

□

D.T4.4.1 POLICY RECOMMENDATION AND ACTION PLAN

CITY OF SPLIT

Version 1
04 2020





The main objective of this report is to summarize policy recommendations and a strategy in each partner country to pursue for a widespread and homogeneous application of energy efficiency measures in school buildings based on previous activities and bilateral meetings with policy makers to foster the policy implementation.

Target Users: *Local authorities, policy makers*

Current situation on energy efficiency in public buildings

National legislation and provisions for public buildings

In Croatia, Energy Efficiency Directive (EED) is transposed into national legislation and there is no special legislation/regulation at regional/local level. There is, however, an obligation of regional authorities (counties) and large cities (with more than 35.000 inhabitants) to develop their three-year energy efficiency action plans. Within these plans, cities and counties are obliged to define long-term energy efficiency targets and measures to achieve



these targets. Fulfilment of targets shall be reported annually to the National Energy Efficiency Authority (within Ministry of Environmental Protection and Energy).

Energy Performance of Building Directive (EPBD) is transposed into national legislation and there is no special legislation/regulation at regional/local level. In the national legislation minimal energy performance requirements for new buildings and buildings undergoing major renovation are prescribed and they differ for continental and costal part of Croatia, due to significantly different climate conditions.

National Energy Action Plans and other planning documents

The Fourth National Energy Efficiency Plan of the Republic of Croatia is a document that meets the obligations stipulated in the EPBD Directive (recast) (2010/31/EU), the EED directive (2012/27/EU) and the Directive on the deployment of alternative fuels infrastructure (2014/94/EU). As a comprehensive implementing document, the NEEAP defines the energy efficiency policy for the relevant three-year period (2017-2019) and features an evaluation of the achieved energy savings compared to the objectives set in the 3rd NEEAP of the Republic of Croatia until the end of 2015.

The national energy savings target for the period from 1 January 2014 to 31 December 2020 is 1.938 PJ per year or, cumulatively, 54.250 PJ. In order to achieve the specified target, Croatia has opted for a combination of the two approaches: energy efficiency obligations scheme and the application of alternative measures.

Local and regional legislation and provisions for public building

There is no local or regional legislation relating to energy efficiency of buildings. Local authorities may adopt their own regulation to stimulate nZEB through abolition of communal fees, but there are very few examples of this practice.

At local/regional level, it is important to adopt and implement energy efficiency action plans and to plan annual budgets accordingly. Most of other policy measures, especially those related to financial subsidies for energy renovation programmes are at the national level. Local authorities and citizens may use available funds for co-financing energy renovation of buildings. These are available through public calls issued by the Ministry of Construction and Physical Planning for the use of ESI funds. The most recent call was for co-financing energy renovation of public buildings. According to the call propositions, energy renovation projects must achieve reduction of energy demand of at least 50%.

Local action plans for public buildings

In line with its legal obligations, City of Split has its Energy Efficiency Action Plan for period 2017-2019 (available at: www.split.hr/lgs.axd?t=16&id=20317). There are 59 measures in this Action Plan for buildings, district heating, transport and public lighting. The Action Plan and



measures proposed are a part of overall development strategy of City of Split, which is dedicated to becoming a smart city. Within the Action Plan the energy consumption in all public buildings in the city of Split was analysed. There are 25 measures defined for public buildings, each measure is related to a specific object and comprises different technical actions that are planned to be undertaken. Most of them will be financed from the budget of the city, while for only one measure it is predicted to use EU structural funds or other sources. ESCO model is envisaged for only two of these measures.

National, local and regional measures to stimulate energy renovation of public buildings

Financing from regional/local budget

Traditional financing of projects in cities and municipalities relies dominantly on the use of own budget. One of the financing challenges facing municipalities, more often for smaller municipalities rather than larger ones is the insufficient revenue base with which to fund projects (not only EE projects, but also other development projects as well). An insufficient revenue base, which may be the result of a small number of tax-paying commercial businesses and/or high-income residents, can reduce the availability of adequate funds for capital investments. Municipalities depending on revenue transfers from regional or national governments often have limited revenue-raising powers. Such limitations imply that any decision to invest in an EE project either requires the municipality to reallocate funds or convince higher levels of government that the EE project is economically viable. This may often not be a simple task. Reliance on transfers from other levels of government also exposes municipalities to the risk that permitted levels and uses of funds may be affected by changes in national budgetary or political priorities. This introduces further uncertainties and makes commitment to multi-year programs of capital expenditures more difficult

Local and regional government regulation regarding financing of schools (City of Split and County Splitsko dalmatinska) is in jurisdiction of:

- City of Split (<http://www.split.hr/>)
- County Splitsko dalmatinska (<https://www.dalmacija.hr/en>)

Cities and counties as local and regional government unit determines the funds allocated to finance programs beyond the minimum financial standards.

Considering interdependence of jurisdictions, investments and investment relating decisions regarding schools could be complex and time-consuming process, which should be foreseen and timely planned.

Funding from ERDF

Various commercial banks have available green lending lines. One of the most significant is the EBRD's (European Bank for Reconstruction and Development) credit facility for local and regional government units approved through various commercial banks. These credit facilities enable easier investments in energy efficiency and renewable energy projects as the result of the EBRD



project implemented in co-operation with the European Union under the name of the Western Balkans Sustainable Energy Financing Facility II (WeBSEFF II).

There are grants provided for projects that meet the criteria for energy savings and / or CO2 reduction from 5% to 10% of the credit facility amount for legal entities, or 10% to 15% of the credit facility amount for local and regional government entities. Additionally, this credit facilities arrangement also offers/include free technical consultant assistance for preliminarily estimations of savings at initial stage and assess whether the projects meet the granting criteria.

National funding

This Call is financed by European Regional Development Fund under the "Operational Programme Competitiveness and Cohesion 2014 - 2020", priority Axis 4 "Promoting Energy Efficiency and Renewable Energy Sources", specific target (ST) 4c1 "Reduction of energy consumption of the public sector buildings". Main target groups and beneficiaries of ST 4c1 are public bodies/institutions/bodies (owner of public buildings).

The purpose of mentioned Call, which is conducted as an open procedure in the modality of a permanent Call, is to achieve energy savings or reduce energy consumption in public sector buildings. Energy renovation measures will be supported, which will result in a reduction of the energy for heating / cooling by at least 50% on an annual basis (kWh / yr), compared to the annual heating / cooling energy consumption before the implementation of the above mentioned measures and the use of renewable energy sources.

The total of 1.110.000.000,00 kuna has been secured from the European Regional Development Fund for the renovation of the public sector buildings. The lowest amount of the grant to be awarded for the financing of eligible costs of the project is 80.000,00 kuna, and the highest is 40.000.000,00 kuna.

The Ministry of Construction and Physical Planning is the Level 1 Intermediate Body, while the Environmental Protection and Energy Efficiency Fund is the Level 2 Intermediate Body - both responsible for specific objectives 4c1 Reducing energy consumption in public sector buildings and 4c2 Reducing energy consumption in residential buildings

EPC

Energy Performance Contracting encompasses development, performance and financing of projects to improve energy efficiency and reduce operating and maintenance costs. The goal of each project is to reduce energy costs by installing new more efficient equipment and optimizing energy systems, thus ensuring the repayment of investment through realized savings over a period of several years depending on the client and the project.

Under an EPC arrangement an external organisation (ESCO) implements a project to deliver energy efficiency, or a renewable energy project, and uses the stream of income from the cost savings, or the renewable energy produced, to repay the costs of the project, including



the costs of the investment. Essentially the ESCO will not receive its payment unless the project delivers energy savings as expected.

Loans

On Croatian market there are special lending programs for environmental protection projects, energy efficiency and renewable energy sources.

For energy efficiency projects, there are HBOR's (Croatian Bank for Reconstruction and Development) credit facilities approved through commercial banks operating in the Republic of Croatia, directly through HBOR with the risk-sharing model in co-operation with commercial banks. Major advantage is a lower interest rate of (4%).

PPP financing

Public Private Partnerships it is defined as a long-term contractual relationship between a public and a private partner for specific purpose of construction and / or reconstruction and maintenance of a public building used for providing services of public partner.

Public-private partnership enables use of expertise of the private sector and their resources, in order to contribute to the infrastructure and public sector service activities. In this way, the public sector triggers private sector activity, taking into account public interest and quality control. The private partner, on the other hand, closes the financial structure and contributes to the project by offering its expertise (depending on the type of project it may be designing, performing etc.). The private partner's financial coverage is ensured through some contractual right (concession or similar rights).

Public private partnership is potential option for energy efficiency projects for schools on larger number of schools, depending on private partner and founders' interest.

Pilot projects findings

- *Number of audits held: 8*
- *Local specifications/problems with energy efficiency renovations (to nZEB standard)*

During pilot action activities energy audits in 8 schools were performed, discussion with school managers on energy efficiency topic were held and the energy efficiency measures leading to nZEB standard were proposed and explained. The results of the energy audits were presented to school managers and respective local authorities, open lessons on energy efficiency with pupils in schools were organized.

It can generally be concluded based on the findings of above mentioned activities that:



In each school, three different functional zones were targeted: classroom, sport hall, and canteen. Pilot consisted of the following activities:

1. Data collection - preliminary data, such as historical energy consumption and building technical schemes, have been collected.
2. On site energy audits - pilot schools have been visited and energy audits have been conducted. As a result, reports describing building energy performance have been drafted.
3. Improvement options - based on on-site energy audits results, energy efficiency measures have been proposed so that nZEB standard could be reached.
4. Optimal financing schemes - using the Financial App, plans of financing the renovation measures have been proposed.
5. Carbon footprint of restoration - using the ERE App, the improvement of building carbon footprint has been calculated.
6. Open lessons for behavioural change of school staff and students - in each school participating in the project lessons activating energy saving behaviour have been organised. Lessons targeted students, teachers and technical staff.
7. Improvement and validation of the apps - results of the ERE App and Financial App have been compared with results of on-site audits, so that Apps could be improved.

In schools there is only one measuring point and because of that only one value is available, because there is only one gauge installed for the whole object. Distribution for the consumption of part of the classroom/sport halls/canteens are made according to the surface area of the same in relation to the whole object. Most of the schools don't have available technical documentation.

Based on the energy audits, efficiency measures have been proposed to reach final goals in two scenarios:

1. *Combination of energy efficiency improvement measures - achieving minimally 50% $Q_{h,nd}$ (energy required for heating of the building) reduction*
2. *Combination of energy efficiency improvement measures - transformation into Nearly Zero Energy Building*

Energy efficiency improvement options are for:

- **Building envelope (depending on following 3 criteria)**
 1. the requirement that the heat transfer coefficients for the parts of the envelope that are reconstructed are in conformity with the current Technical Regulation on the Rational Use of Energy and Thermal Protection in Buildings
 2. the requirement for the proposed measures to achieve energy savings of at least 50% $Q_{h,nd}$ (heating energy demand)- total heating energy savings in relation to the standard heat demand for actual climate conditions in accordance with the criteria for Energy Renewal and Use of Renewable Energy Sources in public sector buildings of the Ministry of Construction and Physical Planning.



3. the requirement for the proposed measures to achieve a requirement for Nearly Zero Energy Building (nZEB)
 - **Building systems**
 - a) **Heating, cooling and DHW system**
 - b) **Photovoltaic power station**
 - c) **Lighting system**
 - **Use behaviour change**
 - **Other suggestions (Systematic Energy Management)**

The advantage of the Feedschools project is to create a database of facilities that have prepared parameters for saving from the implementation of energy measures and various financing models for achieving savings.

Main difficulties with the pilot implementation are in the development of the optimal financing plan, because the costs of implementing energy renovation measures are high at the start, and there are no significant savings achieved in the area of Split (compared to the continental part of Croatia) due to the milder climate conditions, which cause of the return on investment extends.

Schools form one unit, and it is not common to divide a school into three zones (as required by this project), because it is not common to have separate energy consumption in 3 zones. In most cases, it is not possible to implement the measures by zones when implementing energy renovation measures, since the buildings are for the most part a unique architectural unit.

In Croatia, the requirements for reaching the nZEB standards are too high, and thus the investment in implementing energy renovation measures is in most cases too large. Achieving the nZEB standard is in most cases unprofitable for projects in the city of Split, long return on investment is required. Considering that these are public buildings, which have a long lifespan, and the vast majority of buildings are old, investment in maintenance is still required. The most appropriate financial model should be selected and the proposed measures can be implemented.

In project were open lessons for behavioural change, which educate users how by changing the behavior it is possible to achieve energy savings, and it is estimated that change of behavioural can save up to 5% per year in energy consumption.

Given the limited financial resources, and since the City of Split is currently implementing several energy renovation projects for public facilities, no significant financial investments by the City itself are possible. If interested partners are found for co-financing, then it would be possible to give results in below 2 years.

Barriers and opportunities

During the Feedschools activities performed in *Croatia* were identified following barriers obstructing more extensive growth of number of energy efficiency projects in schools.



Financial barriers

Barrier	Description	Opportunity
Lack of funding	Schools need to have a certain amount of expenditures just to apply to EU or other funds) and ineffective usage of public budget	School budget planning must take into account preparation of project documentation. Budget planning should be in collaboration with the founder (e.g. local authority)
Unstable funding sources	Insufficient and inconsistent offering of grants and subsidies, with demanding conditions for application There are grants available for energy renovation of public buildings, procedures are complicated	Easier application process and easier approval of changes. More simplified project management protocols, once project is confirmed.
Underutilisation of public- private financing model	Underutilised usage of private capital in EE project in public sector (ESCOs and PPPs) because they are still not trusted enough	Making easier PPP-models and ESCO models - ESCO-models are legally complex and too long lasting. Easier and shorter models are necessary, similar to models in the private sector.

Legislation barriers

Barrier	Description	Opportunity
Unclear ownership	Unsolved legal and property ownership status of school buildings (including legalisation of buildings, multiple ownership issues, etc.)	Resolving property and legal relations of buildings.
Energy management system	Inconsistent implementation of the public`s sector obligation to systematically manage energy consumption in public buildings	Education and motivation of school staff to work in energy management system. Installation of remote energy reading system.
Unclear and inconsistent legal framework	Numerous ordinances and regulations in energy efficiency projects.	Reducing and optimizing the number of ordinances and regulations. Adopting simpler instructions in energy efficiency criteria.

Technical barriers

Barrier	Description	Opportunity
Skilled working force	Insufficient quality and reliability of	Organization of educational workshops



	suppliers and contractors (capability of construction sector to organise and deliver works in an appropriate manner). Insufficient quality of energy audits.	and seminars to improve required knowledge for implementation of energy efficiency projects.
School opening hours	Implementation of projects while schools are operating	Dynamic work plan should be planned in phases (WBS) depending on the school operating hours (considering weekends and holidays)
Local utility company requirements	Stricter requirements that it is required by the regulations, hence prolonging or increasing the costs of implementation	In project planning phase, all technical requirements by utility companies should be implemented and incorporated into the main project to avoid subsequent changes.

Communication and organizational barriers

Barrier	Description	Opportunity
Lack of experience	Undercapacity in staff and experience in management of energy projects	Involvement of external experts, whose work is often co-financed (in national funding)
Communication problems	Communication problems between building owner and its operator	Communication can be carried out through the project manager, who will represent the interests of the owner but also understand the requirements of the contractor

Information and knowledge barriers

Barrier	Description	Opportunity
Lack of expertise	Lack of expertise in energy projects, in legal and technical terms	Outsourcing.

Policy recommendations and action plan

To overcome the financial barriers

- Budget planning for schools must take into account preparation of project documentation. Budget planning should be in collaboration with the founder (e.g. local authority)
- Application procedures for grants available for energy renovation of public building should be easier, as well as approval of changes and management of project in general.
- Making easier PPP-models and ESCO models because they are legally complex and too long lasting. Easier and shorter models are necessary, similar to models in the private sector



To overcome the legislation barriers

- Resolving property and legal relations of buildings (legalisation of buildings, multiple ownership issues, etc.), must be considered even before preparation of technical documentation.
- Systematic energy management in public buildings is legal obligation, and therefore school director must have the responsibility and appoint member/s from school staff for implementation of project. Education and motivation of school staff to work in energy management system is important. Also, installation of remote energy reading system eliminates human mistake and it is recommended.
- Numerous ordinances and regulations in energy efficiency projects should be reduced and optimized. The adoption of simpler guidelines in energy efficiency criteria is very important.

To overcome technical barriers

- It is necessary to improve knowledge for implementation of energy efficiency projects by organized educational workshops for skilled working force (suppliers, contractors, planners).
- Dynamic work plan should be planned in phases (WBS) depending on the school operating hours (considering weekends and holidays). Occupational safety must be taken into consideration due to the large number of children.
- In project planning phase, all technical requirements should be implemented and incorporated into the main project to avoid subsequent changes which are prolonging and increasing the costs of implementation.

To overcome communication and organizational barriers

- Involvement of external experts with experience in energy projects, whose work is often co-financed (in national funding), can be really important for quality management of energy projects.
- Communication problems between building owner and its operator can be avoided, when there is project manager (external expert) who will represent the interests of the owner but also understand requirements of the contractor.

To overcome information and knowledge barriers

Lack of expertise in energy projects can be resolved by outsourcing external experts in specific fields of project.