Interreg CENTRAL EUROPE

European Union
European Regional Development Fund

FEEDSCHOOLS

FINANCING ENVIRONMENT AND ENERGY EFFICIENCY DEVELOPMENT IN SCHOOLS

LOW CARBON CITIES AND REGIONS

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PROJECT BUDGET 1.971.837 EUR | FUNDING 1.646.878 EUR FROM INTERREG CE AS ERDF FUNDING | DURATION 09.2017-08.2020

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WHO WE ARE

Partners from seven European countries have joined their forces to develop and implement solutions for increasing energy efficiency and the use of renewable energies (RES) in public buildings.

Austria
- Graz Energy Agency

Czech Republic
- ENVIROS

Croatia
- City of Split
- HEP ESCO

Hungary
- Zala County Foundation for Enterprise Promotion

Italy
- City of Udine
- Italian National Agency for New Technologies, Energy and Sustainable Economic Development

Poland
- City of Warsaw
- Research and Innovation Centre Pro-Akademia

Slovenia
- Local Energy Agency Spodnje Podravje
- Municipality of Slovenska Bistrica

Who funds us

Our project is funded by the Interreg CENTRAL EUROPE Programme, which encourages cooperation on shared challenges in central Europe.

With 246 million Euro of funding from the European Regional Development Funds, the Programme supports institutions to work together beyond borders to improve cities and regions in Austria, Croatia, the Czech Republic, Germany, Hungary, Italy, Poland, Slovakia and Slovenia.

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WHAT ARE FEEDSCHOOLS OUTPUTS

FEEDSCHOOLS project will provide new solutions and user friendly tools that will disseminate state-of the art technical knowledge and will allow to attract more private funding to the process of decarbonisation of EU building stock.

FEEDSCHOOLS toolkit will simplify energy audit process allowing significant economic and time savings while choosing optimized NZEB renovation plan based on best available technologies and practices, along with selection of suitable mechanism for the investment financing.

FEEDSCHOOLS Pilot activities include energy audits conducted in 55 schools from six CE countries. Preliminary plans for **renovation to the NZEB standard** for schools participating in project Pilots will be available on the project website.

Practice-oriented **face-to-face training modules** in national languages focused on regional context, best practices, pilot studies and the use of toolkit along with **e-learning course** in English containing modules on energy, environmental and financial issues will be available on the FEEDSCHOOLS website.

Policy recommendations outlining strategies for municipalities to renovate public schools to the NZEB standard will be transferred to decision makers. **Partner Action plans** to be implemented after the end of the FEEDSCHOOLS project will ensure further dissemination of toolkit and project results.

- TOOLS
- PILOT ACTIONS
- TRAINING
- STRATEGIES AND ACTION PLANS

WHAT IS NEARLY ZERO ENERGY BUILDING (NZEB)

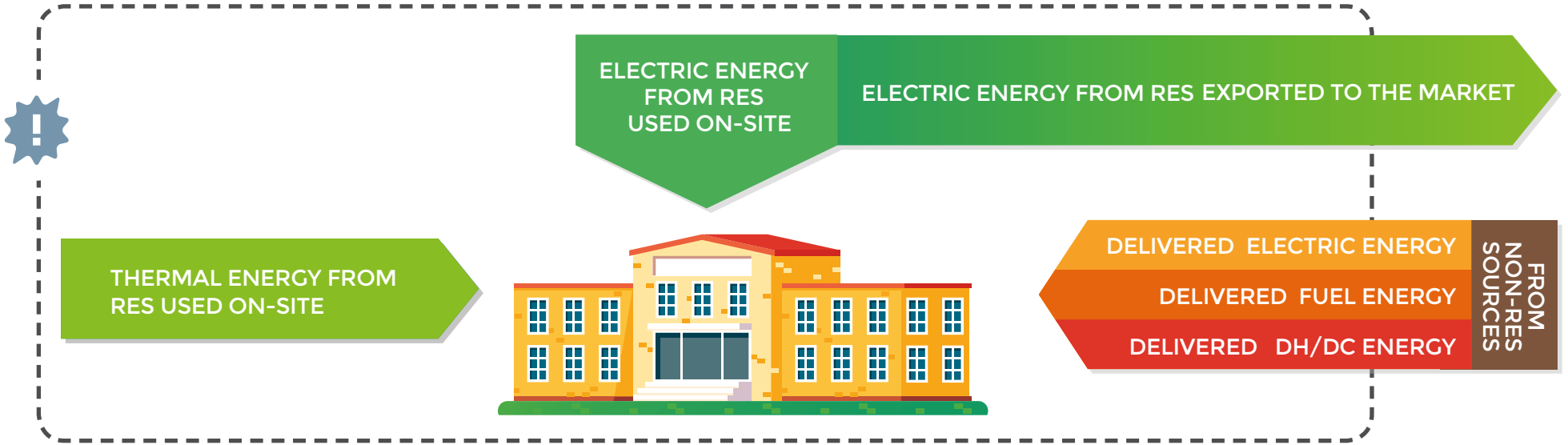
Nearly zero-energy building (NZEB) means a building that has a very high energy performance. The nearly zero or very low amount of energy required to meet NZEB needs should be covered to a very significant extent by energy from renewable sources (RES), including the energy from RES produced on-site or nearby.

Energy performance of a building means the amount of energy needed to meet the energy demand associated with a typical use of the building, which includes, inter alia, energy used for heating, cooling, ventilation, hot water and lighting. The amount of energy needed should be calculated or measured on the annual overall basis. The calculations cover all energy sources.

All energy uses should be expressed in a single indicator of **primary energy from non-RES**. Therefore, in order to determine energy performance of a NZEB building, one has to take into account the primary energy from non-RES sources delivered to the building and deduct the primary energy from RES sources produced within the building system boundary and exported to the market.

A building that uses primary energy from non-RES sources delivered to it for heating and other purposes (eg. during cold seasons), and exports to the market electric energy produced from RES sources on-site (eg. during hot seasons), meets NZEB requirements if energy efficiency in the first place, and use of RES in the second place, are maximised over the life cycle of this building at the optimal cost levels.

Building system boundary: all areas associated with the building, where energy is consumed or produced.



HOW TO REACH NZEB STANDARD IN SCHOOL BUILDINGS

ENERGY EFFICIENCY AND RES MEASURES FOR NZEB RENOVATION OF SCHOOL BUILDINGS

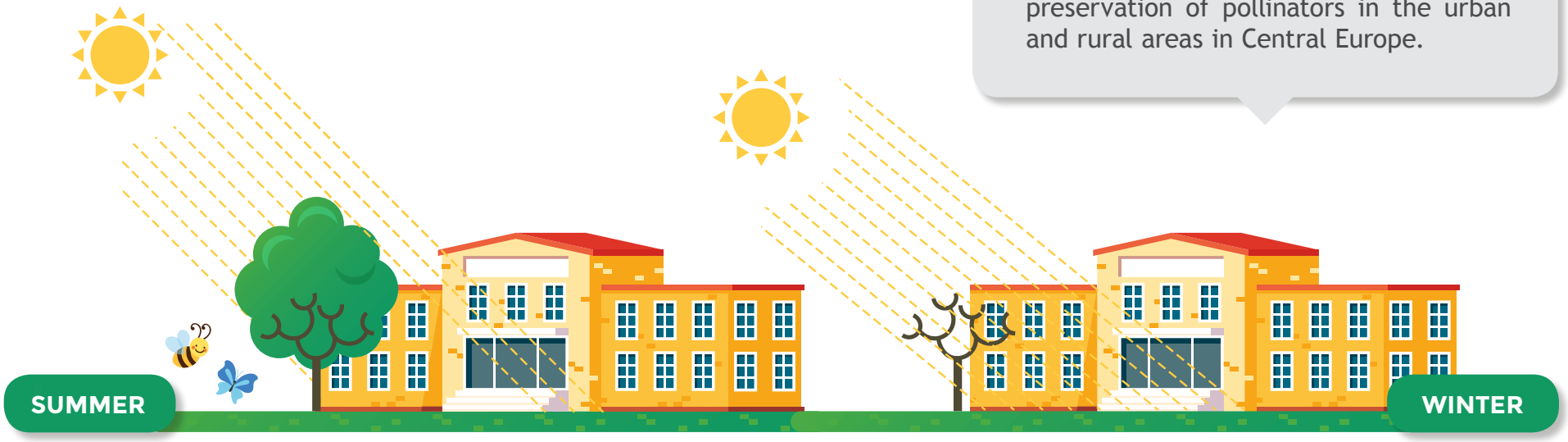
Energy efficiency and RES measures applied to building structure and building systems should be combined in packages of measures since meaningful combinations of measures can create synergy effects that lead to better results regarding costs and energy performance than single measures. Energy efficiency and RES measures recommended for school buildings are displayed below and illustrated with examples of best practices.

BUILDING STRUCTURE:

- additional insulation system of existing walls, roofs slabs and floor construction;
- replacement and better framing of doors and windows;
- better sun shading (fixed or movable, operated manually or automatically and films applied to windows, use of plants periodically green nearby).

BEST PRACTICE

Possibility to use green roofs and green walls or trees nearby, as well as effective water management in the school building and use of rainwater for school garden watering are also important element of renovation to **sustainable NZEB buildings.** Choosing melliferous plants in schools gardens will contribute to active preservation of pollinators in the urban and rural areas in Central Europe.



HOW TO REACH NZEB STANDARD IN SCHOOL BUILDINGS

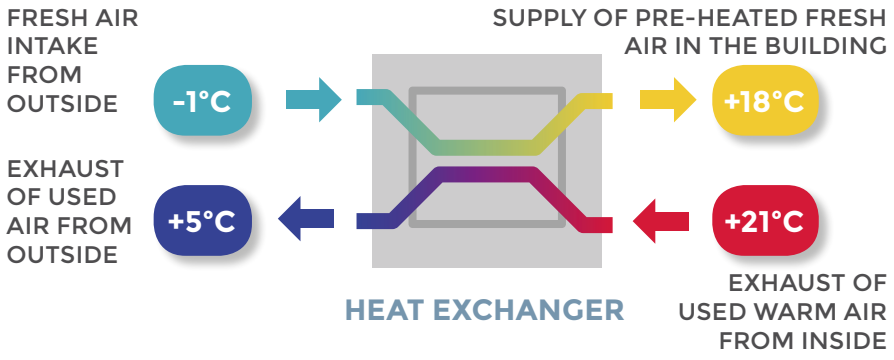
ENERGY EFFICIENCY AND RES MEASURES FOR NZEB RENOVATION OF SCHOOL BUILDINGS

BUILDING SYSTEMS:

- improvement of hot water supply system (based on fossil or renewable energy);
- insulation of pipes;
- installation or improvement of active or hybrid cooling system;
- improvement of ventilation;
- active lighting system;
- modernisation of pumps and fans;
- installation or improvement of PV systems;
- solar heating (and cooling) installations (of different sizes);
- direct water heaters or indirect water storage heated by different carriers;
- monitoring and metering devices for temperature control of space and water temperature;
- change of energy carrier for a building system to a lower carbon-emission one;
- installation of condensing boiler (preferably based on bio-mass or natural gas);
- installation of heat pumps;
- connecting the building to efficient district heating and cooling.

BEST PRACTICE

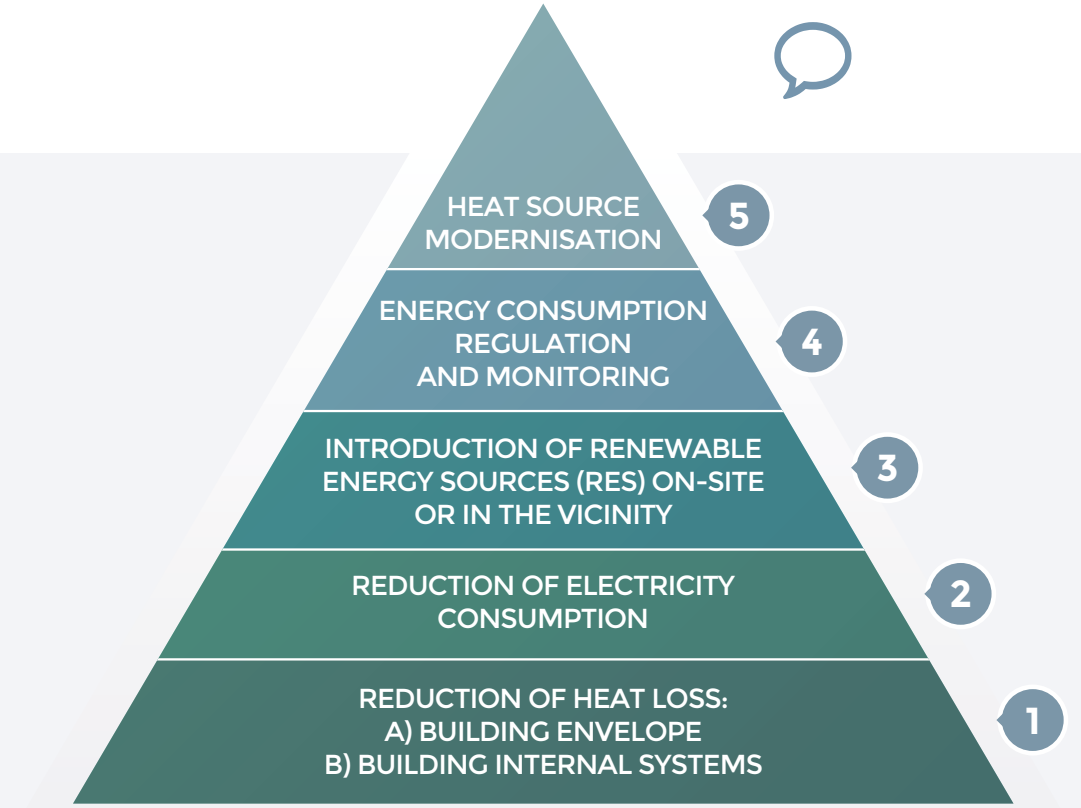
Mechanical ventilation heat recovery (MVHR) systems can recover up to 95% of heat in the exhaust air. Therefore they significantly contribute to improvements in energy efficiency and to increase in savings of the building operational costs. Used air from inside the building can be utilized either as a heat source or as a heat sink, depending on climate conditions, time of year and requirements of the building. MVHR remove stale air with moisture, odours and pollutants and replace it with the right amount of filtered fresh air. This allows for the school building to comply with the NZEB air-tightness requirements and, at the same time, to ensure clean air and comfortable inside conditions that are vital for the health and wellbeing of pupils and teachers.



HOW TO PLAN SCHOOL RENOVATION TO THE NZEB STANDARD

Following steps are recommended when planning **renovation to the NZEB standard:**

- Conducting of energy audit, resulting in a list of possible energy efficiency measures and measures based on renewable energy sources (RES) that can be implemented in the building;
- Selection of best available practices and innovative solutions along with resulting energy savings and reductions of CO_2 emissions;
- Elaboration of packages of energy efficiency and RES measures leading to the energy performance of the building corresponding to the NZEB standard in the respective Member State/region. It is recommended that energy efficiency and RES measures are introduced in accordance with the Energy Efficiency Pyramid and they should be compatible with the binding requirements for construction works and for air quality and indoor comfort levels;
- Selection of the optimal package in terms of energy savings and investment costs;
- Decision on investment financing, taking into account innovative financial mechanisms dedicated to energy efficiency improvement in public sector available in Central Europe countries, including Public Private Partnership and hybrid financing.



ENERGY EFFICIENCY PYRAMID

Measures acting on one system can affect the energy performance of another system. For example, the insulation level of the envelope affects the capacity and dimensions of the building systems. This interaction between different measures has to be addressed when defining packages. **Energy Efficiency Pyramid** shows consecutive measures to be introduced when planning schools renovation to the NZEB standard. It should be followed also for staged NZEB renovation plans, in order to avoid locking-in of future renovation activities.

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HOW FEEDSHOOLS OUTPUTS SUPPORT MUNICIPALITIES AND SCHOOLS MANAGEMENT IN PLANNING NZEB RENOVATION

FEEDSCHOOLS innovative approach consists of **developing transnational and holistic support toolkit** facilitating the process of NZEB renovation planning in its all stages: from simplifying energy audits through assisting in selection of best available technologies for implementing energy efficiency and RES measures to showcasing innovative financial mechanisms supporting public investments in NZEB renovation.

The user-friendly 3-PART **FEEDSCHOOLS TOOLKIT**, translated into national languages, will be based for free use on ENEA website. Project Leader guarantees the FEEDSCHOOLS TOOLKIT maintenance beyond the project duration.

1

Energy and Resource Efficiency Application for calculating energy savings and reductions of CO_2 emissions resulting from implementation of various energy efficiency and RES measures.

2

Database on novel energy efficiency technologies and good practices: innovative techniques, materials, components and systems, for retrofitting existing school buildings and converting them to NZEB buildings

3

Financial Application with optimal funding models available in Central Europe, from ERDF and national levels, as well as from the private sector, that will allow public bodies to afford costs of schools NZEB renovation.

LEAD PARTNER

Italian National Agency for New Technologies, Energy and Sustainable Economic Development
ENEA mario.tarantini@enea.it | www.enea.it