Interreg Danube Region

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NRGCOM

Project NRGCOM:
Creating appropriate operational conditions for renewable energy communities in the Danube Region

SYNOPSIS REPORT

Improving the production and use of RES within the potential of existing RECs

Contribution PP12-NEK for the 4th period of activity A.T.3.6

A.T.3.6 Joint development of a White Paper to enhance the use of renewables and the expansion of energy communities in the Danube Region

English + Slovak version

PP12 National Energy Cluster NEK, Slovak republic

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Project partner:

PP12 Národný energetický klaster NEK, Bratislava

Country:

Slovak Republic

Activity leader:

PP – FORSCHUNG

Reporting period: 4rd

Contribution to the creation of the White Paper on improving the use of renewable energy and energy communities

Document Content

1 Brief description of the origins and development of the activity in Slovak conditions

Energy communities are citizen-led initiatives that allow them to take control of local energy production and consumption. They help decentralize those energy systems where the grid is owned by local residents with solar and wind farms set up in fields or solar panels installed on rooftops. By doing so, the local residents consume clean and renewable energy that they produce at home, and each household becomes an actor in the energy sector. Citizens actively participate in the decision-making process and participate in management within the local community, as these projects stimulate local employment. In this way, energy communities organize collective and citizen-led energy events that help pave the way for the transition to clean energy and at the same time bring citizens to the fore. They also contribute to increasing public acceptance of renewable energy projects and spark the interest for private investments in the clean energy transition.

The aim of this activity A.T.3.6 is, together with other partners of the NRGCOM project, to include the conclusions and results created and obtained from the pilot testing and evaluation activities of the related activities A.T.3.2, A.T.3.4 and A.T.3.5 in the development of the main output of the project, namely the White Paper on improving the use of RES and expanding EC in the Danube region.

PP12-NEK, within the framework of its tasks, has already in this 4th period dealt with key aspects such as the current state of RES use and the development of EC in domestic conditions, but also the establishment of exemplary best practices for improving the application of RES in the country's own internal energy mixes.

The result for Slovakia should also be a policy proposal for the main frameworks and the necessary regulatory environment, the related method and sources of financing and designing technological and

distribution solutions while meeting the requirements for sustainable energy-efficient, environmentally and economically efficient economic activity of small and medium-sized enterprises and energy communities.
Also expected in the next 5th period of the project are solutions for the socio-economic and environmental benefits of the EC with the application of OZe and related factors such as job creation, energy cost savings, energy security.

Dissemination of the outputs and knowledge from the White Paper is and will continue to be a key aspect and it is necessary for PP12-NEK to effectively share this with policymakers in the coming period - state and legislative bodies, energy and environmental agencies, regional and local self-government bodies, production and energy companies and major customers and consumer organizations.

The implementation of activity A.T.3.6 is based on the results and database from activities A.T.3.2, A.T.3.4 and A.T.3.5, which can be briefly summarized from the individual conclusions - outputs of the evaluation reports on individual tasks already solved or completed, according to documents (published within the internal Google portal of the NRGCOM project in the SO3 section and the Slovakia block:

- NRGCOM_Activity_3.2 - Template for Reporting on Mentored Pilot Operations-4rd period
- A.T.3.2_NRGCOM - Information on the methodology and status of implementation of activity
- A.T.3.4-UPDATE for the 4th per.-METHODOLOGY OF VERIFICATION OF THE READINESS ...PP12-NEK
- Information on the status of implementation of activity A.T.3.4
- Synopsis Report of the PP12-NEK project for the 4rd period of activity A.T.3.5
- Information on the status of implementation of activity A.T.3.5

2 Current results and information on RES and EC issues

Project management, experts and leaders of energy communities continuously engaged in professional analyses, pilot testing of the methodology and evaluation of selected ECs in Slovakia within the 4th period and presentations of experiences and results not only within A.T.3.6, but also in connection with the test results from A.T.3.2, A.T.3.4 and A.T.3.5, which jointly addressed various issues related to the creation of materials for the future White Paper. An overview of the most important outputs is in the table:

Event: **Podujatie:**	**Date:** **Termín:**	**Focus:** **Zameranie:**
Internat.field training on professional topics of the 4th period	28-31.08.2025	Joint field training and education of experts, the working team and representatives of energy communities on the activities of the 4th period of the project and the harmonization of technological pilot actions.
Green Deal for Buildings event- Zelená dohoda pre budovy, ZSPS+NEK	12.09.2025	Participation of PP12-NEK management in a partnership project presenting NRGCOM outputs in the field of pilot actions for energy communities
Meeting on the professional topics of the 4rd period of the NRGCOM-PP12 NEK	15.09.2025	Joint online meeting of managements of energy communities and SMEs in the field of renewable energy and experts
Brief information about the event: International conference SLOVAKIATECH FORUM – EXPO 2025	17-18.09.2025	Presentation of outputs of SMEs and energy communities at the conference, participation in a panel discussion on educating energy communities based on renewable energy sources
Online Conference- Presentation NEK for EnerCmed project	03.10.2025	Online participation of PP12-NEK management in a partnership project presenting NRGCOM outputs in the field of energy communities

Joint testing of the ETMEC update	10-13.10.2025	oint verification, testing and assessment of changes and comments of participants - managements of companies and energy communities during the implementation of the ETMEC SW tool (output from activity A.T.3.3)
Meeting of experts and EC management in PP12-NEK on the project for the 4th period of NRGCOM	26.11.2025	Joint online meeting of selected ambassadors, experts and management of selected pilot energy communities for internal assessment of their operational, economic, technical and legislative level according to the methodology of activity A.T.3.4
The 8rd joint national workshop on the professional topics of the NRGCOM project	16-18.12..2025	Joint solution and evaluation of the activities of the 4th period of the project within the competence of PP12-NEK. Meeting of ambassadors, experts, managements of energy communities and stakeholders of Slovakia
Activity A.T.3.2 Pilot testing of the energy community creation method	12-2025	Joint evaluation of the pilot testing of EC documents for the activity according to its documentation in the NRGCOM project A.T.3.2
Document - Information on the methodology and status of implementation of activity A.T.3.2 in Slovak conditions.	12-2025	Joint evaluation of the pilot testing of EC documents for the activity according to its documentation in the NRGCOM project – A.T.3..2
Document - Information on the status of implementation of activity A.T.3.4	12-2025	Joint evaluation of the pilot testing of EC documents for the activity according to its documentation in the NRGCOM project-A.T.3.4
Technological pilot testing of a selected energy community EK – TEEK, Opatovce	12-2025	Joint evaluation of the pilot testing of EC documents for the activity according to its documentation in the NRGCOM project - A.T.3.4
Technological pilot testing of a selected energy community EK - Energy Community of the Municipal District of Petržalka and OZ: SOM_EKO", Petržalka	12-2025	Joint evaluation of the pilot testing of EC documents for the activity according to its documentation in the NRGCOM project - A.T.3.4

Baedeker by energy communities, Guide – How to do it?	In printing and manufacturing December 2025	Processing and production of a peer-reviewed work of authorship for the general professional public in the field of energy companies and communities in the Slovak environment with impacts and recommendations as well as examples of good practice for the entire NRGCOM project and other partners

Current status of energy efficiency in the Slovak Republic

In November 2014, the Government of the Slovak Republic approved the Energy Policy (EP SR), which set the goals and priorities of the energy sector until 2035 with a view to 2050. The strategic goal of the EP SR is to achieve a competitive low-carbon energy sector ensuring a safe, reliable and efficient supply of all forms of energy at affordable prices, taking into account consumer protection and sustainable development. The Slovak Republic places great emphasis on air quality, reduction of greenhouse gas emissions, climate change mitigation, security of supply of all types of energy and
their affordability.

The Energy Policy of the Slovak Republic (EP SR) was originally based on four basic pillars - energy security; energy efficiency; competitiveness and sustainable energy.

The EP SR also included science, research and innovation. This plan updates the current energy policy, while also expanding it to include the decarbonization dimension.

The priorities of the energy policy of the Slovak Republic are:
• optimal energy mix;
• increasing the security of energy supplies;
• development of energy infrastructure;
• diversification of energy sources and transport routes;
• maximum use of transmission networks and transit systems passing through the territory of the Slovak Republic;
• application of the principle of energy efficiency as a priority;
• reduction of energy intensity;
• a functioning energy market with a competitive environment;

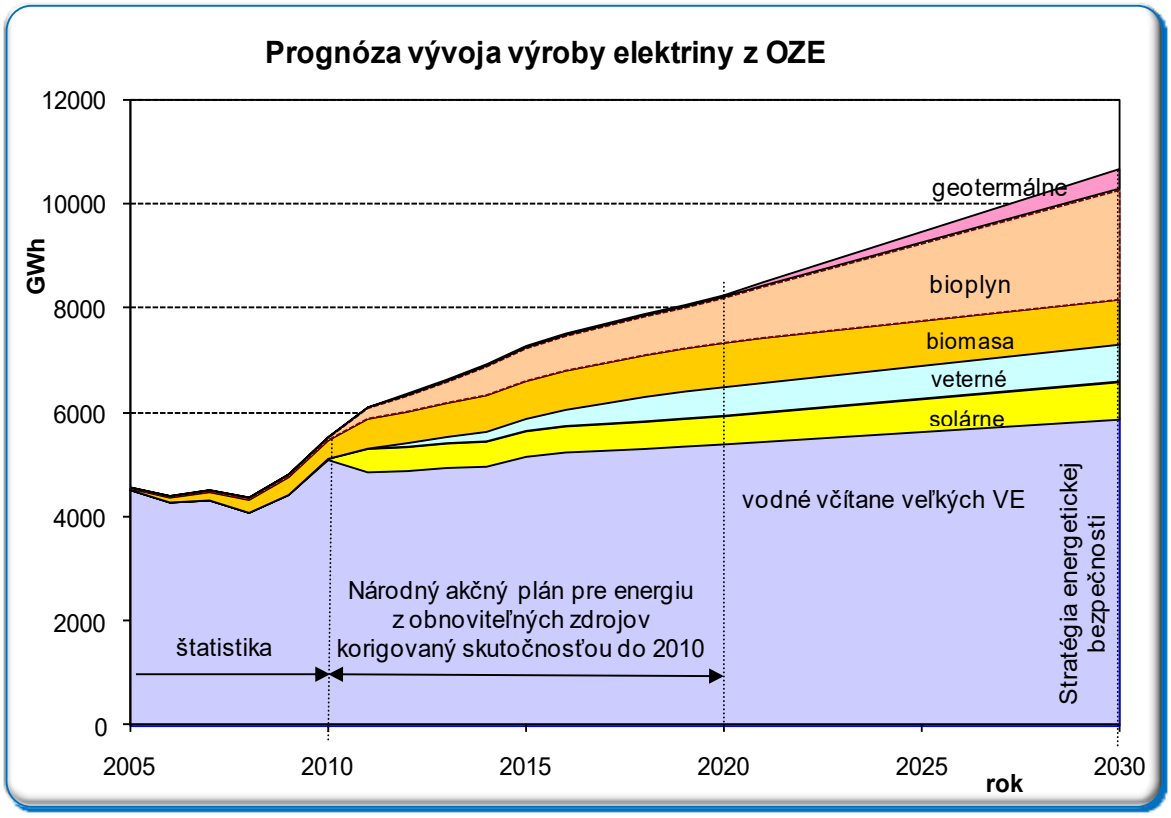
• quality of energy supplies at affordable prices;
• protection of vulnerable consumers;
• addressing energy poverty;
• an appropriate pro-export balance in the electricity sector;
• support for highly efficient combined heat and power generation;
• support for the use of efficient district heating (CHP) systems;
• support for the use of renewable energy sources for the production of electricity, hydrogen, heat and cold.
• the use of nuclear energy as a low-carbon source of electricity;
• improving the safety and reliability of nuclear power plants.

Sustainable development must meet the needs of the present without compromising the ability of future generations to meet their own needs. This requires changes in technologies, practices and habits, both on the production and consumption sides.

In 2030, this share will reach the expected figure of 20%, while in the following period there will be a more intensive use of RES for heat production. While in the period from 2010 to 2040 the share of electricity from RES in electricity consumption increased and will increase even more significantly from 19% to 29%, the use of RES for heat production will grow from less than 10% to a very significant amount of more than 30%. It is shown in Fig. 3 and, in reality, this is a positive trend in the area of the implementation of RES, especially in the energy economy of SMEs.

Real measurements in order to support the energetic efficiency (Tab 2) in the industry for the long period of 2021-2050 are a combination of validated actions and activities from the Slovak action plans for energetic efficiency from the period before 2020 and newly proposed actions and activities at least until 2030.

New measurement ideas reflect the need of SR to increase the pace at which the energy savings are reached in the industry, while stemming from the other countries' experience where they were proven to be very effective.



	Tab.: Supporting measurements for energetics efficiency
1.	Additional increase of energetic efficiency in the industry and industrial processes on top of modelled scenario framework.
2.	Introducing the circular economy and innovations into the industrial processes, for example usage of hydrogen as an innovative technology (including the switch to steel production based on hydrogen in case of sufficient hydrogen supply), including the compliance to Findings about BAT („best available techniques").
3.	Innovate the energetically and materially demanding businesses in the industry area.
4.	Transfer to the new, clearer ways of power production and products also via using the energy sources without the greenhouse gas emissions in the industry or implementing the principles of circular economy.

5.	Lowering the usage of fossil fuels in the industry under the condition that it is technically and economically effective and this solution brings a real emission saving
6.	Capturing and using all the thermal waste from the industrial and energetic processes in an efficient, cost saving way
7.	Adjustment of the financial supporting mechanisms from EU and SR by means that those will be able to finance as much as possible of decarbonating measurements and measurements lowering the energetic severity, including the administrative burden along the project submissions
8.	Including the fulfillment of Parisian agreement into the basic enactments in the international trading agreements between EU and third countries (tzv. „Paris clause“)
9.	Transformation shouldn‘t endanger the competitiveness of industry. Therefore, it is necessary to introduce a supporting measurement for the third country product importers into EU as for EU product exporters from EU to third countries. As a supporting measure for the product importers Slovak Republic supports the introduction of a customs duty for import according to the carbon footprint (so-called carbon border adjustment/tax), while it is also required to solve the measurements for keeping the exporters‘ competitiveness

Potential incentives

The development of community energy in Slovakia should also be helped by the Ministry of Economy of the Slovak Republic, which is expanding its powers to create a support framework for promoting and facilitating development. Over time, a point of contact for guiding the administrative procedure regarding the establishment, operation and development of energy communities and communities producing energy from RES should also be established, whose tasks will be performed by the Slovak Innovation and Energy Agency (SIEA).

Energy communities and communities producing energy from RES are currently a hot topic in which great potential is hidden. In the coming years, we can therefore expect a boom in community energy, which, after clarifying the situation and eliminating the

above-described and exclusively domestic legislative threats, should contribute to an increase in energy efficiency and self-sufficiency.

Due to the fact that the regulation of energy communities and communities producing energy from RES defines only the basic conditions for their creation and functioning, we can expect that other mechanisms and processes will soon be created after the application practice has stabilized.

3 Linking the activity to the results of pilot activities A.T3.2 and A.3.3 to date

This table lists the decisive criteria for pilot assessment according to the methodology within the framework of the creation and development of the energy community in A.T.3.2, namely:

The decisive aspect of assessing success:	**Tested by EC:**	**Tested by EC:**
Name:	**EK - TEEK**	**EK OZ SOM_EKO**
Form of founder:	Interest association of legal entities	Interest association of legal entities
Number of founding members of the EC:	7	3
Number of subscribers at the time of testing:	58	22 + 148
Whether legal, financial and technical conditions are provided:	Partially	YES
hether the internal organizational model is democratic:	YES	YES

Whether the performance of administration and management is satisfactory: /	YES	YES
Whether the energy management, production and distribution system is functional and sustainable /	In test startup mode	In test startup mode

Mentoring Checklist – Steps to Build a Renewable Energy Community

At this point, PP12 – NEK presents the results obtained from the evaluation of the EC –TEEK and EC – OZ SOM_EKO according to the evaluation methodology developed by the guarantor of the activity A.T.3.2 – PP-AEER, namely the status of each step with a short comment. These findings and values will be a direct part of the processing of the final results into the NRGCOM project White Paper.

The following table clearly shows the results of the evaluation of selected successful ECs (EC-TEEK, Opatovce and EC OZ SOM_EKO, Petržalka) as examples of good practice:

Step	Status EC-TEEK	Comments EC-TEEK	Status EC-SOM_EKO	Comments EC-SOM_EKO
1. Baseline assessment of energy needs and resources	☑ Ongoing	Industrial techology park contexts assessed through meetings	☑ Ongoing	Energy and residential park contexts assessed through meetings
2. Stakeholder identification and engagement	☑ Completed	Tenant companies (MIND Park) preliminarily identified.	☑ Completed	Specifically and capacity-clearly defined identified founding and customer companies
3. Feasibility study (technical, financial, legal)	☑ Ongoing	Presentation at conference forums in Slovakia	☑ Ongoing	Presentation at conference forums in Slovakia
4. Definition of governance model and roles	☑ Ongoing	Interest association of legal entities created		A legal entity interest association created and operationally and legislatively secured

5. Awareness-raising and community information events	☑ Completed	Information campaign and professional training conducted.	☑ Completed	Performed a permanent professional information campaign and professional training.
6. Registration of the REC as a legal entity	☑ Ongoing	Waiting for the issuance of a valid SEPS certificate, other establishment agenda fulfilled.	☑ Completed	Obtaining and completing the processes of a valid SEPS certificate, fulfilling another operational internal agenda of the establishment
7. Funding application or financial structuring	☐ Not started	Postponed until REC legal certification becomes feasible.	☑ Completed	Implemented, in the process of evaluation at the Ministry of Economy of the Slovak Republic
8. Procurement and installation of energy infrastructure	☐ Not started	Not initiated; dependent on prior legal and funding steps.	☑ Completed	Implemented; in the stage of updating and verification
9. Establishment of energy management and storage strategy	☑ Completed	Already developed common EC strategy and management system	☑ Completed	A common strategy and management system of the EC has already been developed
10. Regular mentor–mentee follow-up meetings held	☑ Ongoing	Regular meetings were held, primarily in the form of informative and exploratory consultations aimed at clarifying regulatory developments, aligning expectations, and adapting pilot planning to national conditions.	☑ Ongoing	Regular meetings were held, primarily in the form of informative and management consultations aimed at clarifying regulatory developments to date, aligning future expectations, and adapting pilot planning to national conditions.

4. Notes on the issues of creation and starting points for the White Paper

Developed own internal database to solve the problem:

4.1 Accelerating climate change, rising energy prices and pressure on energy security create an urgent need for decentralized, resilient and community-based energy solutions. Renewable Energy Communities (RECs) represent a model that allows citizens, municipalities, SMEs and local organizations to actively participate in the production, consumption, sharing and trading of energy from renewable sources.

However, in the Danube Region this potential remains significantly untapped. Many municipalities and regions face legal, financial and organizational obstacles that prevent them from moving from strategic plans to the real implementation of REC projects. This White Paper synthesizes current knowledge, defines barriers, presents financing options and provides recommendations for policymakers and local governments.

4.2. Why Energy Communities?

4.2.1 Main benefits:

• Energy independence: local production reduces vulnerability to price shocks.
• Cost savings: community production and energy sharing reduce household and municipal bills.
• Social resilience: citizen involvement increases trust and supports local development.
• Emission reduction: RES are the basis for climate neutrality.
• Localisation of the economy: investments and revenues remain in the municipality or region.

4.2.2 European context:

Energy communities are part of the legislative package "Clean Energy for All Europeans" and supported in the programmes

- European Green Deal,
- REPowerEU,
- Cohesion Policy 2021–2027,
- Interreg – Danube Programme.

4.3. Main obstacles to REC development in the Danube region

Analyses (NRGCOM, JRC, EIB, CoM Europe) show the following barriers:

4.3.1 Financial barriers:

- lack of low-cost loans for small municipalities,
- limited ability to combine grants, loans and private resources,
- perception of REC as a "risky" investment by banks,
- lack of ESCO/energy cooperative schemes.

4.3.2 Legal-institutional barriers:

- insufficient integration of REC into regional and territorial planning,
- different implementations of European legislation in individual countries,
- complex permitting processes for small RES projects.

4.3.3 Technical and capacity barriers:

- low knowledge of energy sharing models,
- weak capacities of rural municipalities,
- absence of partnership models between municipalities,
- lack of technical manuals for project managers.

4.4. Starting points for the solution – lessons learned from the NRGCOM and NRG-PLAN projects

The outputs have shown that:

- legislative frameworks alone are not enough if financial instruments are lacking,
- small municipalities need simple investment models,
- joint projects of several municipalities work effectively,
- modular planning tools are key,
- success requires the participation of the "quadruple helix":

the municipalities themselves + SMEs + clusters + universities.

This knowledge is the basis for the recommendations in this White Paper.

4.5. Financing options for energy communities:

4.5.1 Public financing:

- Modernisation Fund
- EU funds (ERDF, Interreg, LIFE)
- Recovery & Resilience Facility
- National programmes for RES and energy efficiency

4.5.2 Private financing:

- community cooperatives,
- crowdfunding platforms,
- "community share ownership" schemes,
- green loans with guarantees.

4.5.3 Blended financing:

The most effective model: grant (20–60%) + soft loan + community capital.

4.6. Recommended models for municipalities

4.6.1 Municipal solar community:

- roofs of public buildings (schools, offices, primary schools, kindergartens, etc.),
- surplus shared with households,
- local network under community management.

4.6.2 Energy associations of several municipalities:

- joint production (solar, biogas, wind),
- joint preparation of project documentation,
- shared financing and operation.

4.6.3 Agricultural energy community:

- RES for farms (agroPV, biogas),
- connection of SMEs + farmers + municipalities,
- local use of heat and electricity.

4.6.4 Industrial energy clusters:

- energy sharing between SMEs in an industrial park,
- accumulation, flexibility, P2X solutions.

4.7. Investment tools for municipalities (Toolkit)

Tools that should be standardized and available:
- Energy Self-Assessment Tool
- Financial planner for REC (Investment Planner)
- Contract templates for partnerships
- Governance models for different types of communities
- Carbon footprint calculator and scenario planning
- Handbook for REC city coordinators
- SW ETMEC (Expert Tool for the Management of Energy Communities)

4.8. Pilot validation in the Danube region

We propose to test the models in:
• rural municipalities,
• border regions,
• energy-poor locations,
• municipalities with suitable RES resources.

Pilot projects should demonstrate:
• economic return,
• social impacts,
• technical feasibility,
• co-operated community model.

4.9. Executive Recommendations

For governments and regulators:
• Simplify permitting processes for small RES.
• Introduce national guarantee schemes for community projects.
• Enable flexible energy sharing within distribution areas.

For municipalities:
• Create joint energy clusters,
• Prepare a reservoir of RES projects,
• Use participatory financing.

For SMEs and entrepreneurs:
• Engage in “Energy as a Service” models,

• Provide technology partnerships for municipalities,
• Build regional energy associations.

For academic and research institutions:
• Provide methodological support,
• Develop optimization models for community energy,
• Train energy managers.

4.10. Conclusion

Energy communities represent one of the most effective tools for achieving climate neutrality, reducing energy costs and strengthening local resilience. The Danube Region has great potential, but fulfilling it requires:

• better access to financing,
• simple investment models,
• support for local governments,
• cross-border cooperation,
• strong quadruple helix partnerships.

This White Paper provides a framework for policymakers, municipalities, businesses and research organisations who want to move community energy from planning to real implementation.