



Regional Action Plan for Energy Storage and Sector Coupling Croatia

Version Final

A stream of cooperation



The CSSC Lab project summary

The CSSC LAB project is being funded within the third call of the INTERREG DANUBE TRANSNATIONAL Programme of the European Commission, under the specific objective SO 3.2: Improve energy security and energy efficiency. It aims to contribute to the energy security and energy efficiency of the region by supporting the development of joint regional storage and distribution solutions and strategies for increasing energy efficiency and renewable energy usage.

The CSSC project targets medium-sized and smaller target cities in the Danube area, aiming to accelerate the up-take of energy storage and sector coupling solutions. To build up the capacities of municipalities and related city actors to assess, define and implement concrete implementation projects, the CSSC Lab project will:

- develop a set of model solution for typical urban CSSC use cases, together with a toolkit for the assessment of potential CSSC applications in terms of energy efficiency indicators, operational requirements, related business models and financing solutions.
- a comprehensive capacity building programme for municipalities with local basic and advanced trainings, complementary webinars and individual city coaching sessions will be developed and piloted.
- pilot investments will be established in four demo-centers in different locations in the project region to demonstrate the feasibility and performance of typical CSSC solutions.
- a series of study visits and demo sessions will allow city representatives from all parts of the project region to learn from practical demo-cases implemented under Danube region framework conditions.

About this document

This document is part of OT.1 within T1.1 of the CSSC Lab project and will contribute to SO3. This document was prepared by REGEA and Zagreb County in cooperation with regional partners and Alba Local Energy Agency - ALEA – work package lead partner.

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General Information

Country:	Croatia
Region:	The Zagreb County
Responsible partner(s):	REGEA (PP1) and Zagreb County (PP2)

Aim of the RAP

The regional action plan (RAP) for the Zagreb County area summarizes the comprehensive approach taken during the CSSC Lab project resulting with actions in focus for upcoming period 2021-2027 to mitigate the current volatile situation on the market and deal with potential energy security risks due to ongoing global geopolitical situation. Based on detailed overview of current and future legislative framework, financial opportunities and needs, as well as technological aspects in analyzed region, the project partners included interested/relevant stakeholders to define main parts in development of CSSC sector in the Zagreb County, outlined through nine different measures/actions. The goals of this document are:

1. To outline the most relevant legal framework which (promote/hinder) influence on CSSC application
2. To outline available sources of financing within the Zagreb County
3. To present achieved collaboration of stakeholders on regional level
4. To outline performed SWOT analysis
5. To describe eight planned measures/actions

These measures should result with a fair ground for proper CSSC technology implementation which should increase the rate of decarbonisation of the electricity/heating sector, but also to influence positively on the energy security which is compromised by ongoing global geopolitical situation and by the volatility of the natural gas market. This should reflect on the technoeconomic parameters of implemented technology achieving energy and financial savings in the long-term.

Both sector coupling and energy storage are equally important for future work, based on current situation and available infrastructure where district heating systems are be in focus in target cities, while other “sector coupling” options will be favorized elsewhere. On the other hand, implementation of CSSC technologies is important factor in future decarbonisation of building stock (in the Zagreb County) where a combination of different technologies based on their viability and a specific regional context the Zagreb County)

can lower carbon footprint, enhance the integration of renewable energy sources and lower financial costs for energy bills.

In the period of the development of this document several crucial documents for the future development of the CSSC sector were published – therefore, adjustments to these documents were made accordingly in all chapters

Energy spatial planning

In high level decision-making, a continuous work to prepare adequate energy related spatial planning changers will be goal of the first measure where included stakeholders will work on promoting RES and energy storage in all types of strategic documentation (SECAPs, urban spatial plans...). Furthermore,

Digitalization of energy action plans

To prepare a detailed set-up for digitalization of building stock in the Zagreb County where not only energy-related aspects will be gathered, but a complete database of all relevant information for each building such as all project documentation, cadastral documents, ownership, and legal usage. Apart from those, it will apply created criteria determination for various purposes. This part will serve as a basis to develop the next measure.

CSSC application in smart villages/city concept

Based on detailed set of data in previous measure, to enable GIS-based decision-making for large-scale utilization of RES and energy storage based on presented (in layers) infrastructure, potential, needs and restrictions.

CSSC application in agriculture

Prepare and implement a project focusing on agriculture which includes application of CSSC technologies, boosted by sensor devices and the main control system, based on which a methodology for potential replication will be outlined. Apart from CSSC application, this measure will also give insights into basic management of crops and production.

Interventions in district heating systems

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 legislation authorities and structural funding managing authorities in Croatia. Therefore, large-scale integration of solar thermal collectors' systems is planned, as well as advancement in quality of heat distribution.

Capacity building on CSSC technologies

Continuous work on increasing the capacity of stakeholders, as well as on awareness-raising for CSSC sector.

Set-up of energy communities

To introduce a steady ground for development of various types of energy communities, based on interested stakeholders and existing/future needs. Two different (parallel) paths included – energy communities including citizens and “closed” energy communities achieved through “virtual power plants”.

Set up a one-stop shop for the Zagreb County (excluding citizens)

To introduce a structured point of contact for local/regional authorities for a continuous support in development of CSSC related investments including a structured working group among all interested (public) for a coordinated acting towards higher level of governance.

Replication (and upgrade) of demo center concepts

To adjust demo site results for the purpose of achieving approval on development of demo center in the Zagreb County with the focus on other aspects of CSSC (excluding district heating sector) which were implemented in other partner regions of the project.

CHAPTER 1: European, national, and regional context

Within the CSSC Lab project, project partners collaborated on gathering relevant information on sector coupling and energy storage sector in three different aspects (legal framework, available financing options and technological aspects/CSSC potential). In summary, the technological basis is basically the same in the Danube region, or the EU, and differs only in local conditions/infrastructure and applicability (potential). However, there are major differences in the legislative and financial aspects based on implemented framework and level of market development.

EU directives and framework

The growing demand for energy, the continuous rise of prices, the problems related to energy supply and security as well as the level of the impact of the energy sector on the environment is a constant concern for the EU continuously strengthening its energy policies, in terms of increasing energy efficiency and the use of renewable energy sources, while continuing efforts to mitigate climate change. List of (some) relevant strategies, legal acts and other framework related to CSSC

- [EU's Climate and Energy policy for 2030](#)
- [The Paris Agreement](#) Also available [here](#)

- [EU Green Deal](#) (Document 1 – [LINK](#) / document 2 – [LINK](#))
- [REpowerEU](#) (Document 1 – [LINK](#) / document 2 – [LINK](#))
- [A hydrogen strategy for a climate-neutral Europe](#)
- [Proposal regarding the promotion of energy from renewable sources, and repealing Council Directive \(EU\) 2015/652](#)
- [Sector coupling: how can it be enhanced in the EU to foster grid stability and decarbonise?](#)
- [European industrial strategy](#)
- [Energy storage and sector coupling: Towards an integrated, decarbonised energy system](#)
- [Powering a climate-neutral economy: An EU Strategy for Energy System Integration](#)
- [Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on the deployment of alternative fuels infrastructure, and repealing Directive 2014/94/EU of the European Parliament and of the Council](#)
- [Proposal for a DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on common rules for the internal markets in renewable and natural gases and in hydrogen](#)
- [Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on the internal markets for renewable and natural gases and for hydrogen \(recast\)](#)
- [Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL concerning batteries and waste batteries, repealing Directive 2006/66/EC and amending Regulation \(EU\) No 2019/102](#)
- [“A Europe fit for the digital age”](#)
- [EU action plan on digitalizing the energy system](#)
- [The Smart Rural 21 Project](#)
- [Smart cities legal framework](#) (Also available [here](#))

National level

At the national level, the Republic of Croatia is complying legal framework to EU Directive’s obligations through several Acts to achieve long-term goals outlined in strategic documents, but also to take advantage of available EU funds to deal with uncertainties in energy market, but also to revitalize parts of countries which were influenced by two large-scale earthquakes and provide a general economic boost after COVID-19 pandemic. More recently, the national government intervened with a set of measures to mitigate disturbances in the Croatian energy market. List of (some) relevant strategies, legal acts and other framework related to CSSC

- [Integrated National Energy and Climate Plan for the Republic of Croatia](#)
- [National Development Strategy until 2030](#)
- [Operational Programme Competitiveness and Cohesion - ESIF in 2021-2027](#)
- [National Plan for Recovery and Resilience](#)
- [Electricity Market Law](#) (and related [bylaws](#))
- [Heat Market Law](#) (and related [bylaws](#))
- [Promotion of RES and highly efficient cogeneration plants](#) (More info available [here](#))
- [Energy efficiency Law](#)
- [Law on development of infrastructure for alternative fuels](#) (and [National Policy Framework on alternative fuels in Croatia](#))
- [Rural development programmers and related smart village concept development](#) (under EISF)
- [National action plan for energy efficiency](#) (2022 – 2024)
- [Croatian Hydrogen Strategy until 2050](#)
- [Governmental measures to protect households and economy from inflation](#) (including abolishment of VAT on PV systems)
- [Governmental measures to mitigate disturbances in energy market](#)

Regional level (Zagreb County)

The Zagreb County, as a county surrounding the city of Zagreb is a fast development region which is planning large investments in creating prerequisites for complete decarbonization of the public and private sector in the county boosting renewable energy sources, developing transport and communal infrastructure with a special attention to protection nature and environment that represent the exceptional value of the county. Through various strategic short- and long-term development plans and masterplans, the Zagreb County is aiming to take advantage of its geographic location and RES potential and develop an attractive location for both residential and business/industry sector. In analogy, local public authorities are in synergy with legal framework in the Zagreb County level, developing their local development plans and different action plans. List of (some) relevant strategies and other framework related to CSSC

- [Development plan of the Zagreb County 2021-2027](#)
- [Urban Agglomeration Zagreb](#)
- [Masterplan of transport sector of the city of Zagreb, the Zagreb County and the Krapina-Zagorje County](#)

- [Development plan of Velika Gorica](#)
- [Sustainable energy and climate action plan – Velika Gorica](#)
- [Strategic plan for development of the city of Samobor 2020-2025](#)
- [Smart city Zaprešić 2021-2026](#)

Available financing opportunities for CSSC applications implementation

The Republic of Croatia has dedicated large financial funds (with support of ESIF/EBRD) to utilize integration of RE technologies and increase the energy security within the country. These are mostly structure in different calls for subsidy/grants by Environmental Protection and Energy Efficiency Funds. Furthermore, the Republic of Croatia has secured additional funds through the National Plan for Recovery and Resilience to trigger a proper recovery from COVID-19 related effects. On the other hand, numerous EU-based funds (outside of regular programmes) are available for the implementation of necessary infrastructure projects, as well as projects which focus on innovation in the energy sector. Lastly, several important measures were introduced that influence (financially) sector of CSSC to tackle ongoing geopolitical situation and preserve stability of energy market. List of some of available financing for project documentation and/or investment

- Traditional financing, either own financial funds or loans
- ESCO financing of RE projects
- Recently, public-private partnership has been explored and developed to sufficient level for certain CSSC technologies
- Available funds (subsidy/schemes) by FZOEU/EPEEF (example – [LINK](#))
- National Recovery and Resilience Plan (example – [LINK](#))
- [Modernization Fund](#)
- [Innovation Fund](#)
- [PVMax](#) – development of tender documentation for integrated PV systems
- Various EU-financed projects under LIFE, Horizon 2021-2027, Interreg

Technological aspects of the energy domain linked to CSSC potential in observed region:

- Most of electrical energy is coming from the city of Zagreb and its large cogeneration plants
- Biomass in rural areas (including one DH system on biomass in Pokupsko municipality)
- Medium hydro potential available given the fact that these rivers already possess hydropower plants

- High quality electric grid with strong stability (operated only by national DSO/DTO company)
- Large potential (and interest) for PV systems
- Medium development of infrastructure for EV chargers and EV market
- Available district heating infrastructure in three target cities (operated by national DH company)
- Properly developed natural gas infrastructure
- Large wave of renovation of water infrastructure
- Properly developed internet infrastructure and transition to 5G

CHAPTER 2: Engagement of decision makers

Engagement of stakeholders

Throughout the project, numerous meetings took place in different forms to set up and successfully conduct the regional action planning. Based on developed analysis at the regional level and feedback from targeted stakeholders, the main goals of interaction have been set as follows:

- Identify main priorities in short and long-term decision-making on local/regional level
- Set up a methodology for replication and financing of solutions must be set up
- Include a wider scope of preparation to connect the synergies of the developments in buildings and district heating sector
- CSSC sector should be inspected together by more stakeholders (aspects)
- Focus should be put on applying digital solutions in the energy sector

Based on interaction with the stakeholders through an organized workshop for Zagreb County region and/or trilateral meeting, intense discussions were brought to the stage with the aim of identifying key learning and forming next steps in collaboration. The kick-off of numerous meetings was organized as a joint workshop of all interested stakeholders in the Zagreb County region at the end of December 2021 where around 40 participants gained insights to the project, developed analysis at the regional level and asked to be included in future discussions. During the organized workshop, attended mostly by local/regional authorities, the participants were introduced to the CSSC Lab and the CSSC-related technological and

financial aspects. The information was centered around built-up know-how in the CSSC sector by project partners based on demonstration centers, but also around current/future legal framework.

Additionally, REGEA and Zagreb County used the “organized platform/interaction channel” to promote good practice examples and related projects in Zagreb County and/or nearby Counties. The organized workshop was an effective way of setting up open discussion(s) among the participants where the goal was to put forward ideas for the regional action plan measures. Presentation of known initiatives related to the CSSC field and other “open” inputs was allowed.

The workshop brainstormed the ideas that were taken up and integrated as measures in this document. As mentioned above, apart from the workshop, project partners in Croatia carried out contact with all interested stakeholders through bilateral/trilateral meetings (either virtual or face-to-face) for purposes of gaining new insights, especially in terms of measures development.

List of stakeholders

Included stakeholders are mostly coming from local/regional authorities, either representatives of municipalities/cities or related public companies. Furthermore, as an associated strategic partner of this project, national district heating company HEP Toplinarstvo Ltd (as an extension of national energy company HEP Group Ltd) collaborated individually with REGEA.

This group of stakeholders reflects the overall ecosystem needed to address the issues on legislation, and policy, and set up (roughly) measures that were then developed by facilitators of these interactions (REGEA).

List of included stakeholders is listed below:

- District heating provider (companies), namely HEP Toplinarstvo who oversee district heating systems in cities within Zagreb County (target cities Zaprešić, Samobor and Velika Gorica)

- Representatives of local governance/authority including
 - Target cities (Zaprešić, Samobor, Velika Gorica)
 - Other cities in the County (Sveta Nedjelja, Vrbovec, Ivanić-Grad, Dugo Selo)
 - Municipalities in Zagreb County (Brdovec, Pokupsko)

- Industry sector (as providers of solutions for DH decarbonization) such as Vaillant, Danfoss, Viessmann, TVP Solar, E.ON
- Design bureaus and other consultancy companies/institutes such as Element Energetika, Energy Institute Hrvoje Požar
- Digital solutions providers such as GDI, Thorium Software, Studio Zona and WpDevStar

This group of stakeholders reflects the overall ecosystem needed to address the issues on legislation, and policy, and set up (roughly) measures that were then developed by facilitators of these interactions (REGEA).

Conclusion of coordinated work among stakeholders

Main conclusions of working sessions such as workshop, bilateral meetings, telcos, and other ways of communication can be perceived as the results of intense discussions about implementation of CSSC technologies:

- Proper implementation needs to start with proper spatial (urban) planning processes.
- Legislation at all levels needs to be aligned to enable implementation and follow outlined EU Directives focusing on energy communities, digitalization, virtual power plants and faster administrative procedures
- Furthermore, district heating needs to be properly addressed as a viable solution for building sector decarbonization
 - District heating systems, if will be favored as option for decarbonization (and if available), should aim for large-scale integration of renewable energy sources (namely solar thermal collectors in combination with thermal storage) which results with complete decarbonisation and lower financial key performance indicators on side of district heating system
- On regional (and local level), strategic legislative documentation such as energy efficiency action plans (and yearly energy efficiency plans) can be used as a great start for a slow push towards gradual implementation of both digital database and CSSC technologies in general
- Technical assistance is needed for project development in terms of proper planning of district heating distribution network and its production units

- Establishment of a main (central) database of buildings is essential for future building management and implementation of CSSC technologies in a coordinated way (in public buildings)
- 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 under way to have activities related to the network modernization eligible in the new OP) - Ex ante conditions need to be worked out properly as a basis/input for the programming structural funding process
- Fostering implementation pilot projects with the aim of setting up a replication pipeline
- Timely communication between stakeholders (main groups) is essential and facilitation is needed.

CHAPTER 3: SWOT analysis of the regional context

PARTICIPATORY SWOT ANALYSIS OF THE REGIONAL CONTEXT IN BRINGING CSSC APPLICATIONS INTO REAL CASES	
INTERNAL FACTORS	
Strengths	Weaknesses
<ul style="list-style-type: none"> • Stable energy security (electric) • High potential for RES/energy storage projects • High interest in development of projects in both public and private sector • Know-how in project development • Clear plans for decarbonisation and modification of spatial plans • Development strategies which include improvement within the energy sector of the UAZ (individual plans for each city/municipality) include energy storage and increase of sector coupling solutions (i.e., PV, electromobility infrastructure) 	<ul style="list-style-type: none"> • Favouring natural gas due to considerable number of cogeneration plants • Lack of knowledge and capacity for proper development of RES/energy storage projects • Bureaucratic problems related to business operations of energy companies which hinders inclusion of both local (national) and international companies • Lack of cooperation between research and SMEs • Due to geographical position (close to the main city), decisions in energy sector are influenced by trends/problems in the city of Zagreb, especially since the same energy company is in charge for both electricity and heating sector • Most of the heating (both district heating and individual) are driven by fossil fuels (natural gas)
EXTERNAL FACTORS	
Opportunities	Threats
<ul style="list-style-type: none"> • On-going projects for technical, financial, and legal support in the development of RES projects • Various available fundings on the national level (OPCC, ITI) • Different EU projects for funding investments in CSSC 	<ul style="list-style-type: none"> • Unfavourable energy policy (until the end of 2024) because of government decisions which promote natural gas heating • Unsteady geopolitical situation focusing on the gas market • Extremely hard gas lobby • Complex legal framework for energy communities and lack of compliance with EU Directives which results in slow changes towards a favourable

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| <ul style="list-style-type: none">• Most of the heating (both district heating and individual) are driven by fossil fuels (natural gas) → current legislation is forcing all buildings to decarbonize in process of energy renovation | <ul style="list-style-type: none">• position for scaling up the number of communities• Lack of established financial support for strategic CSSC support at the national level (legislation, good practices database) |
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Introductory activities within WP T1 gave an initial overview of the buildings stock (focusing on public buildings) and district heating sector in Zagreb County (and target cities), with emphasis on the analysis of the legislation and other policy documents, as well as current state in terms of energy efficiency, usage of renewable energy sources and potential financing. The regional analysis further pointed out the main strengths, weaknesses, opportunities, and threats (SWOT) as a summary of the main points for the development of coordinated action(s).

CHAPTER 4: ACTIONS

All proposed/include measures that have been discussed and adjusted in communication between REGEA, the Zagreb County to set up a rough path for decarbonisation of main identified areas of involvement which are relevant for public local/regional authorities in the Zagreb County.

Action #1 Integrated climate energy spatial planning

Brief description	<p>Integrated planning refers to connecting energy and climate related impact in process of spatial planning to implement energy and climate visions set in any strategic document (such as Sustainable Climate and Energy Action Plans, SECAPs). Based on level of ambitions set in i.e., SECAP, 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.</p> <p>This will enable stronger district heating deployment (based on either high cogeneration or solar thermal energy) and limitation of the usage of fossil fuel for heating purposes where a clear path for CSSC technologies should be set up. Effects on the decarbonization will be multiple, but this one is the strongest one.</p> <p>As a know-how, REGEA prepared the guidelines and achieved similar activity (integration 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.</p> <p>In terms of concrete impact, same methodology would be used to foster implementation of small/large scale PV projects, heat pumps (or mandatory connection to district heating), various type of energy storages and electric chargers in different waves of standardization.</p>
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	<p>This measure presents an end-goal based on a detailed pre-activities/implementation step which should be included/achieved to set up an environment for proper achievement of measures set up in SECAPs. Measures is focused on local authorities where the regional support should come in creating a comprehensive guide for integrated climate energy spatial planning.</p>
<p>Activities/ Implementation steps</p>	<p>Overall, the process can be separated into several steps:</p> <ol style="list-style-type: none"> 1. Setting up initial activities and creating a working group (including local/regional) authority 2. Assessment of current spatial plans of municipality/city/region and linking them with energy demand and needs/RES potential/energy infrastructure as well as with the overall framework of key documents 3. Development and/or adjustment of strategic documents (SECAPs) to properly include energy and climate goals regarding spatial planning with a reflection of all necessary steps to be carried out 4. Analysis and outlook of methodology for integration of energy and climate related impacts/standards 5. Development of the methodology for district heating systems to comply with RES policy (included in a separate action) 6. Implementation of RES technologies in DH and electricity sector (included in a separate action) 7. Modification of spatial plans according to brought methodology 8. Monitoring of the results and impacts
<p>Timeframe</p>	<p>This joint coordinated action should be started in 2024 where a working group should be organized under jurisdiction of the Zagreb County. This will be based on the level of ambition of both local and regional authority, financial funds, and available staff to carry out necessary analysis. The working group will continuously work through 2024-2027 to prepare an</p>

	environment for proper integrated spatial planning meaning guidelines and concrete implementation actions.
Milestones	<p>For this to happen, a work group must be set up to establish a clear structure in decision making process. The proposed action will enable included public authorities to explicitly mandate the implementation of its energy and climate policy through an executive document, reflecting on local spatial plans.</p> <ul style="list-style-type: none"> • Working group kickoff meeting & set-up of structure/methodology • First produced recommendations for SECAPs (or SECAP document) within the working group • First guidelines for modification of spatial plans • First implemented spatial plan changes to promote CSSC
Estimated costs	The approximate cost of the action is 20.000 EUR for the development of one replication of the methodology including development of SECAP documents and related recommendations/guidelines for spatial plan changes. Costs mainly refers to creation of documentation (staff costs) with an additional amount equaling to approximately 4 effective person months of effort for the integration of the measures highlighted in the guidelines in the municipality/city Spatial plan together with the development of the Spatial plan itself (based on complexity of the case).
Financing sources	Each municipality/city will plan its own financing funds to participate in the process of integral spatial planning where Zagreb County can act as a governing body, supporting in certain ways the set up and implementation of actions.
Estimated impact/results	The proposed action, in its full extent, will enable the local/regional authority to join the coordinated initiative to adequately set up strategic documents for proper changes of spatial plan where an explicit impact on the implementation of energy and climate policy

	<p>through an executive document will be done. This methodology will trigger stricter rules/standards for energy efficiency and use/expansion of energy infrastructure with the aim of decarbonization.</p> <ul style="list-style-type: none"> • Number of stakeholders in working group • Number of SECAP measures/documents created • Number of guidelines for spatial planning proposed • Number of initial measures implemented in spatial plans
Actors involved	<ul style="list-style-type: none"> • The Zagreb County • Target cities (Samobor, Zaprešić, Velika Gorica) for DH systems • Local authorities (municipalities/cities) within the Zagreb County • REGEA • District heating company • Croatian DSO – if necessary • Academia – if necessary

Action #2 Energy Efficiency Action Plans for Zagreb County

Brief description	<p>Due to current legislation, the Zagreb County as NUTS-3 region must comply with submission/publishing of its energy efficiency action plan (for three years timespan) as well as yearly energy efficiency action plans which (in short) detailed overview concerning energy monitoring of the building stock, energy refurbishment parameters and identified implementation steps are given. In other words, these plans are used to define plans for facility management of public buildings to comply with national regulation regarding energy efficiency and decarbonization, as well as to regulate a proper standard in monitoring of (all) energy consumption.</p> <p>Based on the defined structure of these documents, this action includes creation of concrete database which reflect on necessary parts of reporting, but also</p>
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	<p>on dealing with the setting up a central point of information for building stock which would be suitable for various criteria determination and would serve as an assisting tool in evaluation of current status, explore the potential for CSSC and application for subsidies/grants. On top of the database, this action includes a proposal mandatory strategic plans to include parameters for assessing technoeconomic parameters of CSSC technologies and comply with SECAP measures and spatial plans changes (Action 1).</p> <p>Apart from providing a clearer insight into technical potential for CSSC technologies, it will set a ground for unlocking necessary financial funds to adjust monitoring and predict total amount of investment needed for uptake of CSSC.</p> <p>Once the first case is implemented, a general update of guidelines will take place to consider lessons learnt in the process.</p>
<p>Activities/ Implementation steps</p>	<p>Overall, the process can be separated into several steps:</p> <ol style="list-style-type: none"> 1. Setting up initial activities and creating a working group 2. Assessment of current plans and identification of potential for changes 3. Development of a central database of the building stock 4. Methodology for coordinated action for implementation added parts in mandatory plans (based on central database) 5. Creation of updated template for new energy efficiency action plans (and yearly plans) 6. Testing and implementation of new structure of mandatory plans 7. Update of guidelines 8. Control and monitoring of new plans and their impacts
<p>Timeframe</p>	<p>The Zagreb County (and all other local/regional authorities) submit action plans every three years, as</p>

	<p>well as complementary plans for each year. Therefore, the timeframe for implementation of this measure is to produce a final proposal and testing phase for plan 2026-2026 where previous plans and plan for 2023-2025 will be used as starting point for development.</p>
Milestones	<p>Milestones can be divided as follows:</p> <ul style="list-style-type: none"> • Working group kickoff meeting & set-up of structure/methodology • First produced recommendations for SECAPs (or SECAP document) within the working group • First guidelines for modification of spatial plans • First implemented spatial plan changes to promote CSSC • 1st update of guidelines
Estimated costs	<p>The approximate cost of the action plan (three-year plan) is 10.000 EUR and for the yearly plan requires additional 2.000 EUR which are used for staff costs with an additional amount equaling to approximately 1-2 effective person months of effort for the proper compliance with current legislative framework. On top of creation of these plans for local/regional authorities, actual implementation of measure including proposing and accepting upgrade points for the plans would require around 15.000 EUR for setting up the working group, creating database, recommendations and provide an update of guidelines.</p>
Financing sources	<p>Each local/regional authority is obliged to create these documents using their own financial funds; therefore, this procedure would be followed. Furthermore, costs of proposing changes to plans can be jointly shared by more local/regional authorities or financed by the Zagreb County as the highest governing body in analyzed region which can act as promotor of CSSC into mandatory legal documents.</p>
Estimated impact/results	<ul style="list-style-type: none"> • Number of stakeholders in working group • Number of action plans / yearly plans created • Updated action plan / yearly plan template

	<ul style="list-style-type: none"> • Included overview of RES potential and energy storage
Actors involved	<ul style="list-style-type: none"> • The Zagreb County • Target cities (Samobor, Zaprešić, Velika Gorica) • Municipalities/cities within the Zagreb County • REGEA • Relevant governing bodies (Ministry, EPEEF, HERA)

Action #3 CSSC applications in smart village/city concept

Brief description	<p>Creating the concept of smart villages/cities are slowly (but surely) becoming a particularly important aspect in future development of both urban and rural areas in Croatia. As part of these concepts which are very dependent on current situation regarding “readiness” for turning any location into smart one, CSSC technologies are an important aspect for achieving sustainable urban/rural areas in terms of renewable energy sources, decarbonized urban areas and digitalization.</p> <p>While smart village/concept include high number of measures (focusing not only on energy sector) this measure aims to achieve a comprehensive energy monitoring in various processes on local/regional level where know-how in setting up an online platform and live data monitoring will be applied. In that way, an update of developed central database (Action 2) can be upgrade with this “plug-in” developed digital solution for receiving a concrete monitoring of required technical parameters. The action will be developed in phases as it integrated any installed RES technology in certain area (if possible), with a high focus on public buildings (and infrastructure). In any case, it will include preparing use cases for software developers reflecting on necessary JSON, API connections and suggestion in handling energy-related database. Prepared digital solution will be tightly connected to available GIS platform and related layers of database which should</p>
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	<p>be compatible and interlinked to provide additional features.</p> <p>On the other hand, the measure will focus on boosting capacity of local/regional authorities and raising awareness through intensive collaboration on promotion of results. As a results of this, a clear methodology for expansion of central database and recommendations for public authorities for uptake will be outlined, as well as a testing version of an online platform for monitoring data (at least for public usage).</p>
<p>Activities/ Implementation steps</p>	<p>Overall, the process can be separated into steps:</p> <ol style="list-style-type: none"> 1. Assessment of current smart readiness index for the Zagreb County (and target cities) 2. Assessment of potential RES projects that can be jointly presented/monitored in one place 3. Development of necessary guidelines for JSON, API connections and energy-related databases, as well as rough draft of virtual live platform 4. Integration of x “pilot location” on the virtual live platform 5. Monitoring of the results and impacts 6. Raising awareness events about live data monitoring 7. Masterplan for replication
<p>Timeframe</p>	<p>This measure should ideally be integrated after implementation of central database focusing on 1) creation of online platform with the purpose of live data monitoring and 2) integration of different RES and storage technologies (sensor data) on the platform. Building up a basic WordPress interface (as for CSSC Lab online platform) can take up to 6 months, while integration of live data depends on its complexity (up to 6 months). The timeframe of the measure (duration) is 12 months starting in 2023, after which continuous integration of (more) pilot projects’ locations will be repeated.</p>
<p>Milestones</p>	<p>Milestones can be divided as follows:</p>

	<ul style="list-style-type: none"> • Final assessment of smart readiness indicator and identification of potential “pilot projects” for integration • Guidelines for proper integration of live data in digital solutions • First produced integration on the platform • Annual event on live data monitoring in (public) buildings and other energy-related infrastructure • First draft of masterplan for replication
Estimated costs	<p>The approximate cost of the whole action is around 37 500 EUR, divided as follows:</p> <ul style="list-style-type: none"> • Desk research and assessment of current situation/RES potential – 14 000 EUR • Development of guidelines for selection and installation of equipment, JSON, API connections and energy-related database 7 500 EUR • Creation of platform including initial rough draft 7 000 € • Integration of live data from 1 pilot project’s location on the platform 3 000 EUR • Organisation of raising awareness events 1 000 EUR • Creation of masterplan for replication 5 000 EUR <p>The measure does not include investment in actual equipment on pilot projects’ locations.</p>
Financing sources	<p>Financing should come from internal budgets of each participating target stakeholder (local/regional authority) or through a joint coordinated action by all included stakeholders as in the working group (Action 1). However, there is a possibility to receive subsidy for creation of smart city strategies and related investments in smart/digital infrastructure for local/regional authorities through the Environmental Protection and Energy Efficiency Fund.</p>
Estimated impact/results	<ul style="list-style-type: none"> • Created platform with at least 10 successfully integrated pilot projects (live data) with full functionality including detailed guidelines for programming part • Number of organized raising awareness events

	<ul style="list-style-type: none"> • Developed masterplan for replication and triggering at least 10 more pilot projects in total • Guidelines for improvement/update of GIS-related solution in terms of energy management <p>This can be achieved either for one stakeholder (i.e., the Zagreb County) or jointly by larger number of stakeholders where each one would have i.e., one pilot location.</p>
Actors involved	<ul style="list-style-type: none"> • The Zagreb County • Local public authorities within the Zagreb County • Providers of equipment for digitalization (sensor equipment, communication equipment) • Digital solution provider (programming company) • REGEA

Action #4 CSSC application in (smart) agriculture

Brief description	<p>The goal of the Agreement is the implementation of the Pilot Project: Smart Agriculture of the Zagreb County" - the establishment for triggering the launch of a smart agriculture system in the area of the Zagreb County, which will contribute to the achievement of county, national and EU goals through the use of digital and communication technologies, along with the application of renewable energy sources and efficient resource management, thereby strengthening the county agriculture sector, the quality of food supply and reducing the negative effects on the climate and the environment.</p> <p>The general goal will be achieved through the realization of specific goals:</p> <ol style="list-style-type: none"> 1. Develop and test smart solutions based on IoT technology on two agricultural farms 2. Analyse and test the possibilities of applying renewable energy sources and efficient management of resources on two agricultural farms 3. Develop a methodology by which tested solutions can be replicated on other agricultural farms. <p>Included investments</p>
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	<ul style="list-style-type: none"> • A system of sensor equipment for monitoring consumption and other parameters for digitization in agriculture • Software solution for managing, monitoring, and measuring monitored data • Network equipment and establishment of the network part <p>The measure does not include investment in RES technologies.</p>
<p>Activities/ Implementation steps</p>	<p><u>A1. Application of renewable energy sources and energy efficiency measures in agriculture</u></p> <p>As part of this activity, the possibility of applying solar power plants to two agricultural farms will be analysed. For this purpose, the following will be carried out:</p> <ul style="list-style-type: none"> - Analysis of locations for setting up a solar power plant - Drafting of a conceptual design of a solar power plant in accordance with the results of the analysis and the request for electric power consent in accordance with the Rules for connection to the distribution network. <p><u>A2. Implementation of devices for remote data reading</u></p> <p>The activity envisages the placement of end devices (sensors and actuators) on the LoRaWAN network of “OIV Smartino” IoT, which includes the procurement, installation, configuration, and commissioning of end devices for remote data reading and remote process management. As part of the activity, data will be sent to the concentrators. Documentation of the state of the implemented end devices of the entire solution will be created and the necessary maintenance services will be provided during the project</p> <p><u>A3. Creation of a software solution for reading data from all sensors and meters</u></p> <p>As part of the activity, a test time-limited (12 months) system of integrated KONČAR DIGITAL and OIV's technical system based on LoRaWAN IoT platform “OIV</p>

Smartino” IoT and KONČAR DIGITAL application solution MARS will be implemented, which will enable the collection and reception of data from devices of different manufacturers , monitoring, i.e. monitoring and alarming and management (sending data and commands to devices), using a low-power radio network, which enables the use of battery-powered devices. All data is available to the business systems of city companies through various integrations with these systems or, if necessary, to citizens through various open interfaces.

A4. Data management, monitoring, consulting, and measurements

As part of the activity, a weather station will be set up at the users' locations, which will be provided by the activity holder. The activity will also include the analysis of data analysis on reception levels and work in the network environment of the IoT system. Data analysis from weather stations will be done via the MARS application platform. As part of the activity, the signal level will be measured regularly to check the positioning of the sensor/concentrator, as well as to provide consulting services and monitoring of the application.

A5. Establishment and maintenance of the network part

As part of the activity, a wireless network will be established to connect all end devices at the locations and ensure the sending of data from the network platform to the application platform. Documentation of the derived state of the entire system will be created and network service maintenance will be provided. In both locations, partners are expected to set up proper equipment to ensure that all devices have sufficient signal levels to wirelessly connect IoT devices. The established network will enable the installation of new

devices in the future and should be of open LoRaWAN type without restrictions regarding the equipment manufacturer.

A6. Establishment of a producer profile on the online VEEMEE platform

As part of the activity, an analysis of the user's situation will be carried out and key parameters will be determined based on which the documentation for the manufacturer's profile will be created. The activity includes the creation of a comprehensive producer profile (CPP) based on real and up-to-date data related to the IoT solution implemented within the project. The internet platform on which the profile is created is intended for all market actors in direct contact with the marketing of fresh food, and one of the main goals is to ensure food traceability. The online platform is located here: <https://www.veemee.eu/>

By scanning the product's QR code, any consumer equipped with a smartphone can access profiles on our platform that contain all relevant information about the origin of the product, its manufacturer, certifications, capacities, and distributors.

A7. Methodology for applying smart solutions in agriculture

Based on the results of the implementation of activities A1.-A6. a methodology will be created that will enable the replication of the results of the pilot projects on other farms in Zagreb County. The methodology will determine and analyse compliance with national goals and strategic programs and documents and propose an optimal approach to the model of establishing smart agriculture in Zagreb County.

A8. Promotion and visibility

The activity includes regular communication of all project results with the primary goal of raising

	<p>awareness among the public about the benefits of applying smart and sustainable solutions in agriculture. Through the activity, the following will be carried out:</p> <ul style="list-style-type: none"> • Invitations to the media • Internet and social networks <p>All project activities communicated to the public will have elements of visibility of all partners (logo), and before sending the announcement announcements, the consent of all partners will be sought.</p> <p><u>A9. Project management and administration</u></p> <p>The activity of project management and administration foresees ensuring regular communication of all partners as well as timely execution of all activities. The activity will include regular partner meetings as well as field visits to pilot projects.</p> <p><u>A10. Final report</u></p> <p>At the end of the project implementation, a final report will be prepared in which the applied systems and technologies will be analysed, and the collected data will be processed. The final report will also be used as a basis for the finalization of activity A6. for the proposed methodology to be harmonized with the results of the pilot project. As part of the activity, feedback from users will be collected and improvements in future applications will be determined.</p>
Timeframe	<p>In total, this measure requires around 15 months for its proper implementation, including selection of pilot project's locations, installation of equipment and providing a fully developed digital solution for monitoring of defined parameters. It is expected that it will kick off in 2023 where a long-term masterplan for replication should be published during 2024.</p>
Milestones	<p>Included milestones for this action are:</p> <ul style="list-style-type: none"> • Installation of RES technologies • Integration of all sensor data • Setup of online platform

	<ul style="list-style-type: none"> • Establishment of VeeMee profile for beneficiaries • Results / reporting
Estimated costs	Total costs of implementation of measure are around 25 000 EUR including all necessary staff costs, project documentation, equipment, and its installation, as well as development of digital solutions (and related costs).
Financing sources	Financed by the Zagreb County using its own financial funds.
Estimated impact/results	<ul style="list-style-type: none"> • To strengthen two agricultural farms in the use of smart and sustainable solutions and by boosting knowledge of employees for their use. • Implementation of various end devices for collecting live parameters and direct management for the purpose of increasing efficiency and/or ensuring product quality. Realized possibility of adjusting the end devices according to the needs of the user and individual production process. • Implemented MARS application solution for two users (selected agricultural farms) with a unique integrated solution for collecting data from different types of sensors and meters, with a decision support system through visualization and analysis of read data, with monitoring of the system by reviewing the current situation in the field and using a reporting system , with the possibility of exchanging data with other systems, with an alarm system and maintenance review of meters/sensor devices, including documentation • Measurement of data on temperature, air and soil humidity, amount of precipitation, based on which deviations from ideal conditions will be determined and measures to mitigate deviations • Setting up the concentrator so that all devices have sufficient LoRaWAN signal levels. • Created QR codes - producer profiles for agricultural holdings and created a validated label /certificate as proof of origin of certain products that contains

	<p>information on the traceability of food from farm to table through the VeeMee platform</p> <ul style="list-style-type: none"> • Developed a simple and applicable methodology for the replication of tested smart and sustainable solutions in agriculture with sufficient professional and tested basis for the further development of the smart agriculture project in Zagreb County and strengthening knowledge for the preparation and application of projects to external funding sources • Updated websites and social networks of partners about the progress of the project, as well as created and published announcements for the media • Ensured implementation of all project activities within the stipulated period. • Processed and analysed data in addition to information collected by the user. Established advantages and disadvantages of applied technologies and methods.
Actors involved	<ul style="list-style-type: none"> • The Zagreb County • OiV Ltd • REGEA • Končar Digital Ltd • MicroLink Ltd • University of Zagreb, Faculty of Electrical Engineering and Computing • VeeMee Ltd

Action #5 Modernization and decarbonization of district heating systems in the Zagreb County

Brief description	<p>As an important actor in decarbonization of urban areas, district heating systems are proving to be the ideal technology for large-scale transformation of energy production for all heating needs. Due to long tradition and interests, the district heating systems have been active in the Zagreb County in three target cities for decades. Since its commissioning, all individual boiler rooms and small-scale district heating systems (in three cities) are operated by national</p>
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district heating company (HEP Toplinarstvo) – a company in a larger legal entity (HEP Group – national energy company). All systems are currently using natural gas boiler rooms to produce high temperature water (85-90 degrees) which is then distributed through relatively old distribution network to end-users for space heating, domestic hot water or industry purposes (steam). As legal framework is pushing district heating as a viable option in urban areas, these systems have to achieve adequate level of RES and high energy efficiency in heat distribution.

Initial phase is dedicated to desk research to create a clear assessment of current situation and potential for decarbonisation. Collaboration with HEP Toplinarstvo. As a result, clear guidelines for transformation of district heating sector in the Zagreb County will be outlined. Guidelines will be accompanied with a proper business models analysis for integration of RES (solar thermal collectors) following the lessons learnt in CSSC Lab project about the differences in small-scale/large-scale pilots and their compliance with the current technical limitations and legal framework bindings.

Based on identified scenarios for decarbonization, each DH system (and included stakeholders) will work on development of projects and necessary tender documentation (using Design&Build model) for:

- Renovation of heat distribution network
- Expansion of heat distribution network and optimizing boiler rooms to be integrated in a single distribution system
- Integration of solar thermal collectors (either as small-scale or large-scale projects)
- Explore viability for large water tanks (heat storage)

These projects and their implementation present a core of this action without which a proper decarbonization of heating sector in target cities cannot be done as the current situation (energy performance and price competitiveness) is not

	<p>favouring district heating as viable option. As all projects are officially developed by national DH company, it will be seen to which extent clustering of projects will take place where ideally one tender can be developed for all mentioned investments.</p> <p>Following achieved investments, DH company and target cities (including also the Zagreb County) will produce a clear methodology for setting up an administrative procedure for connection of all public buildings (which are in range of DH network) and utilization of integrated RES.</p> <p>Based on level of achieved investments, each refurbished pipeline and integrated source of RE will be accompanied with sensor/control equipment for the purposes of creating a virtual heating plant where both DH company, but also public authorities will be able to see live data parameters and track heat exchange.</p>
<p>Activities/ Implementation steps</p>	<p>Overall, the process can be separated into four key steps:</p> <ol style="list-style-type: none"> 1. Assessment of situation in district heating systems in target cities 2. Setting clear guidelines for renovation of heat distribution network, its expansion and inclusion of RES in production side 3. Development of projects and related tender documentation - renovation of heat distribution network (Design&Build) 4. development of projects and related tender documentation – heat distribution expansion and optimization for a single distribution system (Design&Build) 5. Development of projects and related tender documentation - solar thermal collectors 6. obtaining all necessary permits and documentation for all projects 7. implementation of investments in 2), 3) and 4)

	<p>8. Guidelines for implementation of RES in district heating production and impact on fulfilling legal aspects</p> <p>9. development a clear methodology for connection of public buildings (and their actual connection)</p> <p>10. set up of virtual heating plant for live data monitoring and integration of all sensor data</p> <p>11. Monitoring of the results and impacts (through yearly energy efficiency action plans).</p>
Timeframe	<p>Decarbonization of district heating systems in targeted cities is a slow on-going process which started in 2018 with H2020 KeepWarm process. It is expected that all necessary project documentation (using Design&Build approach) will be created for connection of dislocated boiler rooms and integration of “large-scale” solar thermal collectors’ fields. It is expected that finalization of modernization of all three systems is expected by 2030.</p>
Milestones	<ul style="list-style-type: none"> • Developed business models for integration of RE in DH systems • Created tender documentation for Design&Build model (both for pipeline renovation and expansion, as well as solar thermal systems) for first project • Connection of dislocated boiler rooms into a single system (per target city) • Integration of first solar thermal collectors’ system in one of target cities (per target city) • integration of live data monitoring system including all necessary sensor equipment
Estimated costs	<p>This measure does not include investments in equipment (RES and pipeline, as well as live data monitoring), but costs for technical consultancy and preparation of project documentation. Preparation of documentation includes engineering studies for solar thermal collectors’ system (around 50 000 EUR per system), and additionally around 50 000 EUR for preparation of documentation for pipeline</p>

	<p>refurbishment and connection of boiler rooms in a single system (per city).</p> <p>In case of preparation of virtual heating plant and responsive distribution network, around 30 000 EUR (per systems) should be invested to set up a proper energy management platform of district heating system (excluding equipment – it is purchased as part of CAPEX).</p> <p>On top of that, project administration and management would require at least an additional 6 person-months to comply with available fundings and fulfill all requirements, especially in terms of legal permits.</p> <p>CAPEX in investment (pipeline, solar thermal collectors, sensor equipment, labour, etc) is estimated to around 10.000.000 EUR.</p>
<p>Financing sources</p>	<p>All costs regarding preparation of projects are directly financed by the district heating company, while there is a possibility to co-finance certain parts through various EU-funded projects implemented by REGEA. Regarding carrying out investments, CAPEX should be either financed by the national energy company (HEP Group Ltd) or co-financed to some extent through NPOO and/or modernization fund.</p>
<p>Estimated impact/results</p>	<ul style="list-style-type: none"> • Refurbished pipeline (km) • Number of connected boiler rooms in target cities • Area of solar thermal collector’s field • Number of public buildings connected to DH system • Reduction of CO2 emissions • Implemented live data monitoring of both heat production and distribution
<p>Actors involved</p>	<ul style="list-style-type: none"> • National District heating company (HEP Toplinarstvo) • Zagreb County

	<ul style="list-style-type: none"> • Target cities which possess district heating systems • REGEA • Design offices and engineering companies • Equipment providers
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Action #6 Setting up energy communities

<p>Brief description</p>	<p>Building a regional committee /working group for defining future sector of energy communities and interaction between them based on current/future legal framework for exchange of energy in regional/national electricity market.</p> <p>As part of the initial work, a committee will be formed including interested stakeholders to form two taskforces.</p> <ul style="list-style-type: none"> • Energy communities for citizens-included initiatives • Energy communities for public and private companies <p>Based on developed taskforces, detailed guidelines (steps for implementation) for both approaches will be developed among included stakeholders through desk research on legal/technical requirements, interaction with relevant actors in the sector and building different business models. These activities will be performed with the aim of establishing at least one legal entity for each type of energy community for which investments will be triggered. These legal entities will be obliged to transparently present all operations and lessons learnt to prepare action plans / guidelines for improvement of the methodology. Based on further replication of guidelines, the committee will work on establishing interaction with “virtual solar power” plants based on their availability on the market (not excluding possible financial involvement in set-up of pilot projects for both type of communities). Throughout the whole duration of action, the committee will organize the Annual Event</p>
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	where interested stakeholders will network and brainstorm about strategic development of energy communities.
Activities/ Implementation steps	<ol style="list-style-type: none"> 1) Creation of a close action team 2) Research of main principles (legal, economic, technical aspects) 3) Identification of target groups, key actors, stakeholders, and decision makers 4) Establishment of the committee (organization, procedures, representatives, management) 5) Definition of the economic, technical, and societal benefits of the Energy Community - guidelines 6) Legal proposal for establishment of the legal entity 7) Foundation of the legal entities 8) Project development and fundraising for establishment and investments 9) Day-to-day operation, lessons learnt and guidelines for improvement 10) Additional Individual project development / fundraising 11) Set up (or join) “virtual power plant” platform and establish interaction between stakeholders in energy communities 12) Annual event and promotion
Timeframe	Approximately 2 years for establishment of first energy community based on created concept and guidelines within this action – process starting during 2023. During 2026-2027 is expected to carry out with uptake of energy communities (implementing all EU Directive-related obligations and adjusting the market) alongside which the virtual power plant platform will also be introduced.
Milestones	<ol style="list-style-type: none"> 1) Establishment of the committee 2) Guidelines for energy communities 3) Establishment of energy communities 4) Triggered Investments

	<p>5) Guidelines for interaction between energy communities</p> <p>6) Integration of virtual power plant platform in established legal entities</p>
Estimated costs	<ul style="list-style-type: none"> • Establishment of the committee, desk research and creation of guidelines – 25 000 EUR • Establishment of chain of command for setting up one energy communities including pilot project (legal entity) and its equipment – 150 000 EUR • Involvement in virtual power plant platform establishment – up to 100 000 EUR (based on level of complexity and actual involvement since already several platforms are available)
Financing sources	<ul style="list-style-type: none"> • EU funding / own resources (soft projects) • NATIONAL RECOVERY PLAN • OPERATIONAL PROGRAMME ENVIRONMENT 2021-2027 • MODERNISATION FUND
Estimated impact/results	<ul style="list-style-type: none"> • boosting of municipal / local cooperation and coordinated regional approach • at least one investment in energy community setup (equipment) • achieved energy savings and local energy production • compliance with new legal measures • infrastructure for application of community energy principles – guidelines and recommendations • in long term, the involved actors get a legal framework for collaborating, sharing distributed RES generation and starting collaborative / communal investments for the development of further renewable infrastructure
Actors involved	<ul style="list-style-type: none"> • the Zagreb County • municipalities/cities within Zagreb County • public/private energy companies • citizens • National DSO

Action #7 Capacity building in CSSC sector

<p>Brief description</p>	<p>Based on developed materials within the project, REGEA and the Zagreb County will continue to deploy capacity building programme for all interested stakeholders where the materials will be furtherly adjusted to specific needs of organized events (to comply ideally with development of other measures). This action aims to provide a detailed overview of all technical, financial, and organisational aspects of CSSC technologies, pointing out the best practices in implementation of various equipment and achieving goals of decarbonization. For the purposes of developing more concrete materials, real life cases from CSSC Lab project (and other initiatives) including integration described in Action 3, measured live data, and gathered concrete techno-economic information will be used to bring closer the methodology for development a proper CSSC-related project to decision-makers. The action will be done in cooperation with academia and available stakeholders on the market (design offices, engineering companies, etc).</p> <p>Based on prepared (adjusted) training materials, a platform for capacity building will be established where the Zagreb County and REGEA will coordinate organization of various training events, all with the aim of presenting the know-how which should boost decision making towards triggering the investments in CSSC technologies. These intentions for investments will be outlined in city coaching sessions where action plans will be discussed. Based on identified training needs, various technical and financial concepts and their real case characteristics will be presented, as well as updates in relevant legal framework to build a strong basis for more independent actions by local/regional public authorities. Throughout organized training events, feedback will be continuously gathered to improve materials for future use.</p>
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Activities/ Implementation steps	<ol style="list-style-type: none"> 1) Identify main needs for capacity building programme 2) Develop different training modules for specific needs 3) Establish a capacity building platform on the Zagreb County level 4) Perform training events (basic/advanced/awareness raising) 5) Gather feedback on performed capacity building – lessons learnt 6) Drafting up action plan for city coaching sessions and triggering investments 7) Dissemination
Timeframe	<p>Since the CSSC Lab project ends in 2022, it is expected that the process of identification main needs will start during 2023 based on which a platform for capacity building will be established. Concrete training events will be carried out during 2024-2027 to complement other actions as well so this set of activities can be perceived as continuous “support” to achieve other actions.</p>
Milestones	<ol style="list-style-type: none"> 1) Developed training modules 2) established platform 3) Publishing a coordination plan of training events 4) Outlook of lessons learnt
Estimated costs	<p>The estimated costs for implementation of this action are around 20 000 EUR, which include a continuous capacity-building programme and regular training events with up-to-date content (based on the development of other actions).</p>
Financing sources	<ul style="list-style-type: none"> • Own financing funds • EU funded projects (as part of different activities in ongoing/future projects)
Estimated impact/results	<ul style="list-style-type: none"> • Raised capacity of local/regional authorities • Improved and tailor-made training materials • Established platform for capacity building • Organized at least 10 different training events • Published lessons learnt

Actors involved	<ul style="list-style-type: none"> • The Zagreb County • REGEA • Municipalities/cities within the Zagreb County • External experts • Universities (FSB/FER)
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Action #8 One-stop shop for the Zagreb County

Brief description	<p>As one of obligations of the 'Clean energy for all Europeans', each Member State (MS) of the EU has to establish contact points / one-stop shops to help overcome barriers in administrative field of RES (CSSC) technology investments – aiming for its simplification, harmonization and digitalization. In its concept, OSSs should be a main source of independent information about installation of RES, different financing options and available grants, as well as to be involved in capacity building and awareness raising of viability of CSSC across all sectors.</p> <p>In the Zagreb County, two OSSs will be established for dividing focus into citizens-oriented projects and those developed for public authorities, business sector and industry.</p> <p>Main vision, objectives and workplan of each OSS will be developed in Action Plans (AP) for available assistance/support in project development and events that will be developed by OSSs. Based on development of Action 2 (Energy Efficiency Action Plans) where a digital database of buildings should be developed, this action plan to set up a digital support for project development and assistance in different technical/financial/legal aspects, but also focusing on developing a list of validated service providers, engineering companies and other solution providers in CSSC sector.</p> <p>This includes assistance in:</p>
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	<ul style="list-style-type: none"> • development of technical and financial studies and necessary technical documentation • development of tender documentation • application for subsidy/grant schemes • application for different EU financing sources • decision-making process • recommendations for spatial plans (based on Action 1) • Permits (building, water, operation, environmental ...) • Procedures and application forms (DSO, DTO, national DH company, etc.) <p>Apart from project development, OSSs aim to gather energy and building specialists, energy companies included in CSSC sectors, design offices and engineering companies, public authorities, but also citizens whose role will be to provide feedback / information / views on the CSSC and ways to trigger investments.</p> <p>As support in that field, OSSs will focus their day-to-day activities to organization of different roundtables, webinars, workshops, and conferences on CSSC technologies and promote available assistance for project development.</p>
<p>Activities/ Implementation steps</p>	<ul style="list-style-type: none"> • Establishment of 2 one-stop shops (OSS) for the Zagreb County region <ul style="list-style-type: none"> ◦ OSS oriented to citizens ◦ OSS oriented to public authorities, SMEs and industry • Desk research and preparation of Action Plan (AP) • AP on vision and available assistance of OSS • AP on monthly/annual events that will take place as part of OSS activities • Development of digital support for CSSC implementation • Day-to-day activities and project development

	<ul style="list-style-type: none"> • Organization of roundtables, webinars, workshops and conferences • Monitoring and dissemination of achieved results/projects
Timeframe	Planned timeline for this measure is 2023-2026
Milestones	<p>Establishment of two one-stop shops in the Zagreb County</p> <p>Action plan for one-stop shops</p> <p>Achieved first project through one-stop shop</p>
Estimated costs	<p>Staff cost</p> <p>Organization of events</p>
Financing sources	
Estimated impact/results	<p>20 prosumers involved</p> <p>3 experience exchange events organized</p>
Actors involved	<p>Zagreb County</p> <p>Municipalities/cities within the Zagreb County</p> <p>REGEA</p> <p>Design offices and technical consultancy</p> <p>National DSO company</p> <p>National district heating company</p> <p>Energy companies</p>

Action #9 Replication of demo center concept(s)

Brief description	<p>Apart from defined outcomes of other actions in terms of triggering/achieving various investments in CSSC technologies and related sector, this action includes a set up of a demonstration center with the aim of building know-how on different operational modes, technical parameters and installation procedures, with the special focus on integration of any virtual control/monitoring platform.</p> <p>The aim is to include several “same” CSSC technologies (from different service/equipment providers) in order to analyse and compare them, as well as to check their technical limitations for integration of an monitoring platform and possibility for programming.</p>
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	<p>The decision-making process would be the initial phase where knowledge gathered in CSSC Lab project would be utilized for creating a clear plan for demo center implementation including list of technologies, investment plan and main tasks. Concerning available pilot project locations, included stakeholders will decided about the most suitable one to comply with current development plans of local/regional public authorities and use available funding where either a new building will be built or the existing one will be refurbished.</p> <p>Installed equipment will be integrated on any virtual monitoring/control system for the purposes of day-to-day operation and performing various tests. Gathered know-how will be outlined in guidelines for CSSC technologies which will be used in other Actions (based on timeline and status of their implementation steps). This valuable part will be coordinated with equipment providers, academia, and relevant institutions to create validated conclusions on real CSSC applications.</p>
<p>Activities/ Implementation steps</p>	<ol style="list-style-type: none"> 1) Definition of demo center concept, scope, and necessary implementation steps 2) Assessment of potential locations and project partners including selection process 3) Development of project and tender documentation (new/existing building) with the focus on CSSC technology 4) Fund raising and application to different EU funding schemes 5) Integration of CSSC technology and integration to virtual monitoring platform 6) Day-to-day operation, dissemination 7) Test of equipment and on-site research 8) Guidelines for CSSC technologies based on gathered insights and lessons learnt

Timeframe	<p>Starting in 2023 with the initial implementation steps, while the actual development of the project and installation/integration of equipment would take about 1 year. Based on the moment of finalization, testing phase and dedicated work on guidelines will take 1 year.</p> <p>In total, approx..3 years</p>
Milestones	<ul style="list-style-type: none"> • Defined CSSC concept for demo center • Selected pilot project location • Created tender documentation • Installation of equipment • Integration on control/monitoring platform • First set of guidelines
Estimated costs	<p>The estimated costs include staff costs for development of tender documentation, CAPEX for all equipment and additional costs, development of proper software/digital solution and actual integration of live data – in total around 150.000 EUR depending on equipment included</p> <p>In case that the investment take place, additional funds for desk research, testing of equipment and guidelines creation have to be planned – around 15.000 EUR.</p>
Financing sources	<p>Own financial funds (Zagreb County or municipality/city)</p> <p>EU-Funding (EU INTERREG Programmes)</p>
Estimated impact/results	<ul style="list-style-type: none"> • Established competence center of CSSC technologies in the Zagreb County • Digitalized solution for live data monitoring • Awareness raising on a real case example • Gained know-how for project development and software solutions • Gained know-how in CSSC technology operation and related parameters (testing, lessons learnt)

Actors involved	<ul style="list-style-type: none">• The Zagreb County and/or municipalities/cities• REGEA• Equipment providers• National DSO• National DH company (if demo center includes district heating solutions)• Academia (FSB/FER)
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