nZEBs are **ready and proven**, the average EU rate of new nZEB construction is low and is increasing slowly, and thus targeted national countermeasures should be adopted.

There are a large number of European projects and an extensive literature in this field and there are several papers dealing with the definition of the general effective design approach based on cost-optimal principles and that analyzes specific technologies influencing the nZEB performances.

In particular, the focus is on envelope characteristics, HVAC system components and integration of renewable energies.

Nevertheless, although the large number of papers dealing with the topic, currently, the impact of the technologies as well as the final performances are evaluated or by simulation activities or by monitoring a reduced number of real buildings.

Currently, an evaluation of the nZEB features and related performances based on a large sample of buildings is missing. The main reason is the lack of structured and populated databases including nZEB data across Europe. In fact, in the past recent years, several European projects dealt with the setup of building databases, that represent an important starting point for this work, but none of them is specifically focused on nZEBs.



The creation of a database can be a crucial tool to spread and engage the good practices to reach nZEB goals on a wide scale.

Up to now various practices attempting to collect data about nZEBs can be identified. The main purpose could be to record nZEBs, which have been already built, with available monitored data and that represent concrete models for future designing.

The European Commission has been promoting the Green Building Programme (GBP) aimed at collecting data on energy efficiency improvement in non-residential buildings.

Following the achievements of the Green Building Programme, the Commission is launching another initiative to collect data on retrofit projects implemented in both residential and non-residential buildings. This new project is part of the European Energy Efficiency Platform, an instrument consisting of an IT platform to collect data and knowledge on energy efficiency topics at EU level. Based on the experience of Green Buildings, this new project will focus both on NZEBs that represents the new building target from 2018 onwards and on retrofit that is one of the biggest challenges faced by the Europe.

The importance of this tool is that it will allow establishing a harmonised NZEBs database that can furnish a comprehensive reference guideline about NZEBs retrofit. The collected data will provide an overview of the European status on retrofit buildings supporting good practices on building energy performance, interventions, savings and costs.

https://e3p.jrc.ec.europa.eu/articles/refurbished-nzeb-data-collection

https://ec.europa.eu/energy/intelligent/projects/en/projects/zebra2020

https://www.politesi.polimi.it/bitstream/10589/136384/1/Nearly%20Zero%20Energy%20Buildings%20Comparison%20of%20the%20targets%20set%20by%20the%20European%20countries%20and%20analysis%20of%20their%20diffusion.pdf

This fervent activity aimed at disseminating information and technical notes on nZEB buildings underlines how important it is for technicians, designers, builders and all stakeholders to have references on what to rely on to implement on a large scale good practices already put in place.

For this reason, the FEEDSCHOOLS project has chosen to create a database that collects good practices from all the partner countries of the project, with the aim of supporting those who wanted to venture into the world of nZEB.

ITALY (UDINE): IV NOVEMBRE PRIMARY SCHOOL

external facade

external entrance

BUILDING INFORMATION	
Address:	Via Magrini, n.6, Udine, Italy
Building Owner	Udine Municipality
Degree Days	2.323 GG (D.P.R. 412/93)
BUILDING TYPE AND SIZE	
Total floor area	4.628 m^2
Number of storeys	3 + 1 (basement)
Number of classrooms	15
Urban context	historic centre
Number of pupils	302 (school year 2017/2018)
Use profile	only morning 8.10 a.m. -1.00 p.m. (monday-saturday) - canteen from 13.00 until 14.30. After-school activities 2.30 a.m. -4.30 p.m.(monday-friday)
SHORT DESCRIPTION OF THE RENOVATION AND ITS PURPOSE	
The intervation consists in "Inteligens Solution" system installation and energy-saving light fluorescent bulbs. The maintenance operation takes place in order to increase the energy retrofit of the building and make its electrical system more efficient. The "Inteligens Solution" control panel is positioned inside a storage room on the ground level of the school and it's connetted to the building's computer network. The installation of "Inteligens Solution" system and energy-saving light fluorescent bulbs allow optimisation of the savings in the electric power consumption (15 percent per year). Moreover, the renovation does not involve invasive intervention in the structure of the building or in its system of facilities.	
ENERGY CONSERVATION AND RENEWABLE ENERGY MEASURES	
Energy Conservation	Modulation and stabilization of the mains voltage, high efficiency lamps
Efficient energy supply	Replacement of traditional fluorescent lamps with energy-efficient technologies.
Renewables	Installationof inteligens technology of the electrical system and fluorescent lamps
Advanced control and monitoring	The new system installed allows a remote control and supervision.
SAVINGS: kWh, €	
Energy saving kWh/year: 9.600 Money saving €/year: 2.208	

5.1.2

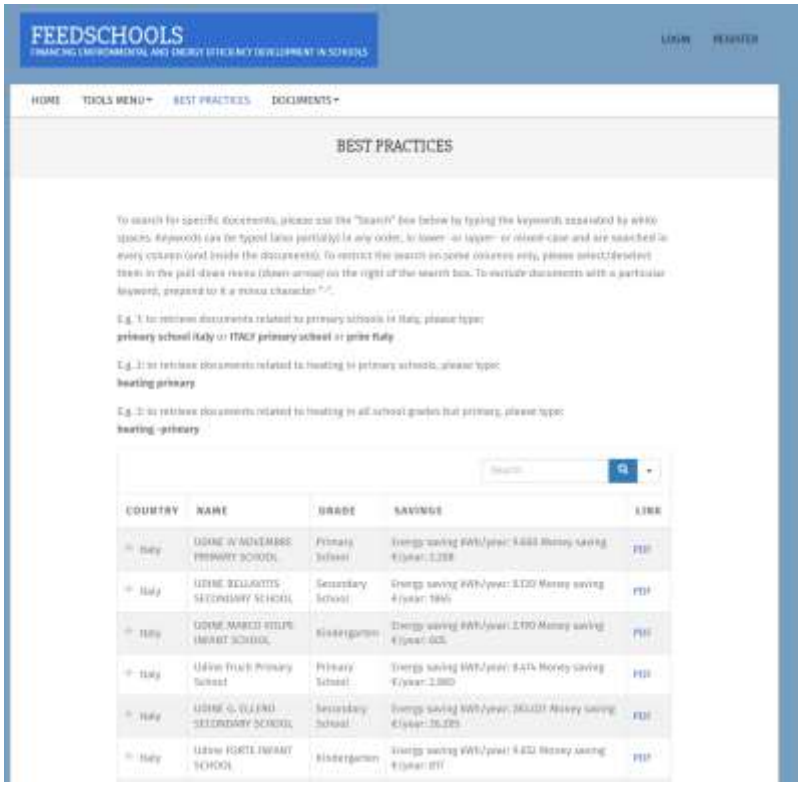
FEEDSCHOOLS Database on Best Practices

5.1.2 obiective

This unit aims to give an overview of the Best Practices Database included in the FEEDSCHOOLS Website

FEEDSCHOOLS project has chosen to make available to users a database that gathers interesting experience in the nZEB field in all the partner countries of the project.

The database is an inventory of the best practices in partner regions; it is located on the web page dedicated to the applications of the project (www.feedschools.eu), it collects examples of school buildings deep renovation that conduct an existing building to an nZEB one.



http://www.feedschools.eu/best-practices/

These improvement actions can be used to **inspire innovative solutions for all stakeholders** (professionals, energy managers, energy auditors…).

In the collected form there are a lot of **information on the school building and on the constructive features** both for **the envelope and for the systems.** Important information about **renovation plan**, **renewables** and **savings** are also collected.

Secondary School Langenzersdorf

BUILDING INFORMATION	
Address:	Klosterneuburger Straße 12, 2103 Langenzersdorf
Building Owner	community Langenzersdorf
Degree Days (20/12)	3456
Other	
BUILDING TYPE AND SIZE	
Total floor area	2'795
Number of storeys	3
Number of classrooms	7 classrooms including workroom, computer room and grouproom, library, gym, hall
Urban context	centrum, detached
Number of pupils	100
Use profile	secondary school
Other	

SHORT DESCRIPTION OF THE RENOVATION AND ITS PURPOSE

The 3-storey main school building was completed in 1876 and several times in his history adapted or expanded (1904, 1962 and 1984). The walls are brickwork, the story ceilings and the upper floor corner are out of wood. 2010 the whole building was renovated and expanded by an extension. The building is equipped with a ventilation system with heat recovery and the building services concept on renewable energy. The secondary school was extended in the courtyard area by a functional area. Here is an approximately 70 m² large auditorium. In the staircase a central wardrobe connected to the main building with access to the new gym and the adjoining rooms was set up.
The lowered gym increases a wooden ceiling and is illuminated from 2 sides over generous glass fronts. The renovated building reaches the nearly zero energy building standard.

ENERGY CONSERVATION AND RENEWABLE ENERGY MEASURES	
Energy Conservation	thermally renovated, new windows and doors
Efficient energy supply	ventilation system equipped with heat recovery
Renewables	heating changed to renewable energy
Advanced control and monitoring	comprehensive energy monitoring
Other	

SAVINGS: kWh, €

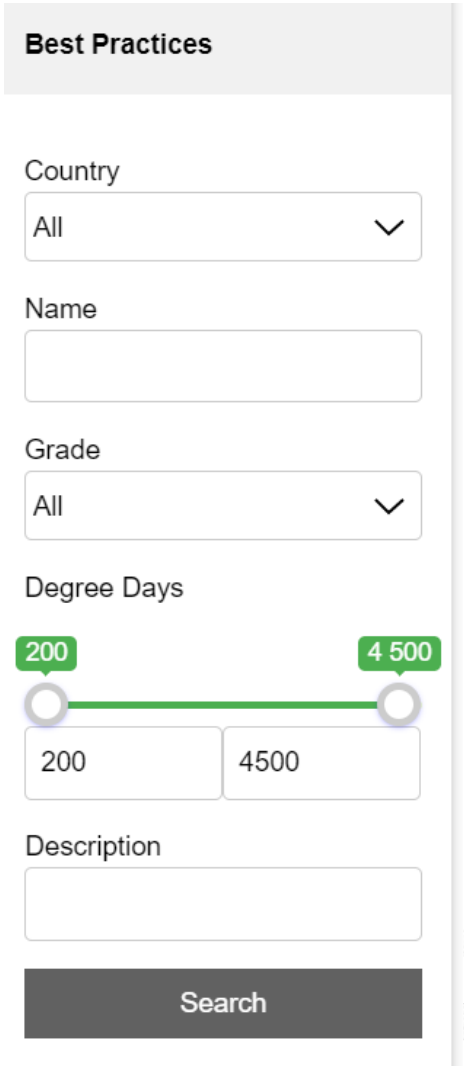
Energy data calculated according to passive house standard tool PHPP after renovation
heating demand (HWB): 14.0 kWh / m² net floor spacea according to PHPP
Primary energy demand (PEB): 56.0 kWh / m²a

The database will be organized by Country.

But it is foreseen the possibility to perform a dynamic search based on predetermined filters.

Interested parties will be able to choose key elements as *Country, Name of a project, School Grade Degree Days and a Description* (one or more elements), so as to find solutions that are consistent with their needs.

The aim of the database is to make known, to a broad public, high-performance and advanced techniques and technologies that can lead an existing school building in nZEB.



Country

Croatia

Name

Grade

Primary

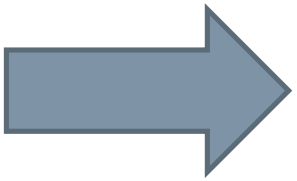
Degree Days

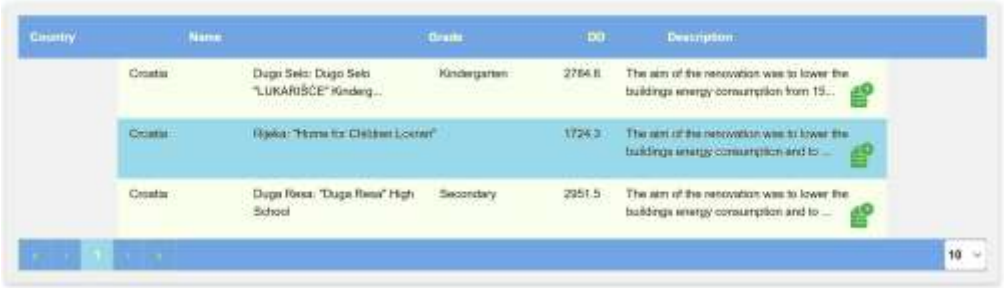
200 | 1 353 | 2 993 | 4 500

1353 | 2993

Description

Search





DUGO SELO (CROATIA): KINDERGARTEN DUGO SELO (LUKARIŠĆE)

North-east facade - before

North-east facade - after

BUILDING INFORMATION	
Address:	Bjelovarska 82, Dugo Selo
Building Owner	City of Dugo Selo
Degree Days	2784,6 (basis for calculation 12°C)
Other	-
BUILDING TYPE AND SIZE	
Total floor area	218,34 m²
Number of storeys	2
Number of classrooms	2
Urban context	Isolated
Number of pupils	60
Use profile	2 shifts (06:00-18:00 h) from Monday to Friday. Approximately 250 working days per year.
Other	-

SHORT DESCRIPTION OF THE RENOVATION AND ITS PURPOSE

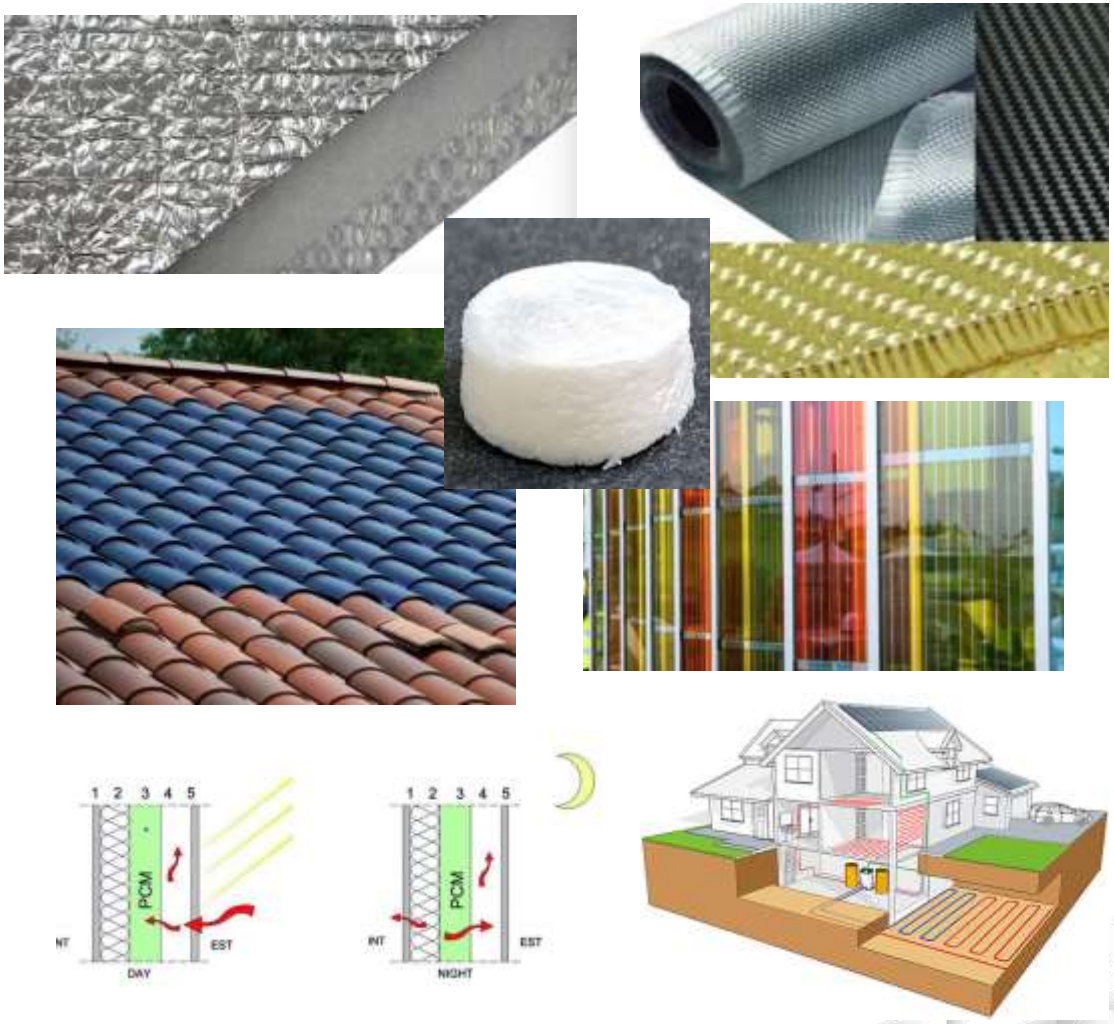
The aim of the renovation was to lower the buildings energy consumption from 155,63 kWh/m² year (Energy class D) to 65,86 kWh/m² year (Energy class B). One of the goals was also to improve comfort and work conditions for all users of the building.
Renovation included a set of energy efficient measures:

1. Renovation of building envelope:
   a) Insulation of the facade - thermal insulation,mineral wool d=14 cm (λ<=0,039 W/mK),
   b) Insulation of the roof, mineral wool d=18 cm (λ<=0,040 W/mK),
   c) Partial replacement of the windows (new PVC windows),
2. Installation of a new energy efficient gas boiler for space herating and DHW (domestic hot water) preparation,
3. Installation of thermostatic valves,
4. Installation of solar collectors (A=6,9 m²) for heating DHW and space heating

ENERGY CONSERVATION AND RENEWABLE ENERGY MEASURES	
Energy Conservation	Renovation of building envelope: a) Insulation of the facade - thermal insulation,mineral wool d=14 cm (λ<=0,039 W/mK), b) Insulation of the roof, mineral wool d=18 cm (λ<=0,040 W/mK), c) Partial replacement of the windows (new PVC windows).
Efficient energy supply	Replacement of the old gas bolier with a new energy efficient condensing boiler (P=24 kW). Installation of thermostatic valves (16 pieces) .
Renewables	Installation of solar collectors (A=6,9 m²) on the roof for heating DHW and space heating.
Advanced control and monitoring	-
Other	-
SAVINGS: kWh, €	
Approximately: 30.140 kWh/year; 1.560 €/year	

Lately several manufacturers have developed **innovative products and technologies** with the purpose to tackle the more stringent requirements of European norms.

The database aims to gather the latest technological innovations and demonstrate how they have been used to **improve existing buildings.**



Maria-Anna Segreto (author and tutor)
Researcher and Head of SEI Laboratory of ENEA
www.enea.it/en/
mariaanna.segreto@enea.it

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https://www.facebook.com/eneapaginaufficiale/

https://twitter.com/ENEAOfficial

https://www.linkedin.com/company/enea_2

SELF ASSESSMENT TEST

The technologies for nZEBs are

1. Proven only for some EU countries
2. Distant and difficult to reach
3. **Ready and proven**

what is the reason why technicians find it difficult to get information on nZEBs?

1. the information is only available for a fee
2. they are unable to search for them
3. **lack of structured and populated databases**

For designers, have information on good practices for nZEBs is:

1. uninterested
2. **Very important**
3. Not important

SELF ASSESSMENT TEST

What is collected in FEEDSCHOOLS Best Practices Database?

1. Envelope solution for energy efficiency improving
2. Conditions of financing mechanisms
3. **Interesting experience in the nZEB field**

For what purpose can the collected improvement actions be used?

1. Only on the conditions of financing mechanisms available
2. **To inspire innovative solutions for all stakeholders**
3. To copy solutions and not waste time

The database will be organized by:

1. **Country**
2. Energy classification
3. Improvement measures costs