

ACTION PLAN FOR THE REGION OF ZADAR (RAP)



December
2020.

INTENSIFY
More Carbon Reduction through Intense
Community Engagement

INTENSIFY
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Development Fund



**GRAD
ZADAR**

Part I – General information

The city of Zadar is the administrative, economic and tourist center of Zadar County and the wider area of northern Dalmatia. The administrative area of the City of Zadar includes 15 settlements on a total area of 194.02 km². According to the last census from 2011, in the area of City of Zadar live 75,062 inhabitants in 27,518 households, making Zadar the fifth largest city in Croatia.

On May 28, 2012, the City of Zadar joined one of the most successful initiatives of the European Commission, the Covenant of Mayors. In this way, the City of Zadar formalized its sustainable development policy, which it began to implement through a series of activities. even before the signing of the Covenant of Mayors. In such a way, Zadar is trying to confirm its position as a leader in sustainable development in Dalmatia. By signing the Covenant of Mayors, the City of Zadar has committed itself to implementing a numerous energy efficiency measures that will ultimately reduce CO₂ emissions in its area by at least 20 % by 2020 and at least 50 % by 2030.

The City of Zadar is constantly actively striving and participating in achieving the highest possible energy efficiency through the development and implementation of various strategic documents. The most important strategic documents developed by the City are the Energy Sustainable Development Action Plan (SEAP), annual energy efficiency plans of the City of Zadar, the Energy Efficiency Action Plan of the City of Zadar for the period 2017 – 2019, the Energy Efficiency Program in urban transport in the City of Zadar. and the Study of Sustainable Urban Logistics on the Zadar Peninsula (SULP).

General information	
Project	INTENSIFY
Partner organisation (s) concerned	City of Zadar
Country	Croatia
NUTS2	Jadranska Hrvatska
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Part II – Policy context

The Action Plan aims to impact:

- Other regional development policy instrument

Name of the policy instrument(s) addressed:

Sustainable Energy Action Plan of the city of Zadar (SEAP), The Energy Efficiency Act and the Strategy for the Energy Development of Croatia in the period until 2030 with an outlook for the period until 2050.

Further details on the policy context and the way the action plan should contribute to improve the policy instruments:

The SEAP was adopted by the City Council of the City of Zadar on 13 March 2014. Its goal is to reduce CO₂ emissions by at least 21 % by 2020 in the area covered by the city of Zadar. Measures in reducing CO₂ emissions are divided into three sectors: Building sector, Sector of Public lighting and Traffic sector. In the building sector it is possible to reduce CO₂ emissions by 22.28 %, in the sector of public lighting by 0.78 % and in the traffic sector by 6.45 %. Since the building sector consumes the most energy and emits the highest CO₂ emissions, it is the same priority in the implementation of measures. The construction sector includes energy recovery in the jurisdiction of Zadar, multi-storey buildings and family houses and buildings of the commercial and service sector. Also, the transport sector is of great importance in reducing CO₂ emissions, as it is the growing problem for the number of tourists, and should therefore be improved. The implementation of all SEAP measures can reduce CO₂ emissions by 29.51 %, which allows prioritization in their implementation.

According to the Energy Efficiency Act (Official Gazette 127/14, 116/18, 25/20), and contains an overview and assessment of the immediate energy consumption, goals, including the indicative goal of energy savings on administrative area of the City of Zadar, measures to improve energy efficiency, sources funds to finance investments in the implementation of energy efficiency improvement measures; and other necessary information. Moreover, very important national document is the Strategy for the Energy Development of Croatia in the period until 2030 with an outlook for the period until 2050 (Official Gazette 25/20). Strategy envisages a much higher share of energy from renewable sources, greater energy efficiency and a reduction of greenhouse gas emissions. The main purpose of this strategy is to ensure energy independence, a safe and sustainable supply, as well as the development and competitiveness of the energy system, in the context of accomplishing the vision of a common energy-climate policy in Croatia and at the EU level.

Part III – Development phases

Development of the Action plan for the region of Zadar is shown below (Figure 1).

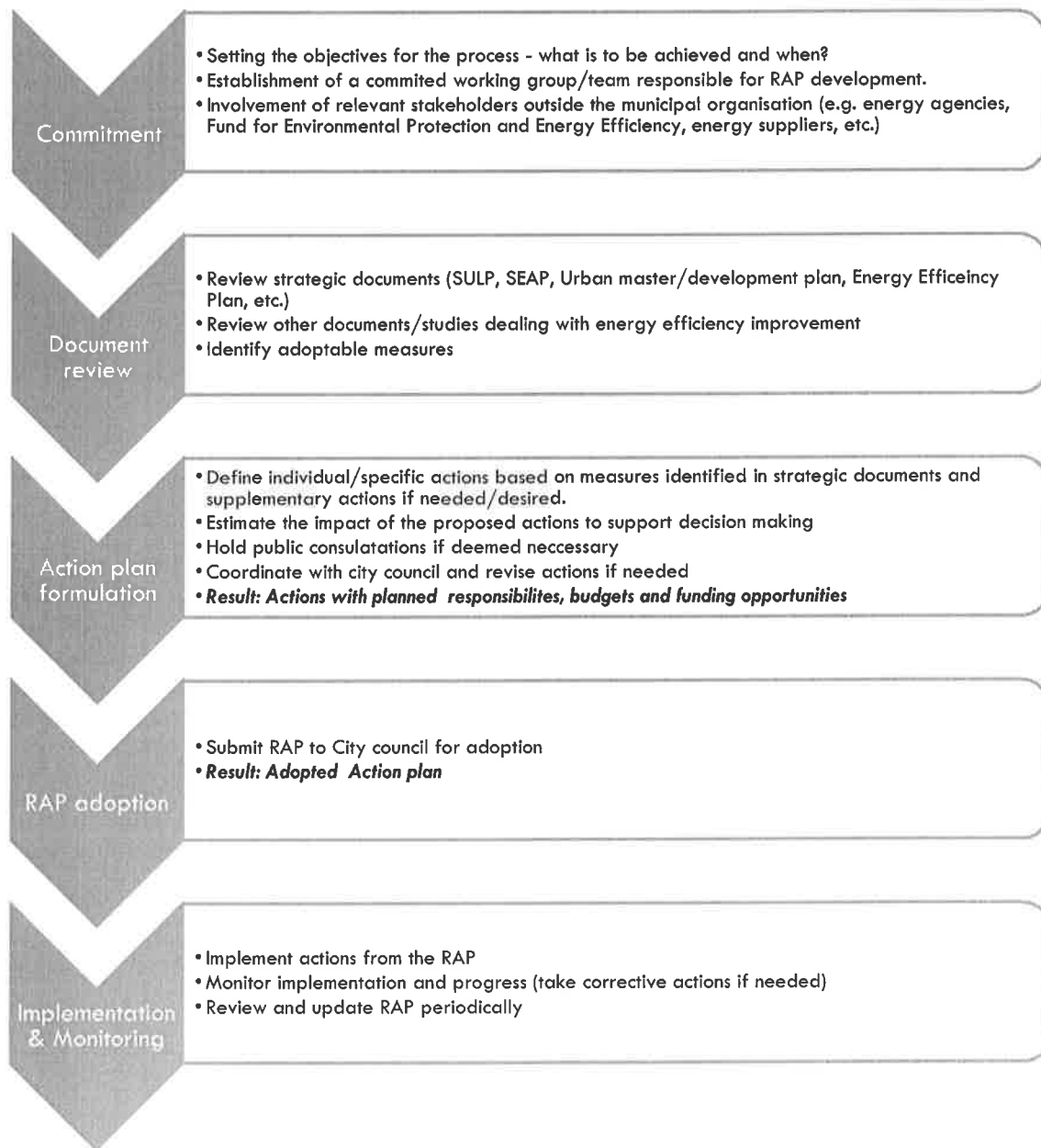


Figure 1 RAP development process

Part IV – Details of the actions

LIST OF ACTIONS

Action plan for the region of Zadar (RAP) aims to increase energy efficiency, reduce CO₂ emissions and reduce energy consumption in region. RAP actions are focused on the construction sector through energy renovations of primary schools, public buildings and family houses. Furthermore, RAP actions could be used in future as an example of good practice for development of other regions in Croatia, or even regions in EU countries. Envisaged actions developed through RAP are shown below (**Figure 2**).

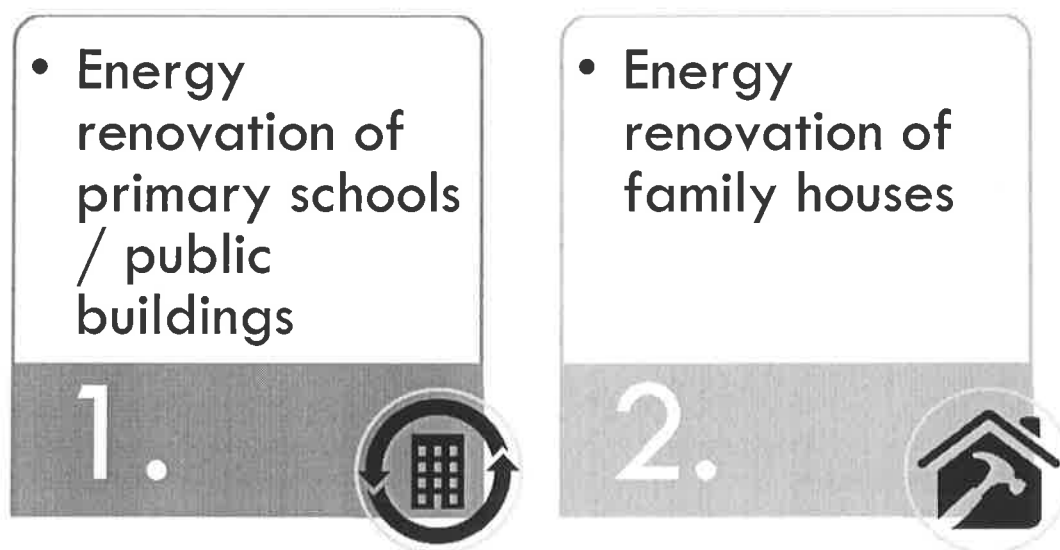


Figure 2 Actions for energy efficiency improvement

Part IV – Details of the actions

ACTION 1 – ENERGY RENOVATION OF PRIMARY SCHOOLS / PUBLIC BUILDINGS

1. Relevance to the project:

The INTENSIFY project aims to reduce CO₂ emissions in cooperation with the community, whose activities would contribute to the reduction of harmful emissions. The energy renovation of primary schools and public buildings is a great example to all who are part of the community that they can be directly or indirectly involved in the implementation of the project. An excellent example of cooperation between the community, schools and local authorities have Treviso and Almada, of which we managed to see through a study visit.

After study visits to Almada and Treviso, we have collected a few excellent ideas that could be implemented in our actions. The two, most important ideas that would be implemented in the city of Zadar are related to:

1. Installation of PV modules on schools and public building based on a crowdfunding principle, seen near the city of Almada and according to project *Coopernico*.
2. Inclusion of the smart metering and social component in the energy savings processes, seen in the city of Treviso school and according to *EPIC* and *Green Schools* projects.

Within the energy renovation of primary schools and public building there will be implemented PV systems on the roofs as a part of such renovation. Implementation of PV systems will be based on crowdfunding principle replicated from *Zarco School* that is a part of *Coopernico* project, visited during study visit in the city of Almada. Crowdfunding is based on the practice of funding a project by raising money from many people who each contribute a relatively small amount in return for a potential profit or reward. With such approach, it is possible to make sure that citizens participate in planning, deciding, building and producing energy and participating in the division of profits. Through this activity replicated from the *Coopernico* project, city of Zadar wants to encourage the development of social entrepreneurship in the energy sector.

Within energy renovation of primary schools and public building there will be included also a social innovation component as a leverage to reduce consumption through the active involvement of the building users in energy efficient actions. Such approach will be replicated from the city of Treviso school and will be based on *EPIC* and *Green Schools* project that this school was a part of. This school was visited during the study visit in the city of Treviso. Social innovation that will be implemented in the city of Zadar is based on trainings, presentations, workshops, information monitors in hallways and organization of competition.

In terms of the SEAP as the document of the city of Zadar which is defined as policy instrument, it is important to state that it has foreseen a special part for stakeholders involvement where the information about

stakeholders involvement in planning and implementation phase should be explained. However, it is only a short part where some methods or tools for stakeholder engagement are not fully explained and not enough information on how to activate and increase community engagement in all phases of the SEAP is provided, especially in its implementation. A more realistic SECAP can be implemented in shorter time and with more financial resources engaged by private partners only if the stakeholders (citizens or organisations) are fully engaged.

Thanks to INTENSIFY activities such as thematic events and study visits helped the city to find solutions and strength the knowledge of the staff and local representative in order to start implementation of action called "Energy renovation of primary schools/public buildings".

2. Nature of the action

As there are already results and analyses of some buildings that have already used the opportunity of energy renovation, according to their results, we are educating future users. Through figures that show savings on an annual basis, we will more easily present the goal of the project and its purpose. With a larger number of users, we will have better results in terms of reducing CO₂ emissions, by educating users about the benefits of reducing CO₂ emissions, we will encourage more people to use these measures, all for a better life in the environment.

Action is prepared for 2 primary schools and 1 public building (in total about 8,900 m²) in the City of Zadar. Action includes renovation of thermal insulation of the building and replacement of windows / doors with new and high-efficiency solutions. This action results in increased energy efficiency, savings in energy consumption for space heating, reduced greenhouse gas emissions, increased functionality and objective improvement of the building.

Furthermore, action includes new installation or replacement of heating systems and domestic hot water systems. This action means modernization of the existing heating system, as well as their efficient management, which results in savings in primary energy consumption, reduction of greenhouse gas emissions. Moreover, reconstruction of the lighting system with a new, more efficient LED system is also envisaged as well as PV system integration and smart metering system.

1st and 2nd Primary school (ca. 4.000 m² and 3.700 m²) renovation

Thermal insulation based on stone wool 15cm will be installed for both buildings. Old windows and doors with metal framework will be replaced with new PVC windows with triple glazed Low-E glass filled with argon gas. According to Regional Energy Agency North experience, such measure can reduce heating energy consumption and CO₂ emissions for 20 %.

Existing old gas boilers for heating and domestic hot water preparation will be replaced with new, more energy efficient condensing gas boilers and air source heat pumps. According to Regional Energy Agency North experience, such measure can reduce heating energy consumption and CO₂ emissions for 25 %.

Old lighting system based on fluorescent technology will be replaced with energy efficient LED technology. According to Regional Energy Agency North experience, new lighting system could be 70 % more efficient than old one.

On 1st primary school, PV system with 50 kWp and smart metering system will be installed and produced electricity will be used for school needs, and the surplus will be sold to the grid. According to Regional Energy Agency North experience, such measure can reduce electric energy consumption for 50 % and CO₂ emissions for 14 tCO₂ per year.

On 2nd primary school, PV system with 40 kWp and smart metering system will be installed and produced electricity will be used for school needs, and the surplus will be sold to the grid. According to Regional Energy Agency North experience, such measure can reduce electric energy consumption for 50 % and CO₂ emissions for 14 tCO₂ per year.

Public building (ca. 1.200 m²)

Thermal insulation based on EPS 12cm will be installed for public building owned by city of Zadar. Old windows and doors with wooden framework will be replaced with new PVC windows with double glazed Low-E glass filled with argon gas. According to Regional Energy Agency North experience, such measure can reduce heating energy consumption and CO₂ emissions for 15 %.

Existing old gas boilers for heating and domestic hot water preparation will be replaced with new, more energy efficient condensing gas boilers. According to Regional Energy Agency North experience, such measure can reduce heating energy consumption and CO₂ emissions for 20 %.

Old lighting system based on fluorescent and incandescent technology will be replaced with energy efficient LED technology. According to Regional Energy Agency North experience, new lighting system could be 75 % more efficient than old one.

On this public building, PV system with 6 kWp and smart metering system will be installed and produced electricity will be used for self-consumption and the surplus will be sold to the grid. According to Regional

Energy Agency North experience, such measure can reduce electric energy consumption for 30 % and CO₂ emissions for 2 tCO₂ per year.

Innovative approach

Implementation of PV systems on primary schools will be based on crowdfunding principle. In the city of Zadar, such project will be led by Croatian company called "*The Green Energy Cooperative (ZEZ)*". Their mission is to help citizens in the development, investment and use of renewable energy sources. They have already implemented one crowdfunding PV system project and their goal is to achieve real changes in the development of energy and the involvement of citizens in the process of energy transition. With such approach, it is possible to make sure that citizens participate in planning, deciding, building and producing energy and participating in the division of profits.

Finally, within energy renovation of primary schools and public building there will be included also a social innovation component as a leverage to reduce consumption through the active involvement of the building users in energy efficient actions.

Social innovation that will be implemented in the city of Zadar is based on following components:

1. **Trainings, presentation and workshops** for building users in order to educate them about possible actions that will impact on reducing energy consumption within a building. For example, turning off the lights if there is a daylight present, usage of exact needed amount of water for electric kettle, efficient use of heating and cooling devices, efficient use of printing paper etc. Trainings will be conducted for 800 people that are daily building users (teachers, students, public administration workers). There will be 3 trainings, 3 presentations and 3 workshops in every school (In total 18 events) and 2 presentations at public building, that will be held by Energy Agency. According to Regional Energy Agency North experience, changing mindsets and behaviour of building users in energy efficient way through trainings and workshops, will reduce energy and water consumption, as well as CO₂ emissions of building for about 6 %.
2. **Placing monitors** in hallways so everyone in the building can see how much energy is consumed in real time, monthly and compared to other days or months. Setting up a monitor gives users an insight into building consumption and encourages them to change their behaviour to achieve better energy savings (turning off lights when they are not in room, closing the tap on time, using less paper for printing, etc.). 3 monitors will be placed, one in each building. According to Regional Energy Agency North experience, changing mindsets and behaviour of building users in energy efficient way through monitor placing will reduce energy and water consumption, as well as CO₂ emissions of building for about 0,5 %.
3. **Organization of competition** between two primary schools in achieving greater savings with appropriate rewards for winners. We can agree that competitions encourage students to be more interested in energy efficiency measures. One competition will be organized by City of Zadar in period

of 6 months. Students that achieve better savings for their school will be properly awarded. Only savings that are achieved with behavioural impact will be assessed. According to Regional Energy Agency North experience, such competition will reduce energy and water consumption, as well as CO2 emissions of building for about 2 %.

What is most important, energy efficiency habits that will students, teachers and other occupants learn in schools and public buildings, is possible to be transferred in their homes and in such way spread awareness of energy efficiency even beyond default borders.

Before implementing social innovations, different surveys and questionnaires will be conducted for all users of primary schools and public buildings to find out how, where and how much energy is consumed at those buildings, as well as in their private homes and private life. The same survey will be conducted every 6 months so that we can compare and measure the improvement and reduction of energy consumption among users affected by these activities, but also to find out how each social innovation measure affect on savings.

3. Stakeholders involved:

- Department of Environmental Protection of the City of Zadar –Project management activities.
- Department of Energy Efficiency of the City of Zadar – Project management activities.
- The Green Energy Cooperative – Project management activities related to PV systems crowdfunding processes.
- Representatives of building managers – preparation of legal and administrative documentation for co-financing application to ministries, Fund for Environmental Protection and Energy Efficiency or EU programs.
- Citizens – participation in financing of PV system through crowdfunding process.

4. Timeframe:

The beginning of the implementation of activities would be in 2021, and the end in 2023. Note that this measure will be implemented in several stages due to financial resources.

5. Indicative Costs:

In the first phase, the amount of financial resources would be 1,700,000.00 € for 2 primary schools and 1 public building (in total about 8,900 m²).

6. Indicative funding sources:

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Primary schools and public building will be co-financed by the Environmental Protection Fund, the Ministry of Environmental Protection, local self-government and EU funds. The co-financing model would be 40 % City of Zadar (640,000.00 €), 40 % public bodies of the Republic of Croatia (640,000.00 €) and 20 % EU funds (320,000.00 €). 100,000.00 € will be spent on 3 PV systems and will be financed by citizens on crowdfunding principle.

Part IV – Details of the actions

ACTION 2 – ENERGY RENOVATION OF FAMILY HOUSES

1. Relevance to the project:

Energy efficiency and reduction of CO₂ emissions are the goal of the INTENSIFY project to reach a larger number of users or aware people through community encouragement, who will help in the implementation of such activities. Energy renovation of family houses is a practice that has been carried out in the city of Zadar for the last few years. The response is not great and most of the funds will not be used, so we want to encourage residents to be as involved as possible in the implementation of such measures for energy recovery and reduction of CO₂ emissions through their households. Renovation of minimum 50 houses will be co-financed through this measure.

City of Zadar will implement innovative business model for the renovation of buildings based on mix of following two sources from INTENSIFY project:

- Intensify online webinar – “Citizen Engagement in the Basque Country”, more specifically the presentation “Coronacion Retrofit Project – Engaging the Community” (SmartENCity project).
- Presentation shown on the study visit to the city of Almada by GoParity – “Ponto Energia: One-Stop-Shop for energy efficiency investments”.

From our project sources previously mentioned, innovative business model is based on establishing of one-stop shop (OSS) centre for citizens in order to help, assist, consult and lead them through the whole process of energy renovation of their houses with an aim to find the most acceptable ratio of price, quality and technology that will be used. OSS will be established with one Energy Agency as a partner for development of technical knowledge bases and technical assistance for citizens. Before launching the One Stop Shop as such, it is essential to ensure to gather all competencies and the necessary support.

OSS will be defined as an online platform for communication and exchange of information, but it will also work in physical form.

Thanks to INTENSIFY activities such as webinars and study visits helped the city to find solutions and strength the knowledge of the staff and local representative in order to start implementation of action called “Energy renovation of family houses”.

2. Nature of the action

Renovation of the thermal insulation of the building and replacement of the existing windows with highly efficient windows and doors result in an increase energy efficiency as a saving in energy consumption for space heating, by reducing greenhouse gas emissions, by increasing object functionality as well as objective appearance improvement object.

Furthermore, action includes new installation or replacement of heating systems and domestic hot water preparation systems. It refers to modernization of the existing heating system mostly with renewable energy solutions, as well as efficient management of system that will result in savings in primary energy consumption, reduction of greenhouse gas emissions and reduction.

Thermal insulation for residential buildings is usually based on EPS or stone wool 12cm. Old windows and doors with metal, wooden or old PVC framework will be replaced with new PVC windows with double glazed Low-E glass filled with argon gas. According to Regional Energy Agency North experience, such measure can reduce heating energy consumption and CO₂ emissions for 20 %.

Existing systems for heating and domestic hot water preparation will be replaced with new, more energy efficient condensing gas boilers, heat pumps, biomass boilers or solar collectors. According to Regional Energy Agency North experience, such measure can reduce heating energy consumption and CO₂ emissions for 20 %.

Also, through this activity, one-stop shop (OSS) in physical and online form will be developed as an unique place for obtaining of all information for citizens and for assisting and leading them through renovation process for their houses.

OSS will have following responsibilities based on replicated solutions from relevant INTENSIFY project sources:

- **Knowledge and information centre** – providing informative and educational material related to renovation technologies, prices, possible subsidies, but also making unique technical solutions for each customer.
- **Assistance to the citizens** – consulting and leading citizens through whole selection process of renovation that is related to choosing of most suitable technical and financing solution, materials, architects, contractors, etc.
- **Management of subsidies** – on behalf of the homeowners.
- **Retrofitting works assistance** – assistance to citizens in organization of works, permits, tendering and supervision of design projects and works, etc.
- **Monitoring of results** – comparison of planned and implemented measures.

This activity will cover energy renovation for about 30 family houses in Zadar region with the possibility of expanding of resources.

Before implementation of this action, different surveys and questionnaires will be conducted for all family houses that will be renovated, in order to find out how, where and how much energy is consumed in their private homes and private life. The same survey will be conducted every 6 months so that we can compare and measure the improvement and reduction of energy consumption after implementation of action.

3. Stakeholders involved:

- City of Zadar – Financial and administrative support to citizens.
- Department of Energy Efficiency of the City of Zadar – Project management activities.
- Fund for Environmental Protection and Energy Efficiency – Co-financing of the project from the national level.
- Energy Agency – Technical support in One-stop shop implementation.
- Citizens – Project beneficiaries. Owners of buildings undergoing integral renovation.

4. Timeframe:

The start of the implementation of energy renovation measures for family houses would be in 2021 and would last until end of 2023.

5. Indicative Costs:

The funds needed for the implementation of renovation activities would amount to 300,000.00 € for three years. (100,000.00 € per year). Funds needed for establishment and operating of one-stop shop platform through 3 years would amount to 60,000.00 €. This measure will be repeated in several stages.

6. Indicative funding sources:

- City of Zadar – 50 % of funding – 120,000.00 € for renovation and 60,000.00 € for OSS implementation and operating.
- Fund for Environmental Protection and Energy Efficiency – 50 % of funding – 180,000.00 €.

Part V – Financing

FINANCING INSTRUMENTS

The implementation of proposed measures may require significant investment. Every country that is a full member of the European Union, has been allowed to withdraw funds from Structural and Cohesion Funds and increased available funding sources. Besides Structural and Cohesion funds, other funding sources which can contribute to the revitalization of investment activities are the ESCO model, revolving funds, public-private partnership, etc. So far, these models are not currently being used to a significant extent. European funding programs provide direct financial incentives to public bodies to develop profitable projects. Financial products such as guarantees and equity are also used to support the project.

The basic and detailed breakdown of funding sources is shown below in **Figure 3** and **Figure 4**.

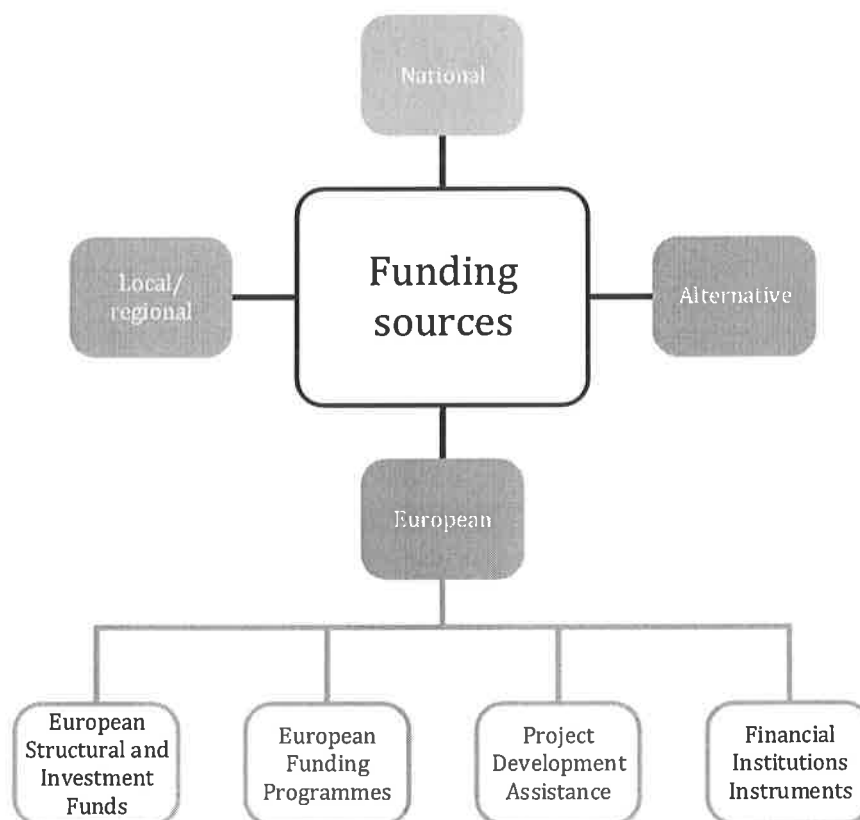


Figure 3 Funding sources

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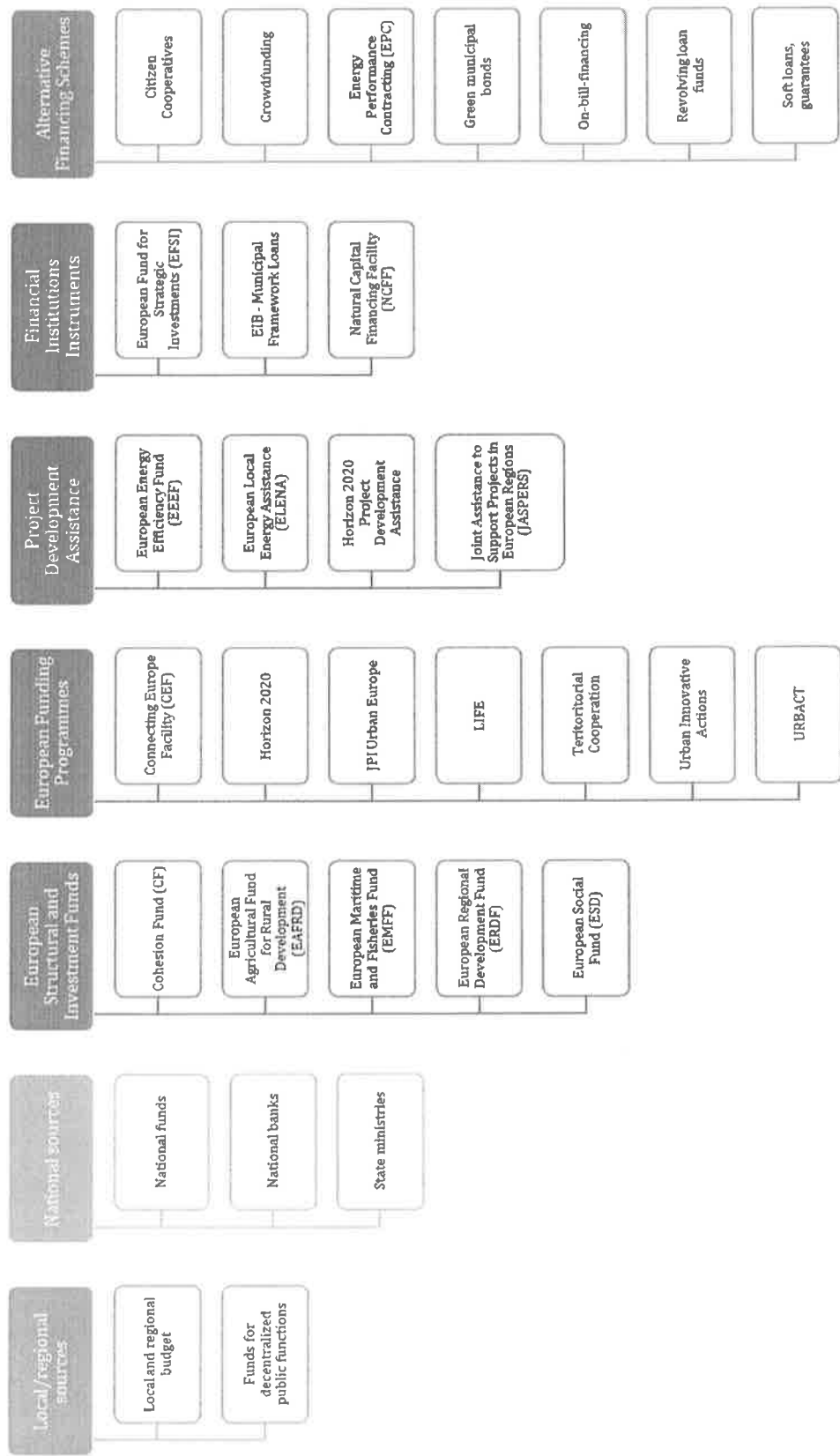


Figure 4 Classification of main funding sources

Part V – Financing

DECISION TREE

The decision tree represents a flow chart of the most appropriate financing mechanisms to address specific situations faced by municipalities in financing energy efficiency (EE) projects. The scheme is not binding as, in many cases, multiple mechanisms may be combined.

The first thing to address is whether the municipality has sufficient resources to fund the project(s) or not. If the municipality has sufficient financing for the project(s), it can allocate part of its budget for the project(s); by establishing a budget line item for project and carrying out the mechanism of general budget financing. If the municipality does not have enough funds, it should seek any grants available from donors. If there are available grants, the municipality should apply for them. Often these grants do not cover the entire project cost as they represent a mechanism of partial budget financing. It is often possible that funds may also come from the national government; in this case the municipality will capture new budget for financing part of the project(s). If the fund does not come from the national government, it is possible to look for energy efficiency funds; this financing scheme is subject to EE fund eligibility criteria.

Beside these funds, commercial banks can also offer dedicated credit lines and/or risk sharing programmes. In order to take advantage of these opportunities, the municipality must respond for its creditworthiness as well as its collateral and borrowing capacity.

Other financing systems can be found in commercial or financial ESCOs; if there are ESCOs in the market the municipality should develop favourable EPCs by negotiating them with ESCOs. If the ESCO is not an option, leasing or vendor financing programmes can be searched. In such case, when the eligibility criteria are satisfied, similarly to the commercial financing scheme, the municipality should negotiate the leasing or the vendor financing agreement. Finally, if the municipality has the capacity to issue municipal bonds it should create a municipal bond programme by taking into account the transaction costs and market situations.

The example of choosing relevant financing model for sustainable energy and climate action projects by using a simple decision tree is shown in **Figure 5**.

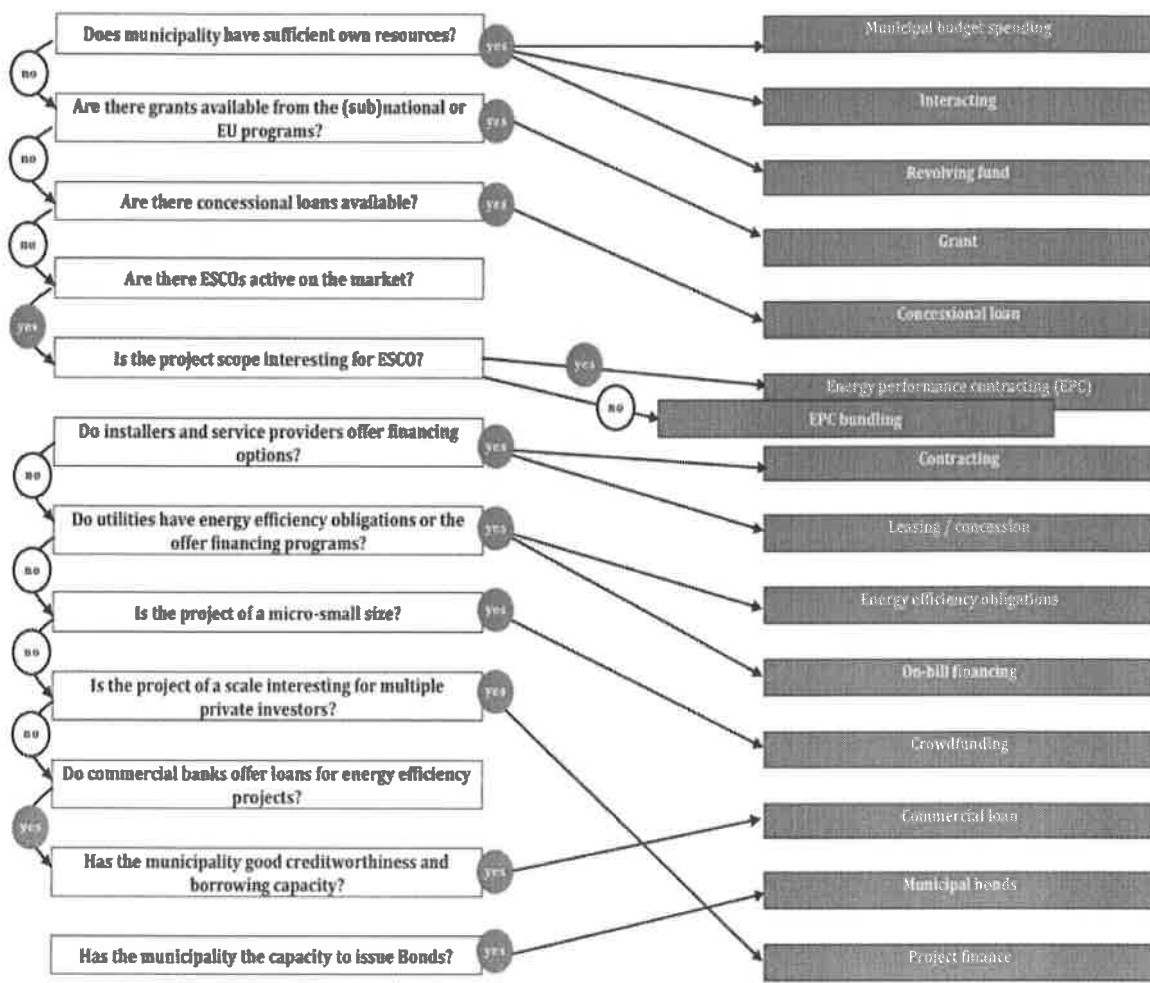


Figure 5 Decision Tree (Source: Novikova, et al., 2017)

Part VI – document verification

Date:

15.12.2020.

Name of the organisation(s):

CITY OF ZADAR

Signatures of the relevant organisation(s):

