

remarkable.

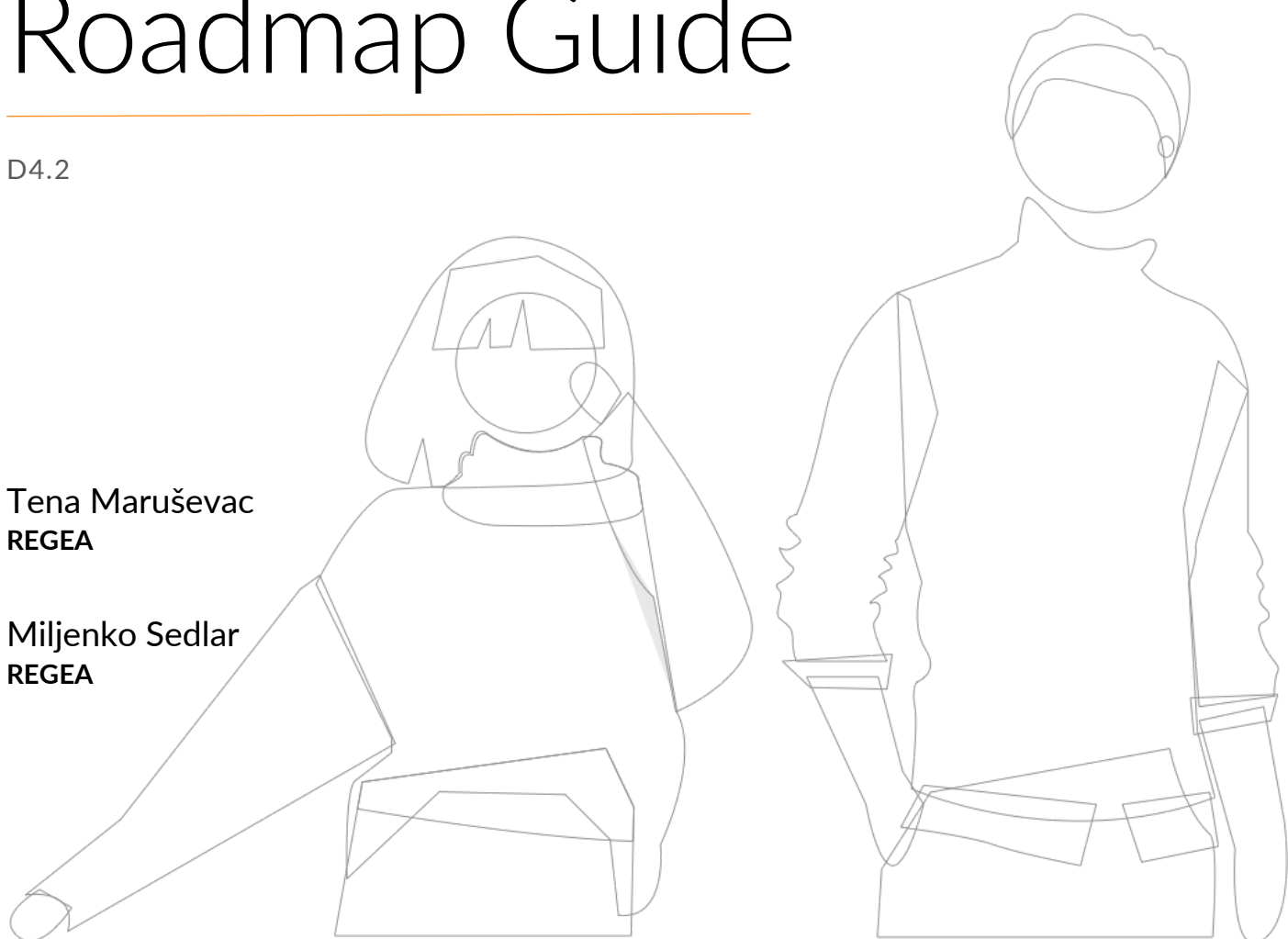
climate leaders

Climate Neutrality Roadmap Guide

D4.2

Tena Maruševac
REGEA

Miljenko Sedlar
REGEA



Remarkable Climate Leaders has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101024972

Disclaimer

The sole responsibility for the content of this report lies with the authors. It does not necessarily reflect the opinion of the European Union. Neither the European Climate, Infrastructure and Environment Executive Agency (CINEA) nor the European Commission is responsible for any use that may be made of the information contained therein.



Copyright notice

© 2021-2024 REMARKABLE Consortium Partners. All right reserved. All contents are reserved by default and may not be disclosed to third parties without the written consent of the REMARKABLE partners, except as mandated by the European Commission contract, for reviewing and dissemination purposes.

All trademarks and other rights on third party products mentioned in this document are acknowledged and owned by the respective holders. The information contained in this document represents the views of REMARKABLE members as of the date they are published. The REMARKABLE consortium does not guarantee that any information contained here is error free or up to date, nor makes warranties, express, implied, or statutory, by publishing this document.

Grant number 101024972

Full title	REMARKABLE - Climate Leaders Achieving 2050 Climate Neutrality
Topic	LC-SC3-EC-5-2020 Supporting public authorities in driving the energy transition
Start Date	1 st September 2021
End Date	31 st August 2024
Duration	36 months
Project website	https://climateleaders.eu/
Project Coordinator	Technological University of the Shannon: Midlands, Midwest (TUS)
Deliverable	D4.2 Climate Neutrality Roadmap Guide
Work Package	WP 4 Climate Neutrality Roadmaps
WP Leader	REGEA
Lead partner for deliverable	REGEA
Due Date	M12
Responsible Author	Tena Maruševac
Reviewers	Miljenko Sedlar (REGEA), Megan Gignac (OÖ Energiesparverbandes)

Document history

Date	Version	Person/Partner	Comments
August 18 th 2022	00	REGEA/M. Sedlar, T. Maruševac	(1 st draft, revision, ready for internal review...) 1 st draft
Sepstember 23 rd 2022	01	REGEA/M. Sedlar, T. Maruševac	Final

Preface

REMARKABLE Climate Leaders will support local leaders to deliver a step-change in progress towards carbon neutrality by 2050 in 7 regions across Europe. REMARKABLE will establish, by 2024, a network of 320 Current and Emerging Climate Leaders who, through their actions and inspiration, will drive their municipalities, public authorities, communities and regions to transform their approaches from ones focused on energy efficiency/renewables to ones focused on the strategic goal of climate neutrality by 2050.

REMARKABLE Climate Leaders will build new leadership capacity in 120 actors from 7 countries in Europe through a Climate Leadership Programme (CLP). The CLP will be inspired by ethnographic research and will be designed with and for leaders across public authorities. The REMARKABLE CLP will also facilitate the creation of 60 Roadmaps for public authorities aiming at Climate Neutrality by 2050. These Roadmaps will allow our Climate Leaders to translate strategic aspirations and policy ambitions into concrete and disruptive far-reaching measures stimulating €300m investment by 2030. A Climate and Energy Check Tool will be developed and tested along with a Climate Neutrality Roadmap Guide.

The 7 Regional Energy Agencies involved in REMARKABLE Climate Leaders will develop 14 new services to expand their roles as change agents in the Clean Energy Transition and Climate Neutrality challenges. Climate Neutrality Training, Climate One Stop Shops, Financing Solutions are targeted as potential services. REMARKABLE will exploit its outcomes and results through the creation of an EU Climate Leaders Circle, reaching up to 320 members by 2024 including 30 from 7 Observer Regions/Countries. An innovative Climate Neutrality Challenge will be organised for Young Climate Leaders. The REMARKABLE Circle will create synergies with existing networks and initiatives to support and enhance their impacts with the ambition of mobilising 10,000 stakeholders by 2030 (2,000 by 2024).

Project partners

No	Partner	Short Name	Country Code
1	Technological University of the Shannon: Midlands and Midwest	TUS	IR
2	Regionalna Energetska Agencija Sjeverozapadne Hrvatske	REGEA	HR
3	Energiesparverband Oberosterreich	ESV	AU
4	Inovacijsko-razvojni institut Univerze v Ljubljani	IRI UL	SI
5	Auvergne-Rhone-Alpes Energie Environnement	AURA-EE	FR
6	Energikontor Norr Ab	EKNorr	SE
7	Tipperary Energy Agency Limited	TEA	IR
8	Escan SI	ESCAN	ES
9	Energetska Agencija Za Podravje Zavod Za Trajnostno Rabo Energije Energy Agency Of Podravje Institution For Sustainable Energy Use	ENERGAP	SI
10	Federation Europeenne Des Agences Et Des Regions Pour L'energie Et L'environnement	FEDARENE	BE

Table of contents

Disclaimer	2
Copyright notice.....	3
Document history	4
Document status.....	Error! Bookmark not defined.
Preface	5
Project partners.....	6
1 Introduction	8
2 Energy Baseline.....	9
2.1 Writing the Baseline Emission Inventory from scratch	9
2.1.1 Building sector	9
2.1.2 Mobility sector	10
2.1.3 Public lighting.....	11
2.1.4 CO ₂ emissions calculation	11
3 Sector mapping	13
3.1 Building sector	13
3.2 Mobility sector.....	13
3.3 Public lighting.....	13
4 Stakeholders mapping.....	14
5 SWOT analysis	16
6 Vision.....	17
7 Recommendations.....	18
8 Conclusion.....	19



1 Introduction

One of the objectives of the REMARKABLE project is to build new leadership capacity in 120 actors from 7 countries in Europe through a Climate Leadership Programme (CLP). The CLP will be inspired by ethnographic research and will be designed with and for leaders across public authorities. The REMARKABLE CLP will also facilitate the creation of 60 Roadmaps for public authorities aiming at Climate Neutrality by 2050. These Roadmaps will allow our Climate Leaders to translate strategic aspirations and policy ambitions into concrete and disruptive far-reaching measures stimulating €300m investment by 2030.

The development of a roadmap requires a comprehensive understanding of the status of the municipality. Helpful tools in this process could be:

- an analysis of the impact of current policies and programmes on the municipality (e.g. upcoming obligations, funding opportunities), including key barriers and opportunities;
- assessing the current status of the energy transition (e.g. based on a SEAP/SECAP or equivalent);
- a stakeholder analysis resulting in a stakeholder map focusing, for example, on local politicians and administration, citizens, industry/SME, NGOs/civil society organisations, where applicable, academia/research
- a SWOT analysis, tools and resources needed, and the definition of success factors.

Following previous points, and with the awareness that cities and regions that will develop the Roadmaps are taking off from different starting points where some are already advanced in the implementation of climate change mitigation and adaptation actions, and some have just recently started the process, the Climate Neutrality Roadmap Guide was created to serve as a guidance document for developing and implementing the Climate Neutrality Roadmaps (CNR). It contains insights into where to access the needed information, exploiting the existing resources from International and EU initiatives, focusing mainly on the energy part of the Roadmap.



2 Energy Baseline

A base year is a year in the past against which the emissions are compared. It usually corresponds to the start of a policy. A Baseline Emission Inventory (BEI) quantifies the amount of CO₂ emitted due to energy consumption in the territory of the Climate Neutrality Roadmap during a baseline year. It identifies the principal sources of CO₂ emissions and their respective reduction potentials.

The BEI should reflect the local situation and, when possible, should be based on local energy consumption/production data and other information necessary to prepare the inventory. It should include at least the sectors where the public authorities intend to take measures to achieve their Climate Neutrality goals, the sectors that constitute important sources of CO₂ emission.

In general, BEI contains three sectors:

- Building sector
 - Public buildings
 - Residential buildings
 - Commercial buildings
- Mobility sector
 - Public
 - Private
 - Commercial
- Public lighting

It is up to the local/regional authorities to determine what sectors and scope they want to include in their CNR, depending on the current state of the city/region and the vision for climate neutrality. For example, it is recommended that the manufacturing sector is also included in the BEI if it represents a large share of the emissions in the city/region. The Baseline may also include local electricity production and local heating/cooling generation, etc.

The data can be copied if the location already has a written Sustainable Energy and Climate Action plan or any other action plan containing a BEI.

If such a document does not exist, the Baseline must be made as the first step of writing the Climate Neutrality Roadmap.

2.1 Writing the Baseline Emission Inventory from scratch

As previously mentioned, the Baseline should cover areas where authorities can influence energy consumption in the long term and encourage markets for energy-efficient products and services. The data of consumed energy per fuel in MWh should be collected in each sector, and then a conversion factor for the location should be used to calculate the CO₂ emissions. Similarly, if the Baseline contains energy production, the data for the produced energy in MWh should be gathered, and the conversion factor should be used to calculate the CO₂ savings. Following are examples of the BEI calculation for the three main sectors: building, mobility, and public lightning.

2.1.1 Building sector

The data that needs to be collected is:



- fuel used for space heating in buildings [MWh_{fuel}], and/or heat consumed by buildings [MWh_{heat}] (in case of district heating);
- electricity consumed in buildings [MWh_e].

The information should be gathered in the form of tables and diagrams, for example:

Table 1 Example for energy presenting – building sector

Building sector – Energy (MWh)					
Category	Wood pellets	Natural gas	Electricity	District heating	SUM
Public buildings					
Residential buildings					
Commercial buildings					
SUM					

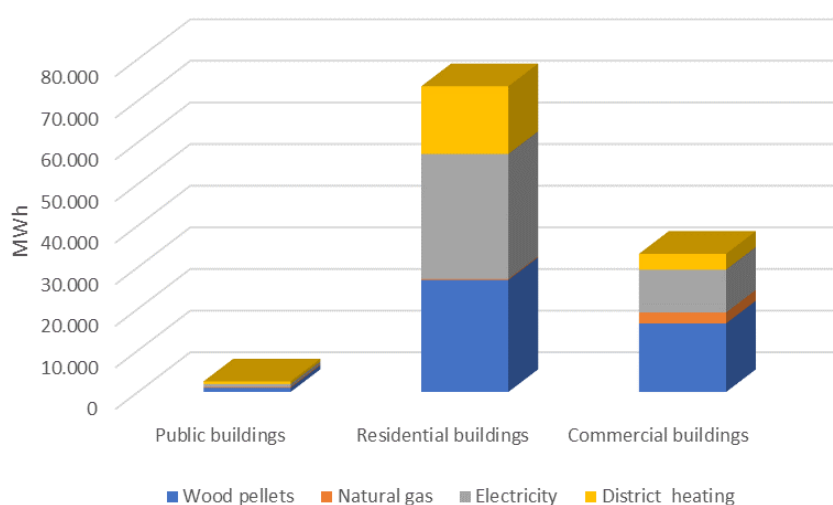


Figure 1 Example for energy presenting – building sector

The public buildings are keeping track of their energy consumption. If a system that keeps track of their consumption exists, the data should be downloaded from it. Otherwise, each building must be asked to deliver its data.

If a relevant study was made for the location that shows the energy consumption of residential and commercial buildings, the data could be taken from it. If not, the data needs to be collected as follows:

- Electricity – from the local electricity distribution companies;
- District heating – from the local district heating companies;
- Natural gas – from the local natural gas distribution companies;
- Wood, wood chips, and wooden pallets – from the local chimney man;
- Other fuels – from the local or country statistics.

2.1.2 Mobility sector

The data that needs to be collected is:

- municipal fleet fuel consumption (e.g., municipal cars, waste transportation, police, and emergency vehicles) (l/year or MWh/year);

- public transportation fuel consumption (containing busses, trains, ferries, etc.) (l/year or MWh/year);
- private and commercial transportation fuel consumption (l/year or MWh/year).

The information should be gathered in the form of tables and diagrams like the ones in the building sector:

Table 2 Example for energy presenting – mobility sector

Mobility sector – Energy (MWh)					
Category	Petroleum	Diesel	Electricity	LPG	SUM
Public sector fleet					
Public transportation					
Private and commercial transportation					
SUM					

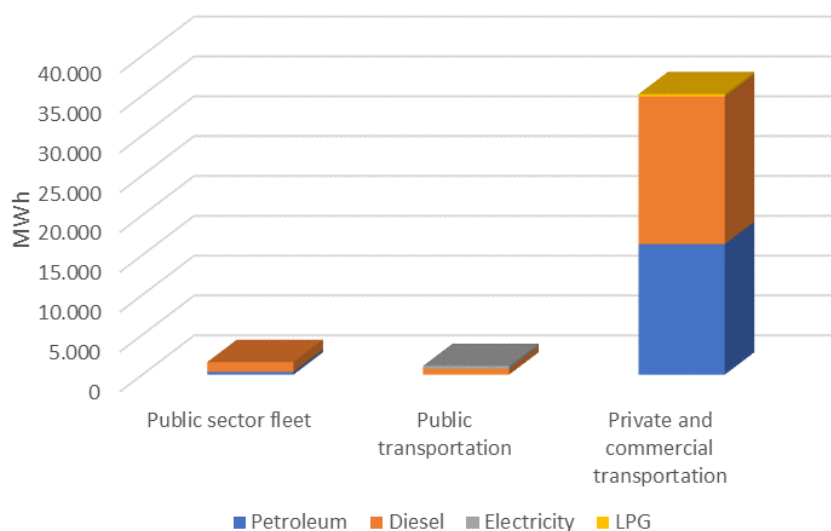


Figure 2 Example for energy presenting – mobility sector

The public sector is keeping track of its vehicle fleet, and so are the public transportation providers. In the case of private and commercial transportation, a local police station should be contacted and asked for information on the number of registered vehicles by class and fuel. Search local and country statistics for the distance (in km) a particular class of vehicle has passed and multiply it by the fuel consumption (l/km) per class and fuel type of the vehicle. Such documents also contain conversion factors that must be used to transform l or m³ of fuel to MWh.

2.1.3 Public lighting

The electricity distributor has information about the electricity consumption of public lighting, while the municipality should have more detailed information about its state.

2.1.4 CO₂ emissions calculation

To calculate the CO₂ emissions, emissions factors are used. Those are coefficients that quantify the emission per unit of energy. The emissions are estimated by multiplying the emission factor with corresponding energy data. If the country has its official document where specific emission factors are specified, that data should be used. If there is no such document,

a recommended source is the CoM Default Emission Factors for the Member States of the European Union¹.

Once all the emissions are calculated, they should be presented as follows:

Table 3 Example of CO₂ emissions presenting

Fuel	Emission, t CO ₂				%
	Mobility sector	Public lighting	Building sector	Sum per fuel	Percentage of total emission %
Diesel					
Petroleum					
LPG					
District heating					
Electricity					
Wood pellets					
Natural gas					
SUM					
Percentage of total emission %					

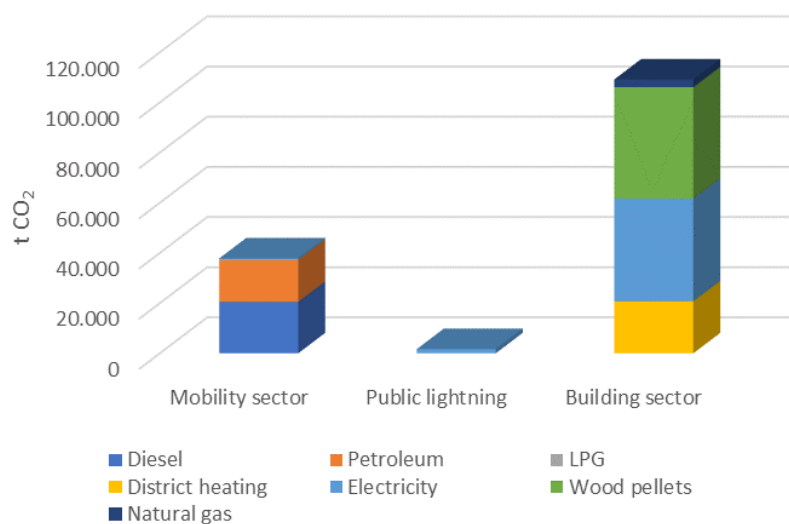


Figure 3 Example of CO₂ emissions presenting

¹ https://www.covenantofmayors.eu/index.php?option=com_attachments&task=download&id=326



3 Sector mapping

Sector mapping should be done parallelly with collecting data for the BEI; thus, the examples will follow the sectors presented in the BEI. It should not be forgotten that the BEI and, therefore, the sector mapping do not have to be restricted to only those three sectors. The gathered data should be analysed as it is received.

3.1 Building sector

When receiving data for the building sector, the average energy consumption per m² should be compared to the latest building regulation. If the consumption is higher than prescribed, the reason for it should be determined so that the measures can be planned accordingly. Key factors that could cause the higher energy consumption of buildings should be studied, such as performance of the building envelope, efficiency of the equipment used for heating and/or cooling, etc.

It is recommended that energy production is also analysed here, that is, the possibility of introducing renewable energy sources, and the locations best suitable for that, both for heating and electricity production.

3.2 Mobility sector

The data gathered for the mobility sector shows the percentage of the population possessing private cars and how many alternative fuel vehicles are in the location. What should further be analysed is to what extent are the private cars used, and search for the solution to lower that amount. Some ways to do that are to improve public transport and bicycle infrastructure or educate people on the matter. If there is a need to increase the number of alternative fuel vehicles, the reasons behind this should be investigated and addressed. Do the citizens have the financial ability to buy such cars, are there enough charging stations, and what is the overall image of alternative fuel vehicles in the location? Depending on the results, local/regional authorities will have it easier to decide what measures will bring faster results.

3.3 Public lighting

Although public lighting does not have a significant percentage in the consumption of the city or region, its state should be analysed. Ensuring that the new LED lighting is installed can reduce energy consumption and also reduce light pollution. Other possibilities to reduce energy spent on lighting should also be considered, such as solar-powered lighting, turning off public lighting in some streets late at night, etc.

4 Stakeholders mapping

For big and vital plans to be successful, the local/regional authority should aim for the actual involvement of all different types of stakeholders throughout the process: from the development of the Roadmap, through the implementation phase to the re-evaluation phase. Only that way can the shared vision for the future and paths that will make the vision come true be established.

Their participation is important for various reasons²:

- a decision taken together with many stakeholders is based on more extensive knowledge and quality-controlled data, which fosters a more ambitious and realistic Roadmap;
- broad consensus improves the quality, acceptance, effectiveness, and legitimacy of the plan (at least it is necessary to make sure that stakeholders do not oppose some of the projects);
- A better-anchored Roadmap has a higher probability of being implemented since both vision and measures are influenced by and supported by a wide range of stakeholders in the region;
- Dialogue between different stakeholders may mitigate potential conflicts and improve cooperation, thereby increasing the implementation rate of the Roadmap;
- The process provides capacity building in the local municipality through access to improved data, knowledge, and new and innovative ideas.

The relevant stakeholders that need to be involved are the ones whose interests are affected by the Roadmap and those whose activities influence it, who have the resources and expertise required for the implementation of the measures, and whose participation is needed for successful implementation.

Following is the list of potentially essential stakeholders:

- Local/regional governance
- City/region connected companies providing communal services
- Energy/heat providers
- Academia/education sector
- Business/Industry
- Innovation community
- NGO
- General public

The following criteria might be of help when choosing the actors for the taskforce²:

- Actors that are able and willing to follow the entire planning process, from the preparation of the plan to the implementation of the measures
- Actors that contribute constructively to the process
- Actors that have a network in the relevant sector
- Actors that can represent a larger variety of stakeholders from their sector

Each local/regional authority needs to decide which means of communication works best for them and their stakeholders. Too many or too long meetings will be perceived by several of the actors as “time-wasting.” Too few or short meetings will reduce the usefulness of the group or make the process perceived as rushed. Sometimes, rather than meetings, sending the taskforce members baseline emission data and drafts for commenting might be more expedient. Allowing participants to choose between different participation instruments, such as phone calls, emails, online platforms, etc, can also create goodwill and make it easier to establish a constructive dialogue. More detailed information on how to choose the taskforce and how to communicate with it during the writing of the Roadmap and during the implementation of the Roadmap can be found in the European Union Horizon 2020 project PentaHelix deliverable Pentahelix guidelines³.



5 SWOT analysis

A SWOT analysis is a valuable strategic planning tool. It comes from the private sector but has been adapted by urban planners and municipal actors. This approach includes identifying objectives, strategies, and actions to reach them. Based on the findings of the baseline review allows one to determine the Strengths and Weaknesses of the public authority in terms of climate neutrality management, as well as the Opportunities and Threats that could affect the Roadmap. This analysis can help to define priorities when devising and selecting actions and measures.

The recommendation is to include identified stakeholders in developing the SWOT analysis. Use it as a guidance tool for the CNR development as it should refer to the identified sectors, stakeholders and actions. It's powerful to have everyone engaged in the process of CNR development, discussing the core strengths and weaknesses, defining the opportunities and threats, and brainstorming ideas.

Many pages that explain the SWOT analysis process can be found online, such as <https://www.wordstream.com/blog/ws/2017/12/20/swot-analysis>.

6 Vision

Once the BEI is created, and the existing state of the city is analysed, a realistic vision for the future can be made. This chapter should highlight the owner's vision and key goals of how and why they should achieve climate neutrality and by when. Developing an infographic for the vision might help the owners to perceive their vision better and help them to present the vision to others.

Following is a suggestion of how the text in the main document could look like:

The City/Region of _____ has set itself ambitious goals for the city's/region`s social, economic and environmental development.

The City/Region is to be carbon neutral by _____. We will achieve these goals through a transition of our energy supply, building retrofits, public infrastructure and mobility, (please state other sectors you are working on) as well as other key initiatives to support the transition on both a short-term and long-term basis.

It is our vision that the ambitious goals are implemented in a way that secures and improves the quality of life in _____and creates opportunities for innovation, jobs and green growth.

The transition in _____cannot happen in one year or through the efforts of each individual stakeholder alone.

Therefore, _____ will be collaborating with companies and knowledge institutions, innovative community (state other relevant) to find new solutions to specific challenges.

7 Recommendations

After creating a comprehensive image of the location and its vision, concrete measures that will lead to Climate Neutrality must be planned. Those measures must be discussed and approved by the stakeholders involved in the process. The measures must be realistic, meaning they should not be planned only in theory, but a concrete plan of how they should be implemented should be made and agreed upon with relevant stakeholders. The local/regional authorities can choose any measure to help accomplish the Climate Neutrality Vision. Measures can, but don't have to, be taken from the National energy and climate plan⁴ or any other valid national plan and adjusted to local/regional needs and possibilities. It is essential that the measures are structured for the location and have a realistic implementation plan.

For each action, a short description must be given, containing information on how the action will be implemented. Targeted sectors should be specified as well as stakeholders that will be involved in the implementation. Finally, the expected results of the action and the due date should be presented. For the energy part of the CNR, the goals are mostly energy (MWh) and emissions (CO₂) savings. An example of how to present the action can be seen in the table below.

Table 4 Example of action presenting

Action	Short description	Targeted sectors	Stakeholders involved	Expected goals	Due to

⁴https://ec.europa.eu/info/energy-climate-change-environment/implementation-eu-countries/energy-and-climate-governance-and-reporting/national-energy-and-climate-plans_en



8 Conclusion

The purpose of the Climate Neutrality Roadmap Guide is to serve as a guidance document for developing and implementing the Climate Neutrality Roadmaps. It contains insights into where to access the needed information, exploiting the existing resources from International and EU initiatives, focusing mainly on the energy part of the Roadmap.

In the Energy Baseline chapter, the Baseline Emission Inventory was explained. Although it is up to the local/regional authorities to determine what sectors they want to include in their Baseline, a calculation for the three main sectors was given as an example. The third chapter presents the process of sector mapping. It is highlighted that it should be done parallelly with the data collection for the BEI, and examples of what should be analysed were given per sector. The following chapter is the Stakeholder mapping, a process of deciding what stakeholders should be involved in the Roadmap development, which is essential for creating a realistic and successful Roadmap. Chapter 5 explains the SWOT analysis, a helpful tool that allows one to determine the Strengths and Weaknesses of the public authority in terms of climate neutrality management, as well as the Opportunities and Threats that could affect the Roadmap. Combining all the gained knowledge during the first stages of the development of the Roadmap, in chapter 6 it is explained how to present the Vision for Climate Neutrality. After creating a comprehensive image of the location and its vision, concrete measures that will lead to Climate Neutrality must be planned. The final chapter gives guidance on determining what measures will be incorporated into the Roadmap and how to present the actions.

Finally, this document explains what is needed for specific chapters of the CNR to be written. To help the developing process, it gives some suggestions and explains some sectors in more detail. It is essential to always remember that those are only guidelines, and it is up to local/regional authorities to decide the scope of their Roadmap.