

LC Districts

Interreg Europe



European Union
European Regional
Development Fund



**[REGIONAL ACTION
PLAN - CROATIA]**

Index

| | | |
|-----|---|-------------------------------------|
| 0 | Introduction..... | 3 |
| 1 | Part I – Background..... | 4 |
| 1.1 | General information..... | 4 |
| 1.2 | Policy context | 4 |
| 1.3 | Main findings from the Regional Diagnosis | 5 |
| 2 | Part II – Methodology | 7 |
| 2.1 | Interregional approach and conclusions..... | 7 |
| 2.2 | Regional approach. Stakeholders..... | 7 |
| 2.3 | Regional strategic thinking process..... | 8 |
| 2.4 | List of relevant objectives and possible solutions | 8 |
| 3 | Part III- Actions | 9 |
| 3.1 | Action 1: Primary energy factors for heating | Error! Bookmark not defined. |
| 3.2 | Action 2: Integrated energy, climate and spatial planning..... | 9 |
| 3.3 | Action 1: Revalorisation of primary energy factors for heating..... | Error! Bookmark not defined. |
| 3.4 | Action 2: Integrated energy, climate and spatial planning..... | 9 |
| 3.5 | Actions Summary..... | 13 |
| 4 | Part IV – Regional Action Plan Endorsements | 14 |

o Introduction

This document summarizes the actions that have taken place and will have to take place to enable the developments in the district heating sector in the period of the next MAFF 2021-2027. District heating sector is high on the agenda of the EU in the relation to its role in the decarbonization processes related to the building stock energy transition but has also come under the radar of the legislative authorities and structural funding managing authorities in Croatia, thanks to the work on the LC District project as well.

The approach in the LC Districts project in Croatia slightly differs from the initial one envisaged in the project application, as we have stepped in the period of the programming for the usage of the funds from MFF 2021-2027. In the period of the development of this document one of the crucial documents has already been published and execution of activities arising from it will soon start. It is the National Plan for Recovery and Resilience, where the district heating sector is represented with available funding for modernization of the production processes, to some extent thanks to the work of the stakeholders rounded around the LC districts network in Croatia. The other key financing document, the Operational Programme for ESIF in 2021-2027 is currently in the process of development and we are making efforts for other dimensions of the district heating sector to be represented, mainly the distribution part, and for that, we are directly in communication with the authority responsible for drafting, Ministry of Economy, and sustainability.

Apart from working on policy documents on the financing side, significant work has been done on technical policy documents and legislation and the processes of urban planning to match the financing demands and to put district heating on the map of solution providers for building stock decarbonization in Croatia.

The entire ecosystem around the district heating sector in Croatia has become more favourable and the sector itself is finally on the path to be recognized as a better option for heating and consequently for decarbonization of the building stock in the challenging goal of reaching the 2050 GHG emissions reduction targets.

In the light of the actions that we can currently influence and that is foreseen to happen in the period of the last phase of the LC Districts project our efforts will be focused on the actions related to phasing out of natural gas in the processes of spatial planning and on the creation of a more favourable legislative environment for DH sector (revision of Primary energy factors).

1 Part I – Background

1.1 General information

| | |
|--|--|
| Project Name | Towards low carbon city districts through the improvement of regional policies |
| Project Acronym | LC Districts |
| Partner organization(s) concerned | North-West Croatia Regional Energy Agency |
| Country | Croatia |
| NUTS2 region | |
| Contact person | Miljenko Sedlar |
| Email address | msedlar@regea.org |
| Phone Number | +385994380826 |

1.2 Policy context

1.2.1 Policy Instrument

The Action Plan aims to impact:

- Investment for Growth and Jobs programme
- European Territorial Cooperation programme
- × Other regional development policy instrument

Name of the policy instrument(s) addressed:

Spatial plan of the City of Karlovac

Integrated energy, climate, and spatial planning – Energy and climate aspects are not currently valorised in the processes of spatial planning in Croatia. We will develop methodology and a guideline on how to embed these issues in the spatial planning process and evaluate it in the process of spatial plan upgrade of the City of Karlovac. The final goal is to have a part of the plan developed in a way that natural gas is banned as a source of energy for heating and district heating and other renewable sources are the only choices. REGEA has initiated a pilot project in cooperation with the City of Karlovac.

Explanation

We opted to change the policy we tend to influence through the LC Districts Project due to the timing of the execution of the initially selected policy and other connected changes in the ecosystem of the district heating sector. Nevertheless, the timing for change fit great for the Project and development of future actions related to legislation, policies, and funding. The timing was perfect to inline the activities of the project with the activities conducted by other stakeholders related to legislation changes and programming of the financing documents for the MFF 2021-2027. Initially foreseen activities were widened to encompass a broader DH ecosystem development. We plan to develop, assess, and implement the process that will result in actual decarbonization of a district in the first phase, and later in the decarbonization of the city.

1.2.2 Link to the RIS3

Energy, as a pillar is present in the S3 of Croatia and the intention, is to transform the energy sector to be able to respond to global challenges referring to secure, clean, and efficient energy, climate change and resource efficiency. A significant contribution is expected in the areas of energy storage and demand response, all highly related to the district heating sector. Actual investments relevance:

- Presence of natural resources for the production of energy from renewable sources. This is relevant in the context of the production side in the district heating sector, as possibilities are connected to geothermal, solar and energy production from biomass.

1.3 Main findings from the Regional Diagnosis

The regional diagnosis gave a broad overview of the buildings and district heating sector in Croatia, with emphasis on the analysis of the legislation and other policy documents, as well as

funding-related documents. All the relevant initiatives for low carbon transition have been analysed and key findings listed. Regional diagnosis has given us an input that further investments are needed in the district heating sector to be able to respond to the need of the buildings sector concerning decarbonization, as well as the fact that natural gas is still predominantly used for heating purposes in the urban areas.

The building sector in Croatia corresponds to approximately 35% of the total final energy demand and the majority of this is used for space heating and the preparation of domestic hot water. The decarbonization of the heating sector is a critical issue in the effort for total or near total decarbonization. District heating is an ideal technology to address this as it can provide heat energy at high densities which are produced from renewable sources or collected as waste heat and transported to where it is needed. This also goes hand in hand with the nearly zero energy building regulations which require all buildings to supply at least 30% of their energy from renewables, a requirement which multiapartment buildings will have issues satisfying with individual solutions.

Legislation barriers have been identified that need to be fixed to allow the DH sector to further develop and serve as a solution for decarbonization. Efforts must be made to back the changes up with technical parameters.

The further development and expansion of district heating in Croatia will, alongside investments, need additional efforts regarding integrated planning. To facilitate the decarbonization of the building sector, cities need explicit and binding tools with which they can mandate their development and the development of areas under their authority. This includes the integration of energy and climate into spatial planning and zoning regulation. By empowering municipalities, cities, and regions to act in this way, we can give them the tools needed to not just plan, but also implement sustainable development practices thus driving their decarbonization and transformation towards smart and green cities.

DH projects financing needs support, so co-funding from structural funds in whatever shape available will be needed.

2 Part II – Methodology

2.1 Interregional approach and conclusions

A strategic approach has proven as a key to all the actions envisaged. The approach was national, but that does assume that different regions are a part of the overall assessment and planned activities. When we worked on regional diagnosis, we have concluded that a wider scope of work must be done to be able to connect the synergies of the developments in buildings and the district heating sector. Key learnings that came out of the intense dialogue with key stakeholders are the following, and they are reflected in the actions:

- Proper implementation needs to start with proper spatial (urban) planning processes.
- Legislation on all levels needs to be aligned to enable implementation. In our case alignment needed to be inter and intra-sectoral.
- Ex-ante conditions need to be worked out properly as a basis for the process of programming structural funding.
- Timely communication between stakeholders (main groups) is essential and facilitation is needed.

2.2 Regional approach. Stakeholders

As the district heating sector was our focus, we opted to collaborate with the stakeholders that are in that ecosystem. The list of included stakeholders is listed below:

- District heating providers (companies)
- Association of district heating companies organized within the Croatian Chamber of economy
- Relevant ministries
- Local and regional governance
- Industry sector (as providers of solutions for DH decarbonization)
- Academic community (technical faculties)

This group of stakeholders reflects the overall ecosystem needed to address the issues on legislation, policy, and level of financing documentation. It is a nationwide approach as we have concluded that this is the only way to make a so much needed structural change.

A basic way of work was that we, as REGEA, were facilitators of the discussion between the main groups of stakeholders on different topics that are reflected in the actions part of this document.

Main conclusions of working sessions:

- There are legislation changes needed to put the district heating sector on the list of solution providers for buildings sector decarbonization
- Technical assistance is needed for project development
- Co-funding is essential for future projects related to heat production and distribution (already present in the National Plan for Recovery and Resilience, work is underway to have activities related to the network modernization eligible in the new OP)
- Proper planning (spatial/urban) need to be conducted to foresee DH as a solution

2.3 The regional strategic thinking process

| | Planning part | Legislation part | Finance and execution |
|--------------|---|--|---|
| Why? | It is essential to have an anchor in urban spatial plans | Legislation needs to support decarbonization | Finance is crucial for projects development and execution. Technical assistance needed |
| What | Spatial plans of cities | Several laws and bylaws in the domain of DH and buildings sector | <ul style="list-style-type: none"> • National plan for recovery and resilience • Operational programme in 2021-2027 |
| Stakeholders | <ul style="list-style-type: none"> • Local and regional governance • DH companies • Technical facilitators • General public | <ul style="list-style-type: none"> • DH companies • Ministries in charge • Technical facilitators • Academia | <ul style="list-style-type: none"> • Ministries as managing authorities • Technical facilitators • DH companies • Local and regional governance |

2.4 List of relevant objectives and possible solutions

| Necessity | Solution |
|---|--|
| Need for spatial plans to encompass comprehensive energy and climate planning | Develop methodology and guidelines to integrate strategic energy and climate elements into spatial plans and assess it on an actual case |
| The legislation does not fully support the decarbonization of the buildings and DH sectors | Initiate the change of laws and bylaws to support the decarbonization of the sectors involved related to primary energy factors |

3 Part III- Actions

| Action | Objective |
|--|--|
| 3.1 Action 2: Integrated energy, climate, and spatial planning | Through this action, REGEA is proposing the integration of energy and climate measures in the city spatial plans thus empowering the City of Karlovac to mandate the implementation of its energy and climate vision. This is one of the prerequisites for decarbonization of the buildings sector by districts. |

3.1 Action 1: Integrated energy, climate, and spatial planning

3.1.1 Relevance to the project

Through this action, REGEA is proposing the integration of energy and climate measures identified in the SECAP of the City of Karlovac into its spatial plans, thus empowering the city to mandate the implementation of its energy and climate vision. This is one of the prerequisites for decarbonization of the buildings sector by districts. The proposed measures include a higher standard of energy efficiency as well as a mandate to ban the use of fossil fuels for space heating, allowing only the use of district heating and on-site renewable energy production. The action is of significant relevance for the project, but also has a much higher impact as the final goal is to, wherever possible, ban the usage of fossil fuel for heating purposes and favour the district heating, which will be the unique case that will open the door for further implementation and scale-up enabling decarbonization.

Activities which can be considered as sub-actions that were required to take place before the actual measure included a joint work of the teams at the University of Zagreb, Faculty of Mechanical Engineering and Naval Architecture, the Croatian Chamber of Economy and REGEA to change the current primary energy factors used in the building design process, which highly favour individual gas heating. This sub-action was identified as the part of work and was very important in enabling the execution of the proposed action 1 as there is a strong link between those, especially in support of evaluation of the decarbonization process on a city district level. Currently, primary energy factors used in the design process of new buildings and building refurbishment is very unfavourable for district heating and is favouring individual gas heating (according to by-law dedicated to the system for monitoring, measurement, and verification of energy savings¹). The Croatian Chamber of Economy, the University of Zagreb, Faculty of Mechanical Engineering and Naval Architecture and REGEA has initiated an action

¹ https://narodne-novine.nn.hr/clanci/sluzbeni/2021_09_98_1772.html (In Croatian)

to change this and propose more realistic figures. Actions proposed in this action plan are designed to support the revalorization of the factors, which should result in a more favourable environment for district heating systems as a solution for the decarbonization of districts and cities.

3.1.1.1 Stakeholder input

The city of Karlovac has initiated the process of their spatial plan change and the local District heating company requested the city to implement heat zoning. In discussion with the city officials, a decision was made to expand the process to include all measures foreseen in the city SECAP into its spatial plan. During the development of the guidelines and methodology for the integration of the SECAP measures into spatial planning as well as the implementation of these guidelines, workshops with key stakeholders as well as public debate have been organized and most inputs were in favour of the decarbonization path, as the City of Karlovac has a bright green and sustainable vision.

Regarding the sub-actions, throughout the discussion with Croatia's district heating sector representatives, the issue of primary energy factors was identified, as well as the fact that they need support in the process of their revalorization. The main input was that current factors are more in favour of individual natural gas usage for heating than district heating. The issue was also communicated with technical faculties, but also with the relevant ministries. It was a mutual understanding that efforts need to be made to initiate the change and implement it.

3.1.1.2 Interregional learning

We have used the Marche region approach in the development of SECAPs and the ITACA protocol, which gave us the idea to develop the guidelines for implementation of SECAP measures into the spatial planning procedures and documents and through it a possibility to go a step further where possible and to influence the local spatial plans to fully ban the usage of the fossil fuels for heating purposes.

Regarding sub-section, the district heating and cooling operation in the Växjö commune in Sweden was the main influencing project/operation within the LC Districts project. District heating is there properly valorised and is a dominant heating solution that is completely based on renewable energy sources (biomass). Small biomass boiler units in the districts in Navarra, in combination with the efforts on the side of the building also gave input for this action.

3.1.2 Nature of the action

The proposed action involves the integration of SECAP measures of the City of Karlovac into its spatial and zoning plans on diverse levels of application. This will enable stronger district heating deployment and the limitation of the usage of fossil fuel for heating purposes. Effects on the decarbonization will be multiple, but this one is the strongest. Currently, the guidelines have been integrated into a sub-local spatial plan for a new development zone in the City of Karlovac making it Croatia's first green spatial plan to date.

On the other hand, sub-action aims at positive policy changes regarding the use of primary energy factors for building design.

3.1.2.1 Policy improvement

The proposed action will enable the city to explicitly mandate the implementation of its energy and climate policy through an executive document. Local spatial plans will be upgraded to encompass guidelines that put the DH system in at least equal position with natural gas as well as enable the city to set more strict rules on the efficiency and the use of green infrastructure and renewable energy, thus enabling the decarbonization process.

On the other hand, sub-action focuses on using a current norm as the baseline methodology for the calculation of primary energy factors and CO₂ emissions factors used for energy demand calculations in the design of buildings. The current factors favour individual systems, especially natural gas while penalizing district energy systems.

3.1.2.2 Activities

Overall, the process can be separated into four key steps:

1. Assessment of the spatial energy demands and potential suppliers as well as the overall framework of key documents and spatial plans in the city.
2. Development of the methodology and measures for the integration of energy and climate into spatial planning (guidelines are documents for identification of measures for the integration).
3. Implementation of the developed methodology and measures.
4. Monitoring of the results and impacts.

The process assumes continuous communication with the City of Karlovac and the local stakeholders throughout the entire process.

Sub-action activities include:

- Analysis of current primary energy factors impact on buildings design
- Calculation and definition of new factors that will enable DH as a solution to be competitive for heating in buildings
- meetings with the key stakeholders and active advocacy directly with the relevant decision-makers and at events and conferences.

3.1.3 Stakeholders involved

- City of Karlovac (owner of the process)
- City departments and city enterprises
- REGEA
- Karlovac district heating company
- Interested public

On the other hand, sub action activities involve REGEA, the Croatian Chamber of Economy, the University of Zagreb, and representatives of Croatia's district heating sector, as well as relevant ministry.

3.1.4 Timeframe

The process has been initiated in June 2020 and is ongoing. The methodology and measures have already been developed and the next step is to integrate them into a sub-local spatial plan of a new development zone. The implementation into the overall city spatial plan is expected early in 2022. REGEA is continuously supporting this process. Sub-action has kicked off in June 2021 and is ongoing.

3.1.5 Costs

The approximate cost of the action is 15.500 EUR for the development of the guidelines (staff costs) with an additional amount equalling to approximately 4 effective person-months of effort for the integration of the measures highlighted in the guidelines in the Cities Spatial plan together with the development of the Spatial plan itself.

3.1.6 Funding sources

The City of Karlovac has funded the development of the proposed guidelines for the integration of energy and climate into spatial planning while the LC Districts project budget has been utilized for the monitoring process of the implementation of the process.

3.1.7 Success indicators for the action

The methodology and measures have been finalized and approved by the City of Karlovac. SECAP measures integrated into at least one sub-local spatial plan for a new development zone. Explicit ban of the utilization of natural gas for local generation of space heating and no options for the expansion of the natural gas grid into this zone. The only acceptable sources of heating are the cities district heating system and onsite heat production from renewable sources. Additionally, stricter energy efficiency requirements, as well as stricter mandates on the utilization of green infrastructure and climate change adaptation measures, are to be implemented.

When it comes to sub-actions, changed methodology for the calculation of primary energy factors and CO₂ emissions factors used for energy demand calculations in the design of buildings can be seen as success indicators. The recalculated factors are now undergoing a debate process before they will be accepted.

3.2 Actions Summary

| Action title | Stakeholders involved | Timeframe | Costs & Funding sources | Success indicators for the action |
|---|--|------------------------|--|---|
| Integrated energy, climate, and spatial planning | <p>The city of Karlovac</p> <p>REGEA</p> <p>Croatia's district heating sector representatives (association of district heating operators; under Croatian Chamber of Economy)</p> <p>The University of Zagreb, Faculty of Mechanical Engineering and Naval Architecture</p> | June 2020 – early 2022 | <p>15.500 €</p> <p>Sources</p> <p>The city of Karlovac</p> <p>LC Districts</p> | <p>SECAP measures integrated into at least one sub-local spatial plan for a new development zone</p> <p>Explicit ban of the utilization of natural gas for local generation of space heating and expansion of the natural gas grid</p> <p>Only acceptable source of heating to be district heating and on-site heat production from RES</p> <p>Implementation of stricter energy efficiency requirements and measures for utilization of green infrastructure/climate change adaptation</p> <p>Pre-measure activities:</p> <p>Modified/improved methodology for the calculation of primary energy factors and CO₂ emissions factors used for energy demand calculations in the design of buildings</p> <p>Acceptance of recalculated factors</p> |

4 Part IV – Regional Action Plan Endorsements

This action plan will be implemented and monitored by the Managing director of North-West Croatia Regional Energy Agency, Mr Julije Domac, PhD.

Date: January 27, 2022

Place: Zagreb





Julije Domac, PhD

Managing Director