



Rzeszów Regional Development Agency

Boosting Low Carbon Innovative Building Rehabilitation in European Regions

REGIONAL ACTION PLAN

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Region: Podkarpackie

Part I – General information

Project:

BUILD2LC Project

Boosting Low Carbon Innovative Building Rehabilitation in European Regions

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Part II – Policy context

The Action Plan aims to impact:

<input checked="" type="checkbox"/>	Investment for Growth and Jobs programme
<input type="checkbox"/>	European Territorial Cooperation programme
<input type="checkbox"/>	Other regional development policy instrument

Name of the policy instrument addressed: Regional Operational Programme for Podkarpackie 2014 – 2020

Part III – Details of the actions envisaged

ACTION 1

SUPPORT SCHEME FOR NEW NZEB-TYPE PUBLIC BUILDINGS

1. **The background** (please describe the lessons learnt from the project that constitute the basis for the development of the present Action Plan)

The action was inspired by some site visits, especially in Bračak Energy Centre (Croatia, 2016, good practice source: "Bračak Energy Centre" from REGEA (Croatia), as well as discussions with project partners, especially in Östersund (September 2017) where inspiring examples were discussed during round table on How do we reach the nearly zero-energy buildings in existing buildings, Moreover the action bases on all gathered knowledge and need to create a financial instrument that would support public institutions to erect new buildings of high energy standards that would play exemplary role while conforming provisions of EPBD (recast) Directive and implementing Nearly Zero Energy Buildings (NZEBs). Such buildings are still expensive in comparison to standard energy use ones. Meanwhile public institutions lack sufficient financial sources for such buildings. It was necessary then to create a support scheme that would face these needs and expectations.

2. **Action** (please list and describe the actions to be implemented)

The action aims to implement high energy standards to public building. It will be possible thanks to elaboration of appropriate measure in Regional Operational Programme for Podkarpackie 2014 – 2020. A special type of project for this purpose. It is Measure 3.3 Improvement of air quality, Sub-measure 3.3.1 Implementation of low-carbon plans - General competition, Type of project: 5. Construction or modernization of public utility buildings which will meet the passive construction standards under ROP 2014 - 2020.

The first stage was to define what conditions should be met by new public buildings to apply for the support. The definition that was developed is a functional one. According to it a building with the characteristics corresponding to a passive building is an object with the following parameters and features, such as primary energy demand $\leq 120 \text{ kWh/m}^2 \text{ year}$; final energy demand $\leq 15 \text{ kWh/ m}^2 \text{ year}$; U-value for opaque building envelope? $0,15 \text{ W/m}^2\text{K}$; windows with a U-values of less than $0.8 \text{ W/m}^2\text{K}$ for frame and glazing, with a total solar energy transmission coefficient for glazing $g \geq 50\%$; tightness of the building envelope, as confirmed by a pressure test, during the test with an external and internal pressure difference of 50 Pa ; heat recovery (performance of recuperation $\geq 70\%$ and energy consumption $\leq 0.4 \text{ Wh/m}^3$); Use of renewable energy sources covering min. 20% of the building's primary energy needs; Use, whenever necessary, of external elements increasing energy efficiency of investments (e. g. shading by trees), SPBT (Simple Payback Time) for the total investment? 30 years with the proviso that the life to return on investment ratio 2:1.

Next step was to define catalogue of qualifying costs. They were divided into several categories:

- **Heat source.** Is should be renewable energy source or district heating network, natural gas, alternative solutions. Heat source should be integrated with the building, i. e. located on its grounds or located directly next to it (not applicable for district heating network). The cost includes the purchase, installation, all necessary connections, water tanks and other installations in the building itself and which are related to the heat source (necessary for its operation). Total costs of heat source and hot water. together with the necessary installations, they may not exceed 10% of the

costs of the building itself. The source may not be used for the needs of another building (except for district heating network).

- **A source of domestic hot water.** Renewable energy source or district heating, natural gas, alternative energy sources. The use of dual function solutions (i.e. comprising heating with domestic hot water) is permitted provided that the requirements specified for heat source are met. The qualifying cost includes purchase, installation, all necessary connections and installations, water tanks in the building itself. Total costs of heat source and hot water, along with the necessary installations, may not exceed 15% of the costs of the building itself.
- **Electricity source.** Electricity grid, renewable energy source, natural gas (only in cogeneration or trigeneration), alternative solutions. The cost includes the purchase, installation, all necessary connections and installations, water tanks on the building side. The total cost of the electricity source including the necessary installations shall not exceed 15 % and, in the case of high-efficiency cogeneration or trigeneration, 30 % of the cost of the building itself. The electricity generated must only cover the building's needs, operate off-grid or have a blockade of access to the network.
- **Preparatory and verification costs.** This includes design and construction documentation, energy audits, building tightness test, certification costs etc. Total costs in this category may not exceed 10 % of eligible costs.
- **Cost of construction works and materials.** This includes such elements as: preparation of land for construction works; construction work including finished building shell; connection and installation of all necessary installations; ensuring heat recovery in a building, including the purchase and installation of a heat exchanger; purchase and installation of passive building specific elements; completion works; purchase and installation of low-energy lighting; land development around the building in necessary elements for its functioning as a passive building as well as purchase and installation of an energy management system.

Apart from this a catalogue of unqualified costs was also developed

It was also necessary to determine the level of support which on one hand would be a sufficient incentive effect and on the other conform all the regulations on ERDF financing. The cofinancing was set to 65% of qualifying costs.

Another step necessary to undertake is to implement the defined solutions into the ROP. It needs decision by Managing Institution of the Regional Operational Programme (which is the Regional Management Board of Podkarpackie Region) and securing sufficient financial sources for this purpose.

After finishing preparatory stage a call for proposals will be announced. It is expected that after conducting all procedures some 10 projects will be implemented in the region thanks to this support scheme.

3. **Players involved** (please indicate the organisations in the region who are involved in the development and implementation of the action and explain their role)

Urząd Marszałkowski Województwa Podkarpackiego (Podkarpackie Regional Authority) – Podkarpackie Regional Operational Programme managing authority. It is responsible for applying changes to the programme. Its role is to adapt the measure taking into account all regulations considering structural funds, public support, Polish and EU legislation. The authority coordinates works and participation of other stakeholders in the process.

Local municipalities – potential applicants. They expressed interest in passive buildings and they describe their needs in this respect.

Professional organisations in construction and civil engineering – they will elaborate feasible solutions

that compromise need for high energy efficiency standard and affordability.

4. Timeframe

2017 – elaboration of the scheme

2018 – conforming legal obligations, securing financial sources

2019 – call for proposals

2019 – 2020 – implementation of the construction works

5. Costs (if relevant)

16 000 000 PLN (circa 3.5 million euro) ERDF sources plus own funding from public investors (some 12 000 000 PLN – 2,7 million euro).

6. Funding sources (if relevant):

ERDF (Podkarpackie Regional Operational Programme 2014 – 2020)

ACTION 2

NZEB DEMONSTRATION PUBLIC BUILDING

1. The background (please describe the lessons learnt from the project that constitute the basis for the development of the present Action Plan)

The action bases on good example of Bračak Energy Centre in Croatia which was energy rehabilitation of a historic building under cultural heritage protection of Bračak Manor focusing on two aspects: application of advanced technical solutions and repurposing of a public building. Another good example that inspired the project is Manantia: A+ eco-business building with Andalusian patio concept which is a contemporary approach of the Andalusian traditional terraced patio house. Among other strategies, the patio is the climatic "heart" of the house and acts as a climate regulator element, useful both in winter for heating and summer for cooling purposes. Especially the ideas which were examined on the basis of this action were: design according to LID (Low Impact Development), appropriate guidelines for the optimal use of solar energy, wind studies and acoustic-sound techniques, reuse of water and gray water treatment, efficient gardening equipment, reduction of the emission of greenhouse gases, optimization of energy efficiency, use of renewable energy, heating and cooling active and passive systems, green roof and tempering indoor temperature by usage of water bodies, efficient optimization of ventilation systems, control of pollution, thermal comfort enhancement, natural light maximization and high performance and artificial lighting regulation, as well as integrated building control system.

The action emerges from the diagnosed need to develop professionalization of the construction sector. Engineers in Podkarpackie region have basics skills on energy efficiency in buildings, but they lack knowledge of the specifics of near-zero energy buildings or of the passive house standards. It is necessary to show professionals a working example and to test in local conditions all elements that constitute a modern low energy building. It could be also used to educate potential users on new solutions in energy efficiency in buildings. And thanks to gathered data on weather, internal conditions in the building (such as temperature, humidity, insolation, number of visitors and their behaviour, water usage etc.) it will be possible

to analyse how building behaves in different conditions and prepare in future better building projects.

2. Action (please list and describe the actions to be implemented)

The action aims to create a passive house standard public building which will be headquarter for Chamber of Civil Engineers of the Podkarpackie Region which is a public institution. The building, apart from being headquarters will be also a demonstration building where both members of the chambers and other stakeholders will learn how it works, and how the solutions applied here help to save energy while providing thermal comfort. The action involves design and construction works of the building with following parameters:

Aims:

- administrative centre of the Podkarpackie Regional Chamber of Civil Engineers;
- building training centre - use of the building database enabling training and exhibition;
- metered model object of passive construction; in order to use it as a Research Centre - use of a controllable building installation together with a database of collected data for research;

In more detail:

- Surveys - use of a controllable building installation together with a database of collected data for testing.
- permanent exposition of control elements and effects of operation of the entire system;
- carrying out tests and experiments of special elements and installations, e.g. the possibility of using spiral probes to obtain energy stored in the water reservoir, fire, etc...;
- to enable research into the control and functioning of the building as a whole in a changing environment time and year-round amplitudes of temperatures in the extreme Polish climate as in Europe (from -30 to +30)
- Promotion/Education - use of a database enabling training and exposition:
 - promotion of passive construction in the Podkarpackie region as an innovative activity of the region;
 - education of personnel of Podkarpackie engineers in the application of new technologies;

Technical parameters:

- Building surface 710 m²
- Net surface: 1001,96m²
- Ground floor 616.49 m²
- Floor 385.47 m²
- Building height to the edge of the attic: 10,40 m
- Height of turbines wind turbines : 13.50 m
- Extensive area green roofs : 390 m²
- projected energy consumption for heating purposes: 15 kWh/m²year
- designed primary energy consumption less than 120 kWh/m² a year
- PV cells surface: 144 m²

Heating:

- heat pump as the primary heat source
- spiral probes to use the energy stored in the fire water tank
- Gas boiler as a peak load heat source
- Fan coils as a top source of cold.
- mechanical ventilation system with heat recovery > 75% efficiency

Data management and control:

- visualization of the condition of technological installations of the building;
- control of all elements of the installation (ventilation/air-conditioning units, heat pumps, cooling unit, fan coil units, heating, control of blinds ...)
- measurement of system components

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- collection, processing and collection of data from building installations;
 - collecting data and parameters from the weather station;
 - defining and reconfiguring control tasks in order to best adapt the building;
 - analysis of collected system operation information and weather data;
 - Correlation with additional examinations of the operation of elements;
 - reconfiguration and modification of system settings;
 - Treating a building as a data source allowing for "in situ" research on the "living" organism in use;
- (The aim is to create a database of "good practices" for scientific analysis and use in the construction industry as well as the ideal design of the building taking into account the mutual operation of the equipment).

3. **Players involved** (please indicate the organisations in the region who are involved in the development and implementation of the action and explain their role)

Podkarpacka Izba Inżynierów Budownictwa (Podkarpackie Chamber of Civil Engineers) – The Chamber will design and implement the project, as well as it will provide financial sources for the construction works (own and external funding). Representatives of the Chamber took part in study visit in Bračak, from where they took some inspiration for their plans.

4. Timeframe

2017 – elaboration of the project

2018 – public procurement, start of construction works

2019 – finalisation of the project, opening the building

5. Costs (if relevant)

The estimated costs are about 10 million PLN.

6. Funding sources (if relevant):

ERDF (Podkarpackie Regional Operational Programme 2014 – 2020)

Own sources of Podkarpackie Chamber of Civil Engineers

Date: 01.03.2019

Organisation: Rzeszow Regional Development Agency

Signature of representative of the organisation:

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