DiGreen Handbook of GREEN good Practice

Solutions for cities and municipalities

F. Cecon, G. C. Dumitrescu, M. Fečko, D. Maffei

eurac research

UNIVERZITA PAVLA JOZEFA ŠAFÁRIKA V KOŠICIACH

UNIVERSITY OF APPLIED SCIENCES UPPER AUSTRIA

Institute for World Economy

DiGreen

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1.

About this handbook

1. About this handbook

The **DiGreen Handbook of GREEN good Practice** - Solutions for cities and municipalities is the result of the *Digital Government for Green Municipalities and Cities - DiGreen* project. The project is co-funded by the Erasmus+ Programme of the European Union.[1]

The handbook of GREEN good practice presents good examples of providing public services using green means. Municipalities and cities produce these "in-house" tools or use private sector products.

The text of the handbook is written in a clear, non-technical language, accessible to the general public, to be user-friendly and easy to understand and apply for practitioners. The ecologically provided public services present ways to rationalise the provision of competencies that the municipalities and cities have, engage inhabitants in governance, enhance the provision of public services qualitatively, base public policymaking on evidence, and take transparency and openness into consideration when providing public services.

The importance of targeting municipalities and cities is relevant in terms of their involvement in higher education. Higher education students of public administration, public management, public policy and other similar study programmes also fulfil their practical part of the study at the municipality and city public bodies.

The handbook was produced in hard copy and electronic format, both in English. The online form is available through the official DiGreen project website.

Short versions of the handbook were published online in the national languages of every partner (Slovak, Italian, German, Romanian).

The authors would like to thank all the involved municipalities and cites, which contribution and cooperation in formulating green good practice examples was valuable.

Municipalities and cities from which the good examples are presented in this handbook:

— Kremsmünster (Austria)

— Linz (Austria)

— Oberösterreichische Zukunftsakademie - think tank for trends and innovation (Austria)

— Lana (Italy)

— Naturno (Italy)

— Luson (Italy)

— Bacău (Romania)

— Gura Humorului (Romania)

— Mărăcineni (Romania)

— Kežmarok (Slovakia)

— Hlohovec (Slovakia)
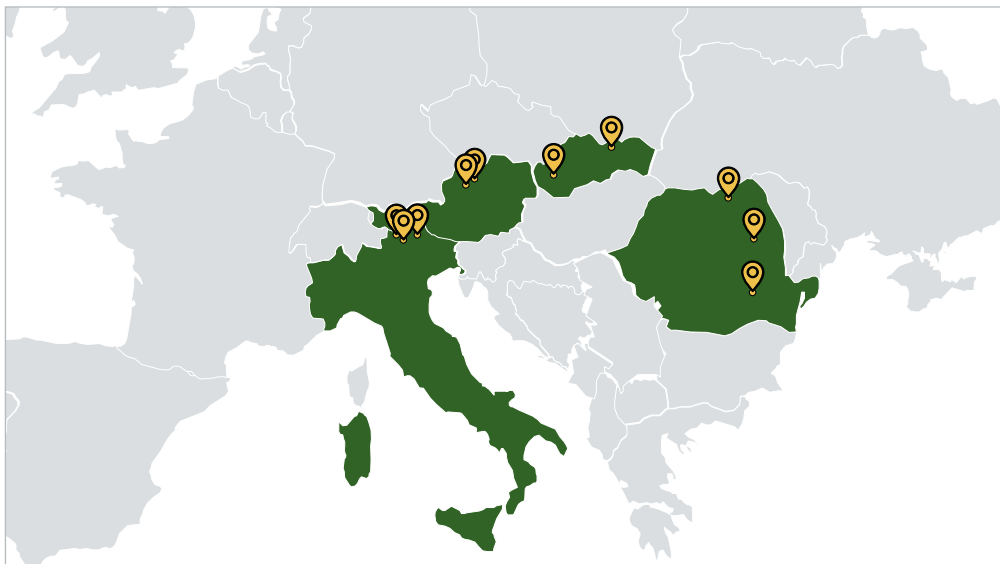
PROJECT DETAILS

Programme: Erasmus+
Action Type: KA220-HED - Cooperation partnerships in higher education
Call: 2021
Round: Round 1
Field: Higher Education
Project Title: Digital government for green municipalities and cities
Project Acronym: DiGreen
Project number: 2021-1-SK01-KA220-HED-000023505
Duration: 01. 11. 2021 – 01. 11. 2024
Total Budget: 324 810 Euro
National Agency: Slovenská akademická asociácia pre medzinárodnú spoluprácu (Slovak Academic Association for International Cooperation)

Project Coordinator
Univerzita Pavla Jozefa *Šafárika* v Košiciach, Fakulta verejnej správy (Pavol Jozef *Šafárik* University in Košice, Faculty of Public Administration, Slovakia)

Project partner organisations
Accademia Europea di Bolzano (Eurac Research, Italy)
Institutul de Economie Mondiala (The Institute for World Economy, Romania)
FH OO Studienbetriebs gmbh (University of Applied Sciences Upper Austria, Austria)

Project Scope
DiGreen aims to provide professionals working in the municipality/city self-government public bodies and young citizens (students) with a framework to exchange knowledge and digital and green good practices. DiGreen will provide a crosscutting teaching and education DiGreen concept together with a multidimensional curriculum.
DiGreen will facilitate the exchange among an international network of municipalities and cities, municipalities' employees, universities, research institutions and communal practitioners on learning about green digital skills and other environmental and digital issues.
The general objective of the DiGreen project is to establish a transnational collaboration between partners involved and apply innovative approaches for addressing their target groups.

Project results
Project result 1.: Handbook of DIGITAL good practice – cities and municipalities as the source for viable solutions
— The "digital" handbook is a source of good practice in providing digital services at the municipality/city level. Partner municipalities and cities cooperating with the consortium are the primary sources of good examples,
— Project result activities 01.12.2021 – 28.02.2023.

Project result 2.: Handbook of GREEN good practice – cities and municipalities as the source for viable solutions.
— The "green" handbook is a source of good practice for municipalities and cities' employees as key drivers for a green and sustainable environment. Partner municipalities and cities cooperating with the consortium are the primary sources of good examples,
— Project result activities 01.01.2022 – 31.03.2023.

Project result 3.: Crosscutting teaching and education DiGreen concept
— The teaching and education concept is an interdisciplinary educational and life-long learning knowledge base that encompasses content for developing knowledge in the field of digitalisation and climate neutrality,
— Project result activities 01.02.2023 – 30.06.2024.

Project result 4.: Multidimensional DiGreen Curriculum
— The curriculum is usable in its entirety or at the level of particular specific modules for higher education covering digitalisation and climate neutrality topics,
— Project result activities 01.08.2023 – 31.08.2024.

https://www.upjs.sk/fakulta-verejnej-spravy/en/international-relations/digreen/

2.

Why is the green transition important?

2. <u>Why is the green transition important?</u>

The "green transition" refers to the shift towards using renewable energy sources, reducing carbon emissions, and promoting sustainable practices in various industries. This transition is important because it addresses the pressing issue of climate change and the need to reduce our reliance on fossil fuels (Figure 1).

Climate change and environmental deterioration threaten the European Union and the rest of the globe. The European Green Deal, Europe's growth strategy, will make the Union a modern, resource-efficient, and competitive economy to meet these problems (European Commission, 2023a).

The president of the European Commission said about the Green Deal: "The European Green Deal that we present today is Europe's new growth strategy. It will cut emissions while also creating jobs and improving our quality of life. It is the green thread that will run through all our policies – from transport to taxation, from food to farming, and from industry to infrastructure. With our Green Deal, we want to invest in clean energy and extend emission trading, but we will also boost the circular economy and preserve Europe's biodiversity" (Ursula von der Leyen, 2019).
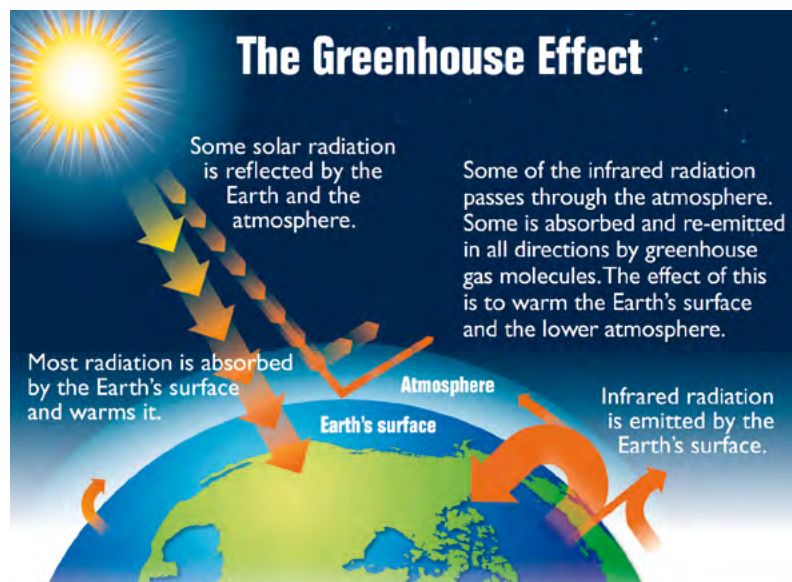
Figure 1: The greenhouse effect
Source: OER Services (2023)

The green transition is significant for the European Union for several reasons:

Climate change: The EU is committed to reducing its greenhouse gas emissions and meeting its targets under the Paris Agreement. Achieving these targets will require significant shifting to more sustainable and low-carbon practices and technologies.

Economic opportunities: Transitioning to a green economy can bring economic benefits to the EU, such as creating jobs and driving innovation in new technologies.

Energy security: Enhancing the use of renewable energy can reduce the EU's dependence on imported fossil fuels, improving energy security and reducing the impact of volatile energy prices.

Environmental protection: The EU is committed to preserving the environment and natural resources. A green transition can help to reduce pollution, protect biodiversity, and improve public health.

Compliance with EU regulations: The EU has several laws and regulations to protect the environment. By transitioning to greener economies, countries in the EU will meet their climate targets and comply with the EU's rules and regulations.

Overall, the green transition is a way for the EU to address climate change and design a greener future for all its citizens (Figure 2).

Figure 2: The benefits of the European Green Deal
Source: European Commission (2023b)

"The increasing frequency of extreme climate events, incentives provided by research projects and the development of European policies have led many local governments to develop and implement adaptation plans throughout Europe. Differing patterns of adaptation planning and adaptive capacity exist among different regions in Europe. Large cities generally fund their adaptation plans locally, whereas international and national funding appears more important for adaptation in less urban or densely populated territories of Southern and Eastern European regions. We observed that the main barriers that need to be overcome to boost the development of adaptation plans and their implementation are insufficient resources, capacity (mainly technical), commitment (mainly political) and uncertainty, highlighting the dependence on external financial support in many cases" (Aguiar et al., 2018).

The green transition is vital for municipalities because it can help mitigate the effects of climate change and reduce greenhouse gas emissions, leading to a more sustainable future. By implementing environmentally-friendly policies and practices such as increasing renewable energy sources, improving public transportation, promoting sustainable waste management, and encouraging energy-efficient buildings, municipalities can improve their residents' quality of life, reduce costs, and attract new investments and businesses. Additionally, transitioning to a green economy can create new job opportunities and help strengthen the local economy.

Rivas et al. (2021) argue that "Reaching and indeed exceeding national or EU GHG reduction targets, such as those proposed by the EU Green Deal, is not an easy task. However, many municipalities across Europe are aware of their crucial role and are developing strategies towards carbon neutrality by 2050." To them, "The key enabling factor for higher climate ambition in cities is the development of local mitigation actions in line with the results of the baseline emissions inventory; focusing on implementing actions in the most emitting sectors of activity" (Rivas et al., 2021).

The solutions presented are not just in-house products but also instances of successful cooperation with private organisations. Furthermore, the handbook emphasises the need for a European perspective in the green transition process by studying good practice examples from municipalities in many European countries and bringing them together to give significant help and inspiration to other local institutions looking to undertake new green projects.

The green public services will present ways how to rationalize the provision of competencies that the municipalities and cities have, how to engage inhabitants in governance, how to enhance the provision of public services qualitatively, how to base public policymaking on evidence and even how to take transparency and openness into consideration when providing public services.

2.1. AGENDA IN THE EU

The European Green Deal intends to achieve climate neutrality in Europe by 2050, develop the economy through green technologies, promote sustainable industry and transportation, and reduce pollution. Transforming climatic and environmental difficulties into opportunities will make the transition more equitable and inclusive. The European Commission, through the Technical Support Instrument, assists national governments in designing and implementing measures to support their climate aspirations. Policies for modelling greenhouse gas emissions, urban planning, SMART cities, poor quality in urban areas, decarbonising electrical systems, energy-efficient heating and cooling systems, energy efficiency investments in buildings, sustainable transport/mobility, and alternative fuels are among the support tools (European Commission, 2023c).

One-third of the 1.8 trillion Euro investments from the NextGenerationEU Recovery Plan and the EU's seven-year budget will be used to support the European Green Deal (European Commission, 2023d).

According to the European Committee of the Regions (2023) experts, the European Committee of the Regions' flagship program, **Green Deal Going Local**, aims to put cities and regions at the centre of the EU's transition to climate neutrality. The European Green Deal core objectives can only be achieved by empowering local and regional governments and giving them direct funding to make the critical investments that residents require (Figure 3).

Green Deal Going Local has the following objectives:

— To encourage local and regional leaders throughout Europe to act on climate change.

— To boost the delivery of sustainable EU-funded projects in Europe's local communities by accelerating the absorption of EU funding by local and regional authorities.

— To demonstrate how EU regions, cities, and villages are leading efforts to adapt to and reduce the effects of climate change.

Figure 3: Delivering climate neutrality, leaving no one behind
Source: European Committee of the Regions (2023)

Energy communities organize collective and citizen-driven energy initiatives that help pave the way for a sustainable energy transition while bringing residents to the forefront. They help to increase the public acceptability of renewable energy projects and make it simpler to attract private investment in the clean energy transition. At the same time, they can bring immediate benefits to residents by enhancing energy efficiency, cutting power prices, and providing local job opportunities.

The Energy Communities Repository was launched in April 2022 to assist local actors and citizens interested in establishing a Citizens Energy Community or a Renewable Energy Community in urban areas with technical and administrative advice and encouraging their development. It identifies enabling and supporting frameworks for renewable energy and citizen energy communities using the data collected. The Energy Communities Repository also conducts impact assessments of energy communities. It disseminates best practices and know-how to local governments, businesses, citizens, and citizen organizations interested in establishing energy communities, particularly in EU countries with a weak tradition of such initiatives.

Launched in June 2022, **the Rural Energy Community Advisory Hub** offers technical and administrative advice to citizens, rural actors, and local governments to help them establish a Citizen Energy Community or Renewable Energy Community in rural areas and promote their growth. Its primary pursuits consist of identifying best practices for supporting the

rural energy community project framework, with close local government involvement. The Advisory Hub also offers technical support for a few selected rural energy communities providing local stakeholders with networking opportunities (European Commission, 2023e).

As part of United Cities and Local Governments, the Council of European Municipalities and Regions (CEMR) is the broadest European association of local and regional governments focusing, among others, on the environment, climate and energy. Based on members' needs, CEMR's ad hoc Expert Group on Environmental Issues deals with topics such as water management, biodiversity and management of green spaces. Regarding the energy transition, CEMR expresses the political perspectives of local and regional authorities on carbon neutrality and energy efficiency, contributes to both current and future discussions and decisions in Europe (and internationally on climate issues) on critical domains related to climate, energy, environment and the rational use of natural resources, and works in partnership with other European and international networks (notably in the framework of the Local Governments and Municipal Authorities constituency) to recognise the role that the local level can play in this area. Regarding waste management and circular economy, CCRE has the following goals:

— Promote the perspective of local and regional governments on the reform of waste legislation.

— Contribute to the European Commission's thought processes on moving towards a circular economy: improve the use of natural resources, implement waste legislation and its possible revisions.

— Raise legislators' awareness of measures to be taken at the beginning of a product's life cycle, particularly at the manufacturing stage (eco-design, packaging standards, preventative measures on waste).

— Present tangible proposals to reinforce the principle of extended producer responsibility (CCRE, CEMR, 2023).

Amongst its members there are the Austrian Association of Municipalities, CEMR Italian Section (AICCRE), the Romanian Municipalities Association and the Association of Towns and Communities of Slovakia.

The EU Covenant of Mayors for Climate & Energy brings together thousands of local governments committed to providing a better future for their residents. By participating in the program, they voluntarily agree to achieve EU climate and energy goals (Figure 4).

Figure 4: The 3 pillars of signatories' commitments
Source: Covenant of Mayors – Europe (2023a)

In Europe, the Covenant of Mayors was established in 2008. The Global Covenant of Mayors, established in 2015, has capitalized on the experience acquired in Europe and beyond and is expanding on the initiative's major success factors: bottom-up governance, multi-level collaboration, and context-driven framework for action (Covenant of Mayors – Europe, 2023b).

"We, Mayors from all over Europe, hereby step up our climate ambitions and commit to delivering action at the pace that science dictates, in a joint effort to keep global temperature rise below 1.5°C - the highest ambition of the Paris Agreement.

Our vision is that, by 2050, we will all be living in decarbonised and resilient cities with access to affordable, secure and sustainable energy. As part of the Covenant of Mayors - Europe movement, we will continue to (1) reduce greenhouse gas emissions on our territory, (2) increase resilience and prepare for the adverse impacts of climate change, and (3) tackle energy poverty as one key action to ensure a just transition." (Covenant of Mayors – Europe, 2023a).

2.2. COMPARISON OF THE COUNTRIES REGARDING IN THE GREEN TRANSITION

The rise in greenhouse gas emissions has become a massive issue for humans and the environment. As a signatory to the Kyoto Protocol and the Paris Agreement, the European Union joined the international community's efforts to achieve a 20% reduction in greenhouse gas emissions (GHG) by 2020 compared to 1990 levels and up to 55% by 2030 as intermediate steps toward attaining climate neutrality by 2050. Recent analyses have found that reducing global warming to 1.5 degrees Celsius to satisfy the Paris Agreement goals will remain a major challenge under the present level of ambition (Dumitrescu, 2022).

According to the World Meteorological Organization (WMO), by 2025, the yearly global temperature will be at least one degree Celsius higher than preindustrial levels. It is likely between 0.91 and 1.59°C (WMO, 2020). The Biodiversity Ecosystem Services (BES) Index reveals that 20% of all nations have ecosystems that are in a fragile state over more than 30% of their area. Moreover, 55% of global GDP is dependent to a certain degree on BES (Swiss RE Institute, 2020).

According to the statistical data provided by Eurostat (see Figure 5), Romania, Slovakia and Italy met two years before the target for 2020 (a reduction by 20% in GHG emissions, compared to 1990). Austria increased its emissions of greenhouse gases by 20 p.p. in 2018, compared to 1990, reducing the increase to 9.1 p.p. by 2020.
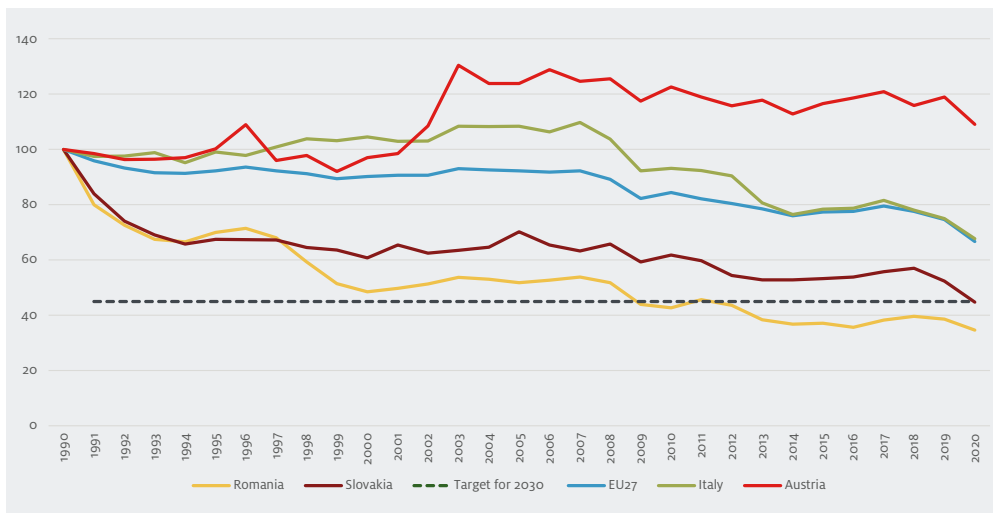
Figure 5: Net greenhouse gas emissions in Austria, Italy, Romania and Slovakia, Index 1990=100
Source: Eurostat (2023)

Concerning the target for 2030 (55% reduction against the level of 1990), we see in Figure 5 that Romania and Slovakia have met it already, while Italy and Austria must continue to address the issue.

As per greenhouse gas emissions per capita (Figure 6), the ranking of the consortium displays the following order: Austria, the first with 8.2 tonnes, followed by Italy (5.9 tonnes), Slovakia (5.2 tonnes) and Romania (4.0 tonnes).
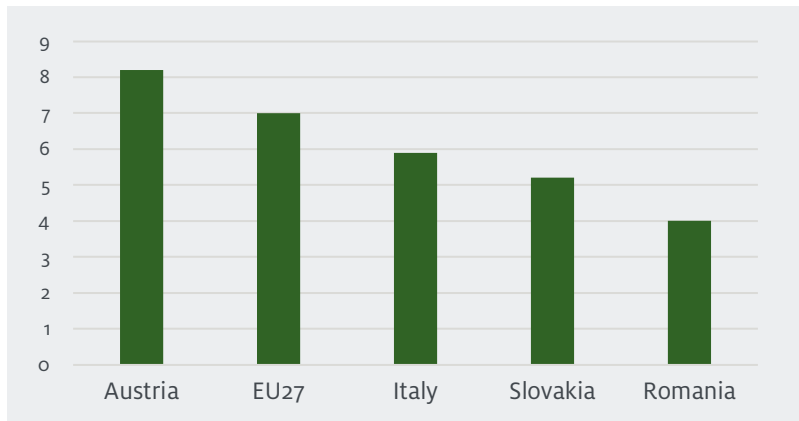
Figure 6: GHG tons per capita in 2020
Source: Eurostat (2022)

The greenhouse gasses emitted in the atmosphere at the EU level reached 3.1 trillion tonnes in 2020. Italy`s share is around 11.4% (Germany`s is 23.35%), Romania`s is 2.46%, Austria`s 2.33% and Slovakia`s is 0.91% (Figure 7).
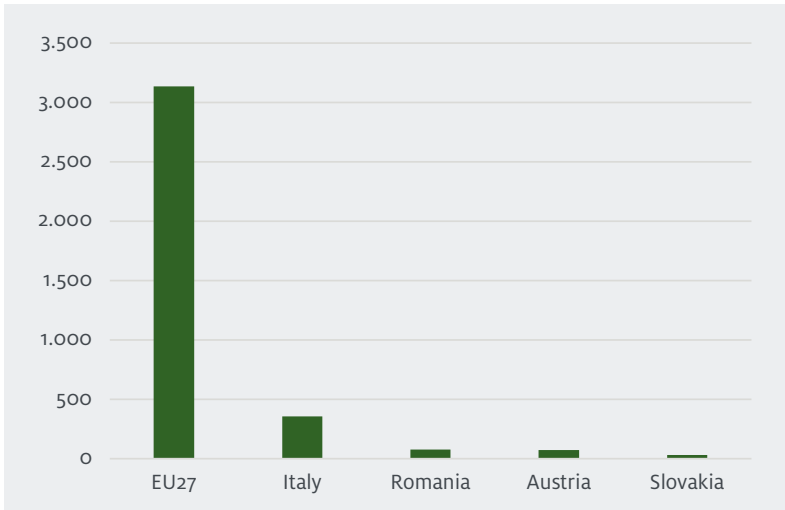
Figure 7: GHG tons in 2020
Source: Eurostat (2023)

Regarding the share of energy from renewable sources, in 2021, Austria ranked first with 36%, followed by Romania (24%), Italy (19%) and Slovakia (17%). The same ranking was in 2004, with a different share of energy from renewable sources for the countries in the consortium (Figure 8).
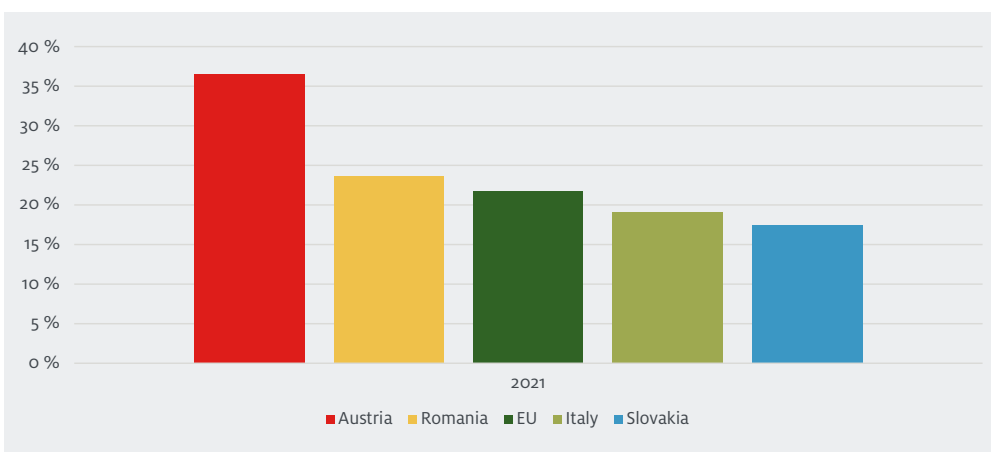
Figure 8: The share of renewable energy sources in 2021, %
Source: Eurostat (2022)

Between 2004 and 2021, Italy recorded the highest growth (201%), followed by Slovakia (172%), Austria (62%) and Romania (40.36%).

Regarding the national expenditure on environmental protection in 2019 (see Figure 9), the latest data available on the Eurostat portal show that Italy allocated the highest amount (282,082 million Euro), followed by Austria (32,987 million Euro), Romania (1,837 million Euro) and Slovakia (1,671 million Euro).

Between 2010 and 2019, Italy increased its allocation by around 30%, the highest boom, followed by Romania (12.12%) and Slovakia (13.10%). We must mention that between 2010 and 2013, Eurostat needed to provide data about Austria's expenditures in environmental protection. Between 2014 and 2019, the highest acceleration was recorded in Austria (36%), followed by Italy (20%), Romania (16%) and Slovakia (15%).
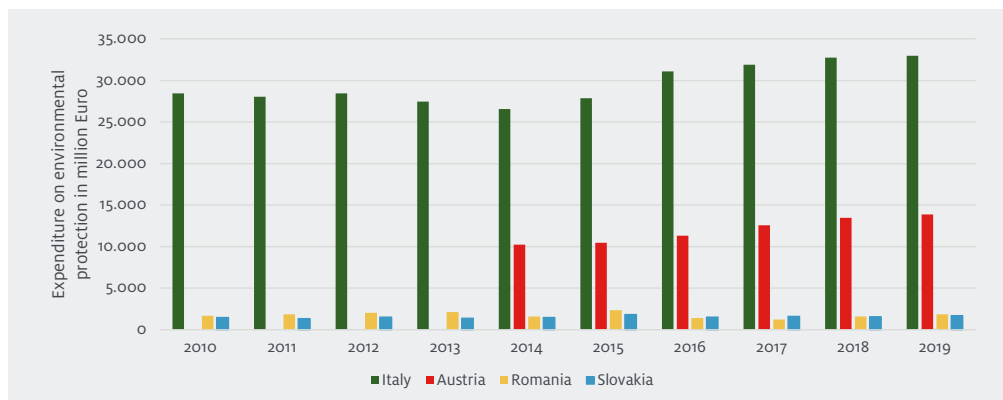
Figure 9: National expenditure on environmental protection
in 2019, million Euro
Source: Eurostat (2023)

Italy's spending on environmental protection represented only 12% of the EU equivalent, while Austria's just 5% and Romania and Slovakia around 1%. Therefore, there is much room for improvement in the situation in the consortium member states.

The Green Deal indicators relate to all economic sectors, from transport to agriculture, energy, circular economy and waste management.

When comparing the analysed countries (Austria, Italy, Slovakia, Romania) with the EU average for several indicators, one may see that all countries have registered significant progress during 2010-2020.

For clean transport indicators, Austria has registered the most significant progress (see Figure 10), performing well above the EU average compared with all the analysed countries.

Slovakia and Romania registered the slowest progress. Moreover, in 2020, after the Green Deal adoption, Austria's progress was very significant, registering 6.2% zero-emission vehicles of newly registered passenger cars, compared with 2.2% in Romania, 2.3% in Italy, and 1.1% in Slovakia, surpassing EU average that was of 5.3%.
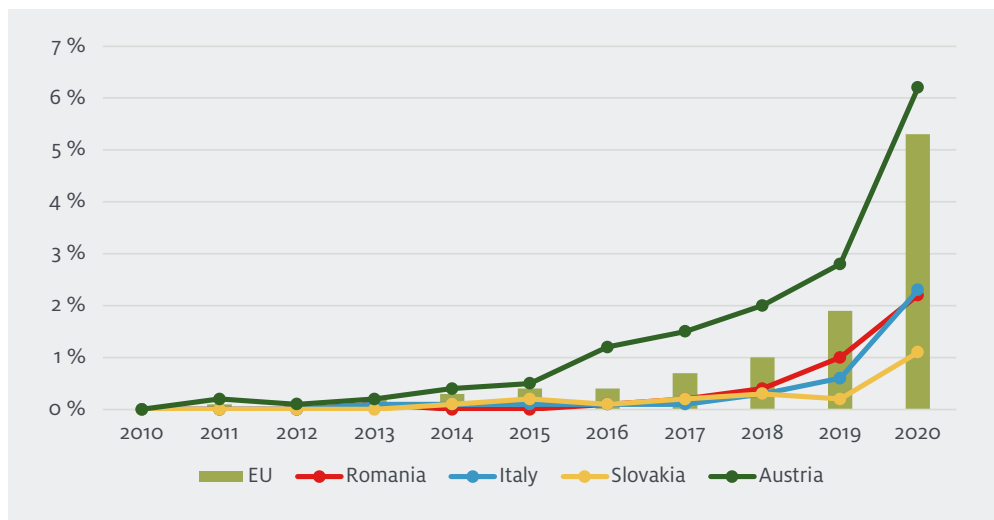
Figure 10: Zero-emission vehicles (% of newly registered passenger cars)
Source: Authors based on https://ec.europa.eu/eurostat/cache/egd-statistics/

Another important indicator for green transport is related to railway transportation, which should be encouraged since it is less damaging to the environment than fossil fuel transportation. According to the Green Deal agenda, there are two leading indicators related to railways: passenger transport by mode (rail % in total inland passenger/km) and freight transport by way (% in total inland freight tones/km).

For the first indicator, there is a substantial gap between the analysed countries. While some, like Austria and Slovakia, performed well and even surpassed the EU average, there is significantly low development for Romania and Italy (see Figure 11).
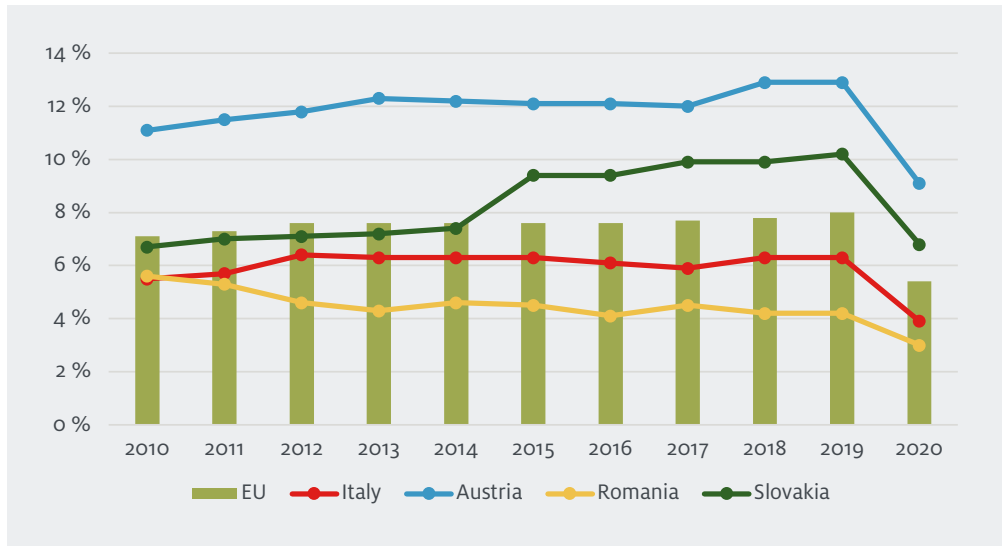
Figure 11: Passenger transport (Rail % in inland passenger/km)
Source: Authors based on https://ec.europa.eu/eurostat/cache/
egd-statistics/

As shown by the graph above best performance is registered in Austria, with a 12.9% score in 2019, while in 2020, all countries performed poorly compared with previous years because of the pandemic consequences that significantly limited mobility.

The freight transport by rail indicator shows excellent performances in all countries, with Slovakia, Austria and Romania ranking well above the EU average. At the same time, there is little progress in Italy, which ranks lowest in all the analysed countries and below the EU average (see Figure 12).
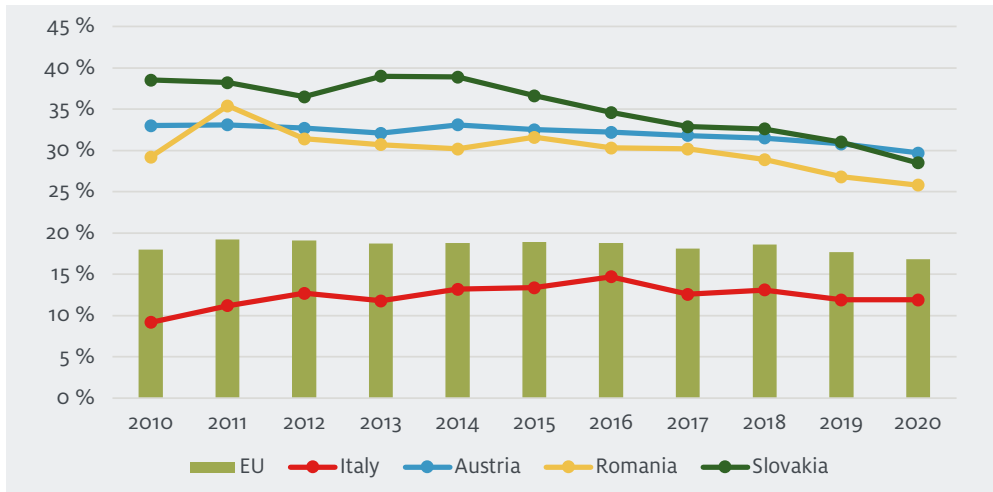
Figure 12: Freight transport by mode (% in total inland freight tonnes/km)
Source: Authors based on https://ec.europa.eu/eurostat/cache/egd-statistics/

Waste recycling is another important indicator for the Green Deal agenda, and EU data shows that two of the analysed countries (Romania and Slovakia) performed better during the analysed period (2010-2020), ranking under the EU average in terms of waste generation while Austria and Italy have surpassed the EU average (Figure 13).
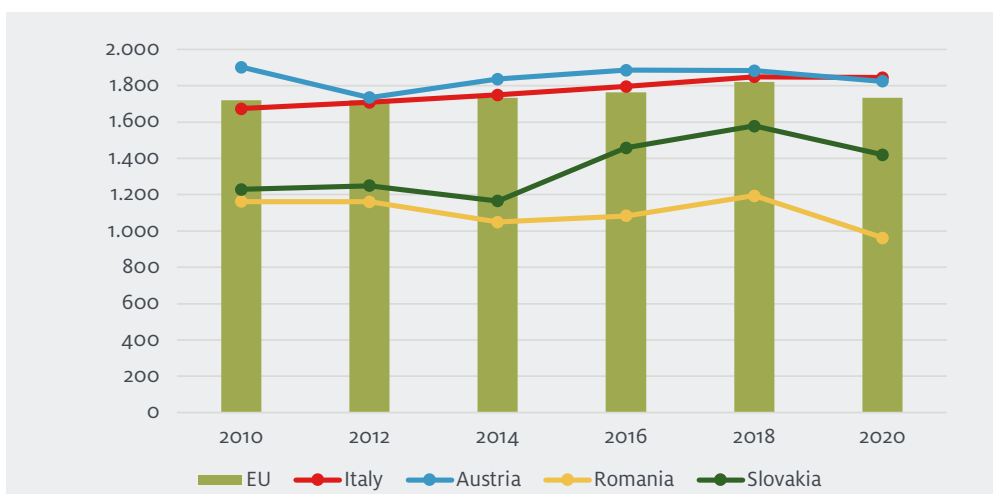
Figure 13: Generation of waste (excluding major mineral waste) by hazardousness (kilograms per capita, hazardous and non-hazardous in total)
Source: Authors based on https://ec.europa.eu/eurostat/cache/egd-statistics/

2.3. **AGENDA IN AUSTRIA**

The main goal behind a green agenda is sustainability. This means that political decisions should not have any negative effects in the future, especially on the environment, and political and administrative decision-makers should always consider these issues when making decisions. There are three core issues that need to be considered when discussing sustainability: ecological, social, and economic. Regarding ecology, sustainability is usually said to go along with the necessity to reduce resource consumption to the minimum required. Green projects are strongly connected with the issue of climate change and the questions of how to mitigate global warming and deal with its consequences. The green agenda at the local level is greatly influenced and determined by legal requirements and decisions that are made by superior political bodies such as the state, the federal government or international organizations and treaties.

In 2019, the Austrian government launched a long-term climate strategy called "Langfriststrategie 2050". This strategy defines the goal of making Austria climate-neutral until 2050. It focuses on reducing greenhouse gas emissions, promoting renewable energies, increasing energy efficiency and on specific issues for sectors such as mobility, consumption, agriculture and industry. Many of the issues discussed in the climate strategy affect municipalities (Bundesministerium für Nachhaltigkeit und Tourismus, 2019). Ever since its publication in 2019, the document has been criticized for being far too little ambitious. At this point, the ministry for climate protection, environment, energy, mobility, innovation and technology ("climate ministry") is working on revising this strategy and a new draft should be made public in 2023 (DerStandard.at, 08.01.2021).

The proposed energy transition is a core part of all endeavours to raise sustainability. The energy transition is a term that describes both the goal of reducing energy consumption and the shift towards renewable energies. Oil, gas and coal are responsible for high carbon dioxide emissions, causing and worsening global warming. The energy transition aims to stop burning these fossil fuels and rely entirely on renewable energies such as wind power, hydropower, solar energy, biomass and geothermal energy. In Austria, as of 2021, more than 60% of electricity was produced by hydropower. However, this only includes electricity, not other important energy consumption sectors such as mobility and heating. Green projects can positively affect this goal by promoting the use of renewable energies. As entirely changing the energy sources takes a significant amount of time, it is also important to reduce energy consumption as much as possible, to reduce fossil fuel use. This is another aspect where sustainability projects on the local level can have an impact by, for example, improving public transport systems or by supporting local production to reduce long-haul transit of goods.

These priorities are in line with the Erneuerbaren-Ausbau-Gesetz (EAG), which can be translated as "Renewable-Expansion-Law". This law has been adopted by the Austrian parliament in 2021. It introduces market premiums to support electricity production from wind power, hydropower, solar energy, biomass and biogas. Besides that, it also includes public funding for the installation and extension of solar energy and wind power plants (Erneuerbaren-Ausbau-Gesetz – EAG).

2.3.1. **Who initiates the solutions for the municipalities**

Green projects are often the result of civic involvement processes. Sustainability depends heavily on the population's willingness to change its behaviour; therefore, it is of the utmost importance to include the general public from the very beginning. Sometimes, municipalities launch a green project together with the local community and then hand over control of the project to committed citizens. Accordingly, a typical green project might start with an idea presented by local politicians or municipal authorities, who then observe the reactions and feedback from the local population and then try to further develop the idea into an actual project with the citizens. However, not all ideas are originally coming from politicians or authorities. Many ideas behind green projects are first put forward by citizens, whose concepts are then picked up by the municipality. Occasionally, ideas of green projects also emerge as a result of cooperation with other public or private institutions or other municipalities.

The fact that green projects are usually carried out by a community of many actors from different backgrounds strongly contrasts with digital projects, which are often initiated, developed and implemented by a relatively small number of specialists and with quite a low extent of civic involvement. This difference might be because digital projects are of interest only to a specific target group of users, while sustainability affects all citizens in their daily lives.

The most important drivers behind green projects are climate change and the public's increasing awareness. Another significant driver is the crises we have faced during the last months and years and their consequences. Especially rising energy prices make public bodies, institutions and the general public to consider their consumption of resources. And eventually can lead, for example, to a more conscious use of energy. Another factor promoting sustainability projects it the increasing importance of the SDGs (UN Sustainable Development Goals) at the local level.

Citizens interested in sustainability projects usually demand an efficient and swift implementation of these projects. An important expectation of the public is that green projects should improve the overall liveability of their community. Many citizens are reluctant or clearly opposed to projects that make their daily life more difficult or that go along with a decrease in convenience, even if there are positive effects on the environment. For example, sometimes people insist on going by car instead of public transport because they do not want to depend on timetables or don't want to share the vehicle with other passengers.

2.3.2. **Role of unions**

As green projects are regularly initiated or implemented by citizens or at least in close cooperation with citizens, unions play an important role here. Unions represent citizens' and other stakeholders' interests and expectations and are a way for citizens who share similar interests and visions to gather and bring forward their ideas and demands. Large organizations that are well-known in public and that sometimes have strong ties to authorities and political parties are not only able to pursue their ideas; they are also a way for individuals to get into the political arena and utter their opinion and suggestions.

Therefore, unions such as associations, non-governmental organizations or citizen platforms can have different roles in green projects. They can be initiators who publicly demand the implementation of a certain project and try to convince politicians of their ideas, often representing a certain group of citizens, such as bicyclists who advocate for more and safer bike lanes. They also can be partners of the municipality to implement an idea that is coming from the local administration or the local government; for instance, they could share their know-how with those in charge of implementing the project or actively participate in implementation with their own staff. Municipalities could even decide to completely outsource the implementation and operation of a green project and delegate these responsibilities to a union. On a smaller scale, unions can also be a valuable source of feedback for the municipalities' authorities when implementing a project to further adapt it to the needs and demands of the citizens and especially of target groups represented by the unions.

The Klimabündnis Österreich (climate union Austria) is a network of municipalities, companies, schools, other educational institutions, and other local organizations. As of 2022, nearly 1100 municipalities are members of the Klimabündnis. Its main goal is promoting the reduction of energy consumption, protecting the environment, reducing waste and consumption of resources, informing companies about ways to make their business more sustainable and environmentally-friendly and supporting municipalities in promoting public transport (Klimabündnis, 2023).

Also, recently active protest movements like "Last Generation" are unions that strongly advocate for their ideas and try to promote a shift towards renewable energies and a more climate-friendly society. Another example is "Fridays for Future", founded in 2018 by Greta Thunberg.

Unions are not always necessarily supportive of green projects, as they also can act as players who lead the protest against sustainability projects. Therefore, while unions are often drivers and supporters of green ideas, they can also be an obstacle or even strong veto players. For example, there is a project to make a wind farm (an area with several windmills) in the Austrian municipality of Trieben. Some of the citizens fiercely opposed the decision to build this wind farm. Only after a referendum, in which 55% of the municipalities' population agreed with building the wind farm, a final decision to allow the project to be realized was possible (ORF.at, 13.11.2022). Nevertheless, opposition against the project continues, led by a local citizen platform that intends to keep fighting the project, despite being democratically legitimated by most local residents (ORF.at, 14.11.2022).

Apart from unions initiated by citizens, powerful companies or other interest groups sometimes actively oppose green projects when they see the trend towards sustainability as a threat to their business model. This form of resistance can be even stronger when combined with the protest of citizens who are afraid to lose their jobs due to a greener economy.

2.3.3. Explanation of best practices selection

After choosing the cities and assuring their readiness to become part of this project, desk research followed by preliminary interviews was conducted. The goal was to get a first overview of sustainability trends and green projects initiated in the last years—representatives of Linz and Kremsmünster (the partner municipalities) and the Oö. Zukunftsakademie were asked to name those green projects they believe are most important. Afterwards, these projects were further analyzed, and eventually, a selection was made based on their relevance, innovativeness and uniquity. When choosing the projects, attention was also paid to making sure that these projects are applicable in other municipalities and that there are projects that cover as many different issues as possible. For example, the "GemeindeNavi" (Oö. Zukunftsakademie) was selected as it is a valuable tool for municipalities to deal with sustainability and find new ways to tackle various challenges. On the other hand, the renewable energy communities (Kremsmünster) were chosen to be of interest because of their high relevance in promoting renewable energy sources. For these selected projects, further research and in-depth interviews were carried out with relevant representatives.

2.4. AGENDA IN ITALY

Seventy billion Euro is the total amount of resources that Italy will deploy by 2026 to attain the second mission of its national recovery and resiliency plan, named "Green Revolution and Ecologic Transition". Of these 70 billions, 59.47 will derive from the national recovery and resiliency plan, absorbing more than 31% of its total resources. 1.31 billion will be obtained from the ReactEU, and the rest will be financed through an auxiliary fund (Governo Italiano, 2021). This mission is subdivided into four main components: (1) sustainable agriculture and circular economy, (2) renewable energy, hydrogen and sustainable mobility, (3) energy efficiency and building requalification and (4) territorial and hydric resource protection.

The first component, worth 6.47 billion Euro, is expected to improve waste management and strengthen the circular economy. Waste treatment plants should be modernized or built, and the North-South gap should be filled in this regard. At the same time, agriculture should become smart and sustainable, reducing the environmental impact of Italian food (Italia Domani, n.d.). The second component shall support the decarbonization of all economic sectors by providing investments and reforms to expand renewable energy sources. At the same time, hydrogen-based solutions should be fostered, from its production to its consumption by industry and transport. To reduce the dependency on other countries, the creation of competitive supply chains for the technologies needed for the transition should also be supported (Italia Domani, n.d.). This component is the largest one in terms of investment, absorbing a total of 25.36 billion Euro. The third component is a 22.24-billion-Euro heavy investment package addressed at improving the energy efficiency of buildings. This is an important goal considering that more than 60% of Italy's buildings (private and public) are more than 45 years old. Finally, the fourth component foresees mitigation measures against hydrogeological risks, protection measures for green areas and biodiversity, reduction measures against soil and water pollution, and measures to ensure

hydric resource availability (Italia Domani, n.d). 15.37 billion Euro will be devoted to the implementation of the goals of this component (Governo Italiano, 2021).

Overall, 37% of the resources contained in the Italian recovery and resiliency plan support green goals.

Together with the national recovery and resiliency plan, whose goals will be achieved by 2026, the Italian environmental efforts include the so-called Plan for the Ecologic Transition (short PTE – Piano per la Transizione Ecologica). The PTE is more long-term oriented and is set to enable the achievement of all goals listed in the Long-Term National Strategy by 2050 (MASE, 2022). The PTE's macro-goals are shared at the European level and consist of climate neutrality, zero pollution, climate change adaption, biodiversity and ecosystem recovery, and transition towards the circular economy and bioeconomy (MASE, n.d.).

The PTE was established in 2022 and is integrated with the national recovery and resilience plan. The PTE represents a transversal document that wants to harmonize and bring together the numerous plans, programs and strategies pursued to achieve the so-called "green" transition (MASE, 2022). The Interministerial Committee for the Ecologic Transition (short CITE) is responsible for process programming and monitoring. The plans' governance foresees strong coordination between ministries and local authorities and requires scientific-based decision-making. The necessity of a long-term transition plan resides in its complexity and the need to preserve it from opportunistic decision-making that will likely emerge following electoral cycles (MASE, n.d.).

The measures addressed within the plan are grouped around eight topics: decarbonization, sustainable mobility, air quality improvement, soil consumption and hydrogeological risk reduction, improvement of hydric resources and their related infrastructures, recovering and strengthening biodiversity, sea safeguard, promotion of circular economy, bioeconomy and sustainable agriculture (MASE, 2022).

Decarbonization entails plans and measures to achieve net zero by 2050 and a 55% reduction of greenhouse gases by 2030. This means that Italian emissions should be down to 256 million tons of CO_2 equivalent by 2030 (from 418 million tons of CO_2eq. in 2019). To achieve this objective, the plan foresees further energy-saving efforts, particularly within the transport and construction sectors. By 2025, coal is expected to be dismissed as a source of energy generation. Energy shall be produced from renewable sources at 72% by 2030 and almost entirely by 2050. Decarbonization will not leave the industry compartment untouched, as it accounts for 20% of the total national emissions. This will be achieved by a tight coupling of state subvention to energy efficiency. Agriculture and forestry will also contribute to more sustainable cultivation mechanisms and management, which is expected to lead to higher CO_2 absorption (MASE, n.d.).

The sustainable mobility measures focus on decarbonising the transport sector, which is currently responsible for 26% of the total national emissions. Of the total transport emissions, 56% are imputable to private transportation and 22% to heavy transportation (bus and trucks). The conversion to electric, hydrogen or biofuel-powered vehicles shall progressively reduce compartment emissions. In alignment with the European goals, the plan expects at least 6 million e-vehicles by 2030, zero-emissions ships and planes by 2035,

the doubling of high-speed train traffic by 2030 and tripling by 2050, a 50% increase of rail cargo traffic by 2030 and its doubling by 2050. Private mobility, which is more present in Italy than on EU-average (90% vs 82.9%), shall be reduced in favour of shared and collective mobility. 25 billion Euro will be poured into the national rail infrastructure by 2026. Further 9 billion Euro will contribute to more sustainable local mobility (MASE, n.d.).

As for air quality improvement, European goals are set to achieve zero air pollution by 2050. By 2030, Italy aims to reduce air pollution-related premature deaths by 55%, the number of threatened ecosystems by 25% and the production of urban waste by 50%. Italy currently counts around 60,000 premature deaths yearly because of pollution, mainly concentrated within the Po Valley. Agriculture, biomass combustion, transportation and civil heating represent the most problematic sectors, with the last two responsible for most of the emissions in urban centres. At the same time, they also have a high potential for improvement (MASE, n.d.).

Reducing soil consumption and hydrogeological risk is serious for a geologically fragile country like Italy. Soil sealing advances at 2 m² per second in Italy and has consumed 8% of the territory in recent decades. This phenomenon prevails in densely populated areas and coasts, and it hampers the soil from doing its geologic function like water and carbon absorption, undermining its stability. 1/5 of the Italian territory is at risk of floodings, mudslides, and climate change-related events like drought, wildfires, and intense precipitations that further exacerbate its fragility. Soil sealing must be reduced and brought to net zero by 2030 through stricter construction rules and the realization of natural-based solutions against coastal erosion. At the same time, measures to increase the territory's security must be taken by better monitoring and forecasting current climate dynamics and financing adequate solutions (MASE, n.d.).

Improving hydric resources and their related infrastructures is functional to the expectation of more frequent droughts. Drinkable water waste in civil aqueducts must be reduced from the current 42% rate (even 51% in some Southern regions). For this purpose, almost 5 billion Euro will be available for improving such infrastructure and supporting its digitalization and monitoring. Water savings in agriculture must be improved by investing in more efficient systems and adequate crop selection (MASE, n.d.).

The sixth topic concerns measures aimed at recovering and strengthening biodiversity. Italy counts 85 different ecosystems on its territory, 29 of which are considered at high risk due to climate change and the overexploitation of resources. To counteract these phenomena, Italy plans to increase protected areas from 10.5% to 30% of the national territory and to adopt more nature-based solutions when human intervention is required. Particular measures already included in the national recovery and resiliency plan regard the digitalization of national parks to improve monitoring and preservation, the renaturation of the Po river, the promotion of urban biodiversity with 6 million trees to be planted in urban areas and the conversion to organic agriculture within protected areas (MASE, n.d.).

Italy's coastal area stretches for more than 8,000 km, making sea safeguarding a topic worth considering. Intense tourism fluxes, heavy naval traffic and fishing activities in the Mediterranean basin threaten the marine environment and require stricter coordination with other Mediterranean countries to face the problems. Italy will promote initiatives at

this level and, in its national waters, it will expand marine protected areas to 30% from the current 19% of the total area. Moreover, at least 90% of coastal and marine systems will be mapped and monitored by 2026 (MASE, n.d.).

The last topic concerns the circular economy, bioeconomy and sustainable agriculture. Measures will focus on reducing resource consumption by improving waste management by 2030, enhancing market mechanisms for both primary and secondary materials to avoid their disposal, and extending producers' accountability over the lifetime of their products. Repairing products shall become easier and cheaper, and more investments will be devoted to research and development in the eco-efficiency sector. Looking at the European objectives for the circular economy, Italy already performs well in certain areas. The 2025 goal has already been achieved in package recycling, but there still is much to do to reduce waste further and improve recycling, particularly in the Centre and the South (MASE, n.d.).

Green Strategy in South Tyrol

Looking closer to South Tyrol, the Autonomous Province of Bolzano also adopted a sustainability strategy to pave the way to a "greener" future. The local strategy focuses on seven action fields: (1) the reduction of greenhouse gas emissions, (2) competitiveness in the circular economy, (3) social security and equal opportunities, (4) natural habitats and biodiversity safeguard, (5) production and behavioural consumption changes, (6) high-quality public services and (7) transparency and justice (Südtiroler Landesregierung, 2021a). Four of these seven sustainability goals are strictly related to environmental sustainability (1, 2, 4 and 5). The first action field is about emission neutrality, achieved through energy savings and increased energy production from renewable sources, which shall also be exported. The second point is about ensuring economic competitiveness while it becomes more sustainable. Point four wants to safe-guard nature by reducing soil sealing and renaturing places and waters. To become more sustainable, it is necessary to make changes also in the behaviour of people and industries in the way they consume and produce. This is the goal set within the fifth action field (Südtiroler Landesregierung, 2021a).

This general strategy is accompanied by more specific and concrete plans, like the climate plan South Tyrol 2040. The climate plan is not an isolated initiative but integrated with national and supranational efforts and other local strategies. The plan foresees a 55% reduction of CO_2 emissions by 2030 (compared to 2019) and climate neutrality achieved by 2040. Energy production from renewable sources is set to increase from 67% to 75% by 2030 and 100% by 2040. Other greenhouse gas emissions (like CH_4 and N_2O) will be reduced by 20% by 2030 and 30% by 2037. These goals are to be achieved together with reducing people at risk of poverty to 8% by 2030 (down from 18% in 2019). There are areas where South Tyrol represents a frontrunner in the fight against climate change, like (1) district heating, which already ensures annual CO_2 emission savings of up to 300,000 tons; (2) buildings renovation; (3) the South Tyrol Pass, which is a unique ticket for all public transportation within the province, it works on a pay-per-use basis but foresees remarkable discounts for intensive use; (4) light pollution reduction and energy saving; (5) renewable energy. Despite these positive examples, further efforts are needed. Laws, positive and negative incentives and a cultural transformation represent the tools that will be used to achieve the objectives set in the climate plan (Provincia Autonoma di Bolzano, 2022).

Greenhouse gas emissions (CO_2, CH_4 and N_2O) in South Tyrol are mainly caused by road transport (44%), agricultural activities (17%), private heating (17%) and industrial activities (12%). Transportation along the Brennero Motorway alone contributes to 16% of the total green-house gas emissions in South Tyrol (not imputable to transit alone). According to the local government, 90% of total emissions are within the intervention area (Provincia Autonoma di Bolzano, 2022).

The measures that will be adopted to tackle the identified problems fall within sixteen action fields, namely (1) communication and sensibilization, (2) heavy traffic and goods transport, (3) passenger transport, (4) construction sector, (5) heating, (6) agriculture and forestry, (7) industry, (8) private services, (9) grey energy, (10) energy production, storage and transport, (11) biomass, (12) long-term CO_2 stockage pits, (13) resiliency and adaptiveness, (14) eating and consumption habits, (15) support and certification services, (16) research (Provincia Autonoma di Bolzano, 2022).

The plan was completed in 2022. Measures labelled urgent started being implemented in March 2023, and the local government's final approval of the climate plan is set for June 2023 (Provincia Autonoma di Bolzano, 2022).

2.5. AGENDA IN ROMANIA

The green agenda in Romania includes a set of initiatives and policies aimed at promoting sustainable development and reducing the country's environmental impact. This includes efforts to reduce emissions, increase the use of renewable energy, and improve energy efficiency.

One key aspect of Romania's green agenda is its goal to produce 30.7% of its energy from renewable sources by 2030. If the National Integrated Plan for Energy and Climate Change is amended by 2024, this target could me more ambitious, namely 34% (Cruceru, 2022).

In Romania, as of June 2022, the installed power in electricity production capacities was:

— 36.3% Water

— 16.9% Coal

— 16.4% Wind

— 14.3% Hydrocarbon

— 7.7% Nuclear

— 7.6% Solar

— 0.8% Biomass and related (International Trade Administration, 2022).

To achieve this goal, Romania has implemented several policies to encourage the development of renewable energy projects. One of these policies is the feed-in tariff, which provides financial incentives for producing electricity from renewable energy sources. Additionally, Romania has implemented a renewable energy quota system, which requires a certain percentage of electricity from renewable sources.

Another essential aspect of Romania's green agenda is promoting energy efficiency. The country has implemented measures to improve energy efficiency in buildings and industry, including implementing energy performance certificates and introducing energy efficiency labelling for appliances. Romania has also launched several programs to encourage using energy-efficient technologies, such as LED lighting and solar water heaters.

As a member of the European Union, Romania is also subject to the EU's ambitious goals for reducing emissions and increasing the use of renewable energy. These goals include reducing greenhouse gas emissions by at least 55% by 2030 and increasing the share of renewable energy in the EU's overall energy mix to at least 30.7%. Romania is working to comply with these targets by implementing its green agenda.

Romania has also made significant progress in developing wind energy in recent years. The country has considerable potential for wind energy development, particularly in western regions with the highest wind speeds.

Green development in Romania: measures, policies, strategies

In recent years, the issue of climate change management and the green transition that may boost sustainable development and renewable energies have been top issues on the EU and Romania's public agenda (Chitu et al., 2022). While the green economy is, in fact, the economic activity that is based on sustainable development encompassing the use of renewable resources and environmental protection, at the EU level, by 2050, there is an ambitious goal: to turn the European economy into the world's first climate-neutral bloc (Potârniche et al., 2022). Zamfir et al. (2016) showed that Romania assumed, a target of 24% share of renewable energy in consumption to be achieved until 2020, higher than the average target of the European Union. This target had already been reached much earlier at the beginning of 2014. More progress in the field of green economy can be achieved through targeted public policies. The central issue of Romania's public renewable energy policy was how to efficiently implement the tradable green certificates system to boost the development of renewable energy projects. Some analyses (Prăvălie et al., 2022) show that in Romania, solar energy may increase the development of renewable energies while facilitating the green transition. However, the study underlines a complicated dilemma in harvesting solar energy across extensive lands without affecting their agricultural potential. The authors show that this dilemma could be addressed by developing solar energy systems in areas highly prone to land degradation, which are less feasible for crops and, consequently, preferred locations for solar electricity generation.

The green economy is a hotly debated global pillar as it significantly impacts sustainable development (Valentin et al., 2022). The implementation of this concept aims to identify

viable solutions for the development, conservation and protection of the environment while supporting sustainable economic growth.

While green development encompasses many levels of action, adopting the Green Deal has paved the way for more precise and targeted initiatives across all Member States. Hence in Romania, the green transition is now an essential topic in the PNRR (National Plan for Resilience and Recovery), while several national strategies have already been adopted.

The first strategy of Sustainable Development in Romania adopted in 1999 aimed at progressive improvement and maintaining the well-being of the population in correlation with the requirements of the rational use of natural resources and ecosystem conservation.

Accession to the European Union in 2007 determined new national priorities through the Strategy National for Sustainable Development. Time frames 2013-2020-2030 (SNDD), approved by the Government of Romania on November 12, 2008, aimed to reduce the socio-economic gap compared to that of the Member States of the European Union in the field of green development.

Currently, PNRR has already adopted a Strategy for the green transition that aims to reduce the impact of climate change and increase the amount of carbon sequestered, biodiversity conservation, sustainable management of forests and the continuous development of forests' ecological and social functions. Also, the National Strategy for Sustainable Development at 2030 Horizon (adopted in 2020) set ambitious goals for green development. This strategy supports green development in Romania on three main pillars: economic, social and environmental. This strategy also shows that an essential pillar for green development at the local and national levels is related to waste management.

In Romania, the primary method of waste management is storage. In the last ten years, measures have been taken to reduce the pressures created by non-compliant deposits on the soil and the quality of underground and surface water. Currently, the storage activity has been stopped in all non-compliant deposits while a greening process was implemented for most of them (and 40 non-compliant deposits are being closed). Measures were also implemented to support green development regarding the realization of collaborative and individual platforms for waste storing within the project's first phase.

Integrated Control of Nutrient Pollution (2008-2015) with a total value of 39,500,000 Euro. Other measures for the development of forested areas and agro-environment and climate measures were implemented through the National Rural Development Program 2014-2020 and contributed directly to the green transition at the national level.

In Romania, the green transition at the local level involves implementing policies and practices to reduce greenhouse gas emissions, promote renewable energy, and improve sustainability. Some municipalities have taken steps to achieve this, such as: implementing energy-efficient measures in buildings, such as improving insulation, upgrading heating and cooling systems, and using renewable energy sources; promoting public transportation, such as investing in electric buses, bike-sharing programs, and carpooling. They also considered encouraging waste reduction and sustainable waste management, such as implementing recycling programs and composting; developing green spaces and promot-

ing urban agriculture, such as community gardens and green roofs; supporting renewable energy projects, such as wind and solar power, and incentivizing the installation of solar panels on buildings.

These efforts not only help reduce greenhouse gas emissions and promote sustainability, but they can also improve quality of life, reduce costs, and attract new investments and businesses.

Presently, despite the progress recorded in the last ten years regarding transport with zero-emission vehicles in Romania, the gap with the EU average has remained considerable and has even deepened in recent years. That is why national regulations such as The National Plan for Infrastructure Investment in Transport for 2020-2030 have established ambitious targets to boost sustainable transport according to Green Deal objectives. In Romania, the legal framework regarding alternative fuels in the road infrastructure is aligned with the provisions of the Regulation of the European Parliament and of the Council on infrastructure implementation of alternative fuels (AFIR), which imposes rules on the types of fuelling stations, their power, and general operating standards. Hence in the future, each road infrastructure project in Romania will include technical-economic documentation for the construction of the supply infrastructure with alternative fuels. Also, within the evaluation process of the respective projects, the beneficiaries will develop an analysis regarding compliance with the DNSH (Do Not Significant Harm) principle as a condition for financing any future transports projects from the National or European funds.

Rail transportation is considered a green alternative to fossil fuel transportation; hence Romania has adopted a Strategy for increasing connectivity for identification and analysing the rail connectivity corridors, a step necessary to establish new investments in railway projects.

The geographical conditions induced by the arrangement of the Carpathian Mountains led to the development of four mail rail connectivity corridors (see Figure 14).
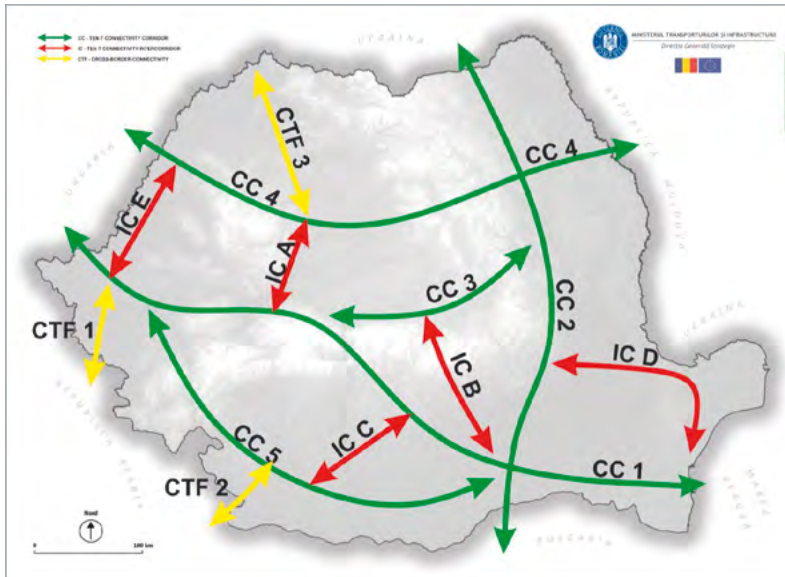
Figure 14: Map of rail connectivity corridors in Romania
Source: The National Plan for Infrastructure Investment in Transport for 2020-2030 (http://www.mmediu.ro/app/webroot/ uploads/files/Plan%20Investitional%20infrastructura%20de%20 transport.pdf)

The continuous development and improvement of the railway infrastructure in Romania is necessary since, in terms of the railway transport of people, Romania performs below the EU average, registering better performances only in the railway transport of goods.

Romania has adopted a National Strategy for a Circular Economy aiming to boost the sustainable use of resources according to Green Deal objectives. This strategy is a roadmap for accelerating Romania's transition from a linear to a circular economic model. Implementing the Action Plan (to be adopted in September 2023) will provide a framework for this transition. The strategy overviews the fourteen economic sectors and identifies the following as having the most significant circular potential: agriculture and forestry, automotive industry; construction; consumer goods (food and beverages); packaging (glass, paper, plastic materials etc.); textiles; electrical and electronic equipment. The National Action Plan for a Circular Economy published on 1 March 2023 in the draft form, proposes some specific objectives and actions to reduce Romania's gap compared with the EU regarding the development of the circular economy.

Romania's National Action Plan for a Circular Economy aims to preserve, conserve and sustainably use natural resources, while preventing excessive waste generation and increasing responsible consumption and environmental education.

To facilitate the achievement of these objectives, the action plan proposes a series of trans-sectoral actions, as well as specific sectorial measures. Such cross-cutting activities are related to education and training; research, development and innovation; public procurement; and digitization, all of which are considered essential to facilitate the circular transformation in the Romanian economy.

In conclusion, Romania has made a significant effort to reduce its environmental impact, increase the use of renewable energy and reduce emissions. Romania's green agenda includes an ambitious goal of producing 30.

7% of its energy from renewable sources by 2030 and implementing policies such as feed-in tariffs and renewable energy quotas to encourage the development of renewable energy projects, improving energy efficiency in buildings and industry, promoting sustainable transportation and encouraging the use of electric and hybrid vehicles. Romania is also complying with the EU's ambitious goals for reducing emissions and increasing the use of renewable energy.

2.6. AGENDA IN SLOVAKIA

The environmental policy in the Slovak Republic, actions and measures adopted by different policy actors at various levels of governance, has been designed as a highly fragmented policy, requiring comprehensive and direct contribution of central government authorities, self-governing regions, and local self-government units. As a result of globalization processes and the increase in human activities on the planet, non-governmental and private sector entities must realise a broader range of important activities and spontaneous and enthusiastic citizens' initiatives. Environmental issues directly impact our society. Thus, high priority must be assigned to the exchange of information between public administration and citizens, as well as educational activities for future generations.

2.6.1. Green agenda in the country - general

The Ministry of Environment of the Slovak Republic is the central state administrative authority and the supreme inspection authority in environmental affairs. The main competencies of the Ministry of Environment determined by Act No. 575/2001 Coll. on the Organisation of the Activity of the Government and the Organization of the Central State Administration, as amended by subsequent provisions, are mainly focused on:

— Protection of the environment, mainly the protection of nature and landscape.

— Waste management.

— Protection of water resources and the quality of groundwater and surface water.

— Fisheries and forestry in national parks.

— Environmental impact assessment of activities and their consequences.

— Air protection, geological works, genetically modified organisms.

— National environmental policy.

Green agenda is constantly shaped by various global challenges, mainly climate change, green economy, healthy and resilient environment, sustainable use and management of natural resources, water and air pollution. As a reaction to contemporary environmental challenges, several strategic documents and plans have been adopted in the past by central state administrative authorities concerning different aspects of the green agenda and the protection of the environment.

The **Greener Slovakia – Strategy of the Environmental Policy of the Slovak Republic until 2030, *"the Envirostrategy 2030"*** (Ministry of Environment of the Slovak Republic, 2020) is the leading national environmental strategy of the Slovak Republic that defines the current and modern vision of the environment in 2030, as well as outlines environmental challenges, policy frameworks for selected areas, institutional framework and list of indicators. The Ministry of Environment established a vision in the Envirostrategy 2030:

"*The basic vision of Envirostrategy 2030 is to achieve better environmental quality and sustainable circulation of the economy, which is based on rigorous protection of environmental compartments and using as little non-renewable natural resources and hazardous substances as possible, which will lead to an improvement in health of the population. Environmental protection and sustainable consumption will be part of the general awareness of citizens and policy makers. Through the prevention and adaptation to climate change, the consequences will be as subdued as possible in Slovakia.*"

The Envirostrategy 2030 identifies three priorities and basic directions for future environmental and cross-sectional policy goals in the Slovak Republic:

— Sustainable use and effective protection of natural resources (enough clean water for everyone, effective protection of nature and landscape, sustainable land management).
    – Production of forest environmental services.
    – The rational use of the rock environment.

— Climate change and air protection.
    – Climate change prevention and reduction of its impacts.
    – Protection against floods consequences.
    – Clean air.

— Green economy.
    – Towards the circular economy.
    – Economical and clean energy.
    – Economic instruments for a better environment.
    – Environmental education and learning for people of all ages.
    – Better data for better decision-making.

Environmental challenges need a comprehensive approach based on wider international, European and national legislation, applicable strategic documents, and international good practice examples. The Envirostrategy 2030 includes a contemporary state of research and priorities that reflect global environmental goals. In this regard, this strategy determines policies and goals for the central government authorities and the regional and local self-government levels.

The need to respect our environment and its limits is challenging contemporary societies. The **Climate Change Adaptation Strategy of the Slovak Republic** (Ministry of Environment of the Slovak Republic, 2018) was adopted as a national adaptation strategy in 2014 and modified in 2018. The strategy aims to improve Slovakia's readiness to face the adverse consequences of climate change, establish an institutional framework and coordination mechanism to ensure the effective implementation of adaptation measures at all levels and in all areas and increase overall awareness about this issue. The Climate Change Adaptation Strategy of the Slovak Republic defines the main consequences of climate change and cross-cutting aspects of climate change:

— Climate change consequences are highlighted in the areas of rock environment and geology; soil environment; natural environment and biodiversity; water regime in the country and water management; residential environment; population health; agriculture; forestry; transportation; energy, industry and some other areas of business; tourism,

— Cross-cutting aspects of climate change contain economic and social aspects; science, research and innovation; information, communication, education and participation; regional and cross-border cooperation.

The educational strategy **Sectoral Concept of Environmental Education up to 2025** (Ministry of Environment of the Slovak Republic, 2015) reflects the importance of environmental education activities. The overarching goal of educational activities in environmental policy is to create an integrated system of environmental education and awareness raising, focusing on the broader population using innovative tools. The concept targets children in kindergartens, elementary school students, high school students, university students, teachers and experts, public administration, prosecution offices and courts, the private sector and entities in selected sectors (industry, power engineering, transportation, agriculture and forestry, tourism), the general public, and marginalized groups.

The publication **Slovak Republic Towards Green Economy** (Ministry of Environment of the Slovak Republic, 2016) leads the way for the Slovak Republic´s green economy transition. The document steers up the pressure on the green initiatives that represent an integral part of the economic growth in the 21st century (p. 8), mainly thanks to their ability to generate new sources of income; increase employment; provide new employment opportunities thanks to innovation and creation of green goods and services; improve the quality of life, environmental infrastructure; enable access to energy and water resources; improve the use of public transport; ensure sustainable management of natural resources and application of green innovation determining the potential, long-term-nature and quality of the future development.

The exchange of information between the government and the public can contribute positively to achieving environmental policy outcomes. Several information portals were created by the Ministry of Environment, mainly to raise awareness of environmental policy and environmental issues in the conditions of the Slovak Republic. The main role of environmental information portals is to disseminate information and knowledge to a broader public, mainly thanks to innovative and user-friendly channels.

The primary information platform on environmental issues in the Slovak Republic is the **Enviroportál**. The portal provides verified news and information on various environmental topics, current level and forecast of environmental indicators, sectoral reports, environmental studies and publications (Enviroportál, 2023). The Enviroportál provides high-level professional information and easily understood information (Figure 15).
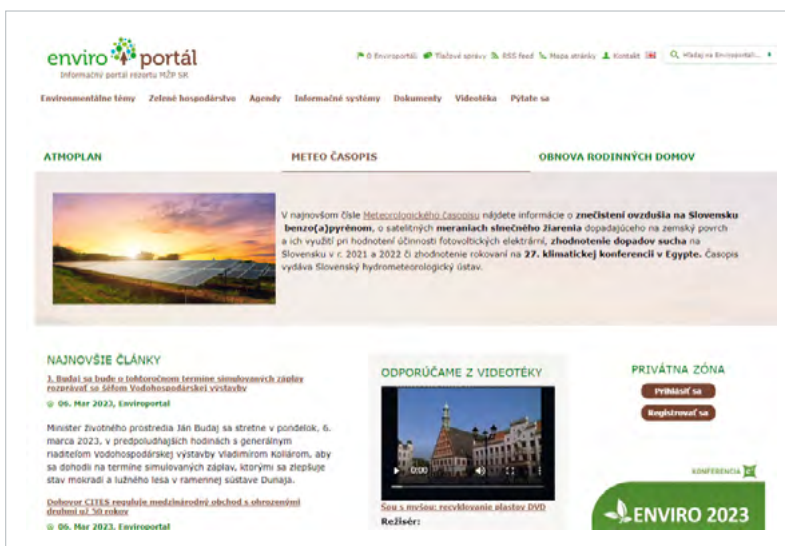
Figure 15: General information portal Enviroportál
Source: Enviroportál, 2023

The Ministry of Environment, in cooperation with the Slovak Environmental Agency, established an information portal called **Green Economy** (Figure 16). The portal aims to be a platform for presenting environmental solutions and good practice examples, as well as constructively influencing consumer behaviour that directly affects the individual environmental and climate footprint (Green Economy, 2023).
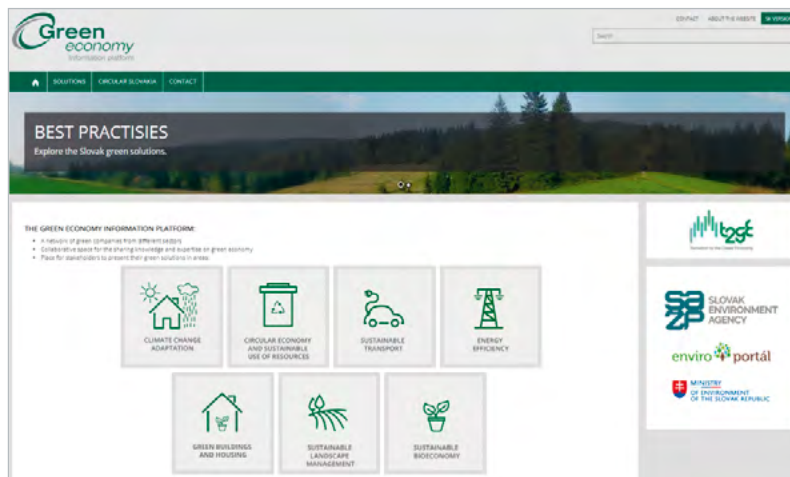
Figure 16: Information portal Green Economy
Source: Green Economy, 2023

Ewobox and EMAS are also prime good practice examples for building environmental awareness in the Slovak Republic. The portal **Ewobox** is an interactive online platform for environmental education that anyone can connect to as a passive recipient or an active contributor. The portal provides basic legal documents at the European and national levels, national legal acts, monographs and research publications, interactive videos, worksheets, teaching aids, leaflets and educational games (Ewobox, 2023). The **EMAS,** as voluntary environmental management and audit scheme website, provides basic information on voluntary initiatives in the European Union. Simultaneously, the website summarizes information about obtaining EMAS Certificate (EMAS, 2023). The certificate serves as a precondition for registering in the Environmental Management and Audit Scheme database.

2.6.2. **Green agenda at the local and regional level**

The municipal level is mainly seen as the closest one to the needs of the citizens. In this regard, municipalities and cities must solve environmental issues daily. The environmental policy at the municipal level and its importance is mainly determined by the fact that the environmental aspects directly affect citizens. Simultaneously, environmental policy at the level of municipalities can be described through municipal competencies. Municipalities and cities fulfil two main types of competencies in the Slovak Republic: original and transferred. As it was summarized by the local self-government competences audits (Association of Towns and Communities of Slovakia, 2019; Association of Towns and Communities of Slovakia, 2020), the municipal level of the environmental policy covers several different roles and tasks, such as:

— Original competences (protection of the environment, ensuring the conditions for delivering residents with drinking water from the public water source; removal or disposal of sewage; emergency drinking water supply; municipal waste management, handling

of small construction waste, and its administration; cleanliness maintenance; management and maintenance of the public greenery).

— Transferred competences (general water administration; air protection; nature and landscape protection; flood protection).

The regional level of the environmental policy mostly corresponds with the general coordination role of the self-governing regions. Still, on the other hand, self-governing regions such as NUTS3 units execute different competencies with significant practical impacts on the environment. Based on various legal acts, self-government regions in the Slovak Republic ensure mainly:

— Monitoring the state of environmental components in the region, especially the quality of water, air and nature.

— Preparation of documents necessary for the protection and creation of the region's environment.

— Administrative opinions in the process of assessing the effects of proposed activities and strategic documents on the environment.

— Resolving environmental issues in connection with land-use planning documents; land-use planning documentation of cities, municipalities and regions (EIA, SEA), provides expert opinions in the framework of the assessment of the effects on the environment of proposed activities (EIA, SEA).

— Proposes and controls the implementation of projects in the area of the region's environment.

— In cooperation with other public administration authorities in the region, solves environmental issues.

Municipalities and self-governing regions in the Slovak Republic exercise their competences in different areas of transferred state administration and self-government. Thus, environmental policy is seen as an integral part of self-government duties. Environmental issues arise locally, and only the joint effort of local self-government authorities with the central government can resolve them.

2.6.3. Green agenda and the role of unions
The Slovak municipal unions/associations perform various roles for the cities and municipalities. They are often the first contact point when new legislation is adopted, and policies have to be introduced. Municipalities also perceive them as a place for exchanging experiences and good practices and as a mediator between the central government and municipal level. Altogether 2,890 municipalities in the Slovak Republic are grouped into two main municipality and city associations, the Association of Towns and Communities of Slovakia and the City Union (Ručinská and Fečko, 2020).

The Association of Towns and Communities of Slovakia encompasses the vast majority of all the municipalities in the Slovak Republic. In the field of climate change and green transition topics, the association helps the municipalities in different ways, for example:

— Creating a meeting platform for cities and municipalities for effective capacity building. This was manifested by organizing various topical workshops, such as the workshop SMART municipal waste - efficient waste management or the workshop Adaptation to climate change and local self-government (Association of Towns and Communities of Slovakia, 2018).

— Dissemination of information on various events, grant calls, reports and analyses, which are concentrated in the environmental section of the association´s website (Association of Towns and Communities of Slovakia, 2023).

— Providing advisory services and creating methodological assistance on new trends in climate change and green transition for local self-government and urban development.

The Association of Towns and Communities of Slovakia performs its supportive role for the municipalities on different topics, including the green municipal transition. The support of green transition policies and the effort to mitigate the negative impacts of climate change, as a joint activity of cities, municipalities and associations, can affect the inhabitants' quality of life directly.

3.

Methodology

3. **Methodology**

Considering the significance of the green transition in the public sector, particularly at the local level and for the people, this project set out to find and compile examples of excellent municipal practices. The project partners decided on a unified approach built on a shared methodology to ensure that the examples would be comparable and organized simply for experts in the field to understand. This handbook should serve as a resource for practical, real-world solutions to green issues and a way for political and administrative representatives to get an idea of the associated costs and resources required for their implementation.

To accomplish this, the project partners developed a multi-step methodology that included preliminary desk research, interviews, and in-depth interviews to identify potential good practice cases.

3.1. DESK RESEARCH & IDENTIFICATION OF PARTNER MUNICIPALITIES

The first step was identifying municipalities willing to participate in the project rather than selecting specific best practice projects. The project partners selected the municipalities based on national circumstances and experience:

Austria
The City of Linz was selected because it is well-known for its innovativeness, which for instance, was recognised when the city won the UNESCO City of Media Arts award in 2014. Kremsmünster was chosen as our second municipality besides Linz because it has been a frontrunner in digitalisation for decades and because of its highly open-minded and innovation-friendly local administration. Additionally, the think tank "Oö. Zukunftsakademie" was selected as another partner for this project because they are a modernisation driver in Upper Austria.

Italy
At Eurac Research, our research mainly focuses on the local level of the Autonomous Province of Bolzano - South Tyrol in Italy rather than the national level. We have established partnerships to access information and reach the relevant authorities. Although we focus on small and mainly rural municipalities settled in an alpine context with low population density, we recognize that they still need to address the challenges of transitioning to a greener future.

Romania

Choosing the municipalities to provide good examples was a challenging task that required discussions among the members of the Romanian DiGreen team. During these discussions, we identified a range of municipalities that met the proposal's requirements and contacted them directly afterwards. Initially, we identified four cities that sent us support letters: Bacău, Berbești, Curtea de Argeș and Bucharest, District 5. Along the process, a few new municipalities supported the project and provided good examples that were finally selected, namely Gura Humorului and Mărăcineni.

Slovakia

The municipalities and cities from the Slovak Republic, acting as the source of good green examples, were chosen based on previous experiences and cooperation with the team from the Pavol Jozef Šafárik University in Košice. The team experienced previous collaboration with the City of Kežmarok on several occasions during past projects and preparation of scientific articles presented at international scientific conferences. The City of Hlohovec was selected because of previous experience and project cooperation, and to include the city's example that enlarges the variety of the Handbook's good examples.

3.2. PRELIMINARY INTERVIEWS

After doing preliminary desk research and identifying potential collaborators and projects of interest for this report, the first contact was by e-mail or phone to inquire whether the municipality was interested in sharing their experiences and if they would be available for a more extended interview later.

The respondents were often local political figures, such as the mayor or municipal officer for green issues. When the dialogue partner acknowledged the municipality's readiness to engage in the study, the interviewer began with non-leading questions to identify green initiatives the municipality thought were successful. The interviewer next brought up the projects identified through desk research and especially inquired about their validity as good practice examples. The interview finished with the participants collectively choosing one of the mentioned projects as the municipality's good practice case.

We chose the projects considering their applicability to other communities and their diverse green objectives. For example, the "Composting plant in the city Kemarok" (Slovakia) was chosen because it was motivated by accomplishing city goals within its green agenda regarding recycling, whereas the "Communal manure platform" (Romania) was selected because poor manure management had a significant influence on the local community's health as well as the residents' quality of life, a situation that can be found in other municipalities.

Once a project was selected as good practice, the partners organised in-depth interviews with the representatives of the involved municipality. Besides the local officials, the

partners discussed with persons directly involved in the project to gather more thorough perspectives.

Whenever possible, the partners organised interviews on the spot or asked the municipal officials to put the researcher in touch with the interview partners to establish an appointment.

The interview partners received, in both situations, an email with further information about the DiGreen initiative and a brief description of the preliminary interview.

3.3. IN-DEPTH INTERVIEWS

The in-depth interviews were performed in person and were mostly one-on-one. The study team conducting the interviews consisted of two people: one moderator who led the interview and asked questions and another who coded and took notes. Interviews were not recorded but were transcribed verbatim during the session. The interviewees also gave additional information, which was later incorporated into the interview transcriptions.

The interviews were conducted in a semi-structured manner. This strategy allowed us to leave as much room for the project's quirks. Simultaneously, a common framework across all project partners ensured the collection of all essential characteristics required to build comparative best practice instances. All interviews focused on the following topics in particular:

— The project's starting point and background.

— Goals and objectives of the project.

— Possible solutions that have been explored and which one has been chosen (and why).

— Implementation phase.

— Project results and the situation today.

— Cost of implementation.

— In hindsight: Lessons learned and Recommendations.

For each good practice example, we interviewed several persons involved in the project. In this way, we could get comprehensive answers to our questionnaire from various specialists that, made the project successful.

For example, the mayor or the political representative of the municipality was generally a good source for the project's objectives and aims, whilst administrative professionals

operatively involved in the project could give further insights about the project's execution phase as well as expenses.

We set no time restriction, so the interviews concluded when the moderators and the participants thought all topics had been adequately addressed.

4.

Good practices

4. **Good practices**

This chapter presents examples of GREEN GOOD PRACTICE identified within the DiGreen project. Each example has the same structure to make comparisons simple. Therefore, practitioners could quickly identify examples applicable to their municipality. At the same time, they would have access to crucial success factors, such as costs and potential difficulties when implementing them.

The topics covered by the Good Practice examples are highly diverse. No case focuses on a single aspect, but the examples can be categorized based on their central themes and objectives:

Green energy & Energy efficiency

Renewable Energy Community (Kremsmünster, Austria) is a project for the joint, regional production and utilization of renewable electricity and heat.

Green Energy for social sustainability (Luson, Italy) is a project to build a hydropower plant as a sustainable, environmentally friendly way to generate recurring revenue.

Our Buildings - Accelerating climate action buildings – strengthening civil society and policy-makers in Romania and Bulgaria (Bacău, Romania) is a project that provides technical support in defining the strategies for building renovation, considering the EU's new requirements in the construction field and the energy efficiency of public buildings.

Waste management

Construction of a communal platform for the storage and management of manure and acquisition of equipment for the development of facilities for the storage of manure (Mărăcineni, Romania). The project aims to protect the waters against nitrate pollution and bacteria from agricultural sources and to limit the spread of unpleasant odours and insects.

Composting plant in the city Kežmarok (Slovakia), a project to increase the recycling rate of the communal waste and to effectively use biodegradable waste produced in the town.

Promoting sustainable development

The GemeindeNavi (Austria), a project initiated by the Oö. Zukunftsakademie and its partners promote the United Nations Sustainable Development Goals (SDGs) at the municipal level.

Innovationshauptplatz (Linz, Austria) is an institution that aims to offer a matchmaking service between citizens, local authorities and businesses. It promotes social innovation and realizes many projects regarding sustainability and climate change.

Six Steps to more energy diversification (Naturno, Italy) is the municipality's project to contribute to the *Sustainable Development Goals (SDG)* at the local level.

The "KlimaGemeinde" program (Lana, Italy) supports municipalities in creating and implementing a sustainable energy and environmental management plan and certifies exemplary municipalities.

Improving environment

O.A.Z.A. (Gura Humorului, Romania) - reinforcing devitalized spaces into green areas for the benefit of the community to regain the utility of some degraded soils and improve, revitalize, and reduce air pollution in the urban environment.

Eco Map in the City of Hlohovec (Slovakia) - an interactive map intending to support the city's circular economy and digitally present different parts of the circular economy in the City, including collection yards, containers for small electrical waste and used clothing, packaging-free stores, swap markets, events focused on ecological activities and many others.

Idea Concept Smart Green City Kežmarok (Slovakia) - The City of Kežmarok adopted a strategic document. The city aimed to utilise modern digital technologies with green and sustainable development in mind. The idea concept followed up on existing solutions in the city, interconnecting them with future activities and focusing on the overall goal of increasing the quality of life of the city's inhabitants.

4.1. MUNICIPALITY OF KREMSMÜNSTER: RENEWABLE ENERGY COMMUNITY

Municipality: Kremsmünster
Country: Austria
Population: 6,710
www.kremsmuenster.at
Google Maps
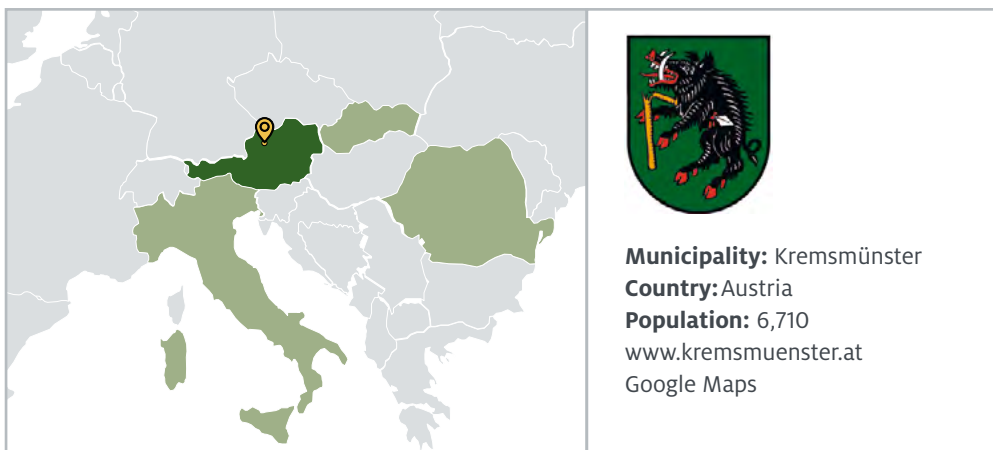
Short Summary:

Renewable Energy Communities (EEGs in German) are the association of at least two participants for the joint, regional production and utilization of renewable electricity and heat. Communities can produce, consume, store and sell this energy together with their citizens, companies or associations. This can happen under largely independently determined conditions and prices. The Municipality of Kremsmünster was one of the first municipalities in Austria to establish a renewable energy community.

The topic of regionality is deeply rooted in the Municipality of Kremsmünster. Energy is a new field of activity in this area, which has become possible via the new law. It was an important goal for the municipality to strengthen the awareness of climate protection and energy in the population through the EEG.

4.1.1. Goals of the project

The EEG enables more efficient use of on-site generation facilities, and the participation of citizens and companies in a community can strengthen social cohesion. Economically, the advantage is that the members of the EEG can buy and purchase self-produced electricity within the community at largely independently determined conditions and prices. The prices can also remain constant for several years, which can be very advantageous, especially in times of rising energy prices. This is made possible by eliminating various charges and reducing grid fees on the electricity traded within the EEG. In addition, up to 50 % of the electricity generated and not consumed within the EEG can be subsidized through a market premium (Österreichische Koordinationsstelle für Energiegemeinschaften, 2022a).

The Municipality of Kremsmünster has set itself the goal of being one of the first municipalities in Austria to implement an EEG and to pass on its know-how to other municipalities.

4.1.2. Existing solutions considered by the municipality

In July 2021, the Renewable Energy Expansion Act (EAG) created the basis for EEGs in Austria, which was impossible before. With this law, the requirements from the "Clean Energy for all Europeans Package" of the European Union were implemented in Austria. This is intended to promote the energy system's decentralisation and increase the importance of the regional and municipal levels (Österreichische Koordinationsstelle für Energiegemeinschaften, 2022b).

Within the EEGs, there are different possibilities for grid levels and company forms. In this context, the Municipality of Kremsmünster decided to establish a regional EEG and chose the organizational form of an association, as this was the more cost-effective and simpler option at the beginning. Changes in the organizational structure, for example, into a cooperative are possible later.

4.1.3. Implementation phase

Establishing an EEG in the Municipality of Kremsmünster could occur via the Smart City project. Accordingly, it was first necessary for this submitted project to be funded by the Climate and Energy Fund. Since this project, with a total budget of 1,113,128 Euro, required a portion of 250,000 Euro to be financed from the municipal budget, the municipal council also had to approve it in advance. The following persons were involved in the project implementation:

— Smart City project consortium participants:
  – Mayor of the Municipality of Kremsmünster
  – Employee of *4ward Energy Research GmbH*
  – Employee of the *Austrian Institute of Technology (AIT)*

— Interested parties and participants of the EEG in the Municipality of Kremsmünster

For the foundation of an EEG, the already mentioned decisions concerning the form of the EEG and the organization had to be made at the beginning. After that, educational and persuasive work in the municipality took place to find corresponding interested parties - producers and consumers. The Municipality of Kremsmünster was lucky to find a producer whose plant (45 Kw peak plant) was already in operation and did not have to be built first. The consumers who could be won over are located in the immediate vicinity, facilitating communication and cooperation.

After the participants were found, an association was founded. Then the technical procedures had to be explained and clarified within the group. For example, the question arose about whether everyone should receive the same share of energy or whether a different distribution would make sense. The association had to work out its statutes. (In the meantime, sample statutes have been provided by the federal government.) These discussions in

advance were meaningful so that all participants were informed, knew precisely what they were getting into, and that the EEG could and can function well after its founding.

The project partner involved, *4ward Energy Research GmbH*, supported the community in legal matters and took over bureaucratic procedures, saving a lot of work for those involved in the community.

The accounting of the ongoing operation was outsourced to a separate company so that the accounting would be transparent and comprehensible.

4.1.4. **Project results**

The EEG in the Municipality of Kremsmünster has been running since May 2022. An earlier start would have been planned. The necessary and already announced legal basis of the government has been delayed.

In November 2022, the EEG in Kremsmünster had seven members - one producer, a consumer, and six other consumers. These are located in the immediate centre and include businesses such as a butcher's shop, an inn, and a drugstore-perfumery. Until September 2022, only one producer was allowed to feed into the system. Since October 1, 2022, including multiple producers is possible, as the public side has adapted the data exchange and its technical process. An expansion of the EEG in the Municipality of Kremsmünster is planned for 2023. For example, two small hydropower plants will become part of the EEG. This will make electricity available around the clock. This expansion of the EEG is relatively simple and can be implemented quickly, according to the mayor.

During operation, meetings of the association members are scheduled when framework conditions need to be discussed and determined. Currently, the topic of tariff setting is on the agenda. Due to the current situation and rising energy prices, those involved describe this as a major challenge.

Since the foundation of the EEG, the Municipality of Kremsmünster and the project partner *4ward Energy Research GmbH* have organized several workshops for interested parties of the *Leader Region Traunviertel Alpenvorland* to show how an EEG can be established and implemented. Furthermore, a guideline with the most important steps for the foundation of an EEG was developed.

4.1.5. **Cost of implementation**

The EEG was implemented in the Municipality of Kremsmünster as part of the Smart City project and thus financed through this project budget.

From the Municipality of Kremsmünster, primarily the mayor Gerhard Obernberger was involved. During the project implementation period of 1.5 years, about ten meetings lasting about two hours were held with the project team and the members of the EEG.

Apart from the time resources invested by the project members and the stakeholders of the future EEG, the costs were as follows:

The photovoltaic system of the feeder was already available in Kremsmünster and did not have to be financed first.

The digital meters were already installed. The only thing that had to be done here was to switch to quarter-hour metering at the grid operator, but this did not incur any costs and was implemented quickly.

An external company was commissioned for billing during operation, which charges a minimal monthly amount per participant.

The Municipality of Kremsmünster provided the association with 1,000 Euro as start-up aid.

Other municipalities now have it somewhat easier with the implementation since many documents and guidelines for establishing an EEG are already available. This will probably reduce the necessary personnel resources for the foundation.

4.1.6. In hindsight: lessons learned & recommendations

The implementation via the Smart City project was very advantageous for the foundation of the EEG in the Municipality of Kremsmünster. Through the project partner *4ward Energy*, the municipality was optimally supported and accompanied by experts in this field during the foundation process.

Difficulties were encountered with the announced bill, which was delayed, thus delaying the start of the EEG. The mayor of the Municipality of Kremsmünster saw the recruitment of the participants, the joint decisions, and the preparation of the statutes as challenges.

In the future, tariff setting will be a challenge for the EEG. Due to the rising energy prices, there will be different tariffs, which are currently difficult to predict.

For the implementation of energy communities in larger communities or cities, the mayor of Kremsmünster recommends the division into several smaller EEGs to ensure clarity.

WHAT CAN BE LEARNED?

— Renewable energy communities make a valuable contribution to raising public aware-ness of sustainable energy and climate protection. They strengthen the cohesion of citizens and promote the efficient use of regional energy.
— Sufficient information in advance and enough time and space for discussion and agree-ment among all parties involved in an EEG are crucial for success.
— For the implementation of an EEG, getting support from experts in legal and bureaucrat-ic matters can be helpful.

4.2. TOOL FOR IMPLEMENTATION: GEMEINDENAVI

Think Tank: Oö. Zukunftsakademie
Country: Austria
https://www.ooe-zukunftsakademie.at/
Google Maps

Short summary:

The GemeindeNavi is a project initiated by the Oö. Zukunftsakademie and its partners. It strives to promote the United Nations Sustainable Development Goals (SDGs) on the local level. Municipalities are encouraged to discuss all the SDGs and their relevance in their local community. Then they develop ideas about how to work towards realizing the SDGs.

The motivation behind this project was to create a tool that helps municipalities deal with the United Nations Sustainable Development Goals (SDGs). The SDGs are a set of 17 goals mainly about ecological, economic and social issues. For municipalities, especially smaller ones, it is rather difficult to break down these comprehensive goals to their situation at the local level. By developing the GemeindeNavi, the Regionalmanagement Oberösterreich and the Oö. Zukunftsakademie intended to make the SDGs more approachable to municipalities and facilitate their understanding of the SDGs' relevance in their community.

4.2.1. Goals of the project

The main goal pursued by the GemeindeNavi was to get municipalities to deal with the SDGs. This should encourage local administrations to discuss and focus on issues that usually tend to be ignored or don't get the attention they deserve. The GemeindeNavi should also get municipalities to see all 17 SDGs as equally important for their development. The project should enable municipalities to create innovative ideas in line with the SDGs that support a positive future development for the municipality and its citizens.

4.2.2. Existing solutions considered by the municipality

There is no information about possible alternative solutions that were considered to reach the goals. The project team is also not aware of any other tools that are suitable for achieving these goals.

4.2.3. Implementation phase

The tool was developed by a small team of about three people. The team members were chosen from within the existing staff based on availability, personal interest and motivation to participate in this project. They frequently got feedback from their colleagues and occasionally used external services; for example, external graphic designers made the graphics. It took about half a year to create the tool.

After preparing the tool, it was first implemented in some testing municipalities. The feedback gained during these testing events was highly useful for improving the GemeindeNavi and preparing implementation in other municipalities. It also enabled the GemeindeNavi team to adapt the tool even better to the needs and demands of local administrations and to understand which questions need to be rephrased to make them better understandable.

4.2.4. Project results

The GemeindeNavi is a tool based on the 17 SDGs. It is carried out in a workshop format. During these workshops, the participants mainly discuss two questions for each of the 17 SDGs: First, what is the municipality already doing to reach this goal, and secondly, what should the municipality work on in the future to achieve it? The tool helps the participants by adding additional questions that make the goal more relevant to the local level. After answering these questions, the participants should assess the municipality's situation for each SDG on a scale from 0 to 5 ("we are already doing" ... from "nothing" [0] to "a lot" [5] and "we should work on ..." from "nothing" [0] to "a lot" [5]). The next step is to find as many ideas as possible for each of the 17 SDGs. Ultimately, the participants should agree on three key ideas for each SDG, creating a set of 51 proposals. This approach makes the GemeindeNavi an effective tool for brainstorming ideas for new local projects for all the various topics the SDGs cover.

For example, the topic of "hunger", which might seem negligible for Austrian municipalities at first, is discussed by breaking it down into more specific questions related to the situation in Austria. People are asked what the municipality is doing to facilitate sustainable agriculture and healthy nutrition, what needs to be done to have valuable land for agriculture, what are people in this municipality doing to ensure healthy nutrition of children and whether there are any initiatives to take care of regional sustenance, to support community gardening and to reduce food waste. In the first step, participants discuss these questions and make a list of things already being done and another list of things that should be tackled in the future. Then they make a short self-assessment as described before.

Another topic, "gender equality", is dealt with by asking participants what measures there are already in place to prevent discrimination against women and girls, whether the balance between men and women is balanced in public life, what is being done to empower women and girls and whether there are enough child care services and elderly care services

available. Also, for these questions, participants should take notes about what is already being done and what should be done, followed by a self-assessment.

The municipality chooses the participants, or there is an open invitation to all local citizens. Usually, there are 20 to 40 people from different backgrounds. These participants should represent important economic sectors (like agriculture), companies, and the local community, e.g., unions, associations, or the local church. Involving people from as many backgrounds as possible helps to gather different points of view and to collect a wide range of ideas.

The most important result of the GemeindeNavi is that this tool, as it was the goal from the very beginning, manages to make the Sustainable Development Goals more approachable and better understandable for local administrations. The GemeindeNavi enables municipalities to discover the SDGs' relevance in their local context.

While the first results of a GemeindeNavi workshop, especially the up to 51 ideas found, are pretty clearly visible already at the end of the event, it takes some time to see if there have been any real and long-term effects on the municipality and its local administration, as these 51 ideas are just ideas at this point. To find out about possible results, the Gemeinde-Navi had in the long run. It is necessary to check after some time, if any, how many of the ideas created have been implemented.

Up to now, the GemeindeNavi has been carried out in roughly 25 municipalities in Upper Austria. For the GemeindeNavi team, this number is also an important indicator of the project's success.

4.2.5. Cost of implementation

The project was planned and developed during the regular work time of the involved staff from the Zukunftsakademie Oö. and the Regionalmanagement Oberösterreich. Therefore, there have been only a few extra costs caused by the GemindeNavi such as printing costs and graphics, and the resources needed seem negligible.

Carrying out the GemeindeNavi in municipalities goes along with the usual expenses that also occur when hosting a small event. Usually, there are no extra costs for staff (as the concerned local administration staff works in their usual work time) and no rooms (municipalities usually own buildings and rooms they can use). However, here might be some costs for catering and energy consumed.

For preparation works that need to be done by the municipality, usually 1-2 people are sufficient. It is estimated that it takes them around 8 hours to prepare and carry out for the GemeindeNavi, including general preparatory discussions, selection and invitation of participants and arranging the event location. The GemeindeNavi team moderates the entire event but also supports the municipality during preparation and after the event.

4.2.6. **In hindsight: lessons learned & recommendations**

The people behind the GemeindeNavi wouldn't change their decision to develop this tool if they had to start over now. They believe it is a successful tool, and the main goals have been achieved. Also, the mayors of municipalities that make us of the service are usually highly satisfied with it. The most important aspects to consider when implementing the GemeindeNavi are being well-prepared, communicating clearly, and choosing capable and suitable staff. The Regional management Oberösterreich and the Zukunftsakademie Oö. would like to carry out the GemeindeNavi in even more municipalities in order to raise awareness about the SDGs and ways to adapt them to the needs of local communities, but to do so, these organizations would need more resources.

WHAT CAN BE LEARNED?

— The GemeindeNavi is a highly useful tool easily applicable to other municipalities.
— It allows administrations and institutions to learn about how to promote sustainability.
— It allows local administration to learn about the relevance of SDGs in their local context.
— It also allows them to learn how to raise awareness about the SDGs in their local community.
— Local administrations can gain new experiences in communication and event preparation, both highly important skills for implementing projects.

4.3. "KLIMAGEMEINDE" LANA: A EUROPEAN ENERGY AWARD MUNICIPALITY

Municipality: Lana
Country: Italy
Population: 12,617
www.gemeinde.lana.bz.it
Google Maps
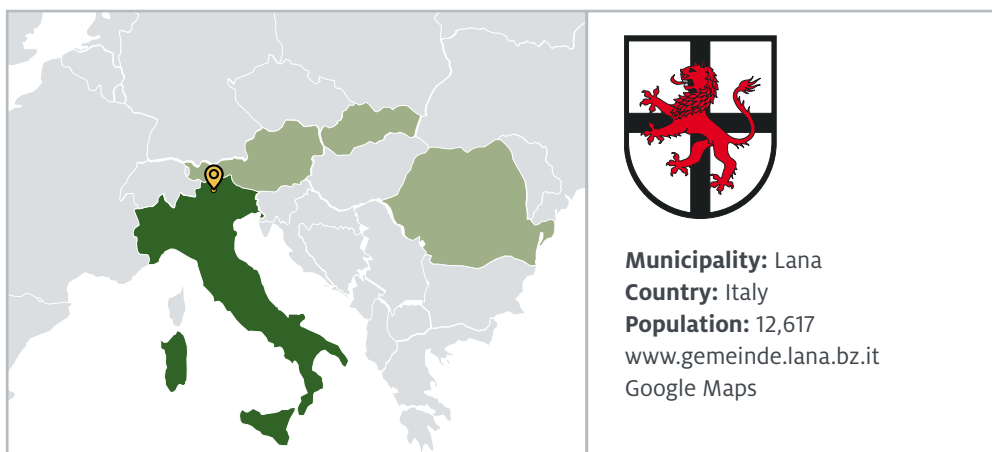
Short Summary:

The "KlimaGemeinde" (ClimateCommunity) program is a quality management and certification system. It supports municipalities in the creation and implementation of sustainable energy and environmental management plans.

The "*KlimaGemeinde*" (literal translation: ClimateCommunity) program of the Autonomous Province of Bolzano - South Tyrol supports municipalities step by step in the creation and implementation of a sustainable energy and environmental management plan and awards exemplary municipalities with the "*KlimaGemeinde*" certification. As part of the program, the energy and water consumption of municipally owned buildings and facilities, the sustainable mobility concept, the local production of renewable energy and waste management, among other things, are analysed, evaluated and improved according to sustainability aspects. In this way, municipalities minimize their resource consumption and emissions of climate-damaging greenhouse gases. The initiative is thus a concrete instrument for realizing a more resource-efficient society (Agency for Energy South Tyrol – CasaClima, n.d.).

The "*KlimaGemeinde*" program is based on the *European Energy Award (EEA)*. The EEA is a quality management and certification system for municipalities and regions. It supports municipalities committed to sustainable energy policy and community development, planning their energy consumption and focusing on expanding renewable energies. Municipalities and local energy experts have continuously developed the program for more than 25 years. Today, 1,700 local authorities with a population of 65 million are already participating in the program (Agency for Energy South Tyrol – CasaClima, n.d.).

The "*KlimaGemeinde*" program was launched in 2015. Today, 17 of South Tyrol's 116 municipalities are certified as "*KlimaGemeinde*": 4 are classified as "*KlimaGemeinde Bronze*", 12 as "*Silver*", and only the provincial capital of Bolzano is "*Gold*". Another 12 are on the way to becoming a "*KlimaGemeinde*".

Lana started preparations in 2016 and was first certified as a "*KlimaGemeinde Bronze*" in 2017. Since then, the municipality has continued to work steadily and is now classified as a "*KlimaGemeinde Silver*".

4.3.1. Goals of the project

Lana has been following the ideas behind the "*KlimaGemeinde*" program for a long time. Mayor Stauder has always been concerned about the community's and society's sustainable development. When he was elected, he incorporated this concern and the issues into the municipality's policies.

With its certification as a "*KlimaGemeinde*", Lana has primarily pursued the goal of **making itself comparable** within South Tyrol and beyond its borders. The *European Energy Award* shows whether one's community has an internationally comparable sustainability and environmental protection level.

At the same time, standardized certification also enables **benchlearning**: Where is the trend going? What are the others doing? For Lana, it's important to be able to learn from others, to be able to compare and see what works elsewhere and what doesn't. It's important to understand: What can you do to get better?

In addition, the municipality is convinced that the "*KlimaGemeinde*" program also offers a **competitive advantage**. Especially for tourism, certification is becoming increasingly important. Lana relies on awareness-raising activities for tourists and the local population.

4.3.2. Existing solutions considered by the municipality

A certification program was the first choice for the Municipality of Lana. Due to the local establishment of an international quality management and certification system, the choice fell to the "KlimaGemeinde" program. Other certification programs were not considered.

eea's 6 areas of activity
A municipality's scope of action regarding energy and climate protection policy covers the areas shown below. The eea process ensures that all activities in each of these areas are systematically determined, assessed, continually checked, co-ordinated and precisely implemented.

mobility
public transport, non-motorised, mobility, traffic calming

development & spatial planning strategy
energy planning, building approval and monitoring

internal organisation
energy team, further training of staff, procurement

european energy award

municipal buildings & facilities
energy and water management of public buildings and public lighting

communication & cooperation
Information, events, local cooperation and support

supply & disposal
energy, water, waste water, waste

Figure 17: eea's 6 areas of activity
Source: Association European Energy Award AISBL n.d.

4.3.3. **Implementation phase**

Right at the beginning of the project, the Municipality of Lana called in an **external consultancy**, the *Ökoinstitut Südtirol*. The cooperative association employs accredited "*KlimaGemeinde*" advisors and currently supports 23 existing and prospective "*KlimaGemeinden*".

As a first step, the *Ökoinstitut Südtirol* supported the municipality in compiling all previous initiatives, projects and measures in sustainability and environmental protection. These were then assigned to six areas and formed the basis for the first evaluation according to the specifications of the *European Energy Award* (Figure 17).

At the same time, new measures were decided and implemented. Here, too, external support plays an essential role. The *Ökoinstitut Südtirol* was able to point out measures and initiatives already successfully implemented in other municipalities.

The certification is based on a catalogue of 95 measures for which points are awarded. If a municipality achieves at least 35% of the points, it is classified as a "*KlimaGemeinde Bronze*",

with 50% as "*Silver*" and 75% as "*Gold*". An independent external commission carries out te evaluation and awarding of the certificates.

4.3.4. **Project results**

Lana was immediately certified as a "*KlimaGemeinde Bronze*" in the first cycle. The municipality did not rest on its laurels, however, but pressed ahead with its own sustainability and environmental protection initiatives. During the re-certification, Lana was able to achieve the status of "*KlimaGemeinde Silver*" (Figure 18).

Figure 18: Lana's certification as "KlimaGemeinde Silver" in 2021
Source: Agency for Energy South Tyrol - CasaClima 2021

In addition to the certification, Lana has implemented a variety of concrete initiatives and measures in the field of sustainability and environmental protection as part of the "*KlimaGemeinde*" program, including:

— education and sensitization of the population
  – in schools, "the little ones educate the big ones", e.g. about avoiding plastic bottles;
  – educational work through associations;
  – harvest workers were provided with reusable drinking bottles in cooperation with the farmers' association;
  – gastronomy no longer uses plastic bottles.

— conversion and modernization of municipal buildings
  – heating: switch away from oil;
  – changeover to green electricity.

— free energy consultations for citizens and businesses

— ecological footprint

— mobility
  – accessibility and attractiveness of the village for cyclists – by creating additional bicycle parking spaces;
  – reduction of traffic, especially by reducing individual traffic (cars);
  – focus on soft mobility – e.g. by further optimizing optimization of bus routes (different routes of buses so that citizens do not have to use cars anymore);
  – optimization of the traffic within the village (new city bus lines) from 20 min to 15 min intervals (as requested by the senior citizens).

The certification has led to more awareness in the municipal administration. Employees are taking a closer look at energy consumption and are committed to realizing savings. The project's communication also helps make the population and tourists aware of the issue.

4.3.5. Cost of implementation
The accreditation as a "*KlimaGemeinde*" causes annual licensing costs of about 2,800 Euro. In addition, there are annual costs for program support and consulting by the *Ökoinstitut Südtirol* amounting to about 5,500 Euro.

The internal effort consists of 2 to 3 "energy team" meetings per year. Lana estimates the workload of the seven members at two days each per year. The internal project manager estimates two additional working days per year for the project. The administrators and political representatives of the Municipality of Lana contribute 16 FTEs per year to the project "*KlimaGemeinde*".

It should be noted that the internal workload was higher in the initial phase. On the other hand, the meetings of the energy team and the related workload also cover the second project of the municipality, the "*Energy Report Online - ERO*" (see handbook of DIGITAL good practice).

4.3.6. In hindsight: lessons learned & recommendations
The Municipality of Lana is very satisfied with the "*KlimaGemeinde*" project. In particular, it has helped to spread the idea of sustainability among the employees, make them see themselves as part of the whole, and try to contribute.

Lana recommends accreditation to all municipalities. Just the initial gathering of all the initiatives is already valuable. Municipalities are often unaware of all that is already being done. Subsequently, the help of external consulting and program support should be sought.

This helps to bundle the existing initiatives and serves as a starting point for further action. At the same time, the network is strengthened, and the external accompaniment can bring in ideas and solutions from other communities.

Monitoring by neutral external experts and the accreditation itself are also important. On the one hand, it serves as a benchmark, and the award helps communication. The communication and involvement of the population and businesses of the municipality so that the whole territory and not only the municipal administration becomes a "*KlimaGemeinde*" is the goal for the future.

WHAT CAN BE LEARNED?

— An award system creates awareness for the municipal's environmental impact.
— Municipalities are often unaware of all that is already being done, so just the initial gathering of all the initiatives is valuable.
— The use of an established quality management and certification system allows for benchmarks with others.

4.4. NATURNO: 6 STEPS TO MORE ENERGY DIVERSIFICATION

Municipality: Naturno
Country: Italy
Population: 6,096
www.gemeinde.naturns.bz.it
Google Maps
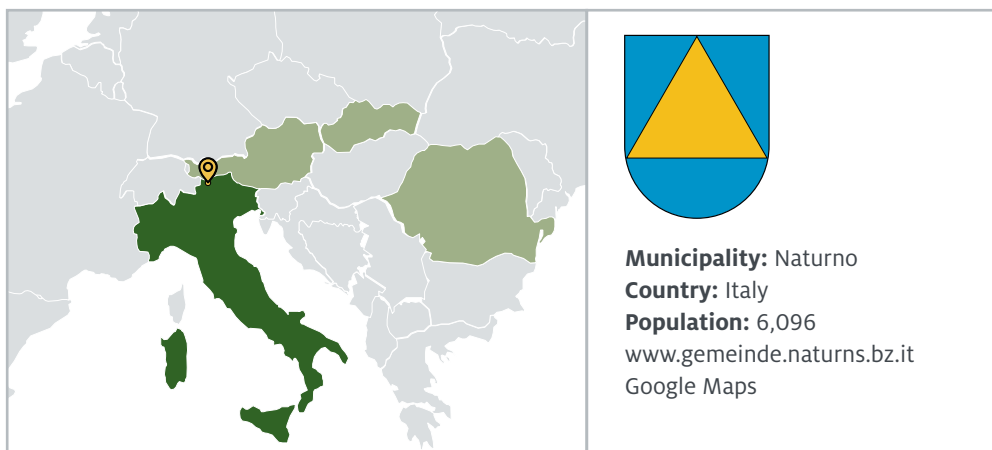
Short Summary:
To contribute to the Sustainable Development Goals (SDG), the Municipality of Naturno has formed a climate and energy team. This team has identified and concretely planned six steps towards more energy diversification, which are now being implemented.

The Municipality of Naturno has recognized sustainability as a cross-cutting task and has committed itself to the following vision within the framework of the sustainability strategy of the South Tyrolean provincial government:

We bear responsibility for people and nature. We are united by the goal of creating a more just society that cultivates diversity and cohesion based on our autonomous responsibilities. Peaceful coexistence creates a homeland worth living in, a small Europe within Europe.

To sustainably develop South Tyrol is our aspiration. Courageous decisions must be made jointly to bring society, economy and environment into harmony, confront the climate crisis, overcome its consequences and transform the challenges into opportunities. (Südtiroler Landesregierung, 2021b)

4.4.1. Goals of the project
The Municipality of Naturno wants to make a concrete contribution at the local level to the sustainability strategy of the province. It is based on the sustainability goals of the United Nations, the *Sustainable Development Goals (SDG)*. They define the requirements of sustainable development for society. The provincial government already committed to these SDGs at the beginning of the term in its government program 2018-2023 (Figure 19).

Figure 19: Sustainable Development Goals (SDG)
Source: United Nations n.d.

Especially in times like these, with rising raw material and energy prices, ecological and economic sustainability is particularly important to the Municipality of Naturno. Only in this way it can act for the long-term benefit of its community and thus also fulfil the third pillar of sustainability: social sustainability.

In doing so, the municipality also wants to act as a role model and encourage its citizens and companies to be more sustainable. Furthermore, public funds should be used as efficiently and sustainably as possible.

4.4.2. Existing solutions considered by the municipality

The Municipality of Naturno could have gone its way in terms of sustainability and not been guided by the overarching goals and objectives of the provincial sustainability strategy. Naturno, however, is convinced that the SDGs of the United Nations provide a meaningful framework. Therefore, going it alone was not an option.

4.4.3. **Implementation phase**

In order to implement more sustainability in the municipality, Naturno has formed a **climate and energy team**. It consists of representatives of politics and administration as well as external technicians and consultants.

The climate and energy team has identified and concretely planned **six steps towards more energy diversification**, which are now being implemented one after the other:

1. Biomass power plant – new construction in the existing boiler room:
   Capacity: 1,000 kilowatt (kW) – costs: 450,000 Euro – output: 3,000,000 kilowatt-hours (kWh) of thermal energy per year.

2. Combined heat and power plant (CHP) for the public indoor swimming pool:
   Capacity: 33 kW – costs: 170,000 Euro – output: 600,000 kWh of thermal and 270,000 kWh of electrical energy per year.

3. Conversion of all existing photovoltaic plants (approx. 300 kW) to facilitate the local consumption ("*scambio sul posto altrove*") or preparation for the new form of "energy community";
   Construction of new photovoltaic plants (up to 700 kW) – for example on the roof of the town hall and nursing home (capacity: 150 kW – costs: 150,000 Euro) and roof of the municipal building for assisted living.

4. Retrofitting public lighting and street lighting:
   Costs: 100,000 Euro (70,000 Euro for retrofitting streetlamps and 30,000 Euro to upgrade the sports facilities).

5. Energetic renovation of the public indoor swimming pool: Costs: 340,000 Euro;
   Optimization of citizen and city hall (energy audit): Heating control, insulation, heat pump.

6. Drinking water power plant "*Haselbrunn*":
   Capacity: 60 kW – costs: 600,000 Euro – output: 400,000 kWh of electrical energy per year.

In total, new **sustainable energy sources of approximately 3,600,000 kWh of thermal energy and approximately 805,000 kWh of solar and hydropower energy per year** are to be developed (Klima-Energieteam Naturns, 2022).

4.4.4. **Project results**

The project is in full swing, and the first steps towards more energy diversification have been taken. To better manage the project, it has been divided into two phases:

— The 1st phase is planned for 2022/23 and includes steps 1, 2, 3 and 4.

— The 2nd phase is scheduled for 2023/24 and includes steps 4, 5 and 6.

In particular, the first step, the renewal of the municipality's district heating plant, is currently being worked on intensely:

The Municipality of Naturno realized its district heating plant very early on. It was built in 1997 during the community's indoor swimming pool construction. It is used to heat the public buildings of Naturno, namely the town hall, the schools, the social housing and the youth centre. In addition, the vicarage and individual private customers such as tenants of the municipality and, of course, the indoor swimming pool itself, were heated.

Originally, the district heating plant was fired with wood chips. This worked well for 15 years, but then the necessary renovation of the furnace was not possible. The district heating plant was fired with gas in the last five years. This was already suboptimal before the Ukraine conflict. In today's situation with the sharp rise in gas prices, it was not only an ecological problem, but also an economic one. Therefore, the existing furnace is to be replaced by a biomass power plant. As early as 2023, the municipality wants to fire the district heating plant with wood chips from the local forests.

4.4.5. Cost of implementation
The municipality expects an investment volume of about 1.8 million Euro. For the first phase in 2022/2023, Naturno expects costs of just over 1 million Euro, followed by a further 750,000 Euro in the second phase (2023/2024).

The investments are primarily financed by government subsidies such as the "*Conto termico*" (Gestore dei Servizi Energetici, n.d. a) the "*Piano Nazionale di Ripresa e Resilienza (PNRR)*" (Italia Domani, n.d.), the "*Gestore dei Servizi Energetici GSE S.p.A.*" (Gestore dei Servizi Energetici, n.d. b) and last but not least by contributions from the Autonomous Province of Bolzano - South Tyrol.

The initial investment costs are also offset by savings in consumption and lower costs for sustainable energy sources. The best example is the new biomass power plant, which will run on wood chips instead of gas, one of the most expensive forms of energy:

A study by the Italian association AIEL for the Italian energy costs in January 2022 has shown gas to cost 138 Euro per MWh, while causing an environmental impact of 250 kg CO_{2ew}/MWh. By comparison, wood chips are priced as low as 24 Euro per MWh and cause only 26 kg CO2ew/MWh (AIEL - Associazione Italiana Energie Agroforestali, 2022).

4.4.6. In hindsight: lessons learned & recommendations
Even if the six steps towards more energy diversification have not yet been fully implemented, Naturno is already seeing the first positive results. In particular, the conversion of the district heating plant to biomass is almost complete. It brings environmental benefits and long-term savings through lower energy costs for the municipality. It supports local cycles and the population because wood chips from the municipality's forests are burned.

The other steps have also been initiated or at least planned in detail. The planning alone creates awareness for sustainable development, and the municipality takes on a role model function for the citizens and local businesses.

All these efforts also help Naturno on the way to accreditation as a "*KlimaGemeinde*" (for further information, see the good practice example of the Municipality of Lana in section 4.3).

While many communities contribute to better environmental protection and renewable energies, the good practice example of Naturno is characterized in particular by the fact that economic sustainability was considered from the beginning. Social sustainability was also taken into account. The simultaneous consideration of all pillars of sustainability is crucial for the municipality to have the necessary financial means as well as commitment by the local population to contribute to environmental protection in the long run.

WHAT CAN BE LEARNED?

— Municipalities have a crucial role in implementing the Sustainable Development Goals (SDG) at the local level.
— Municipalities become a role model for ecological sustainability for citizens and businesses.
— Not only environmental protection, but also economic and social sustainability must be considered.

4.5. **GREEN ENERGY FOR SOCIAL SUSTAINABILITY IN LUSON**

Municipality: Luson
Country: Italy
Population: 1,608
www.gemeinde.luesen.bz.it
Google Maps
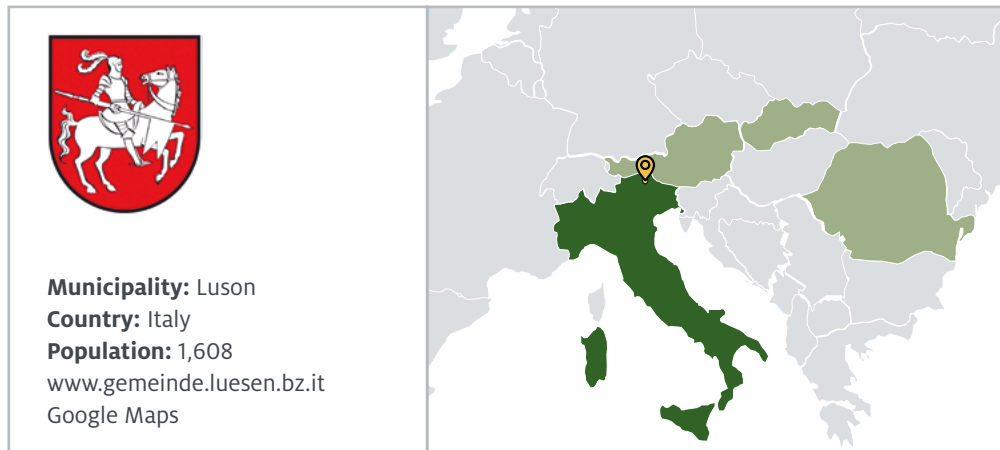
Short Summary:

The Municipality of Luson realized a hydroelectric power plant. However, the generation of green energy was not the primary goal. Rather, they were looking for a sustainable, environmentally friendly way to generate recurring revenue for the municipal budget.

The inhabitants of the mountain village of Luson have used the water power of the "*Lasankenbach*" stream for many generations: until the 1950s with water-powered sawmills, farm mills and a hammer mill. After the Second World War, the village, cut off from the rest of the power grid, was supplied with electrical energy for lighting by a small direct current plant. Then, in the fifties, the village was connected to the power grid, and hydroelectric power lost its importance.

The idea of using water for energy production was picked up again in the eighties, and various feasibility studies were carried out. The unique feature was that the impoverished Municipality of Luson did not want to produce electricity for its population: From the beginning, the project aimed to feed green energy from hydropower into the national electricity grid to create a source of income for the community.

After extensive planning, the water concession was granted in 1994. Subsequently, it was necessary to secure financing for the project costs, which at that time amounted to the equivalent of around 3.3 million Euro (adjusted for inflation today: 6.6 million Euro): The municipality applied to the state-owned Deposit Bank in Rome for a loan of 2.1 million Euro with a term of 20 years. This loan was granted because the province of South Tyrol assumed the guarantee and liability for default. In addition, the province granted a contribution of 930,000 Euro. The remaining 310,000 Euro had to be covered by the municipality's funds.

Construction of the hydropower plant began in September 1996 and was completed as planned in May 1997. The power plant was immediately put into operation, and the first kilowatt-hours were generated. Since then, the Municipality of Luson has been constantly generating green energy from hydropower for the Italian power grid.

4.5.1. Goals of the project
As already indicated, the generation of green energy was not the primary focus for the Municipality of Luson when building the *"Lasankenbach"* hydropower plant. Rather, they were looking for a **sustainable, environmentally friendly way to generate recurring revenue** for the municipal budget.

Such own revenues of the municipalities are not subject to any earmarking in South Tyrol, so they can be freely distributed by the municipality and used as it sees fit for the benefit of its citizens. Luson's goal was to acquire **funds to promote social sustainability**. On the one hand, local associations such as the volunteer fire department and music band could be supported. On the other hand, socially disadvantaged and especially young families in the community, were to be given a helping hand.

This should strengthen the village community and counteract outward migration, especially of the young population.

4.5.2. Existing solutions considered by the municipality
While a hydroelectric plant is not the only option for municipal revenue, this sustainable option has presented itself in Luson, and alternatives have not been considered.

4.5.3. Implementation phase
After many years of planning the construction project itself and, above all, the financing, the construction of the hydropower plant proceeded rapidly: After construction began in 1996, it took less than a year before the *"Lasankenbach"* hydropower plant was connected to the grid and supplied its first electricity.

The power plant consists of a water intake, a penstock almost five kilometres long and a powerhouse with two turbines for electricity generation. The power plant can generate a maximum of 2,030 kilowatt (kW) and has an annual working capacity of 9,500,000 kilowatthours (kWh).

4.5.4. Project results
Today, the small mountain community of Luson is in a good financial position: The recurring income from the hydroelectric power plant's electricity production amounts to 400,000 to 600,000 Euro annually.

The twenty-year loan for constructing the power plant has now been paid off. By selling all the electricity to the national electricity supplier, the municipality has no electricity distribution and grid maintenance costs. As a result, this income can be fully used for sub-

sidies in the social sector. For example, for the reduction of fees for kindergarten, canteen and summer care for children: With a monthly rate of 28 Euro per child, Luson offers the cheapest kindergarten care of all South Tyrolean municipalities and is significantly below the average of 56 Euro (ASTAT, 2022).

The village's associations, such as the volunteer fire department or the music band, are also supported with these funds and are in a good position compared to other communities.

The population development of Luson shows that the strategy of the municipal administration is working: For a small mountain community with about 1,600 inhabitants, one would assume emigration and population decline. However, the population of Luson has grown by 3% in the last ten years (2011-2021). Further growth of 5% is forecasted until 2035 (ASTAT, n.d.).

4.5.5. **Cost of implementation**
The costs for constructing the "*Lasankenbach*" hydropower plant were listed at the beginning. Such a construction means a significant initial investment. However, the municipality's expenses could be spread over the years through loan financing. Thus, about 140,000 Euro had to be raised annually for repayment. However, the income from the electricity production exceeded the loan expenses already in the first year.

The operation of the power plant incurs only minor costs. The administrative effort for the municipality itself is negligible. The power plant also requires little maintenance. A local company has been contracted for maintenance, and annual costs of around 8,000 Euro are incurred. Depending on the wear and tear, major maintenance work must be carried out on the turbines every few years, estimated at about 60,000 Euro.

All in all, the municipality was able to generate net income from electricity production over the entire period. Now that the loan has been paid off, the revenue has increased significantly.

4.5.6. **In hindsight: lessons learned & recommendations**
The Municipality of Luson is very satisfied with its investment in sustainable energy production from hydropower. Even if the green energy is not consumed directly on site, the revenues enable investments in social sustainability and, thus, the village community's long-term preservation.

Such a hydroelectric power plant is also particularly environmentally friendly since it only borrows the water for electricity production but does not consume it; instead, it returns it to the stream. Nonetheless, the lower volume of water in a section of the "*Lasankenbach*" creates a certain environmental impact. However, the municipality is trying to minimize this by setting minimum amounts of water that must remain in the stream and by purchasing and releasing fish through the local fishing club.

In general, Luson would recommend constructing a hydroelectric power plant to other communities as well, but at least in South Tyrol, the development of hydroelectric power is now so heavily regulated that new power plants are not easily approved.

Instead, the actual good practice example is identifying and developing opportunities to realize (recurring) revenue streams for the community budget in an environmentally sustainable manner, which can then be used to benefit the village population.

"Green" investments do not necessarily have to promote only ecological sustainability but can also strengthen the community's economic sustainability and thus provide means to improve social sustainability. Luson has shown how investment in a hydropower plant can strengthen all three pillars of sustainability.

WHAT CAN BE LEARNED?

— Municipalities should strive to identify opportunities to realize (recurring) revenue streams in an environmentally sustainable manner.
— "Green" investments don't have to promote only ecological sustainability but can contribute to the municipality's economic sustainability and thus provide means to improve social sustainability.

4.6. COMPOSTING PLANT IN THE CITY OF KEŽMAROK

Municipality: Kežmarok
Country: Slovakia
Population: 16,268
www.kezmarok.sk
Google Maps

Short Summary:

The City of Kežmarok has built its own composting plant to increase the communal waste's recycling rate and effectively use biodegradable waste produced in the city. The reasoning for the project was based on environmental and economic issues. The city protects its own environment and tries to limit unofficial waste dumping. Economically the city saves financial resources related to collecting and disposal of communal waste. As the end product, the Composting plant produces high-quality compost suitable to be used also for organic planting.

In accordance with the city's strategic document Idea Concept Smart Green City, Kežmarok strives to develop the city in a complex way by integrating digital technologies with its green ambitions. Thus, recycling communal waste, including the introduction and implementation of a sorted collection of biodegradable waste, is a part of this approach. In 2021, the overall EU average municipal waste recycling rate was 49,6%, with the Slovak Republic's average achieving 48,9% the same year (Eurostat, 2022). The City of Kežmarok increased its communal waste recycling average from 40,23% in 2020 to 45,45% in 2021, according to the city's statistics (Kežmarok, 2021a; Kežmarok, 2022a). The project of building the city's own Composting plant is thus in line with the ambition to increase the recycling rate of communal waste, especially to use the biodegradable communal waste produced in the city effectively.

4.6.1. Goals of the project

The overall intention of building a city composting plant was motivated by achieving city goals within its green agenda but was also influenced by the central government's legislation. According to Act No. 79/2015 on waste, cities in the Slovak Republic were required to

introduce and implement a sorted collection of biodegradable kitchen waste from house-
holds starting in July 2021.

The City of Kežmarok aimed to build a centre for biodegradable waste recovery, where-
by the collection, recycling, and recovery of biological waste will, as the end product, be
returned to the environment. The end product in this matter will be compost suitable for
organic planting. Simultaneously, the city will be able to decrease the cost of collecting
and disposing of municipal waste and increase the waste recycling rate (Kežmarok, 2021c;
Kežmarok, 2021d).

4.6.2. Existing solutions considered by the municipality
The city decided to realise the project of the composting plant to tackle waste recycling and
especially to deal with biodegradable kitchen waste in a complex and sustainable way by
using ahead of its time technology.

4.6.3. Implementation phase
The project was supported by the Operational Programme Quality of Environment admin-
istered by the Ministry of Environment of the Slovak Republic. The project proposal was
submitted on the 12th of April 2018 (Kežmarok, 2022b).

The overall project duration was October 2020 – September 2022. The main construction
work was carried out from April 2021 until July 2022. After the main construction was fin-
ished, technological tests of the electrical equipment started (Kežmarok, 2022c).

The project included initial landscaping, construction work of the composting plant and
purchasing the necessary technological equipment. The technological equipment of the
composting plant will enable complex composting activities, including sorting, collec-
tion of waste, transport to the plant and preparing the compost, which will be used for the
needs of the city and its inhabitants.

4.6.4. Project results
The Composting plant uses highly modern technologies to recycle different types of com-
munal waste (Figure 20):

— Biodegradable kitchen waste from complex and individual housing of households,

— Biodegradable waste stemming from the maintenance activities of public spaces, such
as the city greenery, parks and cemeteries,

— Biodegradable waste from gardens.

Figure 20: Composting plant of the city Kežmarok
Source: Kežmarok (2023a)

The Composting plant has three main parts:

— Three enclosed composting boxes intended for the initial phase of the process, including hygienic sanitation.

— Part intended for ripening.

— Storage space for various biodegradable waste and compost (Kežmarok, 2022c).

Inhabitants of the city were directly involved. Every household received an information leaflet and accessories for composting. Several other promotional and explanatory activities have been realised to educate the public about composting. People living in flats received composting bags and a basket. Inhabitants residing in individual family houses are supported by composting in garden composts, which are seen as the best way of managing waste because it's an activity which prevents waste from being produced at its source. Suppose a household living in a family house has much more biodegradable waste than they are able to process within their composter. In that case, they can bring the excess and oversized bio-waste directly into the Composting plant during its opening hours.

4.6.5. Cost of implementation

The project proposal has undergone an evaluation procedure, and it was finally approved in 2020. The overall budget allocated by the Ministry of Environment of the Slovak Republic, within the scheme of the Operational Programme Quality of Environment, was 2.646.773 Euro. The city co-financed the project with 140.000 Euro (Kežmarok, 2022c; Kežmarok, 2021c).

4.6.6. In hindsight: lessons learned & recommendations

Incorporating modern and unique composting technology, which isn't used elsewhere in Central Europe, allowed the city to build a composting plant that doesn't produce any unwanted smells. The composting cycle is much faster than the basic rotting composting. The technology of active composting is thus perfectly suitable for use directly in the cities.

The use of compost as the end product for the city and its inhabitants is only one possible scenario. The city is currently testing the potential of the compost to be used for heating in the city, allowing the city to develop an autonomous system for managing waste.

The capacity of the composting plant is bigger, than what the city produces as biodegradable waste. That's why the city also offers its composting capacities for the surrounding smaller municipalities, which wouldn't be able to start such a project alone. In this sense, the city can be seen as a leader for green solutions not only for its territory but also helps other municipalities use this potential and benefit from it.

WHAT CAN BE LEARNED?

— Significant investments and big projects are harder to implement, but the results bring long-term and sustainable benefits.
— By building its resources, the city is not dependent on third-party private companies regarding biodegradable waste management.
— Direct involvement of the inhabitants is a crucial part of project success.
— Educating the public and explaining city approaches helps to implement the project effectively.

4.7. **MĂRĂCINENI - COMMUNAL MANURE PLATFORM**

Municipality: Mărăcineni
Country: Romania
Population: 2,973
Google Maps
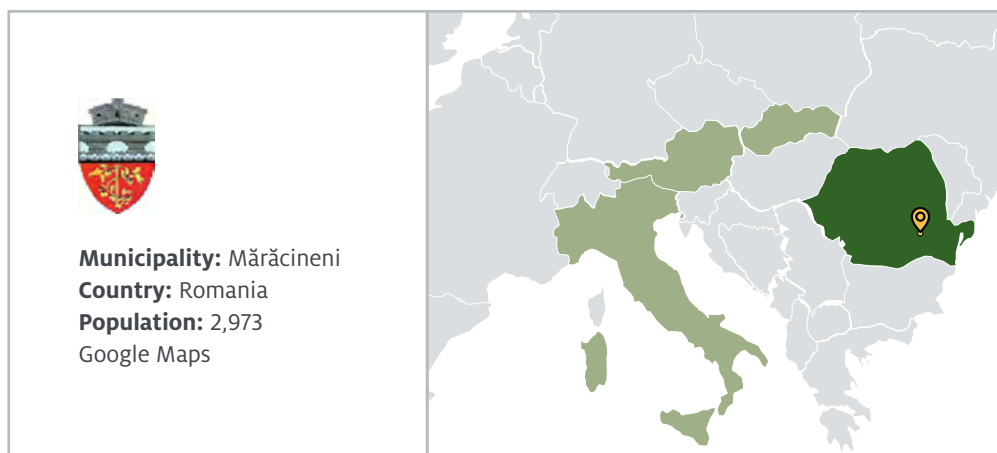
Short Summary:
The Municipality of Mărăcineni has launched a project to protect the waters against nitrate pollution and bacteria from agricultural sources and to limit the spread of unpleasant odours and insects.

The commune of Mărăcineni is located in Buzău county, on the left bank of the Buzău River, at the exit from the Subcarpathian hills and a distance of 2 km to the North from the City of Buzău. The territory of the Mărăcineni Commune has an area of 2,947.89 ha and includes the villages of Mărăcineni, Căpăţâneşti and Potoceni. The number of inhabitants according to the 2011 Census is 8,360 inhabitants, of which 3,080 live in Căpăţâneşti Village, 2,081 live in Potoceni Village and 2,973 live in Mărăcineni Village.

One of the problems the Municipality of Mărăcineni faced was the manure management. This issue has a significant impact on the health of the local community as well as the quality of life of the inhabitants. Manure was stored in improper conditions at the household and the municipality level.

The issue had to be solved, because the municipality has a rich livestock. According to the Agricultural Register 2018, Mărăcineni had: 332 cattle, 190 young cattle, 3,500 goats and sheep, 1,200 pigs, 145 horses, 6,500 birds.

4.7.1. **Goals of the project**
Therefore, the municipality set the investment objective: "The construction of a communal platform for the storage and management of manure and acquisition of equipment for the development of facilities for the storage of manure, in Mărăcineni commune, Buzău county".

The project consists of the construction of a concrete platform, rectangular with walls on three sides (without the front side). The platform is equipped with a basin for collecting effluents and rainwater, with concrete surfaces for the access road, parking for machinery and for the placement of 3 boxes made of reinforced concrete, for recoverable waste that accidentally gets at the platform mixed with manure and a container for hazardous materials.

4.7.2. Existing solutions considered by the municipality

The decision-makers in Mărăcineni analysed two technical-economic solutions:

— Scenario 1 – Platform without a roof

— Scenario 2 – Platform with a roof.

The platform's capacity was identical in both scenarios, with a storage capacity of 3,000 cubic meters/year of stored manure (2,250 t/year). The area of the platform is 1,000 square meters in both scenarios. The capacity of the basin to collect effluents and water from precipitation is different in the two scenarios due to the different surfaces on which the water from rainfall is collected. In the case of Scenario 1, a storage capacity of about 120 mc is required, while in the case of Scenario 2, the required capacity is 38 mc.

The capacity calculated for the communal manure platforms is to ensure the space required for the manure estimated to be collected in a period of 6 months. The duration of the imposed storage period has a beneficial effect on the stabilization of the manure through composting.

The capacity of the storage basin was established depending on the capacity of the platform and the manure's evacuation rate (once or more times a year, depending on the amount of precipitation during a month). The basin for the liquid fraction will store for at least 30 days the rainwater and the liquid fraction that drains from the manure. The average precipitation in the area from the rainiest month was considered according to the climatic averages of the last 30 years.

The liquid fraction collected can be applied to the agricultural lands in the periods allowed for this by authorized entities. It can be reincorporated into the manure piles to preserve moisture or emptied and taken to the sewage treatment plant.

The same technical, functional and technological elements are kept for both scenarios presented previously. The two scenarios differ only by the walls' height and implicitly by the size of the effluent collection basin.

The composting technology is identical in both situations: natural, aerobic fermentation, maintained by periodically overturning the piles of manure to aerate it.

The recommended scenario was scenario 1: **a platform without a roof**.

The choice of the recommended scenario is justified by the following:

— The execution time is shorter than in the case of Scenario 2.

— Fewer maintenance works than in the case of Scenario 2.

— The project is part of a local development strategy.

— It stores in good technological and ecological conditions the solid and semi-solid manure mixed with other organic matter and the resulting leachate.

— Composting and selective application on agricultural land of biodegradable waste, represented by manure from rural households, contributes to reducing its uncontrolled storage and decreasing the amount of biodegradable waste that reaches final household waste depots.

— It reduces the concentration of nitrate and nitrite in drinking water.

— It prevents water and soil pollution with nutrients.

— It reduces or even eliminates the illnesses caused by the concentration of nitrites and nitrates and diseases transmitted by insects in manure areas.

— It increases farmers' incomes by fertilizing agricultural land with manure and ensuring the facilities for accessing European funds.

4.7.3. **Implementation phase**

a) A rectangular platform was built, with walls on three sides (without the front side), with the capacity to store 3,000 mc/year (2,250 tons/year) of manure, having the dimensions L x W xh = 100 .00 x 10.00 x 3.00 m (Figure 21).

b) A storage basin for effluents and precipitation was built. This large, semi-buried, open basin, located close to the platform, collects both the rain that falls on the platform and the effluents from the stored manure; The storage basin was made of reinforced concrete and was designed for 30 days of precipitation; waterproofing concrete was used.

c) Before the collection basin for the liquid fraction, a clarification basin of 1 mc was incorporated; another basin collects straw and other plant debris and was built from the same materials as the liquid fraction storage basin.

d) Near the platform, there are three boxes made of reinforced concrete for the collection of the three categories of inert materials (glass, metal and plastic/cardboard) that accidentally end up in the manure and a container for the collection of any hazardous waste.

e) A wire mesh fence with steel poles was built to surround the platform.

f) Two piezometers were placed to monitor the quality of underground water. They are located upstream and downstream of the platform, in the direction of water flow from the underground water layer. The piezometers are covered and have an insurance system against opening this cover by unauthorized persons.

g) An access road was built inside the property from the entrance gate to the scraper in front of the platform and from it to the exit gate.

h) A row of trees was planted around the platform. The surrounding area is covered with grass.

Figure 21: The communal manure platform
Source: https://www.facebook.com/primariamaracineni

4.7.4. **Project results**

The communal manure platform is fully functional (Figure 22).

Figure 22: The communal manure platform
Source: https://www.facebook.com/primariamaracineni

4.7.5. **Cost of implementation**

The total implementation cost was 180,000 Euro, financed by the World Bank through the Ministry of Waters, Forests and Environment.

4.7.6. **In hindsight: lessons learned & recommendations**

Approximately 45% of Romania's total population lives in the countryside. About 3.63 million agricultural holdings, representing about a third of the farms in the EU, are in Romania. 92% of these rural holdings are less than 5 hectares, and most are subsistence households. Of the total farms, 68% are represented by mixed farms, focused on crops and livestock. Despite the slow but steady increase in the number of medium-sized farms, most farms have a few animals (the most common animals are cows, horses, pigs, sheep, goats, geese and chickens) raised near homes without being provided with adequate storage facilities for the collection of animal waste.

This poor agricultural practice leads to groundwater pollution with nitrates and bacteria and the spread of unpleasant odours and flies. Smallholder farmers need help to apply

environmentally friendly agricultural practices and therefore contribute significantly to nutrient pollution from diffuse sources. This leads to groundwater pollution, which threatens the health of residents who drink water from the wells.

Since the consultation phase for setting up this project, the citizens have raised the issues of the negative impact of agricultural practices (manure was collected without proper installations, being stored at the edge of the land), thus leading to the pollution of groundwater with nitrates and bacteria, as well as the discomfort created by the unpleasant smell and the flies present.

The reduction of water potability indices represents the main effect of groundwater nitrate pollution, thus causing diseases among the population. The wells in the area are also used as a source of drinking water in a proportion of 50% by the inhabitants. Before setting up the communal manure platform, exceedances of the permitted nitrate thresholds in water were reported.

WHAT CAN BE LEARNED?

— Given that almost the entire territory of Romania is in the Danube basin, in 2013, on the recommendation of the European Commission, Romania accepted that its whole national territory complies with the provisions of the Action Program for protecting waters against nitrate pollution from agricultural sources.
— Within this new approach, the preparation and implementation by local authorities of "Local Action Plans for the protection of waters against nitrate pollution from agricultural sources" have become mandatory throughout the territory of Romania.
— Romania needs investments and strengthening policies, regulations and administrative structures, related services and competencies at national, regional and local levels to help rural areas comply with the requirements of the EU Nitrates Directive. If no local budget is available for this kind of investment, a solution should be sought, such as external funding.
— Mărăcineni has found its way to comply with the regulatory framework and be part of the environmental protection solution, making it a good practice example for other regions to follow.

4.8. BACĂU - OUR BUILDINGS - ACCELERATING CLIMATE ACTION BUILDINGS - STRENGTHENING CIVIL SOCIETY AND POLICY-MAKERS IN ROMANIA AND BULGARIA

Municipality: Bacău
Country: Romania
Population: 196,886
https://municipiulbacau.ro
Google Maps
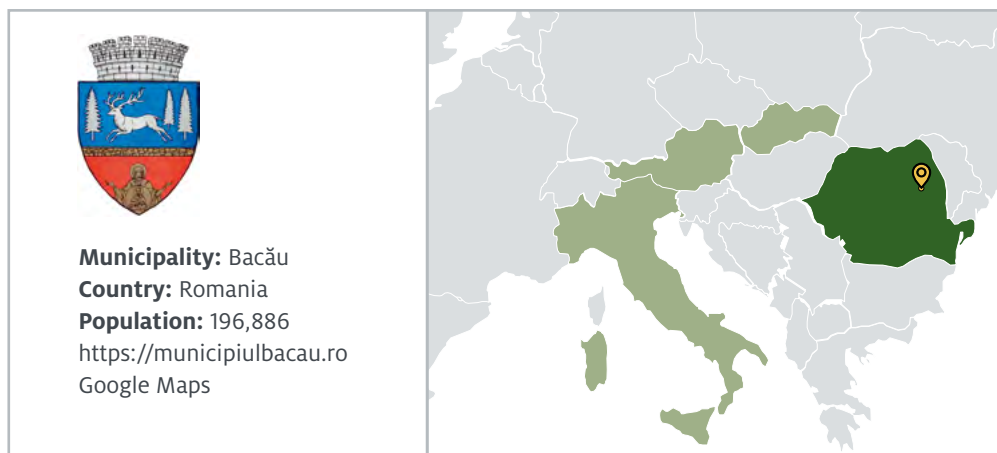
Short Summary:

The Municipality of Bacău has launched a project to provide technical support in defining the strategies for building renovation, considering the new requirements of the EU in the field of construction and the energy efficiency of public buildings.

The project "Our Building" was implemented by Bacău City Hall through Bacău Local Development Agency (BLDA) between 2018-2021. Its objective was to provide technical support in defining the strategies for building renovation, considering the new requirements of the EU in the field of construction and the energy efficiency of public buildings. The project took place in Romania and Bulgaria via the Romanian Network of Energy Cities and EnEffect Bulgaria, having as coordinator The Buildings Performance Institute Europe (BPIE). The project provided technical expertise for six municipalities in Romania and six in Bulgaria for defining local building renovation strategies within the Energy and Climate Change Action Plan. In Romania, the municipalities involved in the project were designated within a selection process, BLDA being one of the winners.

The project will increase exchange between the two countries and disseminate results throughout South-East Europe, create capacity to strengthen NECPs, pursue policy coherence, contribute to shared objectives, support effective governance, train national and local public officers and enable civil society and national stakeholders to contribute proactively to the National Energy and Climate Plans.

In 2018, the situation in the Municipality of Bacău was as follows:

— Lack of energy strategy at the local level regarding the rehabilitation of public buildings.

— Lack of digital statistical database regarding the consumption of utilities at the level of public buildings.

— Insufficient funds for the rehabilitation of public buildings and historical buildings in the municipality.

— Was impossible to access structural funds due to the lack of energy certificates of public buildings (lack of energy audit or earthquake resilience).

— Insufficiently qualified personnel on energy at the level of public institutions to monitor the utility consumption and eventual deficiencies arising in the system.

Considering the abovementioned issues, the municipality decided to join the competition for this project and implement it.

4.8.1. Goals of the project

— Supporting local authorities in creating their energy strategy in the short, medium, and long term.

— Supporting local initiatives in the field of energy efficiency at the level of educational institutions.

— Training of local authorities' representatives.

— Create, update, and monitor the EMS database at the local level.

— Supporting local authorities in the process of efficient energy and environmental policy-making.

— Attracting EU investments for energy rehabilitation of public buildings.

Specific objectives:

— To elaborate a renovation energy strategy at the level of public buildings;

— To create a functional, accurate, and updatable database regarding the consumption of utilities recorded at the level of local institutions;

— To attract funds to finance projects of energy rehabilitation of public buildings;

— To increase public awareness regarding saving energy, applying the knowledge provided by information campaigns at the household level, providing good practices regarding energy efficiency buildings, and providing comfort using non-polluting sources.

— To increase the quality of public services and decrease the costs. To improve the public environment and the incentives to apply energy efficiency principles at the residential level.

— All public institutions of Bacău to use the digital database and work with the Bureau for energy efficiency of the City Hall, established for this purpose, to monitor and find fficient solutions for saving resources.

4.8.2. Existing solutions considered by the municipality

The Citi Hall delegated BLDA to identify a project with benefits and resource savings in the long run. The solutions to reach the project's objective were finalised after Bacău was accepted into the project. That consisted of collaborations, training, and working meetings of project team members with the representatives of the Romanian Network of Energy Cities, decision-makers at the local and national levels, and the representatives of educational institutions.

4.8.3. Implementation phase

The project team organised consultations and meetings with the citizens and the other stakeholders.

Between 2018-2019, each of the six municipalities organised meetings to identify the state of the public buildings and make an inventory of the instruments used by each entity to monitor the consumption of utilities (water and energy).

The work on the EMS database regarding the energy consumption of all educational institutions in Bacău started in September 2019 and ended in February 2021. The implementation of the project was influenced by the pandemic, which delayed the completion of the database. A good number of schools were closed. Therefore, the recorded consumption was not relevant at that time.

In 2020, Bacău organised a working meeting to identify the barriers to developing and implementing the strategy regarding the energy renovation of the buildings. Local authorities and other stakeholders (planners, constructors, architects) attended the meeting.

In the meantime, BLDA and the Romanian Network of Energy Cities centralised the technical data regarding the educational institutions in Bacău, implementing it in the digital EMS database.

The project team members' training regarding database usage followed.

After completing the project, the database was transferred to the Office of Energy Efficiency at Bacău City Hall. Each educational institution had a representative trained in order to be able to implement data into de EMS database, beginning in 2021.

The local strategy for renovating educational institution buildings was finalised after the completion of the project.

Representatives of the Romanian Network of Energy Cities trained the project team and the energy representatives of the public institutions (educational institutions). Why? Because the laws regarding energy efficiency suffered numerous modifications, becoming unpredictable and using unclear indicators.

4.8.4. Project results

The project was successful through its results; other public institutions in Bacău can adopt it. It met almost 90% of its objectives. The digital EMS database is functional and constantly updated. The Integrated strategy for the urban development of Bacău Municipality 2021-2027 contains the elements of the Plan for energy efficiency and the Local long-term renovation strategy of public buildings.

A school in Bacău (Alecu Russo School) benefited from an energy audit and was accepted in a rehabilitation project funded by the EU (Figure 23).

Figure 23: Alecu Russo School
Source: https://www.scalrussobc.ro/

The situation is much better and much more precise. The employees of educational institutions are more aware and more implicated in reaching energy efficiency and its benefits for the entire community. At any moment, data regarding consumption can be collected, and deficiencies can be addressed. The consumption of utilities decreased in 2021 in educational institutions, a good thing considering the challenging international context.

4.8.5. **Cost of implementation**

The project "Our Buildings" was supported by the European Climate Initiative (EUKI) of the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU). The project aimed at developing capacity and transferring knowledge to enable municipalities and civil society to integrate building renovation strategies in local and National Energy and Climate Plans (NECPs) in Romania and Bulgaria (EUKI, 2022).

4.8.6. **In hindsight: lessons learned & recommendations**

The municipality would involve more specialists from the City Hall or the Energy Efficiency Office to monitor and explain to the citizens and the representatives of public institutions the benefits of energy efficiency and digitalisation.

It would train specialists at the level of all public institutions via courses, working meetings, and experience exchanges at the national and international levels, including mobilities abroad, to see other successful projects at work in the digital and green transition field.

The example of good practice should be disseminated via mass media, online and on social networks.

WHAT CAN BE LEARNED?

— The municipality would involve more specialists from the City Hall or the Energy Efficiency Office to monitor and explain to the citizens and the representatives of public institutions the benefits of energy efficiency and digitalisation.
— It would train specialists at the level of all public institutions via courses, working meetings, and experience exchanges at the national and international levels, including mobilities abroad, to see other successful projects at work in the digital and green transition field.

4.9. LINZ - INNOVATIONSHAUPTPLATZ

Municipality: Linz
Country: Austria
Population: 208,000
https://www.linz.at/
Google Maps
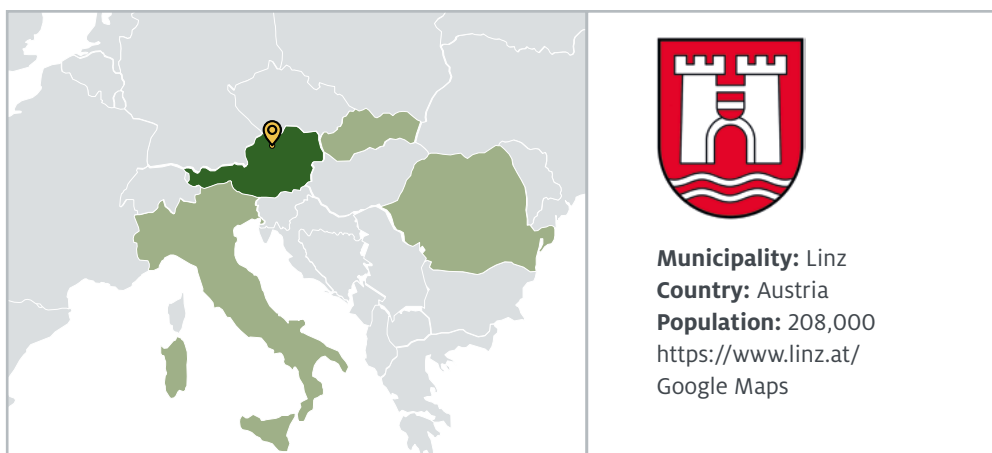
Short Summary:

The Innovationshauptplatz is an institution that aims to offer a matchmaking service between citizens, local authorities and businesses. It also offers a platform to enable citizens to participate in deciding about local matters. Besides that, the Innovationshauptplatz also carries out its own activities to promote social innovation and realizes many sustainability and climate change projects.

The Innovationshauptplatz is an institution in Linz. Literally translated, "Innovationshauptplatz" means "main square of innovation". The commitment of Klaus Luger, the mayor of Linz, heavily drove the creation of the Innovationshauptplatz. He used his strong position and political influence to convince the municipal administration to get this idea through all relevant political entities, especially ensuring the city is providing the necessary funds.

4.9.1. Goals of the project

The Innovationshauptplatz's purpose is to improve the relationship and foster communication between citizens and public administration (in both directions) and allow the people to participate in municipal decision-making and in planning new innovative projects. It also supports citizens in realizing their projects.

The institution describes itself as a matchmaking service between citizens, the local administration, businesses, and other national and international stakeholders. Its broad network is an important asset, allowing them to connect different actors and support future cooperation. They also see themselves as a driver of social innovation.

Social Innovation is a process intending to improve the overall well-being of society and individuals by leaving existing paths and implementing new concepts, processes, organi-

sational strategies and products. Cooperation between various actors is crucial for realizing social innovation. Their combined knowledge and capability should enable organisations and individuals to implement their ideas and eventually lead to social transformation (Socioeco.org, 2022).

4.9.2. Existing solutions considered by the municipality

The team of the Innovationshauptplatz is not aware of any other institutions (in Austria or other countries) that cover all the aspects of the Innovationshauptplatz simultaneously. There are many participation projects in other cities, but often they are set up as one-time platforms for just one participation action and are not intended to facilitate long-term participation. Even if there are long-term projects, they usually lack the combination with a directly related office, like in the case of the Innovationshauptplatz. Therefore, the Innovationshauptplatz seems unique in its extent and its services range.

4.9.3. Implementation phase

After planning was completed, implementing this institution took approximately three to four months. At first, the team took some time to define their goals and think about appropriate actions to reach them. They also organized a kick-off event to make the project known and informed the public via the media. To promote their activities, they also put up posters in public spaces.

Initially, the Innovationshauptplatz was led by staff from the local administration with close political ties to the mayor. After one year, when the project had successfully passed the challenging first months, the leadership was passed on to a more neutral successor with fewer political ties, the current manager Kathrin Obernhumer. This can be seen as a move to increase public trust by positioning the project as more independent from politics while the institution remains part of the local municipal administration and, therefore, under the city's control.

The website is based on a third-party cloud platform. When the project was launched, the Innovationshauptplatz used the citizen participation platform offered by CitizenLab. Over time, the Innovationshauptplatz wanted to implement additional features to make the website more attractive, which was not possible with CitizenLab's platform. After extensive research, they decided to change the platform and rely on another cloud platform offered by Innovation Service Network GmbH (ISN). This platform allowed the Innovationshauptplatz to massively extend the possibilities offered by setting a focus on creating a community and implementing interactive features and gamification. For example, users can now score points for their activities on the website, work in groups or teams and chat with other users.

The Innovationshauptplatz is an integrated part of the city's local administration. This goes along with some perks, for example, the possibility to use the existing powerful infrastructure, but also leads to some downsides, like a lack of organizational flexibility with more restrictive rules and a limited, somewhat isolated IT system. Nevertheless, the municipal administration understands the special needs of the Innovationshauptplatz and has started

to grant them more freedom, which gives them the role of an experimental laboratory for the administration, testing new ways of communication.

4.9.4. **Project results**

The Innovationshauptplatz comprises two main components, a website and a publicly accessible office. The website is available at *https://innovation.linz.at/*, while the office is in the city centre (at the main square – which might explain the institution's name).

The website allows users to put forward their own proposals, share their ideas and thoughts to specific questions raised by the local administration and find information about related events in the city. Users can support ("like") other users' proposals. Once a proposal reaches a minimum of 50 supporting votes within three months, the initiator is invited to a talk about his idea with an Innovationshauptplatz representative and to another talk with a local administration representative from the department in charge. Participating on the website should be as easy and low-threshold as possible. Registering an account on the platform is necessary, but users only need to choose a username, enter their e-mail address and set a password. There are no verification procedures to check the users' real identity.

The web platform currently has 6,600 registered users. Besides the office and the website, the Innovationshauptplatz also uses Social Media to share and promote its projects and causes. They have got 3,000 followers on Instagram and 1,300 followers on LinkedIn.

The office should be a contact point for citizens who want to discuss their ideas or seek help to realize their projects. Like a shop, it can be accessed on ground level directly from the street, which should lower the barriers and effectively allow people to enter the office when they pass by.

The Innovationshauptplatz also offers financial grants for business founders. To allow them to focus on their business idea, they are supported with an allowance to cover part of their living expenses while still being allowed to work for 20 hours a week.

Moreover, the Innovationshauptplatz regularly organizes events all over the city. These low-threshold events should allow adults and children to experience new technology or deal with a specific important topic, such as climate change.

One example of events organized by the Innovationshauptplatz is the "Tour of Linz Innovations". This event is targeted especially at disadvantaged citizens and their kids, and many tour stops are set in underprivileged areas of the city. People can attend as they want and interactively experiment with new technologies. With this event, the Innovationshauptplatz wants to offer the public low-threshold and playful access to technology and digitalization while including climate change. For example, they could take empty plastic bottles, shred them, melt them and create new objects with the plastic. It also was possible to get some insights into computer coding and to build mini robots. There are also cooperations with other organizations, like Scientists for Future (making the topic of science better

accessible to kids) or Emporia (producing mobile phones that consider the special needs of older people).

The Innovationshauptplatz has been criticized by political parties, some representatives of the public administration staff and some factions of the general public, including business people, since the beginning, questioning its purpose and referring to it as a waste of money. Consequentially, this institution's future remains uncertain, as it strongly depends on the results of future local elections and the resulting political majorities. However, the Innovationshauptplatz team points out that the success of its previous and ongoing projects clearly proves the outcome of this institution.

In 2021, the Innovationshauptplatz won the Austrian Administration Award in the "Participation and Co-Creation" category. It was the only project outside of the capital of Vienna to win one of the awards.

4.9.5. **Cost of implementation**
When the Innovationshauptplatz started its operations, there were two and a half full-time employees. By now, this number has grown to four. The office has no costs, as the City of Linz owns the building. The total budget in the first year (2019) was 350,000 Euro, while the budget in 2023 has reached 560,000 Euro, including staff costs.

### 4.9.6. **In hindsight: lessons learned & recommendations**
Performance measurement has been a challenge for this project. The main goal of the Innovationshauptplatz is to promote and support social innovation, which is very difficult to measure. For example, they can use the number of participants to measure the performance of a specific event, but this number does not necessarily reflect the actual impact the event had. To deal with this problem, the Innovationshauptplatz has used the so-called Objectives and Key Results (OKRs). Working with OKRs means that the team sets specific objectives (e.g. "imparting future skills to kids" or "supporting people aged 65+ in digitalization") and connects them with specific results (e.g. implementation of the Tour of Innovations). The use of OKRs makes it easier to understand the intentions of the Zukunftsakademie, but the lack of meaningful indicators to measure social innovation as the institution's key goal remains unsolved.

The team behind the Innovationshauptplatz is rating the project as highly successful. After difficult first months and years, when it was necessary to do a lot of public relations activities to increase citizens' awareness about the institution, they are now in a much stronger position, having many valuable connections and a remarkable degree of publicity. They emphasize that it would not have been possible to realize this project without the total commitment of the local government and a great deal of perseverance of all involved actors.

WHAT CAN BE LEARNED?

— When initiating a project such as the Innovationshauptplatz - a lab for open (participa-tory) social (with the society and various stakeholders) and public (useful for the public sector and beyond) innovations (new projects, ideas, methods, formats etc.) - it is of the utmost importance to have the support of all relevant politicians.

— While implementing the project as part of the local administration, its quite restrictive policies sometimes were a limitation, but over time enough flexibility was ensured to allow the Innovationshauptplatz to realize many of its ideas.

— The Innovationshauptplatz also proves the importance of stamina when implementing projects in the public sector, as it takes much time to establish the necessary relationship with the citizens.

4.10. GURA HUMORULUI MUNICIPALITY - O.A.Z.A. - REINFORCING DEVITALIZATED SPACES INTO GREEN AREAS FOR THE BENEFIT OF THE COMMUNITY

Municipality: Gura Humorului
Country: Romania
Population: 11,402
www.gurahumorului.info
Google Maps
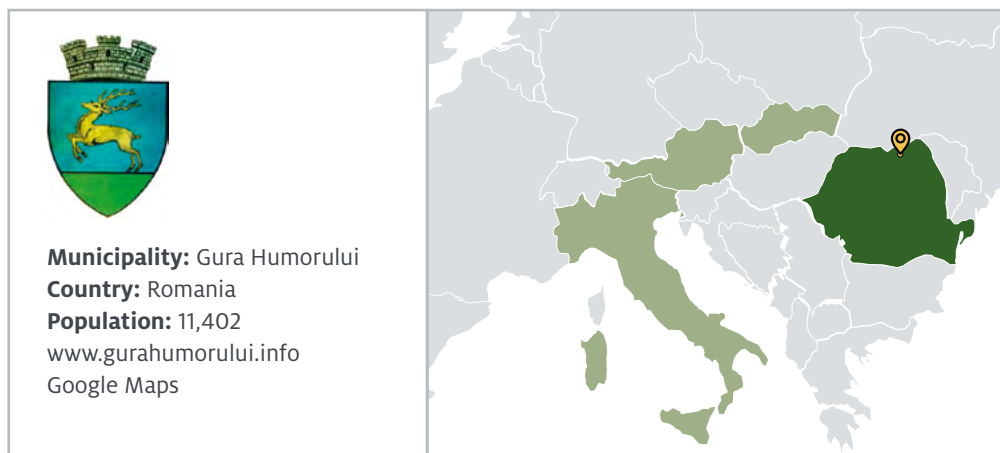
Short Summary:

O.A.Z.A. project succeeded in reconverting 7,2 ha of degraded and abandoned land placed in the local dendrological park of the city. The land was used to create three theme parks with multiple functions: recreation and leisure areas for the community and tourists.

Tourism benefited from investments favoured by access to the EU funds, all principal axes, and private investments (guesthouses, restaurants, terraces, and residential blocks). Tourism is the core of the city's economic development strategy. About 80% of the European funds strengthened the tourist infrastructure. They financed 56 projects, such as:

— A ski slope with night-vision and snow cannons (with the possibility of tubing, skiing, sledging).

— Enhancement of the Piatra Pinului Paleoligocene reserve.

— Outdoor and indoor swimming pool.

The municipality implemented two large-scale projects to restore almost 9 hectares of land in an advanced state of degradation for the benefit of the town's inhabitants and tourists visiting the city, using funds provided by the Regional Operational Programme 2014-2020, bringing 7.5 million Euro to the area.

The first project is T.U.R.I.S.T. (Revitalized Urban Territory with Infrastructure to Support Tourism - completed in 2021), and the second one is O.A.Z.A. (Active City with Developed Green Areas), implemented between 26.10.2017 and 31.03.2022.

O.A.Z.A. succeeded in reconverting 7.2 ha of degraded and abandoned land placed in the local dendrological park of the city, to create three theme parks with multiple functions: recreation and leisure areas for the community and tourists.

The project developed three theme parks covering an area of 78,605 sqm, including 70,745 sqm of landscaped green spaces.

1. The "Hobbit Village" Park, with a total area of 19,050 sq.m and planted green space of 17,145 sq.m, consisting of:
   – 5 "hobbit" houses - buried borders for various activities for children.
   – Children's playground in the form of a castle.
   – A green labyrinth created from hedgerow plants forming winding paths.
   – A sanitary and administrative building.
   – Cobbled footpaths, a square, various buildings, street furniture, and a cycle path.

2. "The Fountain Park", with a total area of 39,755 sq. m. and planted green space of 35,780 sq. m. It has the following improvements for the designated location:
   – A fountain - equipped with sound and light system, next to which there is a grating for watching the performances offered by the fountain.
   – A skateboard track and bicycle track - for sports and recreational activities.
   – Cobbled pedestrian walkways, squares, toilets, various buildings, and street furniture.

3. " The Sun Park", with a total area of 19,800 sqm and 17,820 sqm of planted green space, has the following facilities:
   – A sanitary group and administrative space.
   – Paved pedestrian walkways and square.
   – Various buildings and street furniture.

4.10.1. Goals of the project

The project's general objective is to regain the utility of some degraded soils and improve, revitalize, and reduce air pollution in the urban environment.

The specific project objective is the reconversion of degraded and abandoned lands to create three parks/green areas with the functions of recreation and leisure for the community.

4.10.2. Existing solutions considered by the municipality

The starting point for green initiatives goes back to 2004 when the municipality, in partnership with the World Bank, launched the first short and medium-term community development strategy for Gura Humorului. Tourism is a sustainable and tangible option for the local community for the city's social and economic development. Since then, tourist resorts of national interest have benefited from funding opportunities to apply for non-refundable funds. The Office for European Projects was established in 2005. Since the beginning, it has had an integrated approach, namely partnerships with neighbouring administrative-territorial units, the County Council, and the Ministry of Tourism.

One significant asset of Gura Humorului is its membership in the GAL Association – Northen Confluences - an NGO that promotes sustainable development in the northern part of Moldova.

At the beginning of the project preparation, the applicant, the Gura Humorului municipality, closely followed the preparation steps of the project eligibility plan and compliance with the donor's requirements. It actively identified priority programmes within the Sustainable Development Strategy of Gura Humorului - Horizon 2023. At the same time, the municipality collaborated with a consultancy service provider to prepare the funding documentation, providing the latter with the documents and specific pieces of information for the preparation of the documentation.

4.10.3. Implementation phase

The need for sustainable development has been identified through public consultation (opinion polls, debates, impact studies) in the local community, approved by the City Council and set out in the Integrated Sustainable Development Strategy.

The implementation process involved: external entities (consulting firm, builders and subcontractors) and internal entities (4 municipality employees).

For the sound management of the resources involved in the project and its sustainability, the primary decision-making body was the community, with the direct support of the economic agents.

4.10.4. Project results

The O.A.Z.A. project:

— Increased by 78,605 sqm of the area of green spaces in the city.

— Meet the needs for recreational and leisure activities of city residents and tourists.

— Reduced air pollution by providing green spaces that also contribute to the chemical purification of the atmosphere, cleaning the air.

— Improved the aesthetic appearance of the city by landscaping public spaces.

The new investments significantly impact the tourist activity, adding more value to Gura Humorului. It also reflects people's increasing interest in diversified recreational, sports and outdoor facilities, which can be used year-round, with access to all residents of Gura Humorului and tourists.

4.10.5. Cost of implementation

The total value of the project was 22,050,463 lei (Romanian currency), which is equivalent to 4,804,022 million Euro, of which:

— 85%, equal to 4,033,145.66 Euro, were eligible non-reimbursable European Regional Development Fund value.

— 13%, equivalent to 616,834 Euro eligible value from the national budget;

— 2%, equal to 154,042 Euro, co-financing from the local budget.

4.10.6. In hindsight: lessons learned & recommendations

The project increased the capacity to promote the city's leisure and tourism potential. The municipality organises events such as the Easter Fair, Autumn in Voroneț, and Humor in Gura Humorului every year. The municipality also celebrates the "Town Days" and organises Oktoberfest in the East (1st edition).

In 2022 the project "Explore the smiling city" aimed to raise the visibility of tourist attractions in the city and its surroundings with the help of bloggers, influencers, journalists, and TV people from the country. The City Hall supported the project in partnership with Casa Humor, Best Western Bucovina, La Conac in Bucovina, and Voroneț Pension (economic agents in the tourism sector).

WHAT CAN BE LEARNED?

— This experience has also been taken up by the town hall of Vatra Dornei, which aims to write a project to create a recreational space using disused land.
— The integrated approach is being extended through partnerships with neighbouring territorial administrative units and relevant ministries.

4.11. IDEA CONCEPT SMART GREEN CITY IN THE CITY OF KEŽMAROK

Municipality: Kežmarok
Country: Slovakia
Population: 16,268
www.kezmarok.sk
Google Maps

Short Summary:

The City of Kežmarok adopted a strategic document of the city called Idea Concept Smart Green City. The idea concept was prepared in close cooperation with university and private sector professionals. The city aimed to utilise modern digital technologies with green and sustainable development in mind. The idea concept followed up on existing solutions in the city, interconnecting them with future activities and focusing on the overall goal of increasing the quality of life of the city's inhabitants.

The City of Kežmarok is continuously trying to focus on its development by combining digital solutions with green sustainability. In 2018 the city received the award "Digital number one 2018" (Digitálna jednotka 2018) for an active approach to digitalization. The award was granted by the Digital Coalition, which the IT Association of Slovakia initiated with the support of the Office of the Deputy Prime Minister of the Slovak Republic for Investments and Innovations (Kežmarok, 2021e).

Following the 2018 received award "Digital number one 2018", in 2019, the city received the award "Envirocity 2019" (Enviromesto 2019). The Envirocity award was granted by the Ministry of Environment of the Slovak Republic and the Slovak Environment Agency. Kežmarok was rewarded for its systematic, creative and visionary solutions to increasing the quality of the environment. The environmental reward highlighted mainly activities of the city in building cycle paths around the historic centre of the city, anti-flood measures on local waterways and the development of the Idea Concept Smart Green City (Kežmarok, 2023b). The Idea Concept Smart Green City combines modern technological trends of city development, intending to increase the quality of the environment simultaneously.

4.11.1. **Goals of the project**

The overall goal of adopting the Idea Concept Smart Green City was to lead the way in Kežmarok`s development and to continue building smart solutions. The interconnection of the city's digital (smart) and green activities highlights the necessity to consider the environmental challenges that the city has to cope with. This approach should have helped Kežmarok become a modern and dynamic city which can utilise new technologies to increase the quality of life in the city.

4.11.2. **Existing solutions considered by the municipality**

The Idea Concept Smart Green City was developed by university and private sector company professionals from the Czech Republic, specifically for the city's needs. The Czech Technical University in Prague and the ECOTEN, s. r. o. company (providing energy specialists, construction engineers and architects) as the suppliers of the idea concept were selected based on the results of a public procurement process (Kežmarok, 2021b).

4.11.3. **Implementation phase**

The subject of the contract resulted from the public procurement was the elaboration of a strategic document that should contain mainly:

— Definition of suitable directions of development in the area of the smart city.

— Identifying suitable sources and ways of financing the development in the area of the smart city.

— Proposal of further steps and tools to support smart city development following the city's existing strategic and conceptual documents and tools.

Based on the contract between the city and the suppliers, the final document should have been delivered within 90 days after the contract stepped into force.

4.11.4. **Project results**

As a comprehensive strategic document, the Idea Concept Smart Green City (Svítek et al., 2017) contains interrelated parts. After a general introduction highlighting the overall mission and explanations of the concept, an analytical chapter presents the existing background of the city. Following the analysis, a proposals chapter specifies areas for the city to focus on. Subsequently, follow-up steps conclude the core part of the idea concept.

— The analytical chapter of the idea concept summarizes:

— Existing development documentation of the city.

— Own findings based on analysing the city by the experts, which are devoted to the overall condition of the city; energetics, environment and waste; transport; ICT and infrastructure.

— Decision-making.

— Impulses.

— Financing.

— Evaluation of the state of the areas being addressed (energetics and environment, transport, ICT and infrastructure, decision-making, impulses, financing).

— SWOT analysis.

— Sources of financing.

PROJECT AREAS	SPECIFIC ACTIVITIES
Governance	— Creation and intensification of cooperation networks — Smart parking — Integrated information system for improving the quality of city administration through streamlining processes and better work with data — City information system — Introduction of the city card system — Mobile support for the chronically ill and the elderly — Development of network infrastructure to support smart solutions — Modernization of ICT infrastructure and optimization of healthcare processes with the help of ICT system's integration and secure exchange of medical documentation in the city hospital
Energetics	— The revitalisation of the central heat supply's sources — The potential of photovoltaic and photothermic panels — Energetic management, smart metering and microgrid — Mapping the potential of smart buildings — Revitalization of buildings — Technological tourism
Environment	— Waste — Greenery — Rainwater management
Shared mobility	— Introduction of electromobility

Table 1: Project areas of the Kežmarok – smart city for life
Source: Svítek et al. (2017)

The proposals chapter formulates the vision, mission, pillars and specific further development possibilities, activities and projects for the City of Kežmarok. According to Vision Smart Green City Kežmarok, the city is seen as: "**Kežmarok – smart city for life**". Each of

the specific activities within four main areas is elaborated, containing a description, best practices examples, considered partners and possible sources of financing.

The Idea Concept Smart Green City puts the people living in the city at the forefront. Overall, the city felt positive feedback from the inhabitants, mainly because they are the primary beneficiaries of the changes, implemented projects and activities. The idea concept allows the city to guide its development further and provides a clear pathway for municipal policymaking.

4.11.5. Cost of implementation
The costs for developing the document Idea Concept Smart Green City by the suppliers were 6,800 Euro. The city financed it from the city budget. The costs consider only the process of preparing the strategic document as such. Further projects and activities resulting from the strategic document were financed as separate city expenses.

4.11.6. In hindsight: lessons learned & recommendations
Continuous and complex focus on health and quality of life conditions directed the City of Kežmarok toward sustainable city development. The city's approach was three pillars based, combining environmental, economic and social balance. The city increases people's awareness of waste separation; biodegradable waste is composted; wood chips are used for mulching flower beds; organises educational Forest Days and forest pedagogy; favours housing with low energy consumption; renaturalizes the environment; limits its expansion and promotes the combination of housing, services, shops, density and micro-mobility. The public and companies in the city were also directly involved, for example, by planting trees and perennial beds (Kežmarok, 2021f).

The City of Kežmarok sees the Idea Concept Smart Green City, or any other city strategic document for that matter, as a must. The city can't develop itself without a conceptual and comprehensive document. According to the mayor of the City of Kežmarok, up to 90%-95% of the content and plans formulated in the Idea Concept Smart Green City are completed. This highlights that the strategy wasn't done for the sake of it. It led the way forward for the city to develop its territory utilizing technological trends and maintaining sustainability goals.

WHAT CAN BE LEARNED?

— The city should have a clear vision of its future development.
— Visions of the city should be elaborated in the form of strategies, with clearly formulated projects, activities, responsibilities and funding.
— The interconnection of digital and green goals allows the city to be developed sustainably, with environmental protection at the forefront.

4.12. **ECO MAP IN THE CITY OF HLOHOVEC**

Municipality: Hlohovec
Country: Slovakia
Population: 19,992
Google Maps

Short Summary:

The City of Hlohovec developed an interactive map intending to support the city's circular economy. The city is also trying to educate the public, inhabitants of the city and visitors on the prevention of waste disposal and responsible thinking therein. The aim was to digitally present different parts of the circular economy in the City of Hlohovec, including collection yards, containers for small electrical waste and used clothing, packaging-free stores, swap markets, events focused on ecological activities and many others.

The City of Hlohovec is aware of the climate change challenges and the impacts it brings to the city's development, health and assets of the inhabitants. The city highlights the importance of systematically responding to climate change challenges and adapting its activities based on the existing and expected climate change impacts. Being aware of these challenges for citizens, society, public authorities and cities, the Eco Map is part of the city's effort to support a circular economy in the city territory (Hlohovec, 2023a).

4.12.1. **Goals of the project**

The Eco Map project's overall goal is to support the city's circular economy and contribute to the increase of responsible thinking of the inhabitants. The aim is to prevent waste production, support ecological disposal, and promote events, workshops, discussions and lectures organised in the city on ecological topics. An up-to-date Eco Map should guide the public, inhabitants and also visitors of the city towards ecological activities, events, sharing possibilities, shops and services.

4.12.2. **Existing solutions considered by the municipality**

The City of Hlohovec was searching for an Eco Map project solution that would allow the city to create the content in the map, update it when necessary, to be able to administer the map in-house and publish the map via the city's web pages. Hlohovec used a software solution provided by the company Esri. The Eco Map is operated and updated by the city employees from the Department of Strategy at the City Office.

4.12.3. **Implementation phase**

As the City of Hlohovec operates the Eco Map, there was no need to realize a public procurement process. The city created the Eco Map utilizing software provided by the Esri company, which the city also uses for other city maps. In addition to the Eco Map, the city created a map of investments in the city and the map of ideas for the city's participatory budget.

The collection, administration and elaboration of the data for the Eco Map are seen by the city as an open and ongoing process. The intention is to keep the data provided in the Eco Map up to date. Thus, new information is being added and existing displayed information about the stores, or current ecologically themed events is being updated.

4.12.4. **Project results**

The Eco Map is available via the official web pages of the city (Figure 24). The Eco Map displays all the necessary information, including the exact location, description, contacts and other relevant data about the activity, service or shop. Overall graphical layout and map resolution also help the user quickly orientate himself.
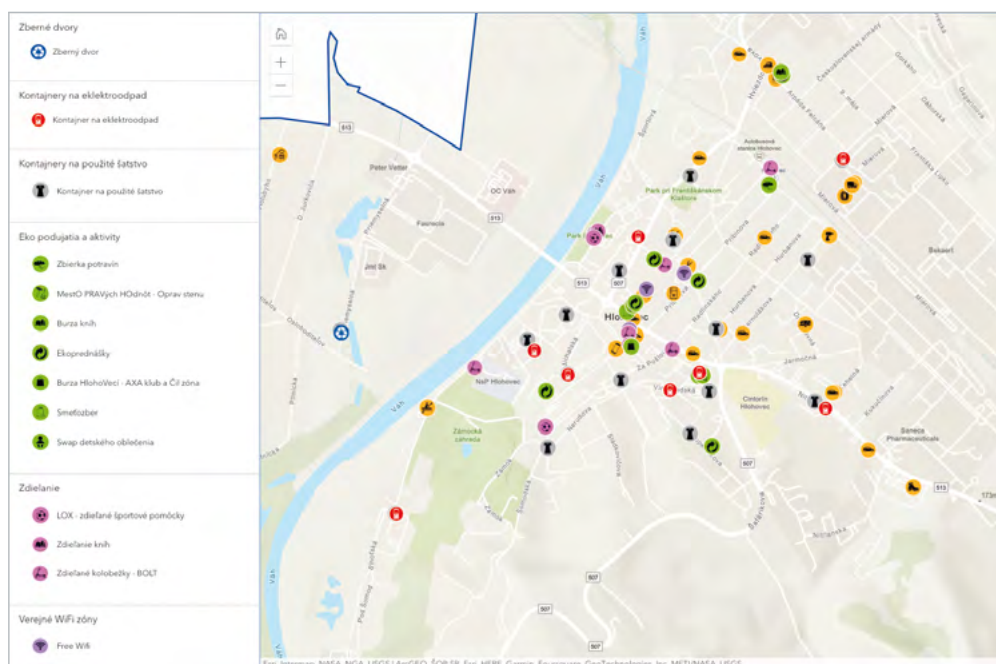

Figure 24: Eco Map in the City of Hlohovec
Source: Hlohovec (2023b)

The Eco Map (Figure 25) displays a variety of circular economy components, including:

— Collection yards.

— Containers for electrical waste.

— Containers for used clothes.

— Ecological events and activities (book exchange, eco lectures, swap possibilities, waste collection activities).

— Sharing possibilities (sports equipment sharing, books sharing, shared electric scooters).

— Public Wi-Fi zones.

— Shops and services (unpackaged store, second hand, tool rentals, car service shops, service of electrical appliances, shoe repairs, cleaning and beating, etc.).
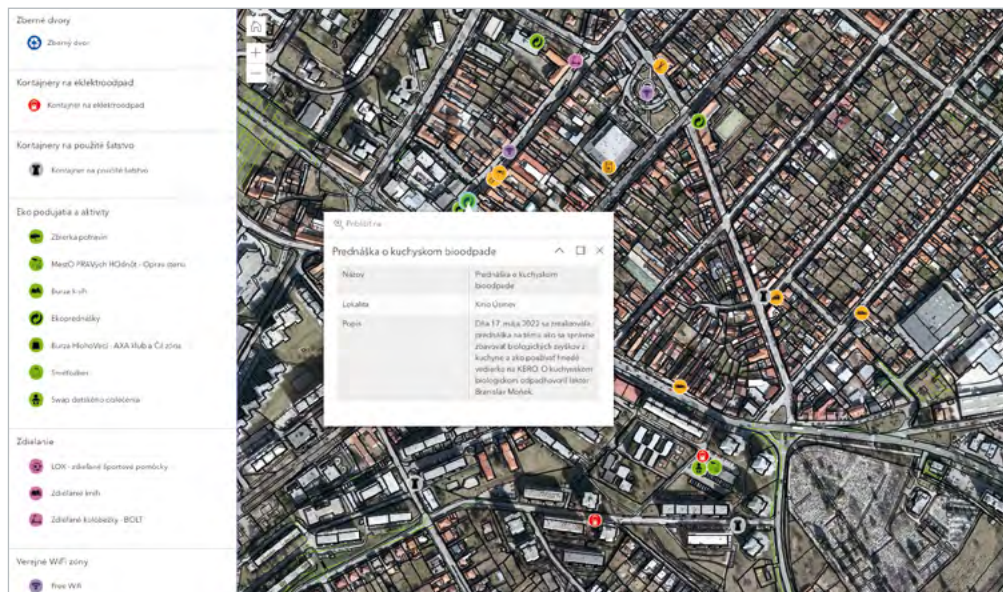
Figure 25: Detailed view on the Eco Map's data
Source: Hlohovec (2023c)

In order to achieve high-quality data displayed, the City of Hlohovec is planning to engage the public, civil sector and private sector companies in adding new information and updating existing once. This would allow the city not only to depend on information known to the city's employees but, where possible, to gain circular economy data from those directly

involved in providing and using such services. The city is calling for inputs via the web pages of the Eco Map, where the public can find the email contacts of the person responsible for the map.

4.12.5. **Cost of implementation**
The City of Hlohovec had no additional cost for developing and running the Eco Map. However, the city has licencing costs for the software, which is used for creating the Eco Map and other maps of the city. Personal costs for managing and updating displayed information are seen as part of the city office employee's workload.

4.12.6. **In hindsight: lessons learned & recommendations**
The Eco Map was developed in the City of Hlohovec as a new project focused on helping the city support its circular economy activities. The city is evaluating the project in order to deduce relevant and valuable feedback for its future green activities. The existing software solution will allow the city also to monitor web analytics data and web traffic, revealing the map's real-world use.

The City of Hlohovec aimed to achieve the impact of not only informing the public about different circular economy possibilities and components but also decreasing the amount of waste produced in the city. In-house administration by the city's employees makes the project sustainable because the content and updates are not dependent on third-party suppliers.

WHAT CAN BE LEARNED?

— The city should use its potential and employees to develop and manage projects, not be entirely dependent on third-party suppliers.
— Support and promotion of circular economy activities are not self-serving but ultimately lead to decreased waste production in the city and encourage responsible behaviour.
— The city should directly engage the public, civil sector and private sector companies in the city's projects.

5.

Conclusion

5. **Conclusion**

The green transition could be more successful if people share knowledge and implement innovative projects in this regard or get influenced by examples of good practices already applied by others.

This handbook of green good practice is the result of cooperation between the municipalities and the DiGreen team members from Austria, Italy, Romania and Slovakia. It offers a selection of such good examples that help people live an environment-friendly way of life improving at the same time the quality of their lives.

The selected projects cover a wide range of topics, from renewable energy to waste management and improving the environment, all in line with the UN Development Goals and the significant Green Deal objectives.

The information is presented in an accessible language to be easy to use by various citizens, administrators and employees of municipalities. The authors wanted to focus on good practices that are scalable and multipliable to show in this way that green practices can be easily achieved. The municipalities involved in the project were selected to be complementary and to illustrate different backgrounds. In this way, the stakeholders that read the results presented in this book will be encouraged to adopt green practices based on the diversity of examples from different countries and cultures.

The good practices have been discussed during national and international multiplier events and considered by the representatives of the municipalities involved as inspiring and appliable ideas, helpful in the transition towards a green municipality for the benefit of the communities and the people in general.

While all the countries have implemented national strategies regarding the successful green transition, the comparative analysis of the Green Deal indicators shows that substantial progress may still be achieved in the field of green transport, renewable energy and waste management. The local authorities can have an essential role in boosting the green transition because the bottom-up approach is often more successful and better tailored for local and region-specific needs. The implemented projects highlight that the circular economy could act as a catalyst for local development and the empowerment of the communities. At the same time, the green transition facilitates innovative solutions to some of the crises the analysed countries face (such as the case of the energy communities that can help mitigate the current ongoing energy crisis).

All the studied examples emphasise the role of green transition in boosting sustainable local development through innovative ideas and practices. While being an essential tool for financing specific local development goals, the selected best practices presented in this handbook are also important drivers for boosting green and sustainable development in line with the Green Deal objectives. The presented projects are not only

successful steps for speeding up the green transition in the areas of implementation but are also key factors for a continuous and complex focus on the quality of life of the beneficiaries involved.

The readers may learn essential lessons from the people that have already implemented such projects, being aware of the challenges and opportunities arising from them and being better prepared to start new projects in the field of the green transition.

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Alina-Cerasela Avram, Senior Researcher at the Institute for World Economy with experience coordinating studies in the digital and green transition fields, is a Bucharest Academy of Economic Studies graduate and has experience coordinating studies in the digital and green transition field. Alina is editor–in–chief and founder of the Junior Scientific Researcher online research journal. The publication was founded in 2015 after she won the Start-Up Smart funding project for young entrepreneurs. She also has vast experience in organising academic conferences, being part of the organising team of the "Romanian Conference for Education and Research", an annual event organised by the Enformation company.

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Josef Bernhart is a Senior Researcher and Vice Head of the Eurac Research Institute for Public Management in Bolzano (Italy) and external lecturer at the University of Innsbruck, the Berlin School of Economics and Law, and the Carinthia University of Applied Sciences. His research focuses on international public management reforms, quality management in public sector organizations, social management, brand management, and sustainability management. Furthermore, he is a committed volunteer in the social and cultural area, especially as a member of the committee and leadership of the Catholic Labourers Association (KVW) and as a representative of the local social associations in the council of the AFI Institute South Tyrol (Institute for the Promotion of Employment).

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Since 2007 Franziska Cecon is Professor for Public Management at the Upper Austria University of Applied Sciences, in the Department of Healthcare-, Social-, and Public Management, which covers a part-time bachelor's and a master's programme. Her fields of interest are public management reforms and innovations at all governance levels but especially at the local level. Digital transformation, sustainability, and reorganisation schemes are only some of the current topics she is dealing with. Also, governance aspects like transparency, participation or outcome orientation are part of her profile. Regional management issues like inter-municipal cooperation, strategic development, resilience of regions or brownfield development are research topics she is recently involved in.

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Andreea-Emanuela Drăgoi, Senior Researcher at the Institute for World Economy, has a strong background in sustainable rural development policies and renewable energies. Mrs Drăgoi participated as an expert in numerous national and international research projects. Between 2013 and 2014, she participated as an expert in the Dialogue and experience exchange project regarding renewable energy policies, identifying opportunities for cooperation between China and Romania. Between 2014 and 2015, she worked as an editing expert and coordinated the volumes edited within the European Programme "Doctorial and post-doctoral programs for research support" - Impact of Socioeconomic and Technological Transformations at a National, European and World Level. Currently, she is a member of the Center for Writing European Projects research team in Climate Change under the Institute for World Economy coordination starting in July 2020.

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George-Cornel Dumitrescu, Senior Researcher and coordinator of the Department of Structural Changes in the World Economy of IWE, has a strong background in macroeconomics. Mr Dumitrescu has attended a significant number of scientific conferences at the national and international levels and published numerous scientific papers in various fields, including but not limited to the transition toward the circular economy and ICT. He is also a research expert at the Centre for Writing European Projects. Mr Dumitrescu has coordinated studies regarding the digital and green transition. He is responsible for managing and coordinating all project activities on the Romanian side.

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Miroslav Fečko is an Assistant Professor at the Pavol Jozef *Šafárik* University in Košice, Faculty of Public Administration (Slovakia). In his research and teaching, he focuses on particular aspects of public administration, public policy, e-government, smart cities, municipalities and cities, communal management, disinformation, EU single market. The research orientation is evident in his engagement in national and international projects in recent years, focusing on Capacity building for an output oriented management in small and medium-sized municipalities; Functional city regions as an innovative approach for an integrated territorial development; Public administration education quality enhancement; Driving change and capacity building towards innovative, Entrepreneurial Universities; Strengthening the Resilience of Public Administration after COVID-19 with the Common Assessment Framework. He also acquired experience as the supervisor of mayors and employees of the self-government units regarding the implementation of the Municipality Data Centre, which was introducing e-government at the municipality level.

Mihaela Gramaticu

Mihaela Gramaticu has been a Research Assistant at the Institute for World Economy (Romanian Academy) since 2020. Previously, Mihaela gained seven years of teaching experience as a professional trainer, developing and designing training courses in development studies.

Among other activities in EU projects, she was an expert for the project "Long life learning training session for teachers to gain IT skills and TIC technologies for teaching and assessment of English language at European level" ID 62665.

She also has experience organising training sessions, conferences, workshops, and debates on the issues of formal education, working for eight years in a Learning Resource Centre affiliated with the Ministry of Education in Romania.

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Bianca Mitrică, Senior Researcher and Head of the Human Geography and Regional Development Department, Institute of Geography, Romanian Academy, has a strong background in local and regional development. She was involved in 40 research projects focused on socioeconomic disparities in regional development, territorial competitiveness, cross-border cooperation and socioeconomic vulnerability to natural hazards. She was the national leader of the *Horizon 2020 Project*, "Social and innovative Platform on Cultural Tourism and its potential towards deepening Europeanisation", 2020-2022. She coordinated WP6 Socioeconomic evaluation of the SEE Transnational Cooperation Program project "Climate Change Impacts on Water Supply", 2009-2012 and is a research expert at the Centre for Writing European Projects.

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Simona Moagăr-Poladian, Senior Researcher and Managing Director of the Institute for World Economy from Bucharest, has experience in structural changes in the world economy, economic integration, and economic effects of climate change. Since 2020 she has been Professor Habil at the Romanian Academy of Doctoral Studies. Moagăr-Poladian is also a member of the Management Board of the Romanian European Institute from Bucharest.

Between 2014 and 2015, she was the project manager for a National Project for Doctoral and Postdoctoral Studies under European Social Fund and coordinated PhD and postdoctoral students in Fundamental and Applied Scientific Research. Since April 2020, she is also the project manager of the Centre for Writing European Projects in the field of Climate Change, submitted to the Institute for World Economy and funded by the Competitiveness Operational Program.

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Tina Ortner has been working as a Research Associate since 2010 at the University of Applied Sciences Upper Austria in Linz. The research projects she is involved in focus on public administration, social services and innovations as well as accompanying social and acceptance research for technical innovations such as in the field of e-health, ambient assisted living and autonomous driving. Since 2022, she is also a lecturer at the Study Programme Social Pedagogue for the Youth Welfare Service and teaches scientific work and nutrition, as she is also a trained dietician.

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Dominik Prüller has joined the DiGreen project team in March 2022 as Researcher. He has a bachelor's degree in social economics. Besides his work for the DiGreen project, he mainly works with children and teenagers in the primary and secondary educational sector, focusing on non-formal education and socially disadvantaged young people.

Steliana Rodino

Steliana Rodino is a Senior Researcher with a background in Biotechnology and Bioeconomy, has a bachelor's degree in Environmental Economy and an M.Sc. in Biotechnologies for Environmental Protection. She has experience in the analysis of business environment for identifying flagship cases in specific areas (circular economy, bioeconomy, ecosystem services, food production); dissemination and transfer of technical and scientific knowledge to interested parties (business environment, public administration, farmers & associative forms, civil society); development of communication strategy for increasing the visibility of the research group and reaching a relevant audience.

Silvia Ručinská

Silvia Ručinská is a University Professor at the Pavol Jozef *Šafárik* University in Košice, Faculty of Public Administration (Slovakia). In her research and teaching activities, she focuses on the topics of public policy, public administration, governance, e-government, smart cities, disinformation, strategic management, leadership, and territorial development. As a lead research and researcher, she contributed in several projects, for example Driving change and capacity building towards innovative, Entrepreneurial Universities (InnoChange, EIT digital Project); Capacity building for an output oriented management in small and medium-sized municipalities (KoWist, Erasmus+ Project); Functional city region as an innovative approach for an integrated territorial development in the Slovak Republic conditions. She worked on several expertise and consultancies for concrete cities in the Slovak Republic. She is part of an international consortium that focuses on analysing disinformation in public policy (Counterfake). In the recent months, she also contributed to a study and analysis for OECD within the project Strengthening the Resilience of Public Administration after COVID-19 with the Common Assessment Framework (CAF).

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