

Regional Action Plan for Energy Storage and Sector Coupling Bratislava Old Town Borough

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 The Faculty of Architecture and Design Slovak University of Technology in Bratislava and Bratislava Old Town Borough in cooperation with regional partners and Alba Local Energy Agency - ALEA – work package lead partner.

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1. General Information

Country:	Slovakia
Region:	Bratislava Old Town Borough
Responsible partner(s):	STU Bratislava and Bratislava Old Town Borough

2. Aim of the Regional Action Plan

The Regional Action Plan presents measures which could help to increase the use of energy from renewable sources, energy storage and the sector coupling. This document is meant to be a strategic guideline for the region of Bratislava Old Borough and Bratislava self-governing region on how to implement CSSC solutions to support the energy transition. The CSSC lab offers various options for CSSC solutions and different issues. To adapt them to the needs in a regional context first a better understanding of the opportunities CSSC solutions offer must be understood by the decision-makers and introduced in their everyday work. The aim is to acknowledge the necessity and opportunities in the region and to support and implement RES and CSSC applications.

The manual helps implementation and discusses options how and with what funding to start projects in the urban planning processes. Besides the legislation and the level of financing of these activities which is mostly conditioned on funds outside the Slovak Republic, Bratislava Old Town Borough must face technically complicated measures to increase energy efficiency resulting from the monument protection of buildings/cultural heritage whose great number fall under its administration. The RAP offers to provide the legislation frame, the funding opportunities on disposal currently or in the nearest future, good practices and guidelines for the implementation, but also identifies necessities on a local level.

With the peer review sessions with two other countries a valuable view from outside to the challenges faced, help to facilitate the tasks, and increase the success of CSSC in the regional context and the CSSC lab in Slovakia.

3. National and regional context

3.1 National context

3.1.1 Legal bodies and measures in place

The Ministry of Economy of Slovakia is increasing the output of local sources, which can be connected to the transmission system this year by an additional 60 MW. "We are pleased with the great interest in local green resources, thanks to which customers can cover their own electricity consumption. Therefore, we are doubling their installed capacity, which can be connected this year, to a total of 119 MW," said Karol Galek, State Secretary of the Ministry of Economy of the Slovak Republic. The ministry is taking this step thanks to a change in legislation in force since 1 April, which gave it a new competence to increase installed capacity during the calendar year.

"The more electricity a household, self-employed person or company can produce in a local source, the less electricity they have to buy from a supplier. In addition, up to 1000 MWh of electricity produced and consumed, it will save on the payment of tariffs for the operation of the system. The operator of a local source can also sell unused electricity to a trader, resp. to the electricity supplier, which represents another potential source of income for him," Galek added.

The largest part of the newly determined installed capacity of 26 MW is intended for central Slovakia, where the allocated limit has been exhausted so far. As part of the ongoing amendments to energy legislation, the Ministry is also simplifying the rules for issuing certificates of compliance with the construction of facilities to produce electricity from the sun and wind and at the same time proposes further adjustments to support the development of RES in Slovakia.

The full text of the notice on the determination of the installed capacity of electricity generation facilities with the right to support for 2022, including the increase for local sources, is published at <https://www.economy.gov.sk/energetika/urcenie-instalaneho-vykonu-zariadeni-for-electricity-production-from-oze-and-flower-covered-support-for-year-2019>.

Slovak Innovation and Energy Agency (SIEA) is a contributory organization established by the Ministry of Economy of the Slovak Republic.

Their task is to:

Inform

Raise the awareness about energy efficiency, renewable energy sources and innovations in all fields of economy and provide expert consulting in those areas.

Educate

Educate specialists in energy efficiency and renewable energy sources.

Monitor and evaluate

Operate the monitoring system of energy efficiency and prepare background materials for annual evaluation of progress towards national targets and action plans for energy efficiency.

Support energy efficiency and innovation

Implementing measures supported by EU funds and state resources for already 14 years, which are focused on energy demand decrease.

Support for the installation of small installations for the use of renewable energy sources in households

In the form of the national project Green for Households II, **SIEA** provides support for the use of renewable energy sources in family and apartment houses. Households can obtain vouchers, which they then apply to authorized contractors for the supply and installation of equipment. Installations of photovoltaic systems and wind turbines with an installed electrical power of up to 10 kW are supported, as well as solar collectors for water heating, heat pumps and biomass boilers.

Those interested can consult their questions in counseling centers, which are available in Bratislava, Trenčín, Banská Bystrica and Košice. Energy consultants also provide recommendations at exhibitions and conferences. At the same time, the SIEA publishes publications on energy savings and the use of renewable energy sources.

Building an information platform for an energy-efficient low-carbon economy and audits of public buildings

The Energy Expert project aims to build an information platform for an energy-efficient low-carbon economy and to develop audits of public buildings that their operators will be able to use to renovate them. SIEA has prepared audits of 250 public buildings since 2013.

Extension of the energy efficiency monitoring system

The Energy Efficiency Monitoring System, operated by the SIEA since 2009, makes it possible to collect energy consumption data and analyze energy efficiency. The processed data helps to determine and evaluate energy efficiency plans. As part of the national project Extension of Energy Efficiency Monitoring, new functionalities are being prepared, which will make it possible to reduce the administrative burden on both data providers and the system operator. Thanks to the planned adjustments, providers will be able to gain a more comprehensive view of their monitored data for previous periods and will be able to compare their own data with average values.

3.1.2 National legislation

Act no. 309/2009 Coll. (In relation to Chapter 6 – Actions)
Act on the Promotion of Renewable Energy Sources and High-Efficient Cogeneration and on Amendments to Certain Acts

Act no. 251/2012 Coll.
Act on energy and on the amendments to certain acts

Act no. 250/2012 Coll.
Act on regulation in network industries

Act no. 657/2004 Coll.
Act on thermal energy

Act no. 609/2007 Coll.
Act on excise duty on electricity, coal, and natural gas

Act no. 79/2015 Coll.
Act on waste

Act no. 321/2014 Coll. (In relation to Chapter 6 – Actions)
Act on energy efficiency

Act no. 555/2005 Coll. (In relation to Chapter 6 – Actions)
Act on the energy performance of buildings

Act no. 314/2012 Coll. (In relation to Chapter 6 – Actions)
Act on the regular inspection of boilers, heating systems and air - conditioning systems

Decree of the Regulatory Office for Network Industries no. 18/2017 Coll.
Decree establishing price regulation in the electricity industry and certain conditions for the performance of regulated activities in the electricity industry

Decree of the Regulatory Office for Network Industries no. 490/2009 Coll.
(In relation to Chapter 6 – Actions)
Decree setting out the details of the support of RES

Decree of the Regulatory Office for Network Industries no. 24/2013 Coll.
Decree laying down rules for the functioning of the internal market with electricity and gas

3.1.3 Nationally planned measures

Recovery and Resilience Plan (NextGenerationEU)

The European Union's recovery plan is presented as a comprehensive response to the consequences of the COVID-19 pandemic crisis, as well as to the main challenges and systemic shortcomings of the Slovak economy. It consists of 18 components, of which we will mention here the Component 1 and 2.

Component 1 - Renewable energy sources and energy infrastructure

It follows the so-called green and digital transformation of Slovakia. Its goal is to increase the share of renewable energy sources in the energy market. The aim is to contribute to the 2030 climate change goals through reforms and investment in renewable energy.

Reform 1: Adjustment of the legal framework for energy efficiency

The aim of the reform is to adjust the legal framework in the field of energy efficiency resulting from the Energy Efficiency Directive. This reform presupposes the creation of conditions for reducing primary and final energy consumption. It presupposes the application of the principle of "energy efficiency first" (energy efficiency as a priority) in the planning, modernization and implementation of projects increasing the share of green energy in electricity and heat.

The Ministry of Economy of the Slovak Republic is currently preparing a comprehensive reform of the electricity legislation. This shall be a comprehensive transposition of new European legislation into national law. It means that there is also a need for a comprehensive legislative anchoring of the topic of electricity storage. The new legislation in the field of electricity market design envisages the introduction of the term "electricity storage" in the Energy Act and the definition of the rights and obligations of a new participant in the electricity market, the so-called "electricity storage facility operator".

Reform 2: Adjustment of the legal framework in the field of energy (until 31.12.2022)

The aim of the reform is to amend the Energy Act and the Network Regulations Act in accordance with the Directive on common rules for the

internal electricity market by facilitating access to the electricity market, increasing the flexibility of the electricity system, and improving the overall connection of new RES to the Slovak electricity system. The implementation of the reform is planned by 31 December 2022.

Reform 3: Reform of the legal framework in the supporting of RES (until 31.12.2022)

The purpose of this reform is to support the increase of the share of new RES in the transport, electricity, and heating sectors through the amendment of the Act on the Support of Renewable Energy Sources and the Act on Thermal Energy. It is planned to adopt long-term investment schemes for new RES and investment support schemes for the modernization of existing RES (so-called repowering). The implementation of the reform is planned by 31 December 2022.

Investment 1 - Investments in the construction of new sources of energy from RES

As part of investments in the construction of new RES sources, the construction of new electricity generation capacities from RES with an installed capacity of 10 kW to 50 MW is planned for 2021 - 2026, while the support scheme plans to secure new capacity of at least 120 MW by connecting new RES into the electricity system. New RES sources include facilities for the use of geothermal energy, biomass, biogas, landfill gas and gas from sewage treatment plant to generate electricity using combined heat and power generation (according to Act no. 309/2009 Coll.)

Aid for the implementation of the project under the call will be intended to cover eligible costs, for which are extraordinary investment costs necessary to support the production of electricity from RES. The amount of eligible costs is determined as the difference between the costs of investing in electricity generated from RES and the costs of a similar, less environmentally friendly investment, the implementation of which would be credible without the necessity of the aid.

The total costs are estimated at 103 mil. EUR. Financial aid is determined uniformly for the Bratislava region at 45% (maximum 15 mil. EUR per project per legal person/natural person). The maximum amount of the subsidy will depend on the indicator of 1 MWh of electricity produced from RES. The result of the project implementation must be the additional installed capacity of the equipment using RES, connected to the distribution or

transmission system on the territory of the Slovak Republic, expressed in MW.

Investment 2: Investments in modernization of existing renewable electricity sources (repowering)

Ministry of Economy of the Slovak Republic plans in accordance with the approved timeframe to announce calls for investments in the modernization of existing sources of electricity from renewable energy sources for biogas plants and hydropower plants in June 2022. The aim is to extend the technological life, modernization and increase the efficiency of existing RES capacities through investment aid. The implementation of the investment is expected to begin by 1 January 2022 and complete by 30 June 2026. The total cost is estimated at 62 mil. EUR.

Investment 3: Investments in increasing the flexibility of energy systems for greater integration of renewable sources of energy

The development of renewable energy is closely linked to the development of technologies for its storage, according to the Ministry of Economy of the Slovak Republic. By 2026, it wants to reach 68 MW of storage capacity, which it will also support from the Recovery and Resilience Plan. Energy storage is one of the possible technologies that makes the electricity grid more flexible and makes it easier and more efficient to integrate renewable energy sources. The rapid expansion of energy storage systems will be crucial to addressing the hourly variability of wind and solar energy, especially as their share of production increases rapidly in the net zero emissions scenario by 2050.

The aim of this investment is to increase the capacity of electricity storage facilities by at least for 68 MW thanks to operation of new storage capacities. The state aid scheme will support the installation of new capacity of battery systems, installation of new capacity of hydrogen fuel cells and increasing the regulating power of hydropower plants. The measure will support energy storage facilities that will contribute to increasing the supply of regulatory power or reduce the demands of variable RES for regulatory power. Battery storage facilities, facilities to produce hydrogen from RES and hydroelectric power plants (pumped storage hydropower plants), which will increase the scope of regulatory power by at least 25% as part of the investment, will be able to apply for support.

The connection of variable RES, such as wind and photovoltaic power plants, to the system is currently notably constrained due to a lack of system flexibility. By introducing construction support for accumulation facilities, the intention is to reduce the direct negative impacts of variable RES (rapid power supply changes) for the power system operation and thus allow the connection of new variable RES into the system.

The total cost is estimated at 62 mil. EUR. About half should go to electricity storage projects and the remaining half should be divided equally between hydrogen production and hydropower reconstruction projects. The ministry plans to publish the first call for projects in the second quarter of 2022.

The Slovak government considers increasing the storage capacity to be very important and has been addressing this issue for a long time. Energy storage technologies are also considered in strategic documents such as the Integrated National Energy and Climate Plan for years 2021 -2030 (<https://www.economy.gov.sk/uploads/files/ljkPMQAc.pdf>).

Component 2 - Restoration of buildings (years 2022 – 2026)

Through measures to improve the energy efficiency of single-family homes and public historic buildings and buildings listed in cultural heritage to reduce energy consumption and thus contribute to reducing CO2 emissions and air pollution. The goal is in line with the Long-Term Strategy for the Renewal of the Building Fund, the Low-Carbon Development Strategy of the Slovak Republic by 2030 with a view to 2050, the Integrated National Energy Climate Change Plan by 2030 in terms of energy efficiency, as well as with the aims of the European Union in the field of climate and energy efficiency by 2030.

Reform 1: Reform of the harmonization of support mechanisms for the renovation of family houses provided by multiple resorts

Integration of existing support schemes under one comprehensive support mechanism within which it will be possible to carry out medium-term renovation of family houses in an efficient manner. The aim of the reform is to integrate more measures under one roof so that measures to improve energy efficiency can be implemented and to support environmental aspects in renovations.

Reform 2: Reform of increasing transparency and streamlining of decisions of the Monuments Board of the Slovak Republic

The aim of the reform of the care of the monument fund is to increase the predictability of the decisions of the Monuments Board of the Slovak Republic, which will support the development of commercial market with monuments and at the same time increase the systematic nature of the reconstruction of monuments in public property and to passport state-owned monuments in terms of diagnosing their technical condition.

Investment 1: Improving the energy efficiency of single-family homes (528 mil. EUR)

Investments from the Recovery and Resilience Plan of the Slovak Republic will be used to support medium-term recovery of family houses, which in this way will take on a significantly higher gradient than has been the case so far. There will be support implemented through a single provider, the Slovak Environment Agency and will lead to improve the energy efficiency of family houses and the introduction of selected green elements in the recovery process. The investment is directly linked to Reform 1.

Investment 2: Renovation of public historic buildings and buildings listed in cultural heritage (200 mil. EUR)

The aim is to improve the technical condition of historic buildings and buildings listed in cultural heritage, while improving their energy efficiency, extending their lifespan, and increasing their use by the public. Investment 2 supports the Reform 2.

3.2 Regional context

Implemented relevant strategic documents in the area

➤ **The Program of economic and social development of the capital of the Slovak Republic, Bratislava**

The program was created by Academia Istropolitana Nova in cooperation with the Czech Republic consulting company BERMAN GROUP in July 2010 and was processed for the period from 2010 to 2020. The aim of the document was to help the development of Bratislava regarding the needs of the citizens of the capital by defining relevant objectives. The program was developed at the level of the whole city and did not differentiate priorities for individual city districts but discussed the goals and priorities for the city. It provided a framework of priorities to be addressed by the city and subsequently by the individual city districts.

Five strategic development topics were defined, which contained individual goals. One of them was the “quality of the environment and urban space” with the aim to prevent and mitigate the effects of climate change, including the increasing of the energy efficiency of urban structures and buildings, as well as the share of the use of renewable energy sources.

➤ **Program of economic and social development of the Bratislava self-governing region**

This document was prepared by AUREX spol. Ltd. for the years 2014 to 2020. The program was created to help the Bratislava region ensure sustainable economic, social, and territorial development while supporting the development of the necessary business activities developing the region. One of its strategic aims was also the “integrated and environmentally friendly transport and reducing the energy demand”.

➤ **The Action Plan for Sustainable Energy Development of the Capital City of the Slovak Republic, Bratislava**

is a comprehensive short- and medium-term strategic document from 2013 that defines the city's activities aimed at reducing CO₂ emissions. The document was prepared by Energy Centre Bratislava in connection with the city's access to the pan-European initiative Covenant of Mayors.

The measures of the action plan for Bratislava are based on the results of the initial emissions inventory and focus on the following areas:

- Buildings sector (Local government buildings, Tertiary buildings, Residential buildings)
- Public lighting
- Transportation (Local government fleet, public transport, Private and commercial transport)
- Local energy production (Electricity generation, Central heat supply)
- Planning, regulation, and public relations (Spatial planning, public procurement of products and services, Working with citizens and stakeholders).

https://bratislava.blob.core.windows.net/media/Default/Dokumenty/Str%C3%A1nky/Akcny_plan_oficial%20material.pdf

➤ **Bratislava Smart City 2030**

Document was prepared and approved by municipality in 2018. The aim of the concept Bratislava Smart City 2030 is the efficient use of resources, the competitiveness of the economy, the growth of quality of life in the city. The

concept determines the framework strategy of urban development as a sensible city and is developed in connection with related strategic documents at the international, national, and municipal levels. The main topics of the document are City administration, Mobility, Energy, Environment, Circular economy, Business, Public space, social inclusion, Education, Culture, Tourism, Sport.

In the field of energy, efficient and ecological energy production to reduce energy consumption from the so-called "Unclean" energy sources (fossil fuels) and their negative effects on the environment is a great opportunity for the city of Bratislava, given the city's energy base. As well as increasing the energy efficiency of buildings, public lighting, and the overall reduction of energy consumption in the city. The city's cooperation with key institutions, organizations and the business sector in the collection and analysis of energy data (production, consumption, share of renewable energy sources) is important. The desired result is to achieve energy savings, reduce energy costs and reduce the negative effects on the quality of the environment.

Support for ecological energy production based on renewable energy sources (RES) using innovation and low-emission technologies, increasing the energy efficiency of urban infrastructure and buildings, as well as the introduction of new technologies with lower consumption or higher energy efficiency to reduce overall energy consumption, increase energy independence from fossil fuels, reduce energy emissions, increase air quality and the quality of life of the population.

Measurable indicators:

- Decrease in greenhouse gas emissions by 30% by 2030 compared to 1990 levels
- Reduction of energy consumption by 20% for the needs of the city and subordinate organizations by 2030 compared to the level in 2015

Measures:

- Implementation of new technologies supporting higher energy efficiency in urban infrastructure based on systems for monitoring and optimizing energy consumption, including the introduction of intelligent, multi-purpose and economical public lighting and streamlining energy supply in the city.
- Reducing energy demand and increasing the energy efficiency of buildings, including cultural monuments owned or in the city administration, including the energy modernization of buildings and the promotion of the use of local renewable energy sources.

Active projects:

- EU-GUGLE - European cities serving as a green city gateway to sustainable energy leadership, (ERDF, MoE SR, city budget / capital Bratislava, Technical and Testing Institute of Civil Engineering, Slovak Green Building Council, Aachen - Germany, Milan - Italy, Sestao - Spain, Tampere - Finland, Gaziantep - Turkey, Vienna - Austria, Gothenburg - Sweden)
 - Urban – E - electromobility, infrastructure and innovative intermodal services, construction of 55 charging stations for electric vehicles (EC grant, city budget / capital Bratislava, Ljubljana, Zagreb)
 - Implementation of the Sustainable Energy Development Action Plan (EIB, City Budget / Capital City of Bratislava)
 - Waste Energy Recovery (City Budget / City of Bratislava, OLO a.s.)
- **Program of Economic and Social Development of The City District of Bratislava Old Town Borough for period 2017 – 2023 with a view to 2040**

One of the Program priorities is Energy. Gradual reduction of energy demand, support of approaches which aim to develop renewable energy sources, as well as more efficient energy management leading to saving resources are the objectives of this priority.

Within this priority falls the measure of “increasing the energy efficiency of the area, buildings and infrastructure”.

Anticipated time frame of the measure: 01/2017 – 04/2023

Qualitative and quantitative indicators at measure level: energy audit of buildings in the ownership/administration of the city district, reduction of energy prices, technological renewal of heating facilities and reducing of energy consumption, increasing the share of renewable energy types created on the territory of the city district.

Financial frame of the measure: 50 000 EUR /financial resources from the city district´s budget/

The measure consists of activities leading to reduction in the energy demand of buildings and area, which ultimately leads to savings in financial resources and raises the quality of environment in the urban area of Bratislava Old Town Borough. The energy audit will reveal reserves in energy management in buildings owned or administered by the city district in conjunction with the renewal of technical heating equipment. Central energy purchase or energy auction is a tool for reducing energy costs,

therefore the city district is considering the use of this instrument. Finally, the city district aims to support suitable renewable sources on its area, whether in the case of investments of the city district or other developers.

Financial context - City District of Bratislava Old Town Borough

Ensuring sufficient financial coverage for the fulfillment of planned measures and activities is a key factor in achieving the objectives set out in the Program of Economic and Social Development of The City District of Bratislava Old Town Borough. Good financial health of the city district, favorable conditions on the financial markets and a wide range of credit options resources and, finally, existing additional financial resources, whether national or European, create good conditions for financial fulfillment of requirements arising from the proposed measures and activities.

Regional development and related development activities in the period of 2014-2023 are financially supported by the European Union resources, the use of which transfer mechanisms, control mechanisms, and others, is defined by the Partnership Agreement for 2014-2020. This in terms of the Bratislava Old Town Borough district defines the following financial mechanisms, suitable for coverage of development activities in the city area:

- a) Operational programs:
 - Research and innovation
 - Integrated infrastructure
 - human resources
 - Quality of the environment
 - Integrated regional operational program
 - Efficient public administration

- b) Cross-border cooperation programs
 - Interreg Austria - Slovak Republic
 - Interreg Hungary – Slovak Republic

- c) Transnational cooperation programs
 - Middle Europe
 - Visegrad Fund
 - Danube Transnational Programme

- d) Interregional cooperation programs
 - ESPON
 - INTERACT

- URBANACT
- Urban innovation actions and more.

Program of Economic and Social Development of The City District of Bratislava Old Town Borough for period 2017 – 2023 with a view to 2040 has a total of 65 defined development activities. The total financial resources, necessary for their implementation, represent the amount of €12,448,700.00. Within the priority of Energy, for the measure of “increasing the energy efficiency of the area, buildings and infrastructure” financial resources from the primary source – the city district’s budget could have been allocated in the amount of 50 000 € in total.

The city district of Bratislava – Stare Mesto is currently composing a new Program of Economic and Social Development of The City District of Bratislava Old Town Borough for period 2024-2030. On the area of the city district of Bratislava – Stare Mesto one of the key challenges on the local level is high energy demand of buildings (especially owned by the municipality). The goal in the following years is increasing the energy efficiency of public buildings through comprehensive renovation with an emphasis on the use of renewable energy sources, including green measures.

4. Engagement of decision makers and other key stakeholders in the region

The Slovak Technical University in Bratislava and Bratislava Old Town Borough coordinated the STK involvement campaign in Slovakia. The main event – The regional action planning workshop was followed by several bilateral meetings at the level of boards of directors and advisory bodies of energy organizations, environmental creators, civic association, and city districts. The outcomes of the STK involvement activities further provide input for the strategic action planning of CSSC initiatives in Slovakia.

Main topics approached:

- Potential for sector coupling
- Regional potential for CSSC implementation
- Capacity building opportunities related to CSSC domain for local authority representatives

Stakeholders:

- regional self-government - Office of the Bratislava self-governing region
- local self-government - cities and municipalities, including their associations (eg. micro-regions)
- state administration bodies and institutions

- business entities, associations of business entities, chambers of commerce and industry
- regional development agencies
- interest associations, civic associations, LAGs
- higher education institutions
- other socio-economic partners

SAPI - Slovak Photovoltaic Industry Association

- Possibility of installation of a local source of energy: A local source is a device to produce electricity, which can only be a renewable energy source. For a source to be considered local, it must generate electricity to cover own consumption of the offtake point, which must be identical to the transfer point.

SEIA - Slovak Innovation and Energy Agency

- Realization of an energy audit: to verify the extent to which the municipality uses energy efficiently, what measures will help to reduce energy consumption and what savings can be expected
- Possibility to use an energy support service or a guaranteed energy service, through which the municipality can have some measures implemented

City district of Bratislava – Stare Mesto

- Investment department
- Project and strategic department

External suppliers:

TWG, s.r.o. company

- energy audits of buildings in the administration of the self-government Bratislava – Stare Mesto

Lucron. company

Example of activity: The project Nesto (in the city district Bratislava – Petržalka) envisages a significant use of renewable energy sources, so far to the greatest extent within the development in Slovakia. The project Nesto plans to produce and consume energy on site, especially thanks to the solar panels, which will be installed to the maximum extent in every single building.

- potential of cooperation with the city district Bratislava – Stare Mesto

Buildings for the Future

Buildings for the Future is the largest professional interest association for the building sector in Slovakia. Through their 9 member organizations, they represent almost 900 entities active in the field of quality construction, renovation, and operation of buildings. Since the association's inception in 2013, their main mission has been to actively participate in the development of public policies that affect the construction and renovation of buildings, with an emphasis on energy efficiency, a healthy indoor environment and sustainability.

Effective energy

The company is a member of the Slovak Association of the Photovoltaic Industry SAPI, the Slovak Electrotechnical Association - Chamber of Electrical Engineers of Slovakia SEZ-KES and an authorized contractor for the Slovak Innovation and Energy Agency SIEA.

GreenWay Infrastructure

The company is building a charging network, providing driver services and solutions to charging station owners to jointly contribute to modern green transport in Central Europe.

5. 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"> • Possibilities for involving key local and national policy players in pilot programmes and initiatives in the context of the implementation of energy strategies; • Possibilities for involving parent organisations which have their headquarters within Bratislava-Old Town • local patriotism of the Old Town residents, a functioning community, motivation to maintain and increase - the potential to work with the public opinion • support for green activities at the highest levels, as well as in educational institutions (eg the President's activity on a carbon-neutral presidential palace, the same effort to reduce the carbon footprint at FAD STU...) 	<ul style="list-style-type: none"> • The level of financing of similar pilot activities is conditioned on funds outside the Slovak Republic, and due to the high economic performance of the Bratislava region, it does not allow similar financing schemes to be applied as in other regions of the Slovak Republic. The problem is that Bratislava's economic performance rate does not adequately support the possibilities of financing strategic projects in the context of the public administration; • Investments are currently limited in Bratislava, and are currently used as a rule for the rehabilitation and restoration of obsolete infrastructure, while the introduction of innovations in infrastructure renewal is limited by the possibilities of their procurement in the context of the conservation zone of the historical core

	<ul style="list-style-type: none"> • the most vulnerable part of the city in terms of resistance to climate change (highest share of impermeable surfaces, heat islands, complicated rainwater management) • high energy demand of buildings (especially in the ownership of the municipality; a large part of these is in a protected area with historical monuments - technically complicated measures to increase energy efficiency resulting from the monument protection of buildings/cultural heritage) • a certain extent of conservatism from the side of The Monuments Board of the Slovak Republic • limited repertoire of available renewables • limited area suitable for the installation of active solar systems
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EXTERNAL FACTORS

Opportunities	Threats
<ul style="list-style-type: none"> • The opportunity may be pilot investment projects building on this project under European Union subsidy schemes to ensure the implementation of the EU strategic approach on energy efficiency, efficiency and reduction of greenhouse gas emissions at regional and local level; • Another opportunity may be interregional cooperation with key actors forming international consortia for the long-term sustainable implementation of strategic projects based on the introduction of innovation, with 	<ul style="list-style-type: none"> • The current pandemic situation is likely to be reflected in a slowdown in innovative initiatives and processes, diverting investment to other currently priority crisis areas of implementation. This is a threat, in the context of ensuring an operational framework for the sustainability of activities with a potential threat to the existing constellation of relationships contingent upon such investments.

a positive economic and environmental impact	
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Specifics of the city district Bratislava Old Town Borough

- Local patriotism of the Old Town residents, a functioning community, motivation to maintain and increase - the potential to work with the public opinion.
- Support for green activities at the highest levels, as well as in educational institutions (eg the President's activity on a carbon-neutral presidential palace, the same effort to reduce the carbon footprint at FAD STU...) At FAD STU we started the project FAD-eCO2, where we are developing an action plan for "decarbonisation" of the faculty with emphasis on operation, processes and user behavior. The result will be a comprehensive electronic manual for reducing the carbon footprint of the faculty and a framework plan implementation of strategic measures to increase its sustainability. The project consists of four work packages. First is the analysis of the current state, collection of data and creation of a virtual model of the faculty building. WP2 identifies areas with the potential to reduce carbon footprint and increase FAD sustainability. The third phase will focus on the user, the action plan will be elaborated. WP4 will focus on the completion of the action plan to reduce CO2 emissions and on proposals for specific measures, including the use of RES with energy storage and sector coupling.

6. Actions

Action 1	Energy audit of buildings in the administration of the municipality and their reconstruction according to the results
Brief description	On the area of the city district Bratislava – Stare Mesto one of the key challenges on the local level is high energy demand of buildings (especially owned by the municipality). The goal in the following years is increasing the energy efficiency of public buildings through comprehensive renovation with an emphasis on the use of renewable energy sources, including green measures.

Activities/ Implementation steps	Energy audit of 5 buildings in the administration of Bratislava – Stare Mesto: <ol style="list-style-type: none"> 1. City district office building – Jurenakov dom (the building is on the list of cultural heritage) 2. Block of flats – Smrečianska street 3. Archives – Čajkovského street 4. Elementary school Vazovova 5. Elementary school Grosslingova
Timeframe	until 2023
Milestones	Gradual realization of 5 energy audits
Estimated costs	Specified according to the public procurement results
Financing sources	financial resources from the own city district´s budget and from the Recovery and Resilience Plan (NextGenerationEU)
Estimated impact/results	Based on the results of the energy audits, the city district plans to realize the necessary comprehensive renovations on the audited buildings.
Actors involved	External suppliers; Investment and Project department of the city district Bratislava – Stare Mesto; working group comprised of the experts from the Environment department

Activities already realized or in the process of implementation on the area of the city district of Bratislava Old Town Borough with the aim of increasing the energy efficiency of buildings in compliance with the current Program of Economic and Social Development of The City District of Bratislava Old Town Borough for period 2017 – 2023 with a view to 2040:

- electrical installation reconstruction (kindergarten building)
- boiler room reconstruction (2 kindergarten buildings)
- reconstruction of central heating (administrative building)
- extension of the elementary school building (in the process)
- a construction of a new kindergarten building projected as a highly energy efficient building

Action 2	Promoting the use of built-up areas for solar energy
Brief description	Currently the activity is in the preparatory phase with the aim of finding out the possibilities

	regarding the solar energy usage of built-up areas on the area of the city district Bratislava Old Town Borough
Activities/ Implementation steps	Solar cadaster is being prepared. Within the APVV research project, the central structures of Bratislava city are evaluated according to the solar potentials of surfaces, roofs and facades, represented by a virtual 3D city model, web browser and the application to the Smart City concept. The results will be used in photovoltaic and thermal applications, passive ways of solar energy use as well as the visualization and interaction with the 3D solar model using tangible interfaces.
Timeframe	2023 →
Milestones	<ul style="list-style-type: none"> - virtual 3D city model - web browser - the application - define and specify the solutions: removable solutions, which must not be in visually exposed parts (applies to historical buildings and cultural monuments)
Estimated costs	Not defined yet
Financing sources	financial resources from the city district ´s budget + APVV research project
Estimated impact/results	The results will be used in photovoltaic and thermal applications, passive ways of solar energy use as well as the visualization and interaction with the 3D solar model using tangible interfaces.
Actors involved	Local self-government; regional self-government; higher education institutions; business entities

Action 3	Capacity building and raising knowledge in the CSSC Lab domain
Timeframe	2020→
Estimated costs	Not defined yet
Financing sources	financial resources from the city district ´s budget and the CSSC Lab project

Estimated impact/results	Better awareness of the CSSC solutions and their application in praxis
Actors involved	Local self-government; regional self-government; higher education institutions; business entities

Action 4	Increasing efficiency in energy purchase - central suppliers, energy auction, etc.
Activities/ Implementation steps	New lease contract with a company MH Teplárenský holding, a.s. from 1.1.2023 until 31.12.2042 for the operation of energy facilities to ensure the production and supply of heat and hot water. The lease contract with the original supplier was renounced. RES utilization: Currently, the new supplier has signed a contract with the company OLO, a.s. for the purchase of municipal waste heat and will connect a device for energy utilization of waste to the system. This cooperation will be expanded in the future after the construction of another boiler.
Timeframe	1.1.2023 – 31.12.2042
Milestones	reconstruction and modernization of the energy facilities (technical evaluation of the subject of the lease contract) in the amount of 2 mil. EUR
Estimated costs	max. 35 000 EUR/year
Financing sources	financial resources from the city district ´s budget
Estimated impact/results	reduction of heat prices by 20% with the new supplier
Actors involved	MH Teplárenský holding, a.s. OLO, a.s. Bratislava Old Town Borough

Storage systems already implemented in Slovakia

Battery storages are gradually becoming part of the energy systems of households, smaller companies, or large enterprises. However, the versatile use of storage technology is still hampered by the relatively high price of battery cells. However, rising electricity prices may contribute to a better payback period.

The Czech company AERS is engaged in the production and supply of battery systems, including used batteries from electric vehicles, which serve as a stationary energy storage in photovoltaic power plants. Its latest container storage on the market has a capacity of 328 kWh and an output of 300 kW, while it consists of discarded electric vehicle batteries and plug-in hybrid Škoda vehicles.

A **large-capacity battery storage** facility worth tens of millions of euros is to be built in the Trnava region. A major electricity supplier has ambitious plans in the energy storage market. ZSE Energia plans to set up a large-capacity energy battery storage facility in the Trnava region, the main task of which is to maintain a balance between energy consumption and production at every moment of the day.

<https://www.energie-portal.sk/Dokument/v-trnavskom-kraji-ma-vyrast-velkokapacitne-bateriove-ulozisko-za-desiatky-milionov-eur-107782.aspx>

The largest battery storage facility in Slovakia near Bratislava has been launched

The battery, developed by a Slovak company, stores more than 430 kWh of energy. It is controlled by artificial intelligence. After the test month, they put the first smart battery solution of its kind in Slovakia and the surrounding countries into operation in the industrial park in Senec. The main task of a smart battery solution is to charge the battery at a time when there is a surplus of electricity in the network and it is cheap, while it can be used at times of expensive peaks, when there is relatively less electricity in the network. At the same time, the battery helps to eliminate voltage fluctuations and stabilize the transmission system.

<https://www.energie-portal.sk/Dokument/pri-bratislave-spustili-najvacsie-bateriove-ulozisko-na-slovensku-106404.aspx>