Connect Youth With Municipalities For
GREEN CITIES

TRAINING FRAMEWORK REPORT

YOUTH PARTICIPATION FOR DEVELOPING SUSTAINABLE GREEN CITIES

Co-funded by
the European Union

Youth Participation for Developing Sustainable Green Cities

2022-1-DE04-KA220-YOU-000085135

R1:A5 – Training Framework Report

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Partnership

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Toplum Gönüllüleri Vakfı - Turkey
Kaán Károly Környezetvédelmi Egyesület - Hungary
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Kean will lead " A report of training framework" (60 pages) and prepare the guidelines. All partners share the parts of the report and finalize it in an online meeting.

Partners involved in the elaboration of the of the document:

Organization's Name	Short Name	Country	Specify if involved
Learning For Youth GmbH	L4Y	Germany	YES
Toplum Gönüllüleri Vakfı	TOG	Turkey	YES
Sdruzhenie Walk Together	Walk Together	Bulgaria	YES
Kaán Károly Környezetvédelmi Egyesület	KKKE	Hungary	YES
Kyttaro Enallaktikon Anazitiseon Neon	KEAN	Greece	YES (responsible of Deliverable)
Citizens In Power	C.I.P.	Cyprus	YES

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PU	X	Public
PP		Restricted to other programme participants (including the Commission Services)
RE		Restricted to a group specified by the consortium (including the Commission Services)
CO		Confidential, only for members of the consortium (including the Commission Services)

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1. Project overview

As the world moves towards sustainable development, the youth's role in shaping our cities' future is paramount. The Erasmus+ KA220 Youth project: "Youth participation for developing sustainable green cities" is an exemplary initiative to unite young minds and help municipalities create a greener, brighter urban landscape.

1.1 Project's goals

The project's goals aim to make it easier for cities and youth to work together to make cities more sustainable:

- establishing a network of self-sufficient, independent youth-led NGOs in partner cities;
- increasing awareness among young and adult citizens about the importance and potential of having their own innovative, green city.

1.2 Impact

The partnership between youth and municipalities helps bridge the gap between generations and encourages the development of independent, self-sufficient youth-led NGOs in partner cities.

By raising awareness about the importance of smart, green cities among citizens of all ages, the project contributes to creating more environmentally-friendly urban spaces.

The ultimate goal is to build a strong network of green youth community NGOs and pave the way for a new generation of environmentally-conscious city dwellers.

1.3 What is a Smart City?

A smart city is a place where, through the use of digital tools, traditional networks and services are more efficient for the benefit of its inhabitants and business.

The first generation of smart cities, the Smart City 1.0, focused primarily on implementing technology and infrastructure to improve city operations and services. It included the integration of ICT (information and communication technology) and IoT (Internet of Things) devices to manage resources, monitor infrastructure, and optimize urban systems like transportation and energy.

The second generation of smart cities, the Smart City 2.0, expanded on the technological foundation laid by Smart City 1.0 by emphasizing data-driven decision-making and the integration of big data analytics. This approach aimed to improve city planning, predictive maintenance, and overall efficiency by analyzing data collected from various urban systems and drawing insights to optimize processes.

The latest concept of smart cities is centered around inclusive, citizen-centric urban development. It goes beyond technology and data-driven decision-making by prioritizing the engagement of citizens in the planning, implementation, and evaluation of smart city projects. This approach aims to create more sustainable and resilient cities by focusing on social equity, environmental sustainability, and economic growth.

Key components of the Smart City 3.0 concept include:

- Citizen engagement involves citizens designing and implementing smart city initiatives, ensuring their needs and preferences are considered.

- Collaboration, encouraging partnerships among governments, the private sector, academia, and civil society to drive innovation and share resources.

- Sustainability and resilience, focusing on long-term environmental sustainability and resilience to climate change and other global challenges.

- Social equity, addressing social inequalities and promoting inclusive urban development for all citizens, regardless of their background or socio-economic status.

- Integrated solutions, implementing holistic solutions that address multiple urban challenges simultaneously, considering the interconnectivity of urban systems and processes.

Overall, the Smart City 3.0 idea uses technology, data, and citizen participation to make cities efficient, sustainable, resilient, and open to everyone.

2. R1 - Training Framework

The first result (R1) expected from this project is the Training Framework. Partners were engaged in field research to identify the primary training needs of young people in the topic of Smart City 3.0 and define the strategies to efficiently transfer the needed skills for sustainable smart green cities.

The objective of the Training Framework is to create a tailor-made training module structure and a report that analyzes it, based on understanding the target group's needs.

2.1 Training Framework's structure

The Training Framework is structured in five different activities carried out by all partners.

- In the "R1:A1 – A map of good practices of smart cities (How they solve their sustainability problems)", a total of twenty-four environmentally good practices were collected by all partners on Smart City 3.0;

- In the "R1:A2 – Understanding the needs of target group using Creative Thinking Methodology", an analysis on the Training needs was conducted through in-depth interviews with young people and environmental experts;

- In the "R1:A3 – Definition of the preliminary modules structure", a complete draft of the modules structure was defined and discussed among partners;

- In the "R1:A4 – Discuss the module structure with proto-personas and Municipalities", each partner presented the draft of R1:A3 to proto-personas (one young person and one environmental expert that participated in the interviews of R1:A2) and to municipalities; then, the module structure was finalized based on their feedback;

- In the "R1:A5 – A report of training framework", we are presenting a report of the whole Training Framework.

3. R1:A1 – A map of good practices of smart cities (How they solve their sustainability problems)

The first activity under the framework of this project consisted in collecting good practices from all over the world, that could be examples of how smart cities move towards sustainability and are easy to reproduce.

Good practices are crucial to inspire Municipalities and Green Youth Communities. Although it's necessary to understand that each city has different green issues and needs different solutions, acknowledging good practices gives the chance to learn how other towns find smart solutions for themselves and consider if they could be implemented elsewhere.

3.1 Template

Each partner of the Consortium researched and collected four different good practices, for a total of twenty-four good practices thanks to the whole Consortium. In order to collect the practices, all partners used the following template that underlines specific elements and guides the researcher with precise questions:

Title Name of the best practice	
Date	**Authors**

Element	Guiding questions
Goals of the best practice	*What is the purpose or objective of the practice? Brief description.*
Target Group/Beneficiaries	*Who are the beneficiaries (direct or indirect) of the practice? How many are there?*
Smart city/Municipality taken as good example	*What are the cities/municipalities already carrying out the good practice? Is there one or more?*
Resources and skills needed to carry out the best practice	*What was the initial situation and its specific context? What are the specific difficulties that the practice seeks to address*?
Methodology	*Indicate which dynamics, mechanics and components are necessary to develop the practice.*
Success Factors	*What are the conditions, internal (systems and tools) and external (institutional, economic, social, etc.) necessary to make this practice a success?*
Related resources /Link	*Establish a list of references related to the practice (training manuals, guidelines, photos, videos, web pages, etc.).* *If possible, contact the organization/city/municipality and/or person who carried out the practice.*

3.2 Challenges

During this first activity, partners had to face some challenges that arose during the collection of good practices.

In general, partners encountered difficulties to find good practices anywhere in the world, as they are not well advertised online and it requires in-depth research to find studies or articles about it.

Another aspect that needs to be taken in consideration is the scarcity of content in the good practices found. Even when the first difficulties to find the material were overcome, often the practices were poorly presented, with few explanations and details of how they worked and how they were implemented on a practical level.

On a national level, some partners remarked how the population in their country is still not aware, or ignores the gravity, of global warming and the impact of environmentally damaging activities on the climate, and this is why it was complicated to find any good practices implemented in their own countries, and easier to find the ones implemented abroad.

Lastly, it has been noticed by some of the partners that it was easier to find good practices implemented in developing countries from Africa or Asia than in other regions of the world usually considered more developed.

3.3 Partners' good practices

Here we report an example of good practices that have been worked on and collected from each partner of the Consortium. All good practices collected are public and available at this link, in the official project's website.

3.3.1 Walk Together: China's Green Great Wall program

Goals of the best practice

The initiative aims to combat desertification, improve air quality likewise increase the country's forest cover by planting 100 billion trees by 2050.

Target Group/ Beneficiaries

1. The environment: The program aims to combat desertification, improve air quality and increase the country's forest cover which can help to reduce soil erosion in addition improve water conservation and create habitats for wildlife.

2. The global community: The program can contribute to the global effort to combat desertification likewise improve air quality and reduce greenhouse gas emissions.

3. Future generation: The program is also aimed at ensuring a sustainable future for China's population by improving the environment, and create better living conditions for future generations

Smart city/Municipality taken as a good example

Many countries around the world have implemented afforestation likewise reforestation initiatives similar to China's Green Great Wall pro- gram. For example – Ethiopia's "Green Legacy" initiative, aims to plant 4 billion trees in the country by planting 350 million seedlings per year.

Resources and skills needed to carry out the best practice

The program has had some success in increasing China's forest cover, but it also faces challenges such as lack of funding, lack of proper planning, and lack of monitoring and evaluation. The program is also facing criticism for not considering the needs of local communities, and for promoting monoculture plantations which are not ecologically sustainable.

Methodology

There are several key dynamics or components necessary to develop a large-scale afforestation initiative like China's Green Great Wall program.

A clear and realistic plan: The initiative should have a clear, well-defined plan outlining the goals, objectives, and strategies for achieving its afforestation targets.

Adequate funding: Large-scale afforestation requires significant funding for tree planting, land preparation, and ongoing maintenance.

Monitoring and Evaluation: A robust monitoring and evaluation system is necessary to track progress, identify challenges and adapt the plan accordingly.

Success Factors

Political stability: The initiative needs a stable political environment to ensure continuity and commitment to the initiative.

Economic stability: Economic stability is necessary to ensure that the initiative has the funds necessary to support the planting, maintenance and monitoring of the new forests. Support from international organizations. Adequate funding: The initiative needs to have stable and sufficient funding to support tree planting, land preparation, and ongoing maintenance.

Resources

Great Green Wall of China

https://en.wikipedia.org/wiki/Great_Green_Wall_(China)

3.3.2 Citizen in Power: Curitiba “Green Exchange” program

Goals of the best practice

“The Green Exchange Program is a city-wide initiative where residents trade recyclable materials for fresh produce. For instance, every four kilograms of recyclables can be traded for one kilogram of fresh fruits and vegetables. In this way, the program guarantees the sale of surplus crop production and helps to keep the

environment clean by encouraging recycling efforts. Moreover, a partnership between SMMA (Secretaria Municipal do Meio Ambiente) and SMAB (Secretaria Municipal do Abastecimento), two Curitiba city agencies, has created the Green Exchange Program.

The program has several important goals. Firstly, it aims to assist small farmers with crop sales and prevent waste among farms with crop surpluses. Secondly, it strives to make fresh produce more accessible and affordable for low-income residents. For example, it aims to improve the nutritional patterns of the population by facilitating fresh produce eating habits. Finally, it seeks to encourage and incentivize recycling and environmental preservation among Curitiba residents."

Target Group/Beneficiaries

Curitiba residents

Smart city/Municipality taken as a good example

Curitiba, Brazil

Resources and skills needed to carry out the best practice

Disaster risk reduction is an essential element of sustainable urban development. And in many cities, the biggest disaster risk comes in the form of flooding. That's certainly the case in Curitiba, Brazil. Sustainable development is impossible without protections for an area's ecosystem and its native plants and animals.

Methodology

-Funds from the Curitiba Department of the Environment (SMMA) are used to buy surplus crops from regional farms.

-These farms are represented and coordinated by the Paraná Producers Federation (FEPAR) — an association of small and medium farmers in the metropolitan region.

-The municipality then exchanges these crops with city residents for recyclable materials (paper, cardboard, glass, metal, oil).

-The exchange takes place every 15 days in 101 different trading sites across the city.

-Every four kilograms of recyclables can be traded for one kilogram of fruits and vegetables; two liters of plant or animal-based oil can be exchanged for one kilogram of fruits and vegetables.

Success Factors

By 2007 the program had recovered over 45 thousand tons of waste from ending up in landfills. Today, the program is still in existence and has developed abundantly. It now includes the Special Green Exchange Program which takes place in schools city-wide.

Citizens do not need to register for this program; they must show up to exchange sites throughout the city on designated dates. Predetermined dates and times are shared with residents through an annual calendar established by the SMMA.

Resources

Urban Food Policy Snapshot

3.3.3 KEAN: The NADHALI approach for Assessing and Planning City-Driven Food Systems

Goals of the best practice

People in urban areas consume up to 70 percent of the global food supply, but much of it is thrown away. Although the causes of food waste vary from one region in the world to another, generally poor food planning, inadequate packaging, improper storage and cultural practices are all contributing to the problem.

In addition, food waste that is not recycled or reused is filling up the landfills. There, it decomposes and generates methane, a greenhouse gas that is more harmful to the planet than CO2. This scenario is not just a waste of food but also a waste of energy, money and natural resources such as land and water that is used to produce and process the food.

In the municipalities of Lima, Nairobi and Dhaka, FAO has helped to create a Food Liaison Advisory Group to tackle issues of food loss and waste. One of the group's initiatives was a city food waste taskforce that has established a composting center for managing biomass waste. As a result, the amount of organic waste disposed of in landfills and city drainage has been cut dramatically.

Target Group/Beneficiaries

Citizens of Lima, Nairobi and Dhaka

Smart city/Municipality taken as a good example

Lima, Nairobi and Dhaka

Resources and skills needed to carry out the best practice

In Nairobi, the County Chief Officer for Agriculture noted that evidence was needed to understand the relationship between logistics in the food system, food cultures and preferences. This information would provide a baseline to support the county in understanding the status of the food system and the improvements needed. To fill this information gap, the FAO developed a Rapid Urban Food Systems Appraisal Tool (RUFSAT) with the goal of identifying food system "hotspots" that compromised or constrained the economic, social and environmental performance of the system. In Dhaka, for example, contrary to the widespread belief that market intermediaries are extracting inordinate profits, the analysis revealed that wholesalers were operating on a margin of just 2 percent. With such low margins, wholesalers were often compelled to find buyers for inferior-quality products, which compromised public health.

Methodology

With the aim of rapidly (within three-four months) collecting information and understanding the complex relationships between rural food producers and urban consumers, three to four food value chains, prioritized by the FLAG, are analyzed. The food products selected for analysis have included a staple food product (rice in Dhaka, potatoes in Lima and Nairobi); fresh produce (commonly a leafy green, a root crop and a fruit crop); and either fresh fish or meat (chicken, beef, pork, mutton or goat). The value chain surveys endeavor to collect information on food sources, seasonality of supply, transport and logistics, long-term trading relationships between buyers and sellers, price margins, operational costs, food safety, food storage, food waste and key constraints impacting the business.

In addition, interactive spatial analysis through Geographic Information Systems (GIS) is conducted to integrate spatial and non-spatial data. This information is critical for urban food planning as it reveals gaps in terms of access to nutritious food and allows the FLAG to identify city neighborhoods with high vulnerability to food insecurity or explore food environments conducive to unhealthy diets such as food deserts, food swamps and food tundra.

Success Factors

The participatory food governance mechanism foreseen in each of the three pilot project cities (NAirobi, DHAka and LIma) relied heavily on the creation of a Food Liaison Advisory Group (FLAG): a multi-stakeholder platform that collectively represents the voices of the various food system actors. These include both private and public sectors, civil society organizations, and other stakeholders affected by government decisions. The latter can be actors representing other commodity systems from the commerce industry and/ or service systems such as the health system. FLAG members, when recognized as a key resource for planning and adequately empowered, are able to lobby decision-makers, flagging potential

problems and advising urban planners and policy makers at local and national levels on holistic approaches that permit sustainable food system planning.

Resources

Five ways to make cities healthier and more sustainable

City-Driven Food Systems

3.3.4 L4Y: Large-scale energy systems for urban heating and cooling in Sweden

Goals of the best practice

The goal is to implement large-scale energy systems for urban heating and cooling as a key component of green cities. These systems aim to significantly reduce energy consumption and greenhouse gas emissions, improve the reliability and resilience of energy supplies, and make housing more affordable.

Target Group/Beneficiaries

Direct beneficiaries: Urban residents

Indirect beneficiaries: Other residents and citizens

Smart city/Municipality taken as a good example

Gothenburg, Sweden

Resources and skills needed to carry out the best practice

By adopting large-scale energy systems, urban areas can reduce their energy consumption and greenhouse gas emissions while also improving the reliability and resilience of their energy supplies. This approach can also help to make living in cities more affordable by reducing energy costs. Overall, the implementation of

sustainable heating and cooling systems can contribute to a more livable and environmentally conscious urban environment.

The specific difficulties that this practice seeks to address include:

The high energy consumption and greenhouse gas emissions associated with traditional heating and cooling systems in urban areas.

The lack of reliability and resilience of energy supplies in urban areas.

The high cost of housing and living in cities, which can be made more affordable through the reduction of energy consumption and costs.

The skills required to develop and implement large-scale energy systems for urban heating and cooling include knowledge of heating and cooling technologies such as heat pumps and district heating and cooling systems, energy efficiency and conservation, and urban planning and infrastructure development. Additionally, knowledge of energy production and distribution, as well as the ability to analyze and interpret data, would be beneficial.

Engineers, architects, energy experts, and urban planners would likely be the main professionals involved in the implementation of such systems.

Methodology

The dynamics, mechanics, and components necessary to develop the practice of large-scale energy systems for urban heating and cooling include the following:

1. Centralized heating and cooling infrastructure and highly efficient technologies, such as heat pumps and district heating and cooling systems, to reduce energy consumption and greenhouse gas emissions.

2. A robust and resilient energy system that is less susceptible to disruption, by centralizing energy production and distribution.

3. Affordable housing by reducing energy consumption and lowering energy costs.

4. Connecting residential and commercial activities in cities to reduce energy consumption and greenhouse gas emissions, create more livable and vibrant urban environments, and promote economic development and job creation.

5. Shared district heating and cooling systems are an effective way of achieving these goals.

6. The extension of district heating to ships in their harbor to connect the urban infrastructure development mainly targeting residents of the city with the commercial activity in the city.

7. In addition, the skills required to design and implement large-scale energy systems, such as engineering and project management, as well as knowledge of sustainable energy systems and technologies.

Success Factors

The conditions necessary to make the practice of large-scale energy systems for urban heating and cooling a success include:

Internal:

1. Centralized heating and cooling infrastructure and highly efficient technologies such as heat pumps and district heating and cooling systems.

2. A robust and resilient energy system that is less susceptible to disruption.

3. Short-term thermal energy storage and the ability to smooth out demand peaks and reduce the size of energy production peaks.

4. The use of cold water from the Göta Älv River to reduce the use of harmful cooling agents, reduce noise and electricity consumption, and increase the efficiency of energy and resources.

External:

1. Support from the Swedish Energy Agency and other institutions to fund the implementation of the project.

2. The ability to connect residential and commercial activities in cities to reduce energy consumption and greenhouse gas emissions, create more livable and vibrant urban environments, and promote economic development and job creation.

3. Cooperation between city authorities, residents, and commercial entities to ensure successful implementation and maintenance of the system.

4. Effective communication and engagement with stakeholders to ensure understanding and buy-in for the project.

Resources

Combined Efficient Large Scale Integrated Urban Systems

3.3.5 TOG: Establishing solar panels in order to meet energy needs of the Delhi Metro

Goals of the best practice

The practice aims to provide the energy needed by the Delhi Metro entirely from renewable energy by establishing solar panels. Delhi Metro Corporation, a joint venture of the Government of Delhi, which includes the Government of India and the Municipality of Delhi, plans to complete the solarization in 2021, which began in 2014 at one station of the Delhi Metro. As of the beginning of 2020, rooftop solar panels applied in 53 stations and 12 warehouses produce 28 MW of energy.

Target Group/Beneficiaries

Residents of Delhi

Smart city/Municipality taken as a good example

Delhi Municipality

Resources and skills needed to carry out the best practice

The metro was using coal for energy production. The practice aims to reduce energy generation from coal by establishing solar panels for the Delhi metro, thus reducing air pollution and dependence on coal, and saving Rs. 793 crore on its energy bill over the next 25 years.

Methodology

Indicate which dynamics, mechanics and components are necessary to develop the practice.

Success Factors

60% of Delhi Metro is now powered by solar energy from Madhya Pradesh.

The 1,590-acre Ultra Mega Solar Park in Rewa's Gurh tehsil is among the largest single-site solar power plants in the world. Also, 24 percent of the park's solar energy is being sold directly to the Delhi Metro Rail Corporation (DMRC), meeting almost 60 percent of its daytime demand.

Resources

Delhi Metro with Solar Energy

3.3.6 KKKE: ECO School - Farm program in Hungary

Goals of the best practice

To achieve the goal of understanding and promoting local community sustainability initiatives, the following actions will be taken. Firstly, an effort will be made to get to know the practices of forward-looking initiatives in the fields of human, social, natural, and economic resource preservation and development. Secondly, these

initiatives will be compared with other initiatives included in the research and presented on a website or in a publication, thereby making them widely known.

Target Group/Beneficiaries

To clarify, the ECO school primarily benefits the students enrolled in the educational institution. This age group is quite diverse and even includes university-aged young adults, making it a comprehensive ecological school. Although it initially focused on high school students, the initiative has since expanded to involve a wider range of ages.

Smart city/Municipality taken as a good example

In Budapest, the capital of Hungary, the ECO school project has been launched in many secondary schools and higher education institutions. It can be said about the eco-school program that many schools in Hungary have joined, thus involving even more students in this great discount. Such cities: Nyíregyháza

Resources and skills needed to carry out the best practice

It can be said that the greatness of the ECO school program lies in its simplicity. Anyone of any age can join because they are trying to change fundamental problems such as bringing back closeness to nature, learning about climate change, wanting to take action against climate change, and protecting nature.

Methodology

To achieve the goal of creating environmentally conscious youth, the main aspect of good practice is emphasized on learning and working with the environment, rather than destroying it. The strategy involves creating small gardens where young people can produce fruits and vegetables that are completely organic and cared for by themselves.

On the “farm” for almost two years, in cooperation with the Waldorf School in Nyíregyháza, he participated in two grades of gardening classes. This joint work

proved to be useful for both parties, as the members of the association learned how to involve children in farming, while the children gained experience.

The goal is for the farm pedagogy program to become a national network and for it to be available to all Hungarian school children as an optional subject.

The main goal of the program, the essence of which is to introduce the children to traditional domestic farming methods in the backyard. For example, the goal is for the children to gain their own experience in food production, to learn to appreciate healthy, small-scale food, restoring in the children the appreciation of the farmer and manual labor. Last of all, this increases their (environmental) awareness and reduces the distance between the rural producer and the urban consumer. The program strives to preserve values such as:

– Farming close to nature and the knowledge required for this, which enriches biological diversity in contrast to industrial agriculture;

– Emphasizing the importance of local products and healthy food;

– Deepening mutual understanding and the relationship between generations and social groups;

– Shaping and developing children's work ethic.

Success Factors

The primary aspect is for this good practice to be successful, and for it to be even more popular and successful, so that farms, schools, municipalities and civil organizations can work together for children. Municipalities and associations must work together with school institutions for children and the environment so that this good practice can be implemented smoothly.

Resources

Oko Schools In Hungary

4. R1:A2 – Understanding the needs of target group using Creative Thinking Methodology

During the second activity of the Training Framework, partners worked with their national communities to collect the point of views of young people and experts on environmental protection through the methodology of interviews. The analysis of the collected interviews allowed the Consortium to address the training needs of the different countries, highlighting common points and main differences.

4.1 Structure

The Consortium developed a methodology for the collection of interviews that all partners could replicate in their countries. Each partner collected 20 interviews from young people and 2 interviews from experts on environmental protection, for a total of 120 interviews from young people and 12 from experts.

4.1.1 Methodology for the research interviews

The research consisted of semi-structured interviews with at least 20 local youth and two experts for each partner. The research had as its main aim to analyze the current needs of young people, through both their own perspective and the experts' perspective. Partners worked on findings using this data coming from interviews.

The interviews followed the method of expert interviews devised by Bogner et al (2018). Expert interviews are a standard qualitative research method that is situated in the qualitative paradigm. Expert interviews are carried out in different fields of political and social research and generally aim at uncovering different types of knowledge the interviewee possesses.

Bogner et al differentiate between three forms of knowledge relevant to interviews:

- Technical knowledge: expert's knowledge can be distinguished from everyday knowledge and comprises facts and information about operations, rules, application routines etc.
- Process knowledge: knowledge based on practical experience and comprises information about sequences of actions, interaction routines, organizational constellations etc.
- Interpretative knowledge: entails subjective perceptions, rules interpretations, normative positions etc. related to the research topic.

In the exploratory phase of a project interviewing experts and other stakeholders is seen as an efficient and concentrated method of generating data.

According to the research design, expert interviews as a method of face-to-face interview follow a semi-structured format: defined topics formed the basis for questioning, yet the interviewer's sequencing of questions is participant-led.

The interview guide involved a list of questions and topics that are likely to elicit descriptions that answer the research questions posed. In order to maintain a flowing course of the conversation the order of the questions could be changed. Partners stated the topic of the interview from the very beginning and started with broader questions in the beginning before moving to more specific questions and formulating open rather than closed questions. Potential follow-up topics were suggested in the interview guide in case participants should have not mentioned

those and to give the interviewers an idea what to ask in order to stimulate conversation.

It was important to set the meeting in a comfortable and cozy space, so the interviewee was more likely to share. The interviewer had to bring: template copy, consent form copy to be signed by the interviewee, recording device (in case the interviewee would have agreed to record the interview) and pen and notebook for taking notes. Despite being already written in the consent form, it was important for the interviewer to remind the interviewee that the participation was voluntary, thus they had the right to decline any answer they were uncomfortable with and to interrupt the discussion whenever they felt like.

After collecting the consent form, the interview could have started. The interviewer was encouraged to structure it as an informal discussion. The questions could be flexible based on how the interview was proceeding: the interviewer was allowed to modify, change, add or remove questions based on how the interview was going.

Note: in case the interview was difficult to organize, questions could be printed and sent to the interviewees, asking them to fill the form on their own.

4.1.2 Consent form

During the process of interviews, the consent form is a necessary document to prove that the interviewees gave their consent for the collection of their data and the research process.

The Consortium prepared the following template to be filled and signed by all the participants:

Youth Participation for Developing Sustainable Green Cities

2022-1-DE04-KA220-YOU-000085135

CONSENT FROM

I volunteer to participate in this interview, within the framework of the international EU-funded project entitled "Youth Participation for Developing Sustainable Green Cities", conducted by INSERT NAME OF THE INTERVIEWER from INSERT NAME OF YOUR ORGANIZATION.
I understand that the project is designed to gather information on green cities and sustainable good practices. I will be one of approximately 20 young people and 2 experts being interviewed in INSERT NAME OF YOUR COUNTRY for this research*.

1. My participation in this project is voluntary. I understand that I will not be paid for my participation. I may withdraw and discontinue participation at any time without any responsibility.
2. If I feel uncomfortable in any way during the interview session, I have the right to decline to answer any questions or to end the interview.
3. The interview might be recorded as part of a series of interviews.
4. I understand that the researcher will identify me by name.
5. I grant permission for this interview's data to be used in the researcher's publications on this topic.
6. I understand that recorded podcasts could be shared identifying me by my name.
7. I have understood the explanation provided to me. I have had all my questions answered to my satisfaction, and I voluntarily agree to participate in this research.

_____ _____ _____

My Name My Signature Date 31.08.2023

_____

Signature of the Interviewer

Note: If the interview is being conducted through an online chat video/audio platform, you can provide verbal consent by indicating "I agree to participate in the research study. I understand the purpose of this study and I am participating voluntarily."

*For further information, please contact: NAME OF THE PROJECT MANAGER OF YOUR ORGANIZATION
Contact Information: CONTACT INFO OF THE PROJECT MANAGER OF YOUR ORGANIZATION

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Each partner personalized the consent form changing the parts underlined in yellow with the details of their own organization and interviewer, and then asked each of the interviewees to fill it and sign it.

4.1.3 Questions for young people

The Consortium was provided with a series of questions to be used during the semi-structured interview for young people. The questions aimed to identify the primary training needs of young people on this topic and define the pedagogic strategies to efficiently transfer the needed skills for sustainable smart green cities. It wasn't mandatory to ask all the questions, but the structure helped the interviewer to give a specific direction to the interview and to address the main topics.

Here's the list:

QUESTIONS FOR YOUNG PEOPLE

1. Do you know what a Sustainable Green City is? (In case they don't, please explain to the interviewee).
2. Do you know any good practices from any cities?

   Additional question: do you think this good practice can be reproduced in your city? Why?
3. Do you know what Smart Cities 3.0 is? (In case they don't, please explain to the interviewee)
4. What is the current situation in your city regarding environment and sustainability?
5. If you could make changes in your city to be greener and smart, what would you do?

   Additional question: which tools, funds, etc. would you need?

6. What is the one good practice that shouldn't miss in a Sustainable Green City in your opinion?

7. How is the ideal and perfect Sustainable Smart and Green City for you?

8. Why is it important to develop more Sustainable Green Cities?

   Additional question: which benefits would you gain from living in a Sustainable Green City?

4.1.4 Questions for experts

The Consortium was provided with a series of questions to be used during the semi-structured interview for experts on environmental protection. The selection of experts will have the following criteria:

- Active involvement of the expert in environmental programs based or smart cities design;
- Experience in policy making decisions or as consultor for companies/public bodies in the field of sustainability.

It wasn't mandatory to ask all the questions, but the structure helped the interviewer to give a specific direction to the interview and to address the main topics.

Here's the list:

QUESTIONS FOR EXPERTS

1. What is the most successful good practice in a Sustainable Green City that you know of?

   Additional question: do you think this good practice can be reproduced in your city? Why?

2. What's your opinion about Smart Cities 3.0?

3. What is the current situation in your city regarding environment and sustainability?

4. In order to make your city greener and smart, where would you start? Which tools, funds and support would you need?

5. What is the one good practice that you think it's easier and possible to reproduce in the majority of the cities?

6. Why is it important to develop more Sustainable Green Cities? How to balance the costs and the benefits?

4.2 Analysis of findings

Once all the partners collected the interviews, the Consortium proceeded to analyze and compare the results of the findings, underlining common points and differences observed among the partners' countries.
To report and structure the findings, the Consortium was provided with a list of questions to help them organize their work:

1. In general, did the interviewees know what a Sustainable Green City is?

2. In general, were they aware of any good practices from any cities?

3. In general, did they know what a Smart City 3.0 is?

4. What common issues were found regarding environment and sustainability in their cities?

5. What changes and good practices were mostly proposed?

6. What was the most common answer to the question: "Why is it important to develop more Sustainable Green Cities?"

The partners answered all the questions basing their response on the interviews collected from both young people and experts.

4.2.1 Level of the interviewees' awareness

Based on the interviews collected, there was a mixed level of familiarity with the concept of a Sustainable Green City among the interviewees:

- Some participants did not know the term at all and asked for clarification or Googled it during the interview.
- Some interviewees had limited familiarity with the concept and attempted to guess its definition. Despite their limited awareness, many expressed a favorable attitude toward the idea, and speculated that it might involve green spaces and eco-friendly practices. Technology-driven approaches were less recognized.
- A majority of the interviewees demonstrated a clear understanding of what a Sustainable Green City entails. They associated it with environmentally conscious urban planning that focuses on ecological, social, and economic sustainability. Key themes included renewable energy, green spaces, and the well-being of residents. They showed a high level of knowledge and awareness of the topic.

Highlighting similarities and differences among the countries, it has to be noted that participants from Germany, Turkey and Hungary standed out with a clear and high understanding of Sustainable Green Cities. Interviewees from Cyprus and Hungary also remarked on the role of technology in Sustainable Green Cities, such as data-driven decision-making and digitalization, which was not as prominently featured in other responses. Young people interviewed in Bulgaria and Greece weren't aware of the terminology, but showed enthusiasm and curiosity about it.

Concerning the knowledge of good practices, in all responses there was a recognition of the significance of implementing sustainable practices in cities to address environmental and social challenges. Many interviewees from different countries highlighted the importance of cycling infrastructure and the adoption of renewable energy as key elements of good sustainability practices. Respondents commonly reference well-known cities around the world (for example in the UK, Denmark and The Netherlands, but also in India and Brazil) as examples of good sustainability practices, suggesting a global awareness of these initiatives. Several interviewees acknowledged the importance of citizen participation and engagement in sustainable practices, such as reducing plastic bag usage or awarding cities for environmental initiatives. Some of them also expressed a need for more education and professional support in understanding and implementing sustainability practices.

Highlighting similarities and differences among countries, we can see how some countries had more limited knowledge of international best practices, like Cyprus and Greece. Participants showed different perspectives on the potential for replicating good practices in smaller towns, with an emphasis on technology investments in Hungary. In general, participants demonstrated varying levels of awareness and examples cited, with German and Hungarian respondents showing the highest level of knowledge and detail.

Finally, when asked about their knowledge of Smart City 3.0, the majority of the interviewees in all countries lacked familiarity with the concept. Some also

mentioned being unfamiliar with Smart City 1.0 and Smart City 2.0. While many respondents expressed a lack of knowledge, some also displayed curiosity, interest, or positivity towards the concept of Smart City 3.0, despite not fully understanding it: several responses indicated that participants conducted research to better understand the concept, suggesting a desire for education and information on the topic.

Once again, the degree of awareness varied across countries, with some noting that it was not widely recognized or discussed in the regions represented by the interviewees. In Germany and Bulgaria, for example, some participants mentioned the progression from Smart Cities 1.0 to 3.0, while this was not mentioned in other responses. Turkey recommended making information about the transition to Smart City 3.0 and even a vision of the 4.0 phase more accessible, emphasizing the need for clearer communication about smart city transformations. In Greece, most participants either didn't know the term or were unsure about it, and they resorted to using online resources to understand the concept during the interview. Hungary mentioned that experts believed 3rd generation cities are the most advanced, with a strong emphasis on community-centric approaches. However, they also pointed out that the East-Central European region lags in this area, and the public in the region may not be ready for such transformations.

4.2.2 Solutions proposed by interviewees

Some common issues regarding environment and sustainability were found from all the interviews.

- Air pollution was a prevalent concern in all countries, often stemming from transportation, industrial activities, and heating systems.

- Many cities faced issues with public transportation, with the need for more sustainable options, such as electric buses, to reduce individual vehicle usage and combat air pollution.
- The importance of waste separation, recycling, and effective waste management systems was a recurring theme in all responses.
- Not all interviewees were fully aware of sustainability initiatives or environmental conditions in their own cities, indicating a need for better communication and education.
- The need for preserving and expanding green spaces for the well-being of residents and the environment was highlighted in various countries.
- There was an implied need for more widespread adoption of renewable energy sources such as wind turbines, solar panels, and photovoltaics.
- All countries recognized the need for better infrastructure to support sustainability goals, including bike lanes, electric vehicle charging stations, and efficient public transport systems.

Specifically, Cyprus noted the challenges associated with architectural choices, like glass-heavy buildings, contributing to increased temperatures in warm weather. Turkey emphasized the importance of sustainability in rapidly growing cities, highlighting the need to meet current needs without compromising those of future generations. Hungary mentioned both advantages and drawbacks in smaller settlements, with investments in small-scale solar, green spaces, and cycle paths as advantages but financial constraints as drawbacks. Greece faced challenges like overcrowding, pollution, inadequate waste management, and struggles with public transport, along with legal issues related to environmental performance. Bulgaria's specific concerns include inadequate recycling efforts and the impact of urban sprawl on ecosystems. In contrast, Germany is more advanced in its public

transportation systems and demonstrates a deeper understanding of the evolution of smart cities.

To address these common issues, the Consortium collected the changes and good practices that were most frequently proposed by the interviewees.

- There was a strong emphasis on educational resources and programs to promote sustainable behaviors, such as recycling, plant cultivation, and the use of microcontrollers.
- Many respondents across countries emphasized the need to enhance and expand public transportation systems, making them more affordable and frequent to reduce individual vehicle usage.
- Transitioning from fossil-based energy sources to renewable alternatives like solar, wind, and geothermal energy was widely recommended.
- Robust waste management, particularly in recycling and waste segregation, was a common theme.
- Proposals included enhancing green spaces, creating bike lanes, and encouraging bicycle usage to reduce car dependence.
- The role of technology, including the Internet of Things (IoT) and artificial intelligence, was highlighted for smarter city management and transparency in sustainability initiatives.
- There was an emphasis on fostering a strong sense of community cohesion and public engagement for successful implementation of green and smart city strategies.

Responses from various countries differed in terms of the suggested sources of funding and resources for these sustainability measures. While EU funds and national funding were commonly mentioned, some also mentioned private

investments, international funding, and public-private partnerships, especially Germany and Hungary. Differences were also highlighted in the specific environmental challenges of each country: for example, Cyprus remarked architectural choices affecting temperatures, Greece faced issues related to sea pollution and air quality, and Hungary emphasized the need for energy-efficient buildings. Several respondents suggested that municipalities should take the initiative in enhancing green spaces and organizing workshops to raise awareness. Germany, in particular, noted the importance of municipalities in promoting sustainability. Some respondents suggested the need for changes in government policies and a shift in mentality in the population to address sustainability issues, especially in Greece.

In general, participants from each partner's country realized how important it is to develop more Sustainable Green Cities. Common reasons were underlined:

- The protection of the environment was a central theme, with a collective understanding that the environment is a shared global heritage that requires collective protection.
- A recurring theme was the focus on ensuring a healthier and safer planet for both current and future generations. Sustainable Green Cities were seen as crucial for countering the effects of climate change, conserving resources, reducing pollution, and promoting cleaner air and a healthier environment. It was viewed as a way to safeguard the health and well-being of residents, particularly children.
- Sustainable Green Cities were seen as enhancing the quality of life. They offer advantages like enhanced air quality, access to green spaces, efficient and eco-friendly transportation options, and a more active, healthier lifestyle. Living in such cities promotes a sense of community and raises environmental awareness.

- Participants recognized that Sustainable Green Cities promote economic growth and innovation. Green technology and sustainable practices embedded in these cities can lead to job creation, attract investment, and stimulate local economies.

In particular, in Turkey the most common answer highlighted the view that the environment is a common world heritage that needs collective protection, suggesting a strong cultural emphasis on shared responsibility. In Hungary, on the other hand, respondents stressed the importance of efficiency in sustainable cities, noting that efficient operation can lead to savings in terms of human resources, raw materials, energy, and waste production, but there was also a particular focus on the challenges of global warming, overconsumption, and high greenhouse gas emissions, underscoring the need for sustainability in response to these challenges. In Cyprus, the emphasis was on the concerns of young people regarding the sustainability of their cities, particularly the need for greener urban design with more green spaces and parks. The focus was on local environmental concerns and the well-being of the capital city, Nicosia. Germany's responses highlighted a strong consensus on the crucial need for Sustainable Green Cities, with a broad perspective: the reasons included climate and environmental protection, ensuring a healthier and safer planet, conserving resources, and reducing pollution. Furthermore, there was an emphasis on the multifaceted benefits of green urban spaces and their positive impact on the quality of life. In Bulgaria, the majority of participants expressed concerns for the future of their children and the importance of developing Sustainable Green Cities to ensure a cleaner environment, better air quality, and their children's health and well-being. Economic growth and job creation were also key reasons. Participants proposed initiatives related to green spaces, tree planting, and infrastructure changes for more sustainable cities. Finally, the responses from Greece placed a strong emphasis on the need to absorb pollution created by the age of technology, reduce global emissions, and enhance the standard of living. The focus was on improving mental well-being by reducing noise

pollution and increasing green spaces. There was an emphasis on promoting social responsibility, reducing greenhouse gas emissions, and fostering a healthier environment.

Each country's responses reflect its unique priorities and perspectives. The differences among these countries in reasons for developing Sustainable Green Cities include especially the local focus on urban design and well-being in Cyprus, the multifaceted environmental benefits and quality of life in Germany, the concern for future generations and economic growth in Bulgaria, and the focus on pollution reduction and well-being in Greece.

4.2.3 Additional observation

Both Cyprus and Germany highlighted the importance of education and awareness among young people for sustainable urban development. In Cyprus, there is a focus on involving the younger generation in decision-making processes, while in Germany, there's an emphasis on the need for greater education and awareness about smart city concepts. In Turkey, there is a suggestion to turn the best interviews into question-and-answer videos, emphasizing a more multimedia approach to disseminating information about smart cities and sustainability. Bulgaria identifies a significant issue where sustainability education is concentrated in the capital city, leaving those in smaller cities with limited access to such resources. This calls for a broader and more accessible approach to sustainability education that reaches beyond metropolitan areas. Greece highlights a notable gap between the awareness of environmental issues and sustainable practices among young people and experts. The younger generation initially shows resignation and acceptance of non-eco-friendly conditions but becomes more open to alternative solutions after discussion. Greece and Hungary stressed the need for a shift in mentality among the

population itself, but also that it needs to be supported by higher institutions (e.g. government, municipalities, etc.).

5. R1:A3 – Definition of the preliminary modules structure

During activity A3, a preliminary module structure for a curriculum was developed. Based on the feedback we received from the previous activities, we designed the structure of the curriculum. This structure was later presented to young adults, municipal staff and experts during activity A4, and the structure of the curriculum was finalized based on the feedback received.

This curriculum makes this information available to others in a summarized form and provides guidance for cities, city stakeholders and young people on smart, collaborative urban planning.

It is also an inspiration for cities and stakeholders who want to start developing and implementing their own smart city projects in the near future and want to learn more about the topic.

The Smart Cities curriculum, in addition to the theoretical basics, provides in-depth explanations of the different elements (see unit 2), and helps participants to understand the topic and to plan and implement integrated smart cities and low-energy neighborhood projects by describing common situations and giving real-life examples. It summarizes the experiences and expertise shared by the partners, as well as citizens, young people, municipalities, research institutions and NGOs working with us. Around the world, many cities and urban stakeholders aim to create sustainable cities that are pleasant to live in, in line with the digital age.

Smart city and low-energy projects require integrated planning and management, and a comprehensive approach that takes into account the whole life cycle of investments in the

built environment and their impact on the whole community. This requires a real long-term perspective, more inclusive participatory and consulting processes, comprehensive theoretical education and extensive cooperation, in which the young generation has a very important role. If these conditions are not fulfilled, the preparation and implementation of projects can be difficult. The aim of GreenCities is to explain how and what tools can be used to achieve this integrated planning and management, and what sub-themes need to be taken into account. It helps to understand that complex thinking is needed and that there needs to be a comprehensive partnership between citizens and governmental bodies.

5.1 Target groups and structure of the curriculum

The training aims to train professionals, experts, young people who:

- learn about the theoretical foundations and characteristics of the smart city model of urban and regional development (its appearance in urban development, theoretical foundations);
- understand smart city terminology;
- understand the legal framework necessary for the implementation of smart urban development;
- learn about national and international good practices;
- learn about possible options for financing smart urban projects;
- know the most typical smart city developments, the conditions and risks of their implementation;
- are aware of the most basic data protection, data security and IT security requirements.

The curriculum covers the main topics in 4 chapters, which are the followings:

- Unit 1: Introduction to Smart City 3.0;
    a) Smart area concepts (general smart city knowledge) - The concept, development and history of smart cities,

b) European Union legal environment in brief, SDGs
c) Challenges of the urban environment
d) Smart city strategic planning and management
e) Urban design

- Unit 2: Thematic subsystems/pillars
  a) Smart environment
  b) Smart governance (public services)
  c) Smart economy
  d) Smart human resources - Citizen engagement
  e) Smart transport
  f) Smart living conditions
  g) Climate impacts, environmental protection, water management

- Unit 3: Technology usage as a solution
  a) Concepts and tools of digitalisation (general digitalisation knowledge)
  b) Digital infrastructure, Geoinformatics
  c) Advanced technologies of the smart cities
  d) Cyber security
  e) AI as the new key elements in the future smart cities
  f) Smart Cities Marketplace

- Unit 4: Good examples
  a) Good examples outside Europe
  b) Smart Cities Marketplace
  c) Good examples from Europe
  d) Good examples in the partner countries
  e) Case studies

This module structure set the stage for a comprehensive and informative training designed to equip participants with a solid understanding of smart city concepts, terminology, legal frameworks, best practices, data security, and various technological aspects. It offers a comprehensive guide to foster integrated planning and collaboration, crucial for the development of sustainable and smart cities.

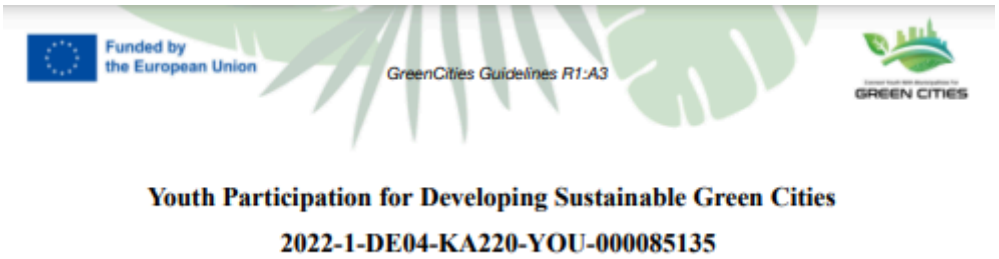
6. R1:A4 – Discuss the module structure with proto-personas and Municipalities

Under the framework of the fourth activity, each partner organized a meeting with at least one representative from a municipality of their country, and one expert and one young person that previously participated in the interviews of the second activity. Each of them had to fill a consent form to be able to participate, and photo-evidences were taken during the discussion.

The aim of the meeting was to discuss the module structure developed during R1:A3, and collect the feedback of the different target groups in order to finally finalize the module.

6.1 Report's template

After the meeting was held, partners were requested to write a report about the discussion, filling the following template:



Summary report on the workshop with proto-personas

on

{date}

Report written by {name}

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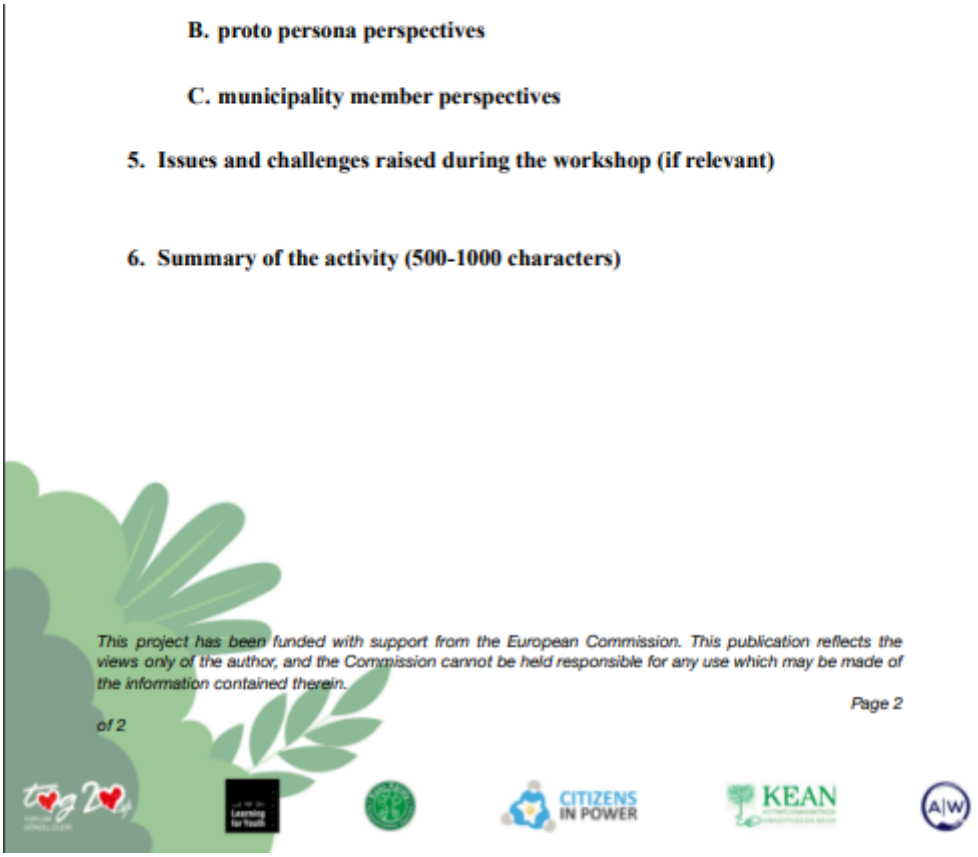
1. **Introduction**
2. **Purpose of the workshop**
3. **Sharing of Experiences about 'Smart Cities' topic**
4. **Comments and answers from participants (please introduce and summarize separately the different participants' answers/opinion**

   A. young person perspectives



B. proto persona perspectives

C. municipality member perspectives

5. Issues and challenges raised during the workshop (if relevant)

6. Summary of the activity (500-1000 characters)

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6.2 Meetings' discussions

During the meetings held in all partners' countries, there was a shared focus on the concept of Smart Cities and urban sustainability, as well as the training framework for educating young people. The following topics were commonly discussed across the countries:

- All countries discussed the concept of Smart Cities and their significance in promoting sustainability, urban well-being, and environmental conservation.
- The training framework for educating young people about Smart Cities was a central theme in all meetings.

- There were discussions about the structure and content of the curriculum, strengths and weaknesses, and its relevance to partner countries and target groups.
- The importance of local environmental transformations and their relationship with public institutions was discussed.
- The role of technology in addressing urban issues and its significance in the transformation of cities into more sustainable environments.
- Identifying challenges faced by cities and exploring potential solutions, including global and local responses to urban issues.
- Urban-specific issues such as traffic management, waste reduction, energy consumption, and urban design were explored.

In particular, in the meeting held in Cyprus the collaboration between stakeholders, smart governance, best practices, and strategies for successful implementation of smart governance was highlighted. In Hungary, there was a detailed examination of each curriculum chapter to ensure it meets the needs and requirements of partner countries and target groups. In Turkey, the discussion revolved around the Sustainable Development Goals (SDGs) within the context of Smart Cities. In Greece, particular emphasis was given to the role of municipalities in Smart Cities and smart city projects. Finally, in the meeting in Bulgaria, a lot of attention was given into identifying the target groups for the training initiative, soliciting feedback and opinions on the training framework, and economic and sociological factors necessary for smart city development.

Across the meetings, there were several common interaction dynamics that emerged: in general, there was a constructive and positive atmosphere, with stakeholders engaged in productive discussions; the interactions were characterized by mutual respect among proto-personas, experts, and municipality representatives. Participants from all countries displayed an openness to discussing various aspects of the topics, and they were willing to consider different perspectives: there was a shared sense of collaboration, with participants

working together to enhance the training framework and address urban sustainability issues. Only two specific cases differed from this general comment:

- In Cyprus, a conflict arose in one instance during discussions about the feasibility of implementing modern technologies in small towns and villages. This conflict was eventually resolved through explanation and the willingness of young people to help others acquire digital skills.
- In Greece, the interaction was limited, with municipality representatives dominating the conversation, resulting in less engagement from the young person. The municipality had more to share about their activities related to the topic.

Across the meetings, the experts contributed in several common ways:

- Firstly, they shared their specialized knowledge in areas related to urban sustainability, smart technologies, blockchain, and the circular economy. They offered valuable insights based on their expertise.

- They evaluated the training framework, providing feedback on the curriculum's structure, content, and chapter organization. They emphasized the importance of comprehensiveness, clarity, and practicality.
- Experts stressed the importance of relating broader concepts to local contexts, suggesting that examples relevant to specific countries should be included.
- They highlighted specific topics and concepts that they believed deserved more focus, such as renewable energy, urban design, and circular city principles.

Focusing on the Country-Specific Inputs by Experts:

- The Cypriot expert, with a background in smart technologies and micro-controllers, expressed concerns about the feasibility of certain units, including cybersecurity. They emphasized the readiness of society to adopt smarter living conditions.

- The Hungarian expert, a university lecturer, underscored the importance of the first and last chapters of the curriculum, explaining key concepts and emphasizing the significance of practical knowledge transfer.

- The German expert, well-versed in Green Cities, advocated for country-specific examples, discussed the importance of renewable energy, and called for greater emphasis on urban design within the training.

- Experts in Turkey discussed projects they had carried out with the municipality, provided insights into smart city concepts, and shared ideas about communication activities with the public.

- The Bulgarian expert shared knowledge in smart cities, technical expertise, and sustainability tips, adding a unique perspective and valuable information to the discussion.

- In Greece, the environmental expert, also a municipality representative, focused on the logistic aspects of the training module structure.

In general, the municipalities displayed a willingness to accept and consider the concerns and suggestions put forth by the proto-personas and other participants in the meetings:

- At the meeting in Cyprus, the municipality member acknowledged the concerns of the proto-personas, particularly those related to urban planning and transportation. They assured the group that the suggestions would be taken into account in the decision-making process and discussed at relevant government levels.

- The Hungarian municipalities at the meeting in Hungary agreed with and accepted all the comments and suggestions provided by the respondents, indicating their openness to incorporating these perspectives.

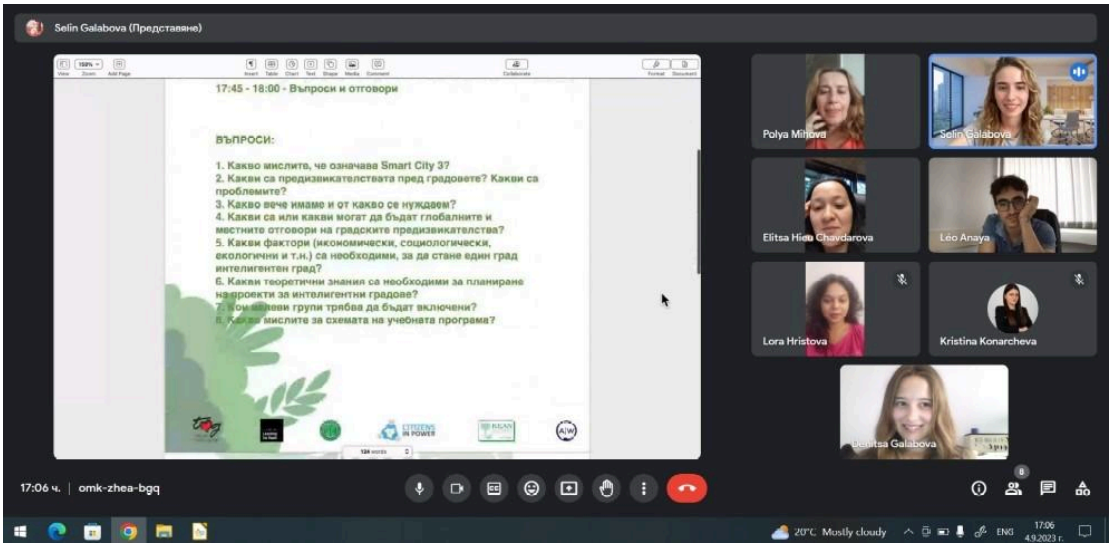
- In Greece, on the other hand, the interactions between the young person and the environmental/municipality representative in Greece did not involve much dialogue,

and the extent of their acceptance of concerns and suggestions is not explicitly mentioned.

- In Germany, the youth worker, who was receptive to concerns and suggestions from the proto-personas, emphasized the importance of striking a balance between complexity and engagement in the training material. The youth worker valued the proto-personas' perspective and noted where the material could be improved to better align with their needs.
- In Turkey, experts emphasized the importance of active negotiations with municipalities and shared good examples. They noted that municipalities were sensitive to youth organizations formed on environmental issues and willing to engage with them.
- In the meeting held in Bulgaria, the municipality secretary not only acknowledged but actively embraced the concerns and suggestions voiced by the proto-persona and other attendees. They expressed a strong commitment to collaborating with all stakeholders to ensure that these inputs were considered and translated into meaningful actions for the community.

The outcomes of the meetings highlighted some similarities as well as some differences across different countries: regarding the similarities, in multiple meetings, there was a common emphasis on the significance of technology in achieving sustainable and smart cities. This technology-driven approach includes concepts like Smart City 3.0, data-driven decision-making, and the role of advanced technologies in urban development. Furthermore, in both Cyprus and Germany, there was a shared outcome related to the need for a more interactive and engaging training framework. Participants highlighted the importance of making the material less descriptive and more interactive to cater to the needs of young learners. Finally, in various meetings there was a commitment expressed to involve young people in the decision-making process. This inclusivity focused on issues such as urban planning, transportation, and engagement of NGOs and the public.

Analyzing the differences, we can see that in Hungary the meeting received positive feedback regarding the importance of educating the population, especially the younger generation. There was a strong emphasis on practical application in the final chapter. The meeting in Turkey emphasized the need for a communication strategy related to climate problems and the establishment of a platform to discuss climate issues involving various stakeholders. The meeting in Greece received positive interest, but there was a sense of individualism in providing feedback on the module structure, with a lack of in-depth dialogue. The meeting in Bulgaria fostered an open and collaborative atmosphere, with a strong commitment to considering and integrating the concerns and suggestions of proto-personas. The expertise contributed to the meeting promises to enhance the development of smart cities with a focus on sustainability and inclusivity.



7. Conclusions

In this comprehensive report, we embarked on a journey to understand and develop a Training Framework for smart cities. We began with a clear Project Overview, exploring the goals and potential impact of this project, while also establishing a foundational understanding of what constitutes a Smart City.

Our journey further delved into the explanation of the Training Framework, where we meticulously examined its structure. We assessed a map of good practices adopted by smart cities worldwide, observing how they effectively tackle sustainability challenges. These insights, gathered under the first activity R1:A1, paved the way for our understanding of the vital components of this framework.

As we ventured deeper into R1, we explored the significance of understanding the needs of our target audience (both young people and environmental experts) through the second activity, with the toll of the interviews. We laid out a semi-structured approach, complete with consent forms and interview questions as a guideline but not mandatory. The analysis of findings revealed the levels of awareness and solutions proposed by our interviewees, while examples of proto-persona interviews and additional observations enriched our insights.

The Definition of Preliminary Modules Structure (R1:A3) played a pivotal role in shaping the trajectory of our project. This segment provided a detailed overview of the target groups and the curriculum's structure, setting the stage for meaningful progress.

Our project continued as we engaged with proto-personas and Municipalities to discuss and refine the module structure, emphasizing the collaborative nature of our approach. We highlighted the importance of template creation and the valuable discussions held during various meetings. Finally, the feedback received from these discussions allowed our Consortium to finalize the module structure.

In conclusion, this report stands as a testament to the dedication and efforts of all involved partners and stakeholders in developing a Training Framework for Smart Cities and Sustainable Green Cities. We have gained valuable insights from good practices worldwide, engaged with our target audience through the interviews, and refined our module structure through active collaboration.

As we move forward, the learnings and findings presented in this report will serve as a guiding light, empowering us to create sustainable and innovative smart cities, thereby shaping a better, more efficient, and environmentally conscious future.

8. Annexes

We report as annexes the interviews of a proto-persona from the activity R1:A2 selected in each country, either from the young group or the experts, that better represent the general view of the interviewees of that region.

Cyprus - interview with the young person Marinos Georgiadis:

1. Do you know what a Sustainable Green City is? (In case they don't, please explain to the interviewee).

   No

2. Do you know any good practices from any cities?

   Large European countries have developed and transformed their small or large cities into green sustainable cities. Some measures they have adopted to help promote sustainability and environmental friendliness are:

   • *Renewable energy: they have invested heavily in renewable energy and developed a strong infrastructure for solar and wind energy production, as well as for the promotion of bioenergy. In addition, energy efficiency programmes have been implemented in buildings and public systems.*

   • *Cycling City: They have created excellent infrastructure for cyclists, with a network of cycle paths, safe cycle tracks and cycle storage facilities. This can encourage many residents to use bicycles as their primary mode of transportation, thereby reducing congestion and emissions*

   • *Sustainable water management: systems have been implemented to collect and reuse rainwater for irrigation of parks and gardens. Awareness-raising and*

education programmes have also been developed to save water and improve sustainability.

• Sustainable Construction: Standards and regulations for sustainability in the construction of new buildings have been established. Standards and regulations have been established and implemented for building construction, such as the use of sustainable materials, energy efficiency and eco-design.

As far as my place of residence, which is Nicosia, is concerned, the practice of renewable energy, and in particular the use of solar energy, the practice of the cycling city, the practice of sustainable construction in the construction of new buildings, and other useful practices that can help our city to transform itself into a modern sustainable and green city can definitely be applied.

3. Do you know what Smart Cities 3.0 is? (In case they don't, please explain to the interviewee)

   No

4. What is the current situation in your city regarding environment and sustainability?

   Nicosia is a city with a small percentage of greenery and a small number of parks. There are a large number of cars, especially in the afternoon, and the only public transport available is buses. Nicosia is a city that is exposed to the sun all the time and it seems that solar energy is not used at all (for example installations on top of apartment buildings).At least in the area of Aglantzia, recycling bags are at an extremely high price (1,50 euro for a medium bag) which prevents the creation of ecological awareness in the lower strata of society.

5. If you could make changes in your city to be greener and smart, what would you do?

Creating parks and planting trees, solar energy facilities, creating means of transport such as trams, creating cycle paths, more practical recycling. Resources can come from government or European grants, from private sector contributions and from the organization of voluntary groups.

6. What is the one good practice that shouldn't miss in a Sustainable Green City in your opinion?

   Political will and creation of ecological awareness (through education and information programmes)

7. How is the ideal and perfect Sustainable Smart and Green City for you & Why is it important to develop more sustainable Green Cities?

   Developing more sustainable green cities is important for many reasons and has many benefits for society, the environment and the economy. Among the main benefits of developing sustainable green cities are:

   - *Protection of the environment: Sustainable green cities seek to reduce greenhouse gas emissions, protect biodiversity and manage natural resources sustainably. This helps to protect the environment and ensure a sustainable future for future generations;*
   - *Improving the quality of life: Sustainable green cities promote the health and well-being of their inhabitants. They offer cleaner air, better water quality, green spaces for exercise and recreation, and healthy and sustainable food and transport options;*
   - *Sustainable development: Sustainable green cities promote economic growth in a sustainable way. They create jobs in the areas of green technology, sustainable construction, recycling and renewable energy. They also promote innovation and entrepreneurship by developing new solutions to the needs of the city;*

- *Resource efficiency: Sustainable green cities promote the efficient use of resources such as energy, water and raw materials. They use advanced technologies and processes to save and recycle resources.*

Germany - interview with the young person Hazrina Puteri Nabilla:

1. Do you know what a Sustainable Green City is? (In case they don't, please explain to the interviewee).

   I think I already have an idea. It is all about being eco-friendly and looking up for mother earth. It is a city built with the environment in mind to have as little impact on nature as possible. The whole idea is to create a place where people can live happily while also taking care of the planet. They want to keep things clean sources wisely, and to prevent pollution. It's all about balancing city life and being kind to the environment.

2. Do you know any good practices from any cities?

   Additional question: do you think this good practice can be reproduced in your city? Why?

   Well, I'm not sure if I know a lot of them, but two months ago I traveled to Copenhagen with my friends and I know that there are a lot of options you can choose for transportation. But, they invested in bike lanes, bike sharing programs and dedicated bikes, which of course help us to have a good air quality because there is not much pollution. And I think, as long as the government has a lot of support and resources, they can plan and of course they did to make the infrastructure like investing in bike lanes and bike sharing programs.

3. Do you know what Smart Cities 3.0 is? (In case they don't, please explain to the interviewee)

I don't know what a smart city is, but I think it is like the supercharged version of a smart city, it's all about using technology and data to improve city life. We're talking about advanced data analytics and artificial intelligence which help us collect and analyze information.

4. What is the current situation in your city regarding environment and sustainability?

   I'm not sure if I'm updated on how it is in Jakarta, but I believe that Jakarta has been investing in improving the public transportation system, such as the mass public transit. And this promotes sustainable modes of transportation.

5. If you could make changes in your city to be greener and smart, what would you do?

   Additional question: which tools, funds, etc. would you need?

   I think I would engage citizens with food, digital platforms and thereby allow applications to inform them about energy consumption, transportation options, and ways to contribute to sustainability. I would also like to encourage citizen feedback involvement in decision making processes and initiatives such as community gardens and farming. In terms of tools and funds needed, the specific requirements would vary depending on the city and its existing infrastructure. Some potential resources include securing financial resources to the public private, partnerships with government grants, international funding or green bonds that can help finance infrastructure, upgrades, and initiatives.

6. What is the one good practice that shouldn't miss in a Sustainable Green City in your opinion?

   I think by prioritizing and investing in public transportation and promoting active modes like walking, cycling.

7. How is the ideal and perfect Sustainable Smart and Green City for you?

   I think it would be great if they would prioritize all aspects of its development and operation; achieve carbon neutrality, zero wasting, protect natural resources and prioritize renewable energy sources.

8. Why is it important to develop more Sustainable Green Cities?

   Additional question: which benefits would you gain from living in a Sustainable Green City?

   Well by adopting sustainable practices. It can mitigate the negative environmental impacts of globalization and contribute to global efforts in combating climate change and preserving ecosystems. And also I can benefit from cleaner air and have green spaces, I believe it will lead to better physical and mental health outcomes.

Turkey - interview with the expert Gizemnur Erdogan:

1. What is the most successful good practice in a Sustainable Green City that you know of?

   Istanbul Metropolitan Municipality; I think Istanbul has taken a good green step with the Local Electronic Waste Sustainable Management Project. I honestly find the projects carried out jointly by NGOs and public institutions healthier.One successful good practice in a Sustainable Green City is integrating renewable energy solutions such as solar panels, wind turbines, and hydropower into its infrastructure. This reduces dependency on fossil fuels and minimizes greenhouse gas emissions, while also promoting energy efficiency and cost savings for individuals and businesses. Additionally, implementing green transport solutions such as bicycle lanes, electric

vehicles, and public transportation can reduce gas emissions from cars and improve air quality, making the city more livable and healthy overall.

Additional question: do you think this good practice can be reproduced in

Istanbul Metropolitan Municipality; I know that the Istanbul Local Electronic Waste Sustainable Management Project is also being implemented in European countries.

2. What's your opinion about Smart Cities 3.0?

   I would first like to talk about the risks and disadvantages of this concept. As an environmentalist, one of the first risks that comes to my mind is global warming risks, Smart City. 3.0 technology requires the use of many devices and sensors. Therefore, increased energy consumption could increase the risk of global warming. Also, making city life more attractive may discriminate against people living in rural areas. We have to prevent rural-urban migration, and for sustainable agriculture and the environment, we should not subject rural people to social discrimination. I am concerned that it may create a negative difference between rural/urban areas. Since my field is the environment, I think that the environmental advantages of Smart Cities 3.0 will also be high. For example, Smart Cities 3. 0 can help conserve natural resources by adopting an environmentally sensitive approach to issues such as energy and water conservation, air quality and waste management. This has a positive impact on human health and can also be beneficial for agriculture. I would love it to be useful in agriculture, my specialty is agriculture and it is one of the most important issues in the world. Sensors and other technologies can be used to detect plant diseases, improve soil fertility and optimize water use. can also be useful in agriculture.

3. What is the current situation in your city regarding environment and sustainability?

Ankara, the capital of Turkey, faces several environmental challenges, including air pollution, water scarcity, and unsustainable waste management. The city's rapidly growing population and urbanization are putting pressure on its natural resources and ecosystems. The government of Ankara has implemented various policies and initiatives to address these challenges, such as promoting renewable energy, improving public transport, and increasing recycling rates. The city also has several parks and green spaces, such as Atatürk Forest Farm, that provide recreational opportunities and contribute to the city's biodiversity. Ankara Metropolitan Municipality has recently been providing seed and fertilizer support to farmers as a rural development service. In this practice, which is important in terms of sustainability, it purchases the products produced by the farmers under an agreement. One of my favorite practices is the purchase of tomato paste produced by women in Ankara/Ayaş for the municipal cafeteria. Additionally, there are various non-governmental organizations and community groups working to raise awareness and advocate for sustainable practices and policies in Ankara. However, more efforts are needed to effectively address the environmental issues and ensure a sustainable future for the city.

4. In order to make your city greener and smart, where would you start? Which tools, funds and support would you need?

   Many different steps can be taken to make Ankara greener and smarter. The first step could be to increase the city's green spaces. This can be done by transforming vacant land in the city into green spaces, reorganizing parks and building new parks. Also, afforestation efforts in the city could be increased. In addition, efforts can also be made to make the city smarter. For example, steps can be taken to regulate traffic flow in the city, improve public transportation systems, and create bicycle lanes and pedestrian paths. Work can also be done on energy efficiency. These include the construction of energy-efficient buildings and the use of renewable energy sources such as

solar panels for energy production. This may require a variety of tools, funding and support. For example, allocating resources from the city's municipal budget, obtaining financial support from local governments or private institutions, applying for grant programs, and enlisting the support of citizens are some of the tools that can be used to finance these activities. In addition, cooperation can be established with specialized institutions and organizations to provide expertise and technical support in carrying out these studies.

5. What is the one good practice that you think it's easier and possible to reproduce in the majority of the cities?

   The best practice for the regeneration of cities is the establishment of a sustainable transportation system. Integrated into this system, options such as bike lanes, walking paths, electric public transport, on-call services and car sharing play an important role in the redesign of cities. In this way, the regeneration of cities can take place in a way that is more environmentally friendly and improves people's quality of life.

6. Why is it important to develop more Sustainable Green Cities? How to balance the costs and the benefits?

   Developing more sustainable green cities is important for creating an environmentally friendly, socially equitable and economically sustainable future. This means conserving natural resources, reducing pollution, protecting green spaces and natural habitats, and reducing risks from heat waves, floods and other environmental events. Various costs will be incurred to achieve these objectives, but these costs will be small compared to the benefits in the long run. For example, a greener and more sustainable city will bring a range of benefits, such as improved air quality, increased physical health of people and a more efficient water management system, which in turn will reduce healthcare costs. Furthermore, a more sustainable city can reap economic benefits by investing in renewable energy technologies. The

costs of a greener and more sustainable city can be offset in the planning and implementation process, including the construction of green spaces, energy-efficient buildings, public transportation systems, bicycle lanes and other sustainable solutions. Such investments can be financed by the public sector, private sector and civil society organizations. As a result, more sustainable green cities bring many benefits in terms of the environment, economy and social development. These benefits exceed the costs in the long run and benefit everyone.

Bulgaria - interview with the young person Lora Hristova:

1. Do you know what a Sustainable Green City is? (In case they don't, please explain to the interviewee).

   Yes, it is a city which is a resilient and safe place for society. Moreover it has green places like parks, gardens, etc. , a good public transportation system, effective waste management policies and comfortable facilities for people which are in a reasonable distance or it is easily reachable by alternative transportation. Sustainable cities are focused to create more value for the communities by making less danger to the environment. Sustainable cities are one of the United Nations' sustainable development goals on a global basis.

2. Do you know any good practices from any cities?

   Here are some general good practices: Free public transportation, rent a bicycle services, usage of renewable sources of energy for public lighting and transportation, repairment of old abandoned buildings and using them for new purposes instead of building new ones, motivating people to use bicycles or another alternative way or walking more often, by giving them gifts after reaching a particular amount of kilometers in a special app on their phones.

Additional question: do you think this good practice can be reproduced in your city? Why?

Definitely yes. Sofia city has the potential to be sustainable and green. Many people are aware of living sustainably here which also contributes to the overall development.

3. Do you know what Smart Cities 3.0 is? (In case they don't, please explain to the interviewee)

   Unfortunately I haven't heard of it.

4. What is the current situation in your city regarding environment and sustainability?

   Sofia is the leading city in Bulgaria when it comes to sustainable and green facilities. Public transportation is developing and many more lines are planned. There are alternatives to using a car and the convenience of driving electric cars is more related to the other cities in Bulgaria, because of the charging stations in/or around the city. Also, there are a lot of people with a sustainable way of thinking which is a really important factor when it comes to creating a green and resilient city. There are often campaigns and events which aim to inform the society about why it is important to be green and sustainable. The Business sector is engaged with the big Sustainability Development topic right now and invests a lot of money to contribute to this global goal.

5. If you could make changes in your city to be greener and smart, what would you do?

   More environmental related topics in the educational system is needed, more parks and green places and less buildings, more bicycle lines, better waste management system, more ways of recycling plastic, less usage of plastic packs, more policies focused on improving the air quality, investing in quality

equipment than fast and cheap, stimulating the society to use energy safe products, investing in green and innovative buildings, engaging the members of the society to clean the environment and not to throw their waste everywhere.

Additional question: which tools, funds, etc. would you need?

Public funds from the municipality and funds from private investors.

6. What is the one good practice that shouldn't miss in a Sustainable Green City in your opinion?

   Well developed public transportation system in all neighborhoods which makes reaching the destination fast and easily.

7. How is the ideal and perfect Sustainable Smart and Green City for you?

   The perfect city for me has an effective waste management system, good public transportation, more green spaces than private buildings, more public campaigns and events, more outdoors activities, uses renewable sources of energy, has good air quality and sustainable infrastructure. Last but not least the society that lives there is more mindful and aware of how important it is to keep the environment clean and safe and not put our own lives in danger by being irresponsible, selfish and ignorant.

8. Why is it important to develop more Sustainable Green Cities?

   Sustainable Development is becoming an important part nowadays in every aspect of people's lives. The surroundings define ourselves. So if we want to be smart, green, sustainable and comfortable we should first create this environment for us.

   Additional question: which benefits would you gain from living in a Sustainable Green City?

Better quality of living, a happy and healthy society, attracting more investors, saving time and energy.

Greece - interview with the expert Dr. Maria Kyriakopoulou-Deliorga:

1. What is the most successful good practice in a Sustainable Green City that you know of?

   In my opinion the most successful good practice in a Sustainable Green City is "green roof". To characterize a building as a "green roof building", its rooftop has to be covered with earth so that plants can grow on. This good practice has a lot of benefits for the society, economy and environment of the city. Most important are that it improves the micro-climate of the city, leads to a sustainable development and makes the urban space friendly for residents. These benefits are clear because of the following. Green roofs:

   i. Help to leaving aside traditional materials (such as concrete or tiles),

   ii. Address the urban heat island phenomenon, which occurs in cities where there is insufficient urban greenery,

   iii. Improve air quality inside cities due to the reduction of CO2 emissions into the atmosphere.

   Additional question: do you think this good practice can be reproduced in your city? Why?

   Yes, totally. Athens suffers from too many environmental problems (air pollution, light pollution, heat island phenomenon, lack of green and blue urban spaces). Green roofs are an easy, quick and mild solution to environmental problems.

2. What's your opinion about Smart Cities 3.0?

In my opinion, "Smart Cities 3.0" is what cities need in order to be able to survive future (social, economic and environmental) challenges/crises. Basically instead of a tech-driven provider approach (Smart Cities 1.0), or a city driven, technology enabled model (Smart Cities 2.0), "Smart Cities 3.0" are beginning to embrace citizen co-creation models for helping to drive the next generation of smarter cities.

3. What is the current situation in your city regarding environment and sustainability?

   As I have already said, my city (Athens) suffers from too many environmental problems. Air pollution, light pollution, heat island phenomenon, lack of green and blue urban spaces are the most serious.

4. In order to make your city greener and smart, where would you start? Which tools, funds and support would you need?

   I think that Athens is far far away from the Smart Cities 2.0 and the Smart Cities 3.0. For that reason my steps to make my city greener and smart would be:

   i. Green roofs

   ii. and Green external walls of buildings

5. What is the one good practice that you think it's easier and possible to reproduce in the majority of the cities?

   The "Green roofs"

6. Why is it important to develop more Sustainable Green Cities? How to balance the costs and the benefits?

   It is very important to develop more Sustainable Green Cities and this is clear based on the cost/benefit.

As benefit can consider:

i. Environmental benefits (e.x. limitation of air pollution, effect on microclimate conditions, aquifer enrichment, wind protection, soil retention, reduction of noise, protection of biodiversity, aesthetic improvement).

ii. Social and economic benefits (e.x. health, education, recreation, employment).

iii. Smart Economy - Competitiveness (e.x. innovative spirit, entrepreneurship, economic image and trademarks, productivity, flexibility of labour market, international embeddedness, ability to transform).

iv. Smart People – Social and human capital (e.x. level of qualification, affinity to life long learning, social and ethic plurality, flexibility, creativity, open-mindedness, participation in public life).

v. Smart Governance -Participation (e.x. participation in decision making, public and social services, transparent governance, political strategies and perspective).

vi. Smart Mobility – Transport, Information, Communications and Technology (e.x. Locan and international accessibility, availability of ICT infrastructure, sustainable, innovative and safe transport system).

vii. Smart Environment – Natural resources (e.x. Attractivity of natural conditions, pollution, sustainable resource management).

viii. Smart Living – Quality of life (e.x. cultural facilities, health conditions, individual safety, housing quality, education facilities, touristic attractivity, touristic attractivity).

As cost can consider:

i. Problems of acceptance by citizens (e.x. indifference, vandalism),

ii. Lack spaces problems,

iii. Few environmental problems (e.x. if appropriate measures are not taken during implementation),

iv. The fact that not all the cities are ready and prepared to become "Smart"

Hungary - interview with the expert Dr. Nikoletta Kaszás:

1. What is the most successful good practice in a Sustainable Green City that you know of?

   Copenhagen, Denmark: lot of efforts put on sustainability, with a lot of investment in green tech and network of bicycle lanes. Besides that the city tries to live with nature and its ambition is to be the first carbon-neutral city by 2025.

   Additional question: do you think this good practice can be reproduced in your city? Why?

   Population does not yet perceive the environmental damage effects of our current, everyday life, and prioritizes comfort over environmental protection. Thus, the initiatives - if there were any - would die, because no one would participate in the programs, they would not take advantage of the opportunities.

2. What's your opinion about Smart Cities 3.0?

   Many people dispute the possibility of using smart and sustainable cities together. In my opinion, however, a settlement can only be sustainable if it also uses smart devices, since the data collection of these smart devices provides a basis for the introduction of various sustainable solutions and helps decision-making: what is needed to achieve sustainability, what needs to be changed. In addition, IT solutions are also necessary to monitor the

effects of already introduced sustainable solutions. Social projection is a matter of life, since until the residents do not consider these steps important, nothing can be realized. Community solutions offer a good opportunity, but in my opinion, the majority of the population is not yet ready for this. We like to sell our tools, chattels and real estate.

3. What is the current situation in your city regarding environment and sustainability?

   It is in its infancy, as the city is currently also struggling with economic challenges. As a result, the environment and environmental sustainability are relegated to the background.

4. In order to make your city greener and smart, where would you start? Which tools, funds and support would you need?

   In my view, businesses will sooner or later be forced to start on this path in terms of their own operations, as domestic and EU regulations will require this. So I would start with the state and public sphere. A thorough examination of the efficiency of the operation of government institutions (waste transport, public transport, educational institutions, municipalities, offices, etc.) would be necessary, revealing wasteful and non-environmentally friendly procedures, including all aspects of operation. This requires adequate competence for the survey, as well as an open attitude on the part of the investigated actors.

5. What is the one good practice that you think it's easier and possible to reproduce in the majority of the cities?

   Digitized administration, optimized procedures and operation in all segments of the city operation.

6. Why is it important to develop more Sustainable Green Cities? How to balance the costs and the benefits?

As a result of urbanization, many people live in cities, and it is well known that cities are the most polluted areas. Thus, making them sustainable is beneficial from every point of view. Many people assume that environmental sustainability involves significant investments and costs. The steps to transform the processes can really involve costs, but at the same time efficiency is at the center of sustainability. As a result of more efficient operation, it is possible to optimize either the human resources, the use of raw materials and energy, and the amount of waste produced through these, which all result in savings.