IN-PLAN

STOCK TAKE ON AVAILABLE GOOD PLANNING PRACTICES

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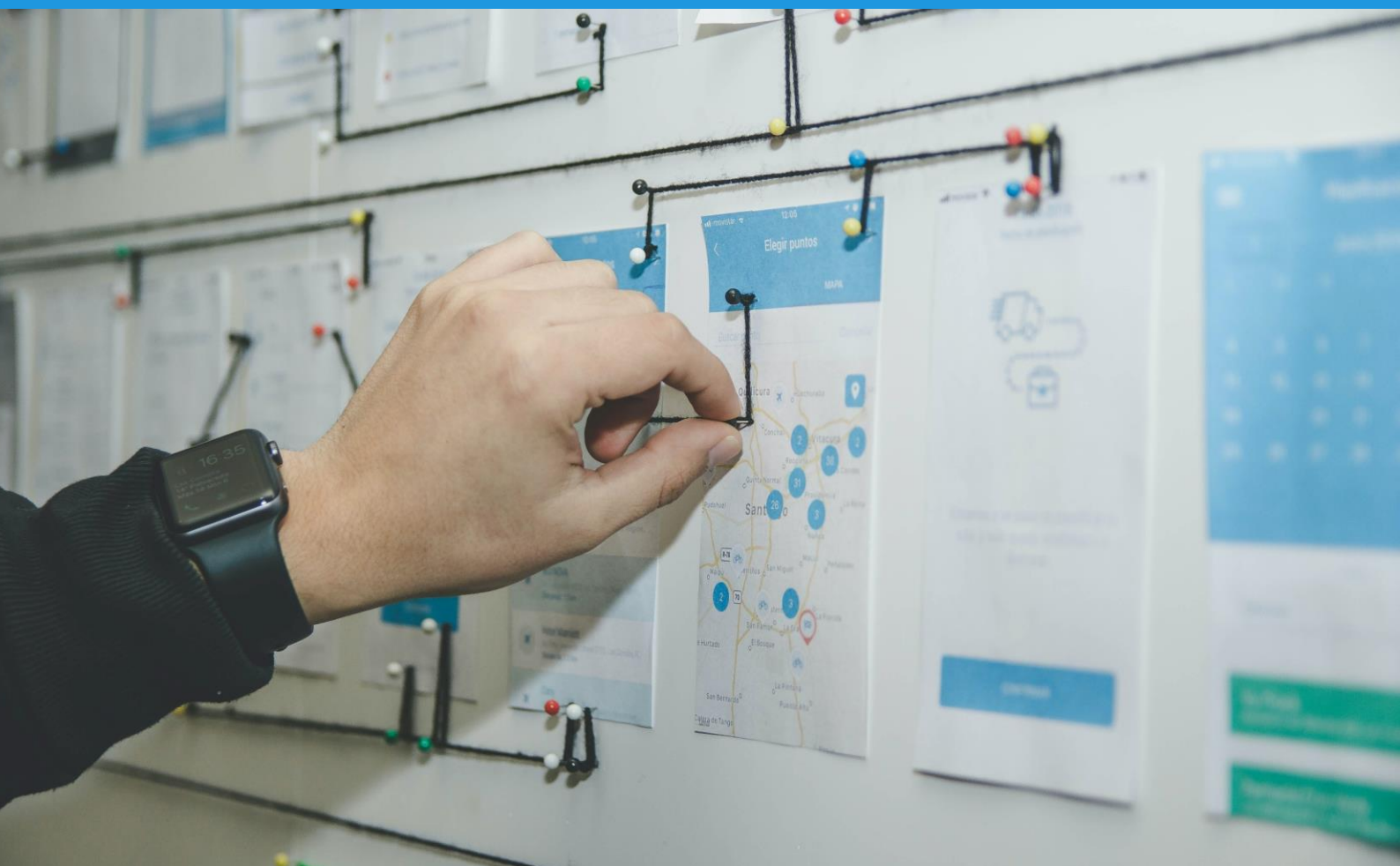

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About IN-PLAN

The overarching objective of IN-PLAN (Integrated Energy, Climate and Spatial planning) is to **develop**, **test** and **roll out** the IN-PLAN practice – a long-lasting support structure enabling local and regional authorities to effectively implement their sustainable energy, climate, and spatial plans. They aim to do so by:

- Integrating energy and climate planning with spatial planning (and other types of planning tools, such as mobility, infrastructure, etc.);
- Ensuring commitment at all political levels (through vertical integration); and
- Matching the included measures with specific dedicated local and regional budget lines.

On top of delivering this innovative and effective approach, IN-PLAN intends to empower local and regional governments and their agencies through a *two-step capacity-building programme*. From the start, the IN-PLAN consortium will engage 15 local and regional governments – the **Lighthouses** – in order to co-create, implement and refine the IN-PLAN practice, its operational guidelines and the capacity-building programme. 30 more local and regional governments – the **Pilots** – will also benefit, in part, from the IN-PLAN practice.

Once developed, the two-step capacity building will start. Phase one will aim at **training the trainers**: empowering energy, climate and/or development agencies from across Europe to become IN-PLAN **Multipliers**. Phase two will aim at passing on the knowledge to local and regional governments, the **Replicators**. They will be tutored either by the five national project partners or by the trained multipliers.

IN-PLAN's ultimate goal is to empower local and regional authorities in developing and implementing integrated energy, climate, and spatial planning in their territories.

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ABBREVIATIONS, ACRONYMS, UNITS

CoM	Covenant of Mayors
DHC	District Heating and Cooling
EEA	European Energy Award
ESCO	Energy Service Company
EU	European Union
GIS	Geographic Information System
H/C	Heating/Cooling
ISTAT	Istituto Nazionale di Statistica (Italian Nat. Inst. Of Statistics)
LWG	Local Working Group
NGO	Non-governmental organisation
RES	Renewable Energy Sources
SDG	Sustainable Development Goal
SEAP	Sustainable Energy and Climate Action Plan
SECAP	Sustainable Energy and Climate Action Plan
SMART	Specific, Measurable, Achievable, Realistic, and Timely
SUMP	Sustainable Urban Mobility Plan

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EXECUTIVE SUMMARY

Integrated planning has gained increasing relevance to tackle complex planning challenges and facilitate the local implementation of actions to meet energy, climate and sustainability targets. Achieving the EU objectives to become climate neutral by 2050 and enabling a just and inclusive transition requires bringing together all key actors, including local and regional governments, citizens, academia, and businesses. Integrated spatial planning is now a "key agent" and a driver for implementing transformative processes and (innovative) actions and for a better management and implementation of economic, social, cultural and ecological policies of a territory. Furthermore, integrated plans allow all people to be supported and also include those most vulnerable to sustainability challenges.

This report introduces an integrated vision for energy, climate, mobility and spatial planning and takes stock of good planning practices to feed the "IN-PLAN practice" – a long-lasting support structure enabling local and regional authorities to effectively implement their sustainable energy and climate plans. We selected, reviewed and identified a comprehensive and tested set of instruments, practices, current standards and approaches used for spatial, energy and climate planning in European local and regional authorities. We conducted desktop research of available scientific work and other relevant information sources, such as projects funded by different EU programmes, local and EU initiatives, strategies on integrated energy and climate planning in local and regional governments and conducted interviews with integrated spatial planning experts. We did so to define the building blocks for the IN-PLAN practice, covering quite a wide range of different territories and approaches to identify sources of inspiration and practical guidance for local and regional governments, who play a vital role in the fight against climate change in the European Union. The report also identifies learnings to the use of integrated planning, and draws 6 key steps (Figure 1) to success that we recommend to local authorities and urban planners to implement a successful integrated planning approach:

- **Create a governance structure and governance plan** to ensure vertical and horizontal cooperation;
- **Assess the local context for opportunities and barriers**: Review existing plans and legislations to ensure consistency;
- **Engage stakeholders and citizens from the very beginning:** Create an engagement and implementation strategy to ensure a common strategic vision and common use of planning instruments and tools;
- **Use data:** Define a data collection and management plan to ensure consistency, reliability and accessibility of data;
- **Create the plan**: Develop a flexible action, monitoring and continuation plan to ensure compliance and impact;
- **Implement high resolution spatial plans, adopt good practices and use innovative planning-support tools** to support common understanding, aid in visualising the goals and foresee the challenges and opportunities.

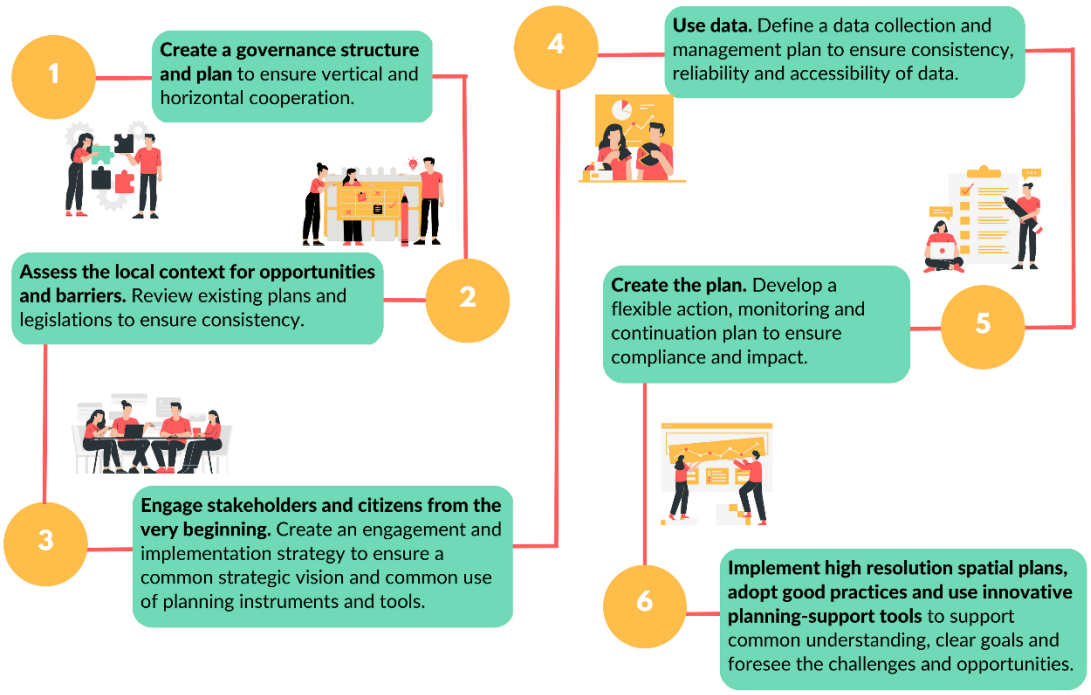


Figure 1 - The six recommendations for a successful integrated planning outcome

1. Introduction: an integrated vision for energy, climate, mobility and spatial planning

Integrated planning has gained increasing relevance to tackle complex planning challenges and facilitate the local implementation of actions to meet energy, climate and sustainability targets. The present deliverable introduces an integrated vision for energy, climate, mobility and spatial planning and takes stock of good planning practices. The results will feed the "IN-PLAN practice" – a long-lasting support structure enabling local and regional authorities to effectively implement their sustainable energy and climate plans by:

a) integrating energy and climate planning with spatial planning (and other plans, such as mobility, infrastructure, etc.);
b) ensuring commitment at all political levels (through vertical integration of governance);
c) matching the included measures with specific dedicated local and regional budget lines to guarantee the necessary resources to actually implement the plans.

The deliverable provides a comprehensive, tried and tested set of instruments, practices, and approaches used for energy and climate planning in European local and regional authorities. We review current standards and good practices across the EU in terms of integrated planning, including available scientific work and other relevant information sources, such as local and EU initiatives, practices, methods, approaches and strategies on integrated energy and climate planning in local municipalities based on desktop research and interviews with integrated spatial planning experts. The report also identifies learnings to the use of integrated energy planning and draws key recommendations.

1.1. The concept of integrated energy, climate, mobility and spatial planning

Spatial planning is an enabling practice for local and regional governments to outline their development pathways, defining and setting restrictions for land use and development with strong links to economic, social, cultural and ecological policies. It is a multifaceted and interdisciplinary planning approach including scientific, administrative and policy aspects all contributing to balanced regional development guided by a strong overall strategy[1]. To achieve a balanced, sustainable and resilient development, in line with EU policies and long-term objectives, integration with energy, climate and mobility issues is of the utmost importance. There is though still a misalignment between spatial plans and the other kinds of plans due to the lack of a binding legal framework applicable to energy, climate and mobility planning, which is so far based on a voluntary commitment to achieve the EU climate and energy targets. The IN-PLAN practice is therefore meant to provide tools to local governments to support them in meeting the challenge of the integration of energy and climate objectives into local steering and planning documents

[1] *The paper issued by the 6th Conference of the Council of Europe of Ministers responsible for spatial planning (CEMAT): https://www.coe.int/en/web/conference-ministers-spatial-planning/6th-cemat.*

adopting a holistic and innovative approach. Indeed, only a holistic approach transversal and pervasive in all the local plans can make city policies converge into a single objective and contribute to the Fit for 55 Package objectives.

The EU itself has no general competence in the field of spatial planning; there are in fact a variety of spatial planning practices and policies adopted in the Member States rooted in their respective planning customs and traditions. While spatial planning responds to a specific set of national binding rules, Sustainable Energy and Climate Action Plans - SECAPs are still voluntary schemes and Sustainable Urban Mobility Plans - SUMPs are mandatory only in some countries and often only for larger cities, with limited binding targets and incentives to reach them. Moreover, besides generic recommendation for considering all relevant plans an integrated and holistic approach is still missing. Spatial plans, SECAPs and SUMPs responsibilities lie within different municipal and regional departments, which usually work with a "silos" mentality hindering cooperation and integration. The lack of a systemic and shared approach makes a good monitoring of implemented measures difficult to perform and it hinders an appropriate matching of funds in order to reach more ambitious strategic targets to support the energy transition and climate protection goals.

Integrated spatial and energy planning can also be seen as a means to reach sustainable development goals, in particular SDG 7 – clean and affordable energy but also to some of the targets of SDG1 – no poverty, SDG6 – clean water and sanitation, SDG8 – decent work and economic growth, SDG9 – industry, innovation and infrastructure, SDG11 – sustainable cities and communities, SDG12 – responsible consumption and production, SDG13 – climate action, SDG15 – life on land[2].

1.2. Tools and approaches for integrated energy, climate, mobility and spatial planning: literature review and experts contributions

1.2.1 A little bit of history

The review of the evolution of the spatial and energy planning integration is identified in the work of De Pascali et al., 2018[3]. According to the study, the relationship between urban characteristics and urban energy system has been studied since the 1970s. In fact, the first time that the urban energy aspects were considered was during the first energy crisis, dating back to the 1920s. The study "The Cost of Sprawl"[4] represents the first study of the settlement density to energy consumption relationship. The

[2] *Stoeglehner, G. Integrated spatial and energy planning: a means to reach sustainable development goals. Evolut Inst Econ Rev* **17**, *473–486 (2020).*
[3] *De Pascali, Energy Transition and Urban Planning for Local Development. A Critical Review of the Evolution of Integrated Spatial and Energy Planning, (2018).*
[4] *Real Estate Research Corporation. The Costs of Sprawl: Environmental and Economic Costs of Alternative Residential Development Patterns at the Urban Fringe; U.S. Government Printing Office: Washington, DC, USA, 1974*

study analyses the city sprawling effect, and its influence on energy and environmental aspects. Following this work, Knowles et al.,[5] demonstrate the harmony between better urban environmental conditions and quality of life. The first relationship between energy and urban spatial planning was defined by Owens et al.,[6] who elaborates the two-way relationship between energy and the "physical-functional" organisation of the city. The study highlights the need for a systematic approach and urges not to think about energy as a sectoral issue without considering the urban texture and urban development, mobility and transport, the distribution of urban activities. Thus, for the first time the idea of energy as a mean to pursue better urban living conditions, land use, and environmental protection and valorisation emerges. From the end of the 1980s to the early 1990s, the general conceptual framework of the importance of energy and spatial planning integration starts to be defined, and from the 1992 Rio Conference, also the issue of greenhouse gas emissions and local pollution starts to appear in the international agendas. Since then, the theoretical framework of the integration concept has grown significantly, however not always translating into the daily urban planning processes.

A clear example of this disfunction is seen in Italy: in 1988 the Italian government has introduced by Law No. 10/1991[7] , two mandatory territorial energy plans, the Regional Plan (at strategic level) and the Urban Energy Plan (at municipal level). The Urban Energy Plan was supposed to be integrated in the main City's Urban Master Plan (in Italian: "Piano Regolatore Generale"). However, due to the ambiguity of the law, the Urban Energy Plan was interpreted as a separate plan. This separation resulted in a separation of responsibilities between the local authority's departments, that have different political responsibilities, views, and powers. The consequence of this was a downfall of the Urban Energy Plan that was perceived as the weaker of the two and lost its potential effectiveness. Today, according to the Italian National Institute of Statistics (ISTAT), only 38% of Italian municipalities adopted the plan, and without proper integration or interconnection with other ordinary planning instruments, these plans have become outdated. Since 2012, there has been no information about these plans, their upgrade or monitoring.

However, in recent years, with the Covenant of Mayors initiative, the Sustainable Energy Action Plans (SEAPs) have been replacing the municipal Urban Energy Plans. Under National and European incentives and investments connected with the initiative, most municipalities have transformed their Urban Energy Plans into SEAPs (and some into Sustainable Energy and Climate Action Plans - SECAPs). The initiative has got huge interest with thousands of municipalities adopting these plans. However, despite the enormous success and relatedness to the sustainable development of territories and cities, environmental protection, social and behavioural change, and economic development, some negative elements of the SECAPs still remain. For instance, local authorities still have scarce comprehension of the complexity of sectoral interaction. It seems that SECAPs still miss the opportunity to translate energy, climate and environmental policies into ordinary spatial planning instruments because of mono-discipline and sectoral-based views (the so-called "silo mentality"). For instance, it fosters to see energy

[5] *Knowles, R. Energy and Form: An Ecological Approach to Urban Growth; MIT Press: Cambridge, MA, USA, 1974; ISBN 0262610256.*
[6] *Owens, S. Energy, Planning and Urban Form; Pion Limited: London, UK, 1986; ISBN 0850861187.*
[7] *Legge 10/91. Available online: http://www.fire-italia.org/prova/wp-content/uploads/2015/04/termotecnica1.pdf (accessed on 15 January 2018).*

as a final product rather than a derived component of the urban form, structure, organisation, management, and synergy with other urban elements and systems. Sometimes different levels of regulation, plans, and policies without proper coordination can reduce the potential effect or even cause conflict between the SECAPs and other municipal plans.

1.2.2 Some approaches and solutions from literature

One key element is to define the horizontal governance structure, that is to improve the collaboration and coordination between the different departments of the local administration, which is crucial to integrate energy, climate and environmental policies and plans. To define responsibilities and address the fear or incapacity of departments to deal with complex and uncertain energy, climate and environmental situations in an integrated way. Purkarthofer et al.,[8] suggest that this step involves negotiation, cooperation, coordination, and mutual learning, decision-making, and agreements. Integrated spatial planning requires vision and the integration of different political agendas, activities and actors that leverages the demand for organisational strategies and management procedures. It is a prerequisite even before the engagement of relevant territorial stakeholders. A successful example of this was seen in Norrköping, Norway, with the construction of the Inner-City Harbour. A coordination group was made with multiple municipal departments and territorial stakeholders, considered key actors for the integrated planning and administrative management in relation to the Inner-City Harbour. The group had different interests, ambitious, and agendas, and required coordination. In this, the municipal planning department became the anchor for mobilising and providing directions and guidance to the working group. Each public and private body was given the chance to express their interests and how they would meet the required planning standards. In this way, the collaboration between the bodies was encouraged, as well as constructive competition, negotiation, and coordination.

Another key factor highlighted by Van Straleen et al.,[9] is to define a vertical governance structure. A successful example of this is seen in the Netherlands. The Dutch have twelve provinces, which are considered institutionalised planning authorities. When the regional infrastructure became a planning objective back in the 1950s, the role of the provincial planning authorities increased significantly (although the national government still retained dominant power). During the 1990s, due to the decentralisation of the national responsibilities and tasks, the provinces became a mediator of national policy design and local policy implementation and gained a permanent role (as regulator, coordinator, and stakeholder) in the municipal planning projects.

As Stoeglehner et al.,[10] have described, it is not enough to define a vertical governance structure and mediators. It is important that the planning instruments at all administrative levels are consistent. A successful example is seen in Austria, where there are regional, provincial and municipal spatial plans,

[8] *Purkarthofer, E. 2016. "When Soft Planning and Hard Planning Meet: Conceptualising the Encounter of European, National and Sub-National Planning." European Journal of Spatial Development 61.*
[9] *F.M. Van Straleen, The Concept of Integration in Spatial Planning: An Exploration (2012).*
[10] *Stoeglehner, G.; Neugebauer, G.; Erker, S.; Narodoslawsky, M. Integrated Spatial and Energy Planning: Supporting Climate Protection and the Energy Turn with Means of Spatial Planning; Springer Nature: Berlin, Germany, 2016; ISBN 3319318705.*

all share the same objectives and direction, although at a different resolution. For instance, all plans strive for compactness, sustainable transport, energy transition, land use and biodiversity, green infrastructure, etc. and follow the objectives defined by the spatial planning laws (e.g. emission reduction objectives, etc.) in a consistent manner.

Stakeholder engagement plays a crucial role in the integration process. There are a multitude of stakeholder engagement strategies in literature. Gopking et al.,[11] defines a stakeholder engagement strategy as follows: i) definition of stakeholders; ii) design of a process of stakeholder engagement; iii) selection of data sources; iv) linking stakeholder inputs to decisions; v) ensuring transparency. Pomeroy and Douvere et al.,[12] describe the stages of the engagement process in a temporal fashion: i) a planning phase, where stakeholders contribute to the setting of priorities, objectives and their roles and responsibilities, as well as identify problems, needs, and opportunities; ii) an evaluation and implementation phase, where they define and implement their actions; and iii) a post implementation phase, where they evaluate the overall effectiveness of their actions. There are numerous methods and tools for the active engagement of stakeholders such as interviews, meetings, survey, observatories, and other data gathering methods and tools. Within the integrated spatial planning approach, many authors describe the importance of the public authority in coordinating the stakeholder engagement process that was clarified in the Norrköping Inner City Harbour example.

Rivas et al.,[13] suggests that sometimes policy and decision makers, stakeholder and citizens lack a basic understanding of the territorial systems, their interrelations and a common vision for long-term objectives. Sometimes there is the lack of data or not efficient data collection, analysis and management methods. Nowadays, many innovative planning-support tools, such as urban energy maps, environmental maps, climate maps and other spatial and temporal visualisation tools, are available to support basic understanding vision sharing and objective definitions. These tools can be of great help for the definition of an integrated spatial planning approach.

Table 1 – Learnings of the literature review

LEARNINGS
Define or improve horizontal cooperation within the municipal departments (provide guidance, define responsibilities and address uncertainties)
Define or improve vertical cooperation within different administrative levels (define a mediator, ascent as regulator, coordinator and also stakeholder)
Aim for consistency of different spatial-temporal strategies and plans at horizontal and vertical administrative levels
Engage stakeholders and citizens, and ensure a participated and transparent approach

[11] *Gopkin, Coming to the table: Early stakeholder engagement in marine spatial planning (2012).*
[12] *Pomeroy R, Douvere F. The engagement of stakeholders in the marine spatial planning process. Mar. Policy 2008;32(5):816–22.*
[13] *Rivas, S.; Melica, G.; Kona, A.; Serrenho, T.; Iancu, A.; Koffi, B.; Gabrielaitiene, I.; Bertoldi, P. The Covenant of Mayors: In-Depth Analysis of Sustainable Energy Actions Plans; Publication Office of the European Union: Luxembourg, 2015.*

Use data, innovative decision making and planning support tools to ensure common understanding and vision sharing

2. Capitalisation of results of previous initiatives and EU funded projects

After years of being regarded as a regulatory tool, spatial planning is now a key agent in delivering better places for the future and a driver for a better management and implementation of economic, social, cultural and ecological policies of a territory.

The main goal of spatial planning may be indicated in the achievement of territorial sustainability and balanced regional development guided by an overall strategy. This goal defines the general and prospective role of spatial planning in a modern and aware society: spatial planning represents the appropriate institutional, technical and policy context for managing the territorial dimension of sustainability, in economic, social and environmental terms.

To ensure sustainable and resilient development, spatial planning shall be integrated with energy, climate (SECAP) and sustainable mobility (SUMP) plans for an improved territorial governance contributing to shared EU goals.

The increased attention to integrated planning as a powerful tool to reach the EU goals set in the Green Deal is witnessed by the numerous and diverse projects, funded by different EU programmes, working from different perspectives on this topic. A non-comprehensive list of some of the more significant is presented in the following paragraphs, with the aim to identify actions, good practices and outputs as building bricks for the IN-PLAN practice, meant to guide local governments in the integration of energy and climate objectives into local steering and planning documents.

2.1. Contribution from different European initiatives and EU funded programmes

The EU is planning to reach highly ambitious achievements in the next 30 years as per the objectives set in the Green Deal for climate and environmental action and for the financing and inclusiveness of the transition. There is a number of instruments in terms of initiatives, awards and funding programmes which have been, are and will be made available in order to support climate action, facilitate the transition and the achievement of the set targets, but also to raise awareness and to strengthen the skills of the involved governmental actors and stakeholders.

Among the several existing initiatives to be mentioned, the EU **Covenant of Mayors (CoM)** was launched back in 2008 with the ambition to gather local governments voluntarily committed to achieving and exceeding the EU climate and energy targets. The initiative now gathers 10 000+ local and regional authorities across 57 countries drawing on the strengths of a worldwide movement and the technical and methodological support offered by dedicated offices. The adoption and

implementation of SECAPs is involving many members of the CoM. More than 10 000 cities have signed the European Covenant of Mayors and in their pledges commit to action to support the implementation of the EU 55% greenhouse gas reduction target by 2030 and the adoption of a joint approach to tackling mitigation and adaptation to climate change.

Awards are also a good tool for local governments to develop and implement their climate and energy policies and contribute to raise awareness and commitment. In particular, the **European Energy Award (EEA)** is a quality management and awarding system for municipalities and regions. It supports local authorities in establishing interdisciplinary planning approaches and implementing effective energy and climate policy measures. It provides guidance for local authorities in allocating their resources to achieve optimum efficiency in their measures. The EEA has been continually developed by municipalities and experts on the local level since 1988 and it has been working in synergy with other initiatives such as the CoM in the framework of several EU funded projects to ensure consistency and a wider impact. The initiatives which have been awarded represent a significant collection of good practices to be considered in the development of the IN-PLAN practice.

Another relevant initiative, which sees the participation of 4 IN-PLAN Lighthouses, is the **Mission "100 Climate-Neutral and Smart Cities by 2030"**, launched by the EU as part of the Horizon Europe programme, the objectives of the mission are to achieve 100 climate-neutral and smart European cities by 2030 and to ensure that these cities act as experimentation and innovation hubs to enable all European cities to follow suit by 2050. Climate neutrality "refers to the idea of achieving net zero greenhouse gas emissions by balancing those emissions, so they are equal (or less than) the emissions that get removed through the planet's natural absorption", according to the definition by the United Nations Framework Convention on Climate Change.

Further initiatives stem from previously EU funded projects, such as the **CELSIUS** hub, a demand driven collaboration hub for efficient, integrated heating and cooling solutions supporting cities in their energy transition to carbon-neutral systems. Focusing on cities' needs, through the forerunner groups, it connects its members to exchange on climate and environmental policies, foster innovation, leading to solutions that accelerate sustainable development in Europe and across the world. The initiative also provides the **Celsius Toolbox**, gathering technical, economic, social and policy expertise. The initiative covers all aspects related to the energy transition such as business and finance, policy and planning, stakeholders' engagement, and technical solutions.

The following sections highlight several projects funded by the EU Horizon 2020 research and innovation programme. These projects present relevant tools and insights for the development of the IN-PLAN practice.

2.1.1 Sustainable Integrated Multi-sector PLAnning

SIMPLA[14] was a project financed by the EU's Horizon 2020 research and innovation programme. The main objective of the project was to support local authorities of small and medium sized municipalities

[14] *Project SIMPA Website :* http://www.simpla-project.eu/en/.

to harmonize their *Sustainable Energy and Climate Action Plans (SECAPs)* and *Sustainable Urban Mobility Plans (SUMPs)*.

In a local authority, energy, transport and mobility are typically managed by different departments, very often with limited horizontal cooperation. As a result, local authorities often come up with individual separate sectoral policies and measures that lack common strategic vision and have poorly coordinated planning tools. SIMPLA offers a methodology in terms of guidelines and training, to lead the harmonisation of SECAP's and SUMP's policies and measures. The areas that need to be harmonised are at the level of: i) the strategic vision; ii) the definition of common methodologies and indicators; iii) the engagement of common stakeholders; iv) the adoption of harmonised climate neutrality and climate resilience actions; v) the monitoring and controlling process. SIMPLA suggests adopting four operational principles for the harmonisation process: i) to have a shared vision by all departments; ii) to cooperate between the departments; iii) to have leadership – a single, qualified and capable project manager; iv) to use project management techniques – defining a work plan, tasks, milestones, and steps.

According to the SIMPLA guidelines [15], the harmonisation process must have an initiation, which includes: i) a political commitment, to inform the mayor, allocate adequate human and financial resources, to appoint a project manager, to formalize the process; ii) set up a harmonisation team, to summon a kick off meeting and involve all relevant local authority's departments – such as urban planning, environment, transport and mobility, statistic, ICT, public procurement, etc. – and to estimate time and budget required for the process, required consultants, a common folder/database with rules for data collection, storage and updating.

After the initiation, follows the planning process that includes: iii) an initial assessment, which consists of the analysis and thorough understanding of the SECAP and SUMP (inputs, work flow, hand-offs, …, opportunities, performances of measures, gaps and barriers), the relevant legislation and plans (urban development, traffic, regional plans), and the sources of information including data availability, reliability, completeness, accessibility, consistency); iv) the involvement of partners and stakeholders, by defining their roles and responsibilities beforehand, before recruitment. Some techniques for stakeholder involvement are interviews, questionnaires, focus groups, advisory boards, workshops, reviews, and role play; v) the draft of the work plan, that should encompass all the objectives and targets, with a clear structure that facilitates their monitoring. In summary, the work plan should identify the areas of harmonisation, determine the goals and objectives and organise them according to the SMART principle, list the resources, identify the constraints, define who is accountable, list the specific actions steps, and create a schedule. A Gantt chart is advisable.

Following the planning phase, the harmonisation process moves to the implementation phase, which consists of: v) the harmonisation of the vision, a strategic vision taking into account the views of stakeholder and main territorial actors, and provide an overarching common orientation for policies and measure comparing both plans; vi) to share common data sets, data collecting methods (especially for BEI/MEI), contacts, site links, by creating a common data repository and common standards for data collection and storage, and assuring also relevant support from stakeholders for data gathering. All

[15] *Project SIMPLA Deliverable: Guidelines for the Harmonization of Energy and Sustainable Urban Mobility Plans.*

departments should have access to the repository; vii) to harmonise the actions, reference years and monitoring timeframes, looking for synergies and correlations between the actions, and integrating additional measures if needed; viii) to formally approve the plans, after the end of the harmonisation process, the revised SECAP and SUMP should be submitted for approval by the City Council.

Once the implementation of the plans has begun, it is important to monitor and control it. This phase includes: i) an assessment of the progress of harmonisation, that should be done by a self-assessment questionnaire, a check with decision makers and stakeholders, and the drafting of a harmonisation report with the lessons learned. The monitoring takes part in parallel to the implementation process and has as the main purpose the identification of potential issues ahead of time in order to take corrective action. In this phase, it is also important to monitor if the time schedules, the costs, the quality, and the stakeholder communication processes are being respected.

Finally, the last phase of the harmonisation process includes its updating and continuation, that is a joint review of the plans. The main goal is to assess the achievements in terms of broader impact of the measures, of the planning process, the lessons learned, and the objective not reached, as well as communication with stakeholders. It can be done by participatory observation, focus groups, ad interviews and should deliver a final report. The idea is that each planning cycle improves the expertise and effectiveness of the next planning process.

Table 2 - Learnings of the integrated planning approach from the SIMPLA project

LEARNINGS
Set up a well-coordinated and formalised **internal team** with a shared vision
Study the **territorial assets, problems and opportunities**
Create an **engagement strategy**, engage stakeholders and define roles, responsibilities and expectations
Determine the **data collection and management methods**
Define a **flexible, shared and procedural work plan** to meet the objectives

2.1.2 Urban Learning

Urban Learning[16] is a project financed by the EU's Horizon 2020 research and innovation programme. The main objective of the project was to mainstream and institutionalise integrative energy planning within the city administrations of Vienna, Amsterdam, Berlin, Paris, Stockholm, Warsaw, Zaanstad, and Zagreb in support of decarbonised local energy systems and of economically viable grids.

The project aimed to increase knowledge and build capacity by supporting the dialogue process between disciplines and departments, promoting peer-to-peer learning within and between the cities' administrations, and institutionalising learning within each city's administration. The workflow of this

[16] *Project Urban Learning Website:* http://www.urbanlearning.eu/.

activity was done in steps: i) formation of an interdisciplinary, cross-departmental local discussion groups (Local Working Groups - LWGs), typically composed of 10-20 members of different municipal departments related to urban development and planning, land use and district planning, infrastructure, energy, construction, housing, mobility, and green space; ii) transfer of knowledge about low-carbon urban energy systems and energy planning by external expertise; iii) in depth analysis of governance processes for planning (planning phases, stakeholders, instruments, tools, frameworks); iv) identification of possibilities to integrate energy planning and urban learning that included a screening and development of proposals; v) development of a step-by-step action plan; vi) realisation of activities; vii) transfer of experiences with other cities that faced similar issues.

For what concerns the planning process, it was found that the legal basis for spatial planning is almost always of national jurisdiction whereas the responsibility for urban planning is in most cases at the city level. The key planning instruments are: i) the strategic urban planning/urban development plan, a document that steers land uses (zoning) and city development; ii) plans and concepts on borough level, for districts and quarters; iii) planning instruments at property/parcel level, which are the zoning plan and/or the building regulation plan. Generally, the urban planning processes are similar between cities, with differences that reflect various local specificities and details, and include: i) preparatory planning phase; ii) feasibility studies and master planning; iii) formal planning phase (zoning); iv) design and implementation phase; v) operational phase. Regarding the instruments and tools currently used in urban planning processes (related to energy consumption), the most relevant instruments are regulation (law-binding), and strategic documents (binding by political commitments), whereas the tools are data-based tools (such as energy maps and energy databases) and building land and monitoring systems. The instruments and tools are usually at city level scale, rarely at quarter or building scale.

The gaps identified in the assessment showed that: i) the energy aspects (particularly related to the supply of heat) are not integrated in the urban planning process; ii) the planning processes are strongly linked to legal and strategic frameworks, cultures, and traditions; iii) the legal and strategic framework need to be upgraded for better integrative planning; iv) data and models are weakly managed and used; v) often there is no continuity of the processes until realisation; vi) monitoring of the outcomes is often not done.[17] [18]

Table 3 - Learnings of the integrated planning approach from the Urban Learning project

LEARNINGS
Set up **interdisciplinary and interdepartmental focus groups**
Study and share knowledge about local problems and possibilities and **understand the planning instruments**
Develop a shared and flexible **step-by-step action plan**
Share **experiences**

[17] *Project Urban Learning Deliverable: Integrative energy planning: How to support decarbonisation by integrating energy planning + urban planning.*
[18] *Project Urban Learning Deliverable: Showcasing good practices of instruments and tools.*

2.1.3 PentaHelix

The PentaHelix[19] is a project financed by the EU's Horizon 2020 research and innovation programme. The objective of the project was to empower local and regional authorities to find innovative and cost-effective approaches to develop, finance, implement and improve sustainable energy and climate action plans (SECAPs). The approach was tested in Belgium, Croatia, Latvia, Norway and Spain.

The project introduced a new approach for integrating multi-governance planning for sustainable energy, both horizontal and vertical, in close collaboration with key stakeholders in energy efficiency and sustainable energy solutions. The integrated approach was focused on five main stakeholder groups: i) public authorities (administrative representatives from municipalities, regional government, national governmental agencies) – that should have relevant knowledge and authority; ii) private sector and industry (representatives from employer's unions, chamber of commerce, and similar organisations, representatives of larger companies, and ESCOs) – to maintain the planning process neutral and equally beneficial to all parties involved; iii) NGOs (local or regional environmental organisations, unions of scientists, youth environmental organisations) – especially NGOs representative willing to constructively contribute to the process; iv) Accademia (academic or administrative employees, and researchers from local and regional centres) – to focus on the operational aspect of the planning process; v) Citizens (residents associations, employees' unions and other relevant organisations, such as inter-religious organisations, specific marginalised groups) – to perceive the process as neutral and transparent as possible, and for individuals who can contribute constructively and able to mobilise other groups of citizens.

The approach is centred on the engagement of these stakeholder groups in both the development, implementation and re-evaluation of the plan. To ensure that, a taskforce of the representatives of the stakeholder groups must be created early in the development phase. The selection of representatives should be focused on individuals or groups who are willing to follow the entire planning process, to contribute constructively to the process, who have a network in the relevant sector, and who can widely represent its stakeholder group. Some of the strategies for the creation of the taskforce from scratch is to open public meetings or meetings where a larger number of stakeholders can be invited, and to ensure the participation process is perceived as open, fair, and inclusive. A fair amount of time and resources in these meetings should be focused on youth and children (e.g: art of innovation competitions can be arranged to raise awareness and understand the needs of these groups). If some groups are harder to reach, bilateral meeting or targeted communication with specific groups should be organised. Sometimes, splitting these meeting into topics can result in wider participation because it must be kept in mind that different stakeholder groups have different interests. The importance of their participation must be shown from the very beginning. Even before of their actual involvement, their contribution in terms of knowledge, solutions, and overall added value to the planning process should be assessed. A clear and transparent strategy ideas, solutions, and data collection must be arranged. A communication strategy must be tailored to the target stakeholder group.

[19] *Project PentaHelix Website: www.pentahelix.eu/.*

Once the task force is created, regular follow-up meetings should follow, with local adaptations regarding the size and composition of the task force, the number of meetings, and the meeting agenda. It is important to allow participants to choose the preferred participation instrument, whether it is a meeting, phone calls and e-mails, or online platforms. The role and expectations within the planning process of each taskforce member should be clear. Sometimes it will be challenging to motivate a stakeholder group, thus it is important to show how important the planning process is for the region of interest, what are the benefits of taking part in the taskforce, and how their effort is appreciated. When the taskforce is ready and the topics have been mapped, targeted workshops and communication sessions must be organised accordingly. Here, the contributions of each representative and stakeholder group will be collected and will contribute to the planning process. Finally, in order to create a long-lasting taskforce that will play an important role in the implementation of the planning process, the engagement strategy should consider how to embrace changes in the taskforce representative, in the dynamics of the groups, and of changes in the work and meeting agenda.[20] [21]

Table 4 - Learnings of the integrated planning approach from the PentaHelix project

LEARNINGS
Determine the **relevant municipal departments and stakeholders**
Create a task force with relevant stakeholder groups representative
Define a participatory process plan, with roles, responsibilities, and expectations, data gathering methods, change management, and follow up strategy
Ensure support on all levels and include all key local stakeholders from the very early stages of the development and implementation of the plans

2.1.4 C-Track 50

C-Track 50[22] is a project financed by the EU's Horizon 2020 research and innovation programme. It supports local and regional authorities in long-term energy and climate planning with the aim of achieving climate resilience and carbon neutrality by 2050. The main areas of focus have been: i) multilevel cooperation - to strengthen the cooperation between EU and local, regional and national levels of governance through a series of roundtables and bilateral exchanges; ii) capacity-building - to build the technical competencies of regions and local authorities in integrated energy and climate policy planning; iii) energy and climate planning – to support the development and financing of sustainable energy and climate policy action plans at local and regional level.

One of the projects main outputs was a step-by-step guidebook for municipalities that frames the steps of the planning process to reach carbon resilience and neutrality:

[20] *Project PentaHelix Deliverable: Pentahelix guidelines.*
[21] *Project Pentahelix Deliverable: Pentahelix final report.*
[22] *Project C-Track50 Website: www.c-track50.eu/.*

1. Initially, a decarbonisation core team with a clear organisational structure, with appropriate human and financial resources, and the assignment of responsibilities based on competencies should be created. Different municipal departments must be involved, such as technical, land use and spatial planning, financial, mobility, and procurement departments. The local/regional authority may even want to establish a steering committee. The principles of multi-level governance should be embraced, which include both vertical and horizontal levels of collaboration;
2. It is critical to engage stakeholders and the public, including the private sector, civil society, and the local community. This can be achieved by developing a communication/dissemination strategy that outlines the beneficiaries and the methods of the engagement process. Of the stakeholders, the following ones must be considered: public authorities at all governance levels, civil society organisations, energy agencies, local businesses and their associations, local industry, financial institutions, private/public transport companies, energy suppliers/utilities, building companies/developers, consumer associations and academic institutes. It is especially important to identify stakeholders whose interest, activities, knowledge, resources and expertise can influence successfully the planning process. Moreover, their role, influence and impact should be assessed, and their involvement synchronised in the appropriate phases of the planning process;
3. The local context must be assessed, which includes the identification of local characteristics and circumstances, the territory's geography, environment, demography, socio-economic situation, industry, history, local/regional regulations and the energy market;
4. It is essential to review the existing local and regional plans, especially those that affect the activities, infrastructure, the urban environment and the energy consumed with the territory. Examples of such plans are Sustainable Urban Mobility Plans (SUMPs), Sustainable Energy and Climate Action Plans (SEAPs and SECAPs), Waste Management Plans, Spatial, land use management and urban development plans, and other relevant strategic local plans;
5. Once the core team is created, the stakeholder participation is secured, and the local context and existing plans are reviewed, it is time to develop a common strategic vision. This step will give direction and steer towards clear, ambitious but also realistic goals. National policies must inform and shape local/regional strategies and plans, which should reflect national, regional, and local targets, and comply with legal frameworks. A local/regional authority's vision with SMART objectives and targets should be set following this process;
6. The commitment to the vision is a necessary step to ensure the long-term compliance with the plan. Compliance is supported by decision makers and politicians who can secure the commitment is high in the political agenda;
7. An action plan should be developed that include: the local/regional authority's vision, objectives and targets; the description of the local context, and of the national, regional and local policies and plans; an assessment of the territory's greenhouse gas emissions and of climate change risks; mitigation and adaptation actions and their implementation (key steps, funding, engagement, etc.) and monitoring process.

When designing the actions, the strengths, and weaknesses of each sector should be defined, and special focus should be invested to investigate high carbon footprint or climate vulnerable sectors,

evaluating the potential impact of the actions for each sector by setting milestones/targets. Also, an estimate of the needed resources and sources of financing, as well as the responsible bodies for implementation and timetable of action should be defined. Some tips for local/regional authorities for the successful implementation of the actions are to: i) lead by example; ii) to promote energy efficiency and renewable energy action first; iii) to include the best available technologies and solutions; iv) to avoid carbon locks and maladaptation; v) to take advantage of local circumstances and strengths; vi) to reinforce the involvement of citizens and stakeholders; vii) to prevent energy poverty or inequalities; viii) to clearly define the specific roles and responsibilities of the municipal departments; ix) to undertake the preparatory work (e.g: engineering, economic, environmental studies) to turn actions into mature projects; x) to ensure compliance with the regulatory and legal frameworks; xi) to explore funding opportunities and secure funds; xii), to closely monitor (and produce monitoring assessments); xiii) to periodically update and improve the actions (the action plan should be a living document, flexible enough to accommodate modifications as needed)[23].

Table 5 - Learnings of the integrated planning approach from the C-Track 50 project

LEARNINGS
Define a **formalised internal interdepartmental and multi-governance group** with well-defined roles and responsibilities, and a group leader or steering committee
Create an **engagement strategy** for relevant stakeholders and citizens
Assess **the local context, the assets, problems and opportunities**, as well as the relevant **planning instruments**
Define a **common vision** and develop a **flexible and commonly shared action plan** with roles, responsibilities, and expectations

2.1.5 CityZen

CityZen[24] is an Interreg Europe project that supports urban farming policies and practices. The notion of urban farming is relevant to integrated spatial planning because its practices provide solutions for sustainable, climate neutral and resilient cities, as well as additional benefits such as local food production or restoration of urban sites. However, land and space in cities are limited and often other planning and infrastructural projects are preferred, such as public parks, kindergartens, playgrounds, sport facilities, residential and office buildings. Urban farming, therefore, necessities of smart and innovative solutions and changes in regulations. Some of the solutions to circumvent the urban land availability issues suggested by CityZen are vertical and rooftop gardens, brownfield greening, and the multifunctional use of sites.

[23] *Project C-Track 50 Deliverable: Guidebook for Achieving Carbon Neutrality by 2050.*
[24] *Project CityZen Website: https://projects2014-2020.interregeurope.eu/cityzen/.*

Urban farming has the potential to make cities more sustainable and aware of the use of its resources such as land, space, water and energy since urban farming often relies on practices for the better management of these natural assets. Urban farming can also be a social safety net that supports vulnerable communities and promotes education, increase resilience to climate change, and reduces inputs of energy and water resources. It can restore the city areas that are unused or contaminated by industry or landfills. In these cases, urban farming can promote soil remediation and site development. Urban farming can increase food supply when is scaled up into a business model. It can also create value chains and networks of actors as it can directly connect growers, consumers, citizens and resource, more sustainably than other farming models. Since more than half of the food wastage happens at the retails, storage and consumer stage, urban farming provides a solution to food waste since it shortens in the supply chain the time the food is produced to the moment it reaches consumer. In addition, urban farming is strongly connected with composting practices and fosters innovative management of food waste.

For the successful planning and implementation of these solutions, the CityZen project finds that the role of policy makers is crucial. Policy makers need to: i) provide better access to municipality owned terrains and rooftops; ii) mainstream application and rental procedures; iii) provide incentives to urban gardeners, such as long-term rental contracts, and better access to farmers' markets; iv) collaborate with innovators for the design of vertical gardens; v) communicate with citizens and stakeholders to promote the use of urban sites for urban farming practices.

The project outlines some of feedbacks from stakeholder groups of what is the most demanded support for the urban farming activities. Some of these are: i) a better access to plots in urban areas; ii) small grants to launch urban gardens; iii) rental schemes for basic infrastructure; iv) free access to farmer's markets to urban gardeners; v) tax reductions for commercial urban farming; vi) free use of water and electricity for the gardens; vii) vouchers for advisory and technical services; viii) need of regulation on urban farming; ix) creation of trade and donations platforms; x) support of innovative business solutions; xi) promotion and incentives for the use of existing innovative solutions and systems; xii) the mapping of public or private buildings suitable for rooftop gardens; xiii) public procurement activities of fresh products[25].

Table 6 - Learnings of the integrated planning approach from the CityZen project

LEARNINGS
Adopt **smart and innovative tools and models**
Strive for **political support, changes in regulations, and financial support**
Promote **awareness, transparency, and equality**
Strive for the **sustainable use and awareness of the territory resources and assets**

[25] *Project CityZen Deliverable: Urban farming policies and practices.*

2.1.6 CITIESMULTIPLY

CITIESMULTIPLY[26] is a project financed under the European Union's Horizon 2020 research and innovation programme. The aim of the project was to encourage local authorities to combine elements of sustainable transport, energy and spatial planning by an integrated planning approach. The project selected cities with previous experience in integrated spatial planning (forerunner cities) and cities with no previous experience but with the ambitions to pursue integrated spatial planning (committed cities). After the selection process, a peer-to-peer learning programme was launched, in order to share experience and build capacity.

Forerunner cities, who had already implemented sustainable energy, transport and mobility, and land-use planning measures, shared their expertise and experiences, participated in targeted workshops, helped gather model solutions and guidelines, and also engaged in exchanges with other frontrunner cities. Here, the list of forerunner cities: Italy: Primiero San Martino di Castrozza, Ferla, Campi Bisenzio; Germany: Emmendigen, Hamburg, Halle; Poland: Piastow, Bydgoszcz, Sztum; Hungary: Budaros, Repceszemere, Szarvas; Austria: Rankweil, Perchtoldsdorf, Weiz; Sweden: Orebro, Botkyrka, Umea. The committed cities, who had a clear vision, and the ambition and potential to implement integrated urban projects but lacked the capacity to plan and implement measures. Their role was to participate in the peer-to-peer learning scheme and targeted workshops, to develop a comprehensive Plan for the energy efficient development of a model district in their territory, to share their experiences and know-how, and to engage in the learning process with other committed cities.

The peer-to-peer learning exchange included 6 national events, and 1 international event (the Big European Exchange Conference). The events that were organized in both forerunner and committed cities, were targeted at different levels of the city staff and focused on the following topics: i) peer exchange by frontrunner cities for municipal high level policy makers that covered the benefits of the cross-sectoral energy transition, the political communication, and the financing of the energy transition; ii) peer exchange by forerunner cities for technical planning staff that covered the technical aspects of energy efficiency projects, the cross-sectoral integration, the impact monitoring, and the technical peer-review of energy Plans; iii) peer exchange for the communication on enabling public support that covered the communication strategies and modern communication tools, the participatory methods, and the peer-review of communication strategies; iv) peer-exchange by committed cities on the review of the Energy Plans among committed cities; v) peer exchange at international level, an event aimed at meeting and sharing innovative approaches to cross-sectoral planning. The project delivered a comprehensive peer-learning plan that details how the event were planned and executed. Also, the project delivers an integrated energy plan template that guides the municipalities on how to develop an integrated energy plan for the energy efficient development of a model district in their territory. The planning guide includes a long-term vision, some concrete short-term implementation measures, realistic financial and communication strategies, as well as templates for the quantitative measurement of CO2-e emissions and energy saving. The plan is made in a way that can be continuously evaluated in the course of implementation and realisation. Finally, the project delivers a "MULTIPLY European guidelines", an online platform with the results and learnings of the peer-to-peer learning program and

[26] *Project CITIESMULTIPLY Website:* www.citiesmultiply.eu/.

the review of the energy plans. The objective of the guidelines is to inspire and activate other European cities to implement integrated planning solutions.

Table 7 - Learnings of the integrated planning approach from the CITIESMULTIPLY project

LEARNINGS
Learn from the **experiences of successful actors** and strive for **their support**
Create a **learning/engagement strategy** with roles, responsibilities, and expectations

2.1.7 Decarb City Pipes 2050

Decarb City Pipes 2050[27] is the first project to unite cities across Europe to work out actionable, spatially differentiated transition roadmaps to decarbonise heating and cooling for buildings in 2050. Responsible for roughly half of the EU's final energy consumption, transitioning heating and cooling to energy efficient, renewable solutions will be critical to bring EU countries in line with their pledged climate and energy targets. The project is still ongoing until 2023 and will produce further outputs.

Bilbao, Bratislava, Dublin, Munich, Rotterdam, Vienna and Winterthur are taking up the challenge of phasing out natural gas in heating. They explore pathways suitable for their local challenges and build up skills in the use of data, planning tools and instruments, techno economic as well as process and transition management knowhow. The cities that are part of the project represent a variety of profiles with differences in size, population, heat density and climatic zone and are therefore an interesting example for other EU cities. They have different existing infrastructures (from well-developed to almost-non-existing district heating and cooling (DHC) systems, for example) and different renewable energy sources at their disposal. They have different planning competences and are at different progress levels on spatial energy planning.

In a participatory process with stakeholders, they develop tangible transition roadmaps, strongly defined by local circumstances. For that purpose, each city has created a local working group comprised of relevant local stakeholders (e.g. municipality, energy utility, DSO, housing cooperatives etc.) at the beginning of the project. The methodology developed by the project is threefold: Cities first had do decide on an energy outlook, then on spatially differentiated plans and lastly will develop transition roadmaps. To develop the energy outlook, cities assessed the existing energy demand for heating and cooling, estimated the future demand and the potential of renewable energy to supply it. Techno-economic megatrends were confronted to local circumstances, to determine which solutions are the most suitable. As a second step, spatially differentiated plans were developed to determine where the different solutions are the most cost-effective for each district, depending for instance on the energy infrastructures available, the types and density of buildings, or the local energy resources. Finally, in a third step, the project cities will each define till spring 2023 in transition roadmaps how and when to implement these solutions, as well as who should be involved. The adaptation and creation of suitable legal and financial instruments will be key to succeed.

[27] *Project Decarb City Pipes 2050 Website: https://decarbcitypipes2050.eu/.*

Among the deliverables produced so far, the Guidance for cities developing H/C plans explains possible procedures for creating a Heating and Cooling Map (H/C Map) and the necessary base maps. The documented procedure in the document is based on the city of Winterthur's approach towards creating its H/C-plan. There are, of course, several other ways to elaborate an H/C-plan, depending on local framework conditions and taking into account local laws, economic aspects, building structures etc.

In the deliverable Cross-city summary H/C Plan process, the cities detail on the framework and principles used when developing their own H/C Plans (e.g. where to pursue DH extension or heat pumps, whether or not to use green gas etc.). All involved 6 partner cities aim for the full decarbonisation of the heating and cooling of the built environment. It is clear that in order to decarbonise, there is a need for heating and cooling plans to give direction to the city's transformation paths. The H/C Plan the cities made, are not final plans. New insights, innovation and more accurate data will be used to update and improve the H/C plans.

Table 8 – Learnings of the integrated planning approach from the Decarb City Pipes 2050 project

LEARNINGS
Engage all relevant stakeholders, e.g. in form of a local working group
Explore the local context to assess opportunities and barriers for the energy transition (check data availability, legal situation etc.)
First, **define an outlook** (a vision or a picture) **for your future energy system** (quantitative break-down of future renewable supply and demand).
Develop spatially differentiated heating and cooling plans, defining where to do what and why

2.2. Techniques, tools and outputs from initiatives and projects

In this section some techniques and tools are listed, as well as some relevant outputs, that have been mapped in the previously described initiatives and projects. These can add value and facilitate the integrated spatial planning approach, act as a source of inspiration or information.

Table 9 – Relevant techniques and tools from projects and initiatives

CITY/COUNTRY	TECHNIQUE AND TOOL
Amsterdam	The Energy atlas is a decision support tool that maps the city's energy consumption, network and the renewable energy potential. It's made from 90 interactive maps that can be consulted or worked with to set measures, create scenarios or make cost-benefit calculations.
Zagreb	GEOPORTAL is an online GIS tool with complete spatial and partial socio-economic data. It displays the existing and planned infrastructure systems and

	energy generation facilities, and in the future the energy consumption data will be available.
Warsaw	The Supply Plan includes assumptions for heat, electricity and gas and it is an inventory of all energy systems to help assess the current situation and to make forecasts of demand.
Paris	The EcoDistrict Label is a label certified at national level for urban development projects that meet sustainability criteria.
Stockholm	SRS model for monitoring is a web-based tool for monitoring the performance and reporting about sustainability requirements in development agreements in the Stockholm Royal Seaport.
Berlin	Energy saving partnership is a model for efficient energy contracting by which a private energy service makes the energy efficiency investments and gets re-financed through savings in the energy costs.
Berlin	Climate protection agreements is an instrument that promotes energy efficiency in housing companies based on voluntary agreements.
Jelgava	Smart City information centre – in the city of Jelgava (Latvia), a communication, information, and analysis centre was set up to facilitate the communication between the city residents, infrastructure managers, operational services, state and municipal institutions, commercial companies and the Civil Protection Commission.
Koprivnica	The Living Lab in Koprivnica (Croatia) aims to support entrepreneurs to develop, test and promote smart city products and solutions for waste management, parking, smart grid, smart city infrastructures etc.
Jelgava	*Jelgavaspilseta* is an application for smartphones that provides recommendation for improving urban environments and has many functionalities such as problem/report damaging with geolocation, emergency calls, public utility services, monitoring and reporting
Croatia	Energy Managements Information Systems (ISGE) were installed to monitor the energy and water consumption of local and regional public buildings in Croatia.

Table 10 – Relevant outputs from projects

PROJECT OR INITIATIVE	RELEVANT PROJECTS OUTPUTS
SIMPLA	Expert reviewed guidelines for the harmonisation of SECAP and SUMP
	Turn-key energy saving packages
Urban Learning	Final report summarising the project's approach, main steps and results

	Report on governance processes of urban and energy planning
	Report of instruments and tool relevant in urban and energy planning
	Report on innovative technical solutions
PentaHelix	Final project summary report
	Guidelines on barriers and drivers for SECAP development
	Report of the potential impacts of SECAPs measures
	Reports of the overall status and results of the SECAP implementation and development in the partners' countries
	PentaHelix guidelines
	Climate workshops presentation
	Guidelines for climate communication
	Report of the feedback received by pilot municipalities
	A list of developed or revised pilot SECAPs
	A set of recorded webinars, workshop and conferences.
	An implementation and replication report
C-Track 50	Final project summary report
	Guidebook for achieving carbon neutrality by 2050
	The energy planning process
	Report on existing multi-level governance models in 11 EU countries
	Recommendations report on national energy priorities in 11 EU countries
	Report on local and regional priorities in 11 EU countries
	English Summaries for Energy & Climate Plans 2050
	English Summaries for Regional Plans
	Project Fiches and Briefing Note
CityZen	CityZen e-Handbook on Urban Farming policies and practices
	CityZen action plans
CITIESMULTIPLY	Guidebook on peer-to-peer learning for integrated urban planning
	European guidelines for inspire European cities to implement integrated planning solutions
	Guidance for cities developing H/C plans

Decarb City Pipes 2050	Cross-city summary H/C Plan of 6 involved cities (individual plans are also available)
	General overview of the principles of cost modelling (supported by good practices of cities outside the partnership)

3. Capitalising on good practices of integrated plans and actions at municipal and regional level in the European Union

Local and Regional governments play a vital role in the fight against climate change in the European Union. They are directly responsible for enabling and/or enforcing the implementation of national and European legislation into practice as they directly and indirectly control the development of their territories. They are an important target for IN-PLAN and it is therefore important to identify a variety of good practices in the integration of plans developed by frontrunners local and regional governments to be looked upon as sources of inspiration and practical guidance. Presented in the following sections is not exhaustive but covers a wide range of different territories and approaches, integrated by a set of 5 interviews to European experts in plans integration.

3.1. Success stories of integrated plans and actions and the integration process told - interviews with the experts

This section details the results of the interview process of the integrated spatial planning experts. The interview script was produced in collaboration with the project partners and includes 4 main sections and 18 total questions that are summarised in Table 11. The interviewee was recommended by the project consortium as representative of a local authority that successfully managed to start an integrated planning procedure. The scope of this interview was to review some of the approaches and methods used by his/her local authority, which can be applied also by other entities wishing to start the same kind of integration process. In total, six experts were interviewed. In addition, in the sections that follow the interviews, some well-known initiatives and experiences at municipal level that are considered best practices are described.

Table 11 - Questionnaire for the interview of integrated spatial planning experts

SECTION	QUESTION
General information	What is your name and for which municipality do you work for? Can you briefly explain your role?
	What is your vision on how spatial planning in your municipality should or will look like in 2050?
	How does your municipality implement spatial planning? What is the framework and process for it? Which competencies does your municipality have, which competencies lie within a higher level of government?

	What planning approach would you like to see in your municipality? Which elements of the current planning approach should change and why?
Outline of the process	If you are, please explain in which way you are integrating energy, climate and/or environmental plans with spatial planning? Please, briefly describe the process.
	What was your role and the role of your team/department in the integration process?
	Where did the idea to initiate the process come from? Who initiated the integration process? What were the preconditions (e.g. amendment of laws etc.)?
	What documents, strategies, topics and elements were considered for the integration?
	Which steps have been taken to integrate energy/climate and/or environmental plans into spatial planning?
Stakeholder and citizen engagement	What stakeholder groups were involved and when? Were citizens involved too? Please briefly explain how you involved them.
	What key challenges did you face when engaging stakeholder or citizens?
	What were the outcomes of the stakeholder engagement?
Results, drivers and barriers	What are the results of the integration of energy, climate and environmental plans into spatial planning?
	Did you face problems within the city (or with other governance levels) and with other stakeholder groups (e.g., citizens or developers) when implementing the integrated planning approach?
	What would you do differently if you would do the integration process again?
Closing remarks	Is there anything else relevant to the study context that we did not already discuss? Is there anything else that you would like to add?
	Can you recommend another municipality and concrete person to interview about the integration process with great learnings which should be shared?
	Do you want to be informed about the outcomes of the study?

3.1.1 Experiences towards an integrated planning approach in Ireland

The first interview was with the planning officer of a County Council in Ireland (it was agreed not to disclose the name of the municipality/county) who was the project manager that oversaw the integrated spatial planning process and guided the elected representatives and executives of the County to develop the policies measures for the County's Development Plan.

In Ireland, the Planning and Development Act conceived under the EU legislation mandates that each County produce, and revisit every 6 years, its County's Development Plan. The National Planning Framework (2018) sets out the national spatial planning vision to the year 2030. Counties must comply with the National Planning Framework and with a range of other national and regional strategies and documents (in particular the new Climate Act adopted in 2022) for energy, climate, and environment when reviewing its County's Development Plan. The county's elected officials and executives have control over the County plan content but must adhere to the national plan and/or plans with higher hierarchy. The consistency within the plan is controlled by the national planning regulator body and can redirect the planning process if necessary. The national planning regulator body can comment to the plan if it does not comply with the national directions, and they can amend them. There is a very extensive set of guidelines, at national and regional level that must be looked at when reviewing the County's Development Plan (e.g. flood risk, renewable energy, urban development guidelines).

Under national legislation, which also set out roles, responsibilities, and planning instruments, the County's Development Plan is initiated for revision every 6 years and must be completed in 2 years. It is a major undertaking for the local authority. The County Council appoints a project manager that manages the work and the time schedules with the elected representatives and the executives. All the County's services (social housing, emergency services, environmental protection, flood risk management, roads and transport maintenance, etc.) are involved in the planning process. National service providers are involved too (national monuments service, national water supply services, national electrical service providers, etc.). The development of the process continues by data collection and analysis, citizen and stakeholder engagement (by social media, newspapers, meetings, webinars, etc.), and the proactive involvement of the elected representatives.

It is the national planning act that requires the County Council to consult directly with a detailed list of authorities and service providers (e.g: planning regulators, transport, electricity, and water agencies, etc.) and other stakeholders' groups, including children and schools. The communication is done via an established public participation network, as well as by direct communication of elected representatives with stakeholder groups.

A report is made at the end of each stakeholder engagement event, and later a summary of all reports is produced. This document influences greatly the planning process.

Once it is produced, the County Development Plan sets out very clear objectives and targets (e.g: sustainable transport, RES, emission reductions, urban development, etc.) that are consistent with the national objectives and targets. Indicators are set and monitored annually to control the targets are met.

Every two years a monitoring report is produced, and the County Plans are revised according to the monitoring report findings.

According to the interviewee, the planning process in Ireland is quite good, especially because there is a strong consistency from national to local level, it is very interactive and transparent, and it engages the whole community. However, this comes at the price of being a slow process (both at plan and decision-making level) and it is difficult to bring a change in a narrow time window. Also, it is sometimes difficult to effectively engage citizens and local stakeholders due to lack of interest, expertise, and long-term vision, but also due to County's lack of resources to consult with everyone. The consultation process could be improved if it had more support from national level. Remarkably, during COVID, the engagement process was done via social media, and it was noted that this turned to be a more effective approach. Sometimes during the implementation of the plan, some stakeholders or local groups put pressure for changes in the plans, which is not always good as it could undermine the integrity of the plan. It is thus very important to involve stakeholders and local groups from the beginning and to offer a sense of ownership of the plan. It is also not advisable to prepare the plan during elections. Finally, there are some issues that are unresolved at national level (e.g. guidelines on windfarms), which constrains local development plans.

Table 12 – Learnings of the integrated planning approach in Ireland

LEARNINGS
The **National Planning Framework** defines the **integrated planning process** and ensure **consistency and guidance**
Autonomy of local authorities of the planning process **under supervision by National Planning Regulator**
Clear stakeholder engagement framework defined under the **National Planning Framework**
Objectives and targets set by the **National Planning Framework**

3.1.2 Experiences towards an integrated planning approach in Italy

The second interview was conducted with the former Office Lead of an Italian municipality (it was agreed not to disclose the name of the municipality), works for the environment and territory department, and coordinated the development of the municipal SECAP. In addition, the interviewee's office coordinated sustainability policies, implemented EU projects activities, managed green procurement, made environmental audits, and organised stakeholders' engagement and communication events.

In terms of general spatial planning approach in Italy, there are 3 main hierarchical planning levels: the regional (spatial plans), the provincial (supra-communal plans) and the municipal (general urban development plans and more detailed plans of specific limited urban areas). Each region develops

several sectoral plans and regulations in the fields of spatial and urban planning to regulate different aspects and provide guidelines to subordinate institutions. Provinces and municipalities then develop new planning regulations or adapt existing ones accordingly.

More specifically, the interviewee shared that in Italy, the legislation does not impose an integrated planning instrument or integrated planning approach for the development of local plans (SECAP, SUMPs, etc.). Thus, departments and offices within the municipalities tend to work separately. As long as there is consistency with the national objectives and targets, the departments/offices control the planning process. There is no oversight of the planning instrument. More than ever, an integrated planning approach is needed with departments and offices working in a transversal manner, especially when important strategies and plans must be delivered.

The interviewee's municipality is structured in departments (urban development, environment, mobility, construction/building). When important planning instruments must be delivered, according to the integrated planning model, the municipal politicians, departments and technicians collaborate actively to set objectives and targets. In the case of the SECAP, thematic and inter-departmental working groups were established. These groups also included stakeholders and external consultants, or everyone who could potentially have relevant knowledge, experience, and data.

In the interviewee's opinion, it is important to have the participatory process going on for years, in order to establish a network of trust and regular stakeholder participation. In the case of the interviewee, the participatory process has gone on for more than 15 to 20 years, and a group of more than 400 stakeholders was formed. There were never any serious issues in regarding the participatory process, aside from some non-motivated, non-productive, non-experienced or non-competent stakeholders. It is important in these cases to have a knowledgeable municipal officer that can clear the main concepts. During COVID, the participatory process was done entirely online, which slowed and complicated the process, but enabled the involvement of a higher number of stakeholders.

The interviewee explained that it is worth taking the trouble of going through a thorough and well participated planning process. In the interviewees case, the SECAP was recognised by the Covenant of Mayors Office as the best SECAP of middle-size cities. The SECAP's working groups have retained their integrity and are still active. Many formal agreements have been signed. The interviewees city has become one of the Italian cities aiming to strive for carbon neutrality by 2030. This means the SECAP will undergo revision with the emission reduction objective of 100% by 2030. Still, according to the interviewee, support at the national level is missing, as well as financing resources, which is a strong drawback for municipalities in Italy.

Table 13 – Learnings of the integrated planning approach in Italy

LEARNINGS
Formalised and coordinated **inter-political and inter-departmental focus groups with common vision**
A **well-established stakeholder group and engagement strategy** that determine objectives and targets
Review of existing planning instruments and context analysis

3.1.3 Experiences towards an integrated planning approach in Norway

The third interview was conducted with a climate coordinator of the Viken County Council in Norway. The interviewee was responsible for the implementation of the County SECAP.

According to the interviewee, when doing spatial planning, it is crucial to focus on financial but also on climate budgets, that is, how will the spatial plan affect the carbon storage vs carbon emission ratio. It is important to set clear and measurable indicators of these budgets.

In Norway, municipalities are free to develop their local plans, as long as these plans are consistent with Counties strategies and plans. The Counties give direction and supervise the municipal planning process, to control that the planning instrument is in line with the regional/county objectives and targets and can amend on it if necessary. The process of integrated spatial planning is framed under national legislation (although regions can deviate from this) and all municipalities must abide by law. The interviewee finds that it would be better if the Counties could also impose the energy and climate standards within the municipal plans.

When plans at all administrative levels (regional, county, municipal) are made, all the departments (and external consultants) get involved. The departments consult the existing plans, usually SECAPs, mobility plans, public health and wellbeing, and agricultural plans. A plan draft is then created, which must go through a stakeholder and public consultation process. The consultation processes are done both in-person workshops and online and must include youth and children. During these processes, sometimes is difficult to meet all the participants needs.

Table 14 - Learnings from the integrated planning approach in Norway

LEARNINGS
Having a **National Planning Framework** that **defines the integrated planning process** and **ensure consistency and guidance**
Autonomy of local authorities of the planning process **under supervision by National Planning Regulator**
Formalised and coordinated **multi-governance and multi-departmental working group** with common vision
Drafting of **an action plan**
Clear stakeholder and citizen engagement strategy and contribution to the action plan

3.1.4 Experiences towards an integrated planning approach in Croatia

The fourth interview was done with an expert who led the development of the sub-urban spatial plan of the municipality of Karlovac, Croatia.

In terms of general spatial planning, Croatia is a centralised country in which plans are developed top-down from the national level and are then locally implemented. Municipalities and Cities have the jurisdiction to determine their budgets and develop their local development plans but often lack the jurisdiction and capacity to implement them. Spatial planning is handled at county, local and sub-local level and is restricted mostly to urban planning and zoning. Energy and climate are only considered in terms of positioning of infrastructure and the definition of zone usage. Large cities have internal departments for spatial planning while other public authorities use external spatial planners.

The interviewee finds that a vertical consistency and interdisciplinarity must be considered for a successful spatial planning approach. However, especially at lower levels, planning instruments are missing. A key element to overcome this is the willingness of the municipality to support the process. In the case of the interviewee, the process was initiated by the municipality´s need to develop a spatial plan for its sub-urban area. The interviewee consulted the SECAP, the development strategies, and other key urban plans to make sure that the sub-urban development spatial plan was in line with these documents. This preliminary consultation led to the successful integration of key energy, climate, and environmental actions into the sub-urban spatial plan, such as a gas ban, higher energy efficiency standards, higher requirements for RES, higher demand on green infrastructure, rainfall water management, biodiversity protection, higher standards on mobility and the use of public transport, etc. The participatory process was implemented before the development of the plan and was open for all stakeholders (citizens, public and private entities and NGOs) which ensured a sense of ownership of the process and support from all political levels. The plan is being implemented, including the realisation of planned infrastructure and buildings.

Table 15 - Learnings of the integrated planning approach in Croatia

LEARNINGS
It is key that the **municipality is willing to support the process**
Interdisciplinarity within the focus groups
Assessment of the existing relevant **planning instruments** and of the **local context**
Consistency between the vertical planning instruments
Engagement process of stakeholder and citizens
Draft of the action plan with shared visions, objectives and goals

3.1.5 Experiences towards an integrated planning approach in Austria

The interviewee is an expert of the energy planning department of the municipality of Vienna, Austria. The interviewee's department is responsible for the city's energy zoning plan, to make guidelines for the management of the city's renewable energy sources, to provide and analyse energy data, and to review the planning drafts from other municipal departments.

Vienna is not only a city but also a federal state (one of nine federal states in Austria). Thus, it has also the competence to pass its own laws on spatial planning and building regulation (with the building code as being the central legal document). The City of Vienna adopts its zoning and development plan by ordinances of the municipal council in the form of "plan documents". In these plan documents, which consist of a plan and a text part, all future uses and the type of development of an area are laid down in a binding manner. Furthermore, Vienna develops every 10 years an urban development plan (currently: Stadtentwicklungsplan STEP 2025), a visionary and strategic planning document that is however not legally binding. Vienna is currently elaborating its upcoming urban development plan (2025-2035) under the premise of Austria´s and Vienna´s goal of reaching climate neutrality by 2040.

Furthermore, some districts (or parts of them) also have their own district development plan (Stadtteilentwicklungskonzept), that puts forward a smaller-scale vision and recommendations for its urban development.

Several municipal departments are relevant in climate mitigation and adaptions (e.g. with the municipality's environmental department defining green belts and spots). The City has two departments for District planning and zoning and one department for Urban development and planning (which elaborates higher-level, spatially strategic planning and concepts).

The energy planning department was formed in 2011 and was put in charge of managing energy subsidies and incentives, of the energy management of municipal buildings, to support with energy issues and produce guidelines. In 2015, the energy department derived a boost for its spatial energy planning from an EU commissioned project "Urban Learning" (see above). In 2018, the City's building code introduced the energy zoning as law binding (according to §2a of the building code).

With energy zoning plans, the energy planning department is in charge of defining areas where new buildings must be equipped with renewable energy or district heating and are prohibited to have a heating system based on gas. These "spatial energy plans" are adopted as ordinances and are thus legally binding. The urban developers need to respect those conditions if they want to get a building permit. Till autumn 2023 Vienna will adopt energy zoning plans (Energieraumpläne) for all districts.

To create an energy zoning plan, a thorough stakeholder process is done. This includes the engagement of the relevant City's energy provider, planning departments and other main territorial actors, experts, associations. Working groups were created to meet regularly to discuss planning issues.

The interviewee finds that spatial planning in Vienna needs a more dynamic approach because the process currently takes too long and does not embrace framework changes effectively and does not accommodate the needs of all the municipality's departments. Often the multi-layered development

plans do not communicate with each other. Also, there is a lack of tools at neighbourhood level. In addition, there is a lack of monitoring and control once the urban developer has obtained the building permit (expect when the interventions are financed by public funds). Regarding the municipality's departments involvement, sometimes it is difficult to define responsibilities, and sometimes the procedural steps are not very clear. Sometimes data is not managed properly (is lost or duplicated). For what concerns stakeholder and citizens' engagement, there can be lack of awareness and of long-term vision or perspective for change, which can affect their overall participation and cooperation in the process. However, stakeholder and citizen awareness and interest for the planning process, and generally for energy and climate issues, has raised over the years.

Table 16 - Learnings of the integrated planning approach in Austria

LEARNINGS
Clear framework of operation, that include the organisational structure of departments and planning instruments, and their responsibilities, jurisdictions, and competences
Deployment of an **energy zoning approach** to ban gas from new buildings
Creation of working groups with relevant stakeholders
District level plans that are consistent with higher order planning instruments

3.1.6 Experiences towards an integrated planning approach in Switzerland

The interviewee works for the municipality of Zurich, Switzerland, and provides consultantship to household-owners for the installation of renewables technologies and district heating.

The interviewee finds that legislation, digitalisation and open data, and the use of innovative tools is essential for phasing out fossil fuels till the climate neutrality target. Indeed, the turning point for this phase-out in Switzerland was made by the introduction of the new Energy Law, which was adopted in autumn 2022 in the Canton of Zurich and which prohibits the installation of new and replacement of old fossil fuelled heating systems in all buildings. The law thus strongly pushes for the installation of district heating, heat pumps, photovoltaics, and other renewable energy sources. With this, the city also started a strong push towards decommissioning and dismantling of the gas grid.

Many instruments and innovative tools have been provided to household owners to support them in this energy transition, the most important being a high-resolution cities' Energy Map (*Energieplan*) that designates the city's areas in relation to renewable energy sources options and energy networks (district heating), an *ad hoc* coaching and consultancy provided by climate offices and information points, and important financial support. These actions have further spurred on the huge energy transition in Switzerland.

To reach the target of climate neutrality by 2040, construction sites in the city will need to double in the next 10 years. This will require a challenging management of the cities' activities and the coordination

of the municipal departments. The city will strive to bring together all the relevant departments once a street is about to be dug up, so as to integrate other aspects, like mobility, climate adaptation etc. For this purpose, the municipality has a coordination plan and communication strategy that assures collaboration within the departments. This includes regular meetings between departments' representatives. Overall, the interviewee finds that the current collaboration method is successful.

However, the most important barriers of these projects and the overall phase-out of fossil fuels are the lack of engineers and construction workers and lack of financial resources.

Table 17 – Learnings for the integrated spatial planning approach in Switzerland

LEARNINGS
Ambitious legislative action by the Canton, and corresponding strong enforcement in the City (political will)
Use of digital instruments and innovative high spatial resolution online tools to give direction to citizens regarding alternative, renewable heating options
Coordination of municipal departments once a construction site is known (a street is dug up), to bundle different aspects, interests

3.2. Good practices from municipalities around the European Union

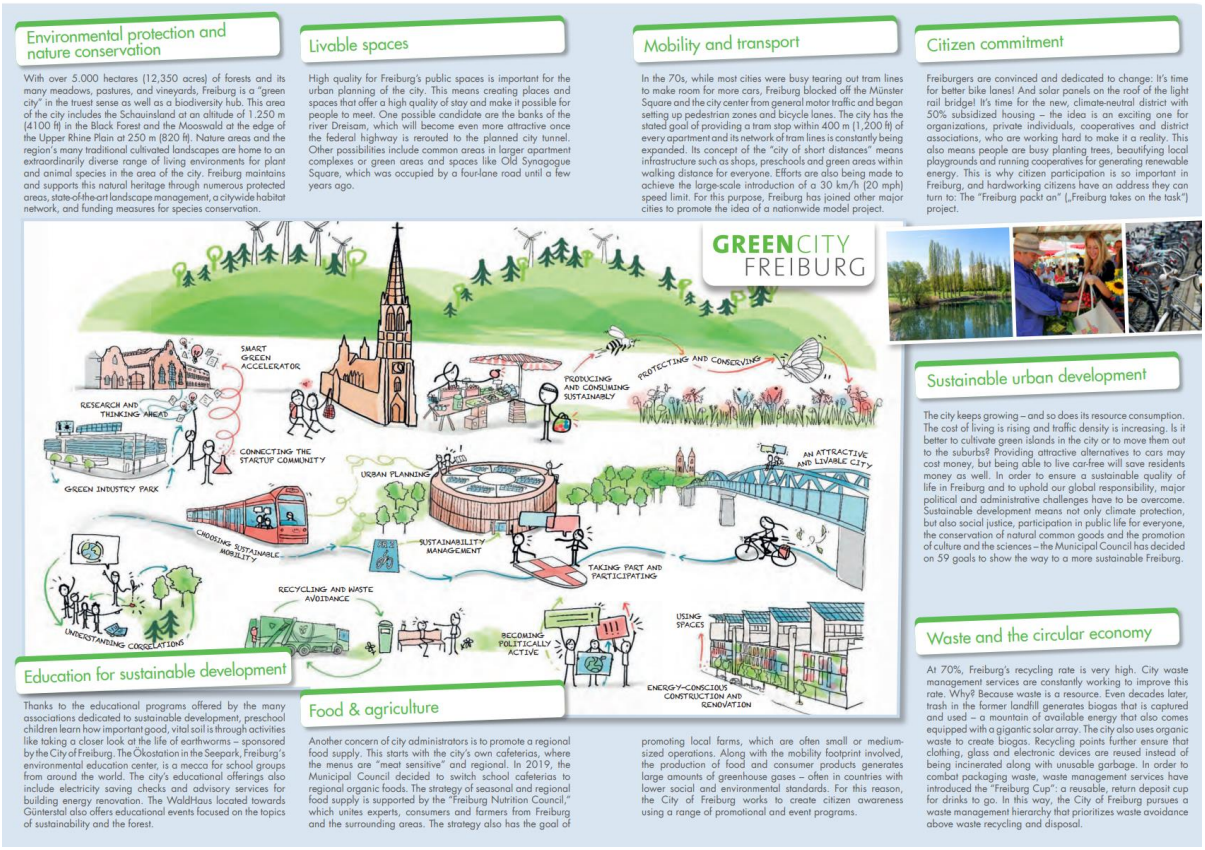
Cities are the place where decarbonisation strategies for energy, transport, buildings, and also industry and agriculture coexist and intersect, they are leading on climate action but still face significant structural barriers. Cities are in a prime position to test new ways of working and living. Not only do they account for more than 70% of global CO_2 emissions and are home to 75% of EU citizens and are centres of economic activity, knowledge generation, innovation and new technologies. Throughout history, cities have often been at the forefront of change and innovation, as it is happening today to face the climate challenge. The climate emergency must be tackled within cities and by engaging citizens who are not only political actors in a governance structure, but also users, producers, consumers and owners. In order to reach EU objectives for climate neutrality set in the Green Deal, it is essential to bring together all key players within a city, including citizens, academia, and businesses and implement transformative processes and innovative actions.

In the following section, examples are provided from cities in the European Union differentiated by size, geographical, social and economic features as an integration to the good practices already collected in the previous chapters with reference to EU-funded projects and initiatives and to the experience of experts working successfully with cities for plans integration targeting climate neutrality.

3.2.1 The Green City Freiburg

The German city of Freiburg im Breisgau is often considered a model city in the context of integrated, sustainable urban development. Freiburg is a university city in the Black Forest in southwest Germany and has around 230 000 inhabitants. The city has the goal of being climate neutral by 2038.

As "Green City", Freiburg[28] has become a role model for municipalities all over the world. The process of sustainable city planning started in 1975 when the citizens of Freiburg refused to accept a planned nuclear power plant. In contrast, people were early advocates of solar energy, which led to the first solar apartment building in 1979 and the construction of the "Heliotrop" as the first plus-energy house in the world[29]. The city has implemented progressive policies, from its renowned waste management concept to its wide-spread use of renewable energy, to its urban transport and mobility policy (Figure 2). As early as the 1970s, policy changes have restricted car use in Freiburg and increased acceptability for cycling and walking [30].



[28] *The Green City of Freiburg Portal: https://greencity.freiburg.de/*
[29] *ICLEI Local Governments for Sustainability Website: https://iclei-europe.org/member-in-the-spotlight/freiburg/.*
[30] *Sustainable Transport in Freiburg: Lessons from Germany's Environmental Capital, Buehler et al., 2011.*

Figure 2 - Overview Green City Freiburg (Source: The Green City of Freiburg Portal: https://greencity.freiburg.de/)

Freiburg has an integrated waste management concept [31]. The concept follows the descending order: 1. Preparation for reutilisation, 2. Recycling, 3. Other uses, for example energetic use. Citizens are encouraged to separate waste, which has led to a recycling rate of 70%. Freiburg introduced the organic waste bin already in 1997 and the organic waste is also used energetically. Collected organic and kitchen waste is used to produce electricity and thermal energy via bio-gas plants. This is a good practice example for the combination of waste management and energy production. In addition, thanks to information campaigns on waste prevention is also the amount of waste per-household below the average of the federal state. It is important to note that numerous guidelines, laws and regulations on a European, federal and national level have pushed the further development of the municipal concept.

Freiburg has a city-wide climate adaptation concept. From 2016-2018, the Urban Planning Office has developed it in close collaboration with the Environmental Office and the Garden and Civil Engineering Office. The concept provides planning guidance how to deal with the increasing heat stress in the city. The concept shows so called "hot spots" where planning must be specifically sensitive to city-climate conditions. The concept also outlines concrete measures to reduce heat stress. The plan of measures functions an integrated overall plan, considering not only heat stress, but also relief-areas, path-network, water and relevant climate functions etc. (Figure 3). The climate adaptation concept is applied to all urban planning frameworks and urban land use planning procedures. The concept has won a price under the category "Climate Adaptation" of the competition "Climate-active communes 2019".

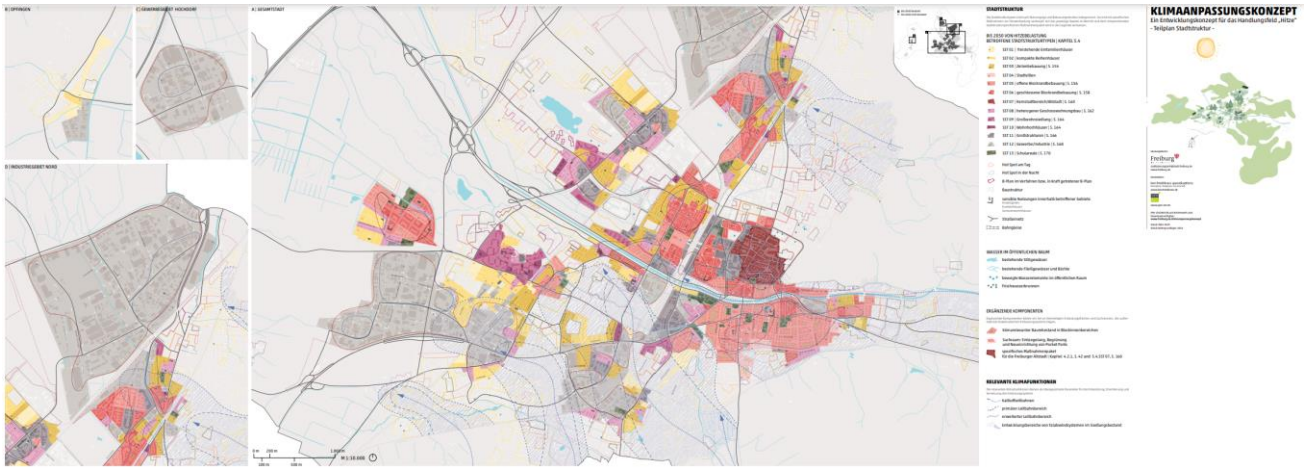


Figure 3 - Urban structure subplan of the climate adaptation concept (Source: https://www.freiburg.de/)

Currently, Freiburg is developing a climate mobility plan. The city is one of the five pilot regions in the federal state of Baden-Württemberg. The aim is to develop plans that identify suitable mixes of measure to reduce emissions in the transport sector by 40% by 2030 in comparison to 2010. Thus, the climate mobility plan is an important instrument towards climate neutral of the city. The urban society and man actors from the city and regions are continuously involved in the planning process. Expectations and

[31] *The City of Freiburg Website: https://www.freiburg.de/.*

opinions are central and integrated in the process. The planning process started in January 2022 and the final decision by the community council is expected in the first quarter of 2023. The process (Figure 4) consists of a technical elaboration and political negotiations, as well the public participation. The engagement started right at the beginning with interview of diverse actors of the urban society. In February 2022 was the public kick-off meeting. Since then, the city initiated an online participation (February-March), held two meeting of the forum Climate & Mobility (May and November) and published the planning documents publicly for written commenting by the citizens (October-December). Citizens were also randomly invited to the forum.

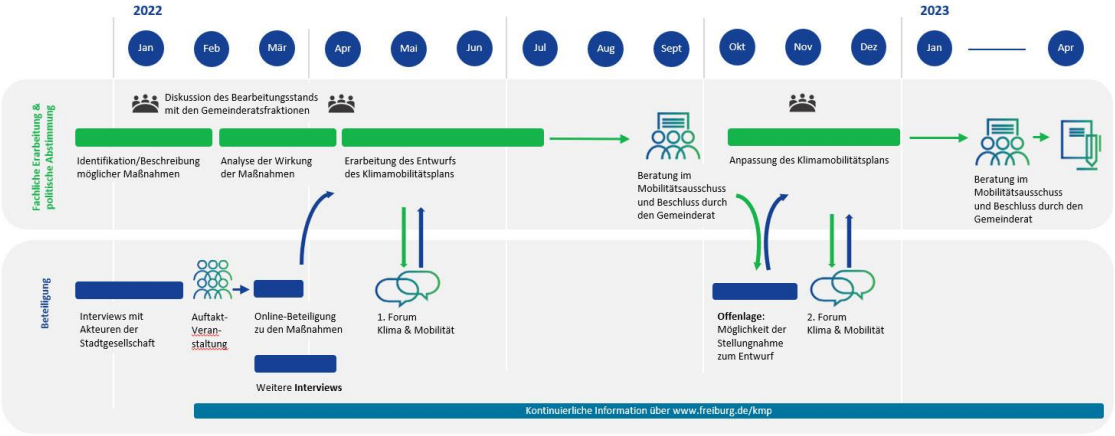


Figure 4 - Freiburg planning process (Source: https://www.freiburg.de/)

In 1986, Freiburg was also one of the first cities in Germany to establish an Environmental Protection Office that supported the implementation of environmental policies in the city. Today, the Urban Planning Office understands itself as “think tank” and future planner in one. Since 2009, the city hosts also the Green City Cluster Freiburg, with connect companies and institutions from the environmental sector to share knowledge and experiences.

Freiburg was a European Green Capital Award Finalist in 2009 and was named German Federal Capital for Climate Protection in 2010. Freiburg is a signatory of the Covenant of Mayor.

3.2.2 Lahti’s 2030 Sustainable Energy and Climate Action Plan

The city of Lahti (Finland) is a positive example of such use of integrated planning, where a local planning approach is coupled with strategic targets and ambitions of the community to enable and guide urban development. Lahti is a middle-sized city with a population of 120.000, one hundred kilometres northeast from the capital Helsinki on the southern coast of Finland. The European Commission has named Lahti as the European Green Capital of 2021 Finland’s leading environmental city.

Lahti’s 2030 Sustainable Energy and Climate Action Plan is pursuing an ambitious goal of carbon neutrality aiming at decreasing the greenhouse gas emissions of the area by 80% from the 1990 level

by 2025 and locking up the rest in carbon sinks. Of all the major cities of Finland, this goal is the most ambitious and it achieves the objectives of Finland's Government Programme ten years in advance and the EU objectives 25 years in advance.

Lahti is involved in the 2030 EU Covenant of Mayors for Climate & Energy. As a new addition to the Covenant, the cities carry out a Climate Risks and Vulnerability Assessment and draw up a Baseline Emission Inventory and Sustainable Energy and Climate Action Plan. Lahti's SECAP includes all of these.

Part of the Plan is monitoring every other year and a new emission calculation every four years. In addition to these, the City implements its own monitoring. The Environmental Developments Unit of the City of Lahti Group Services is responsible for the distribution and monitoring of the Action Plan. The responsible bodies of the measures have been defined separately.

The Climate Risks and Vulnerability Assessment as well as the adaptation measures have been implemented interactively with the citizens and interest groups. The assessment was carried out during 2018 by using the IVAVIA methodology Impact and Vulnerability Analysis of Vital Infrastructures and built-up Areas developed in the international RESIN project.

The impacts of climate change have been broadly recognised in various sectors of Lahti. The sectors include infrastructure and land use, health and well-being of people, living environments, parks and green areas, the economy and inter-sector impacts. In the SECAP there are more than 90 measures related to climate change mitigation and adaptation and their responsible bodies from the existing plans of the City of Lahti, the following table includes some interesting examples:

Table 18 - Measures from City of Lahti's SECAP (Source: Lahti's 2030 Sustainable Energy and Climate Action Plan)

Measure	Responsible bodies	Progress	Adaptation/ mitigation measure	Estimate of the emissions reduction efficiency Is the adaptation measure prioritised?
Energy efficiency actions in the rental housing stock: repairing old building stock.	Lahden Talot; Canemure project; SMARTEES project	Active	Adaptation & Mitigation	High
Local transport runs by electricity and biogas by 2030.	Traffic planning; LSL	New	Mitigation	Relatively high
Replacing the old district heat boiler with a new bio energy boiler: Kymijärvi 3 bioenergy heating plant	Lahti Energia	Active	Mitigation	Very high

Local management of stormwater is increased in both existing and new urban areas.	Lahti Environmental Services; urban planning; building inspection	Active	Adaptation	Prioritised
Securing ecosystem services in forests, open areas and built green areas owned by the City of Lahti.	Forestry services; park services; urban planning	Active	Adaptation	Prioritised
Drawing up the road map for Lahti's circular economy. Developing new sharing services and working as a platform to them.	Environmental Developments Unit	Under prepara-tion	Mitigation	Difficult to assess
Climate and environmental counselling for the citizens and housing associations.	Environmental Developments Unit; Regional Council	Active	Adaptation & Mitigation	Difficult to assess
Climate partnership forbusinesses: Spreading and developing this form of activity.	Environmental Developments Unit; LAMK; LADEC	Active	Adaptation & Mitigation	Difficult to assess Prioritised

Lahti is also an interesting example of a local planning approach with the potential to strategically use statutory planning instruments (including master planning) to guide urban development[32].

The city has in fact developed a unique policy of combining city strategy work with strategic master planning in an iterative process, which is a good example of how institutional frameworks of statutory planning can be utilized as resources in strategic planning[33].

In Lahti, strategic spatial planning is not decoupled from the statutory land use planning system. Instead, the institutional setup of statutory land use planning, e.g. planning hierarchy, zoning, legally binding status, and regulations on preparation, participation, decision-making and appealing of master land use planning, are incorporated as tools in the broader context of the city's strategy work. For example, for the theme of sustainable mobility the iterative Sustainable Urban Mobility Plan (SUMP) instrument, was introduced as integrated with the iterative master planning procedure. Also, in addition to

[32] *Högström J., Brokking P., Balfors B., Hammer M. Approaching Sustainability in Local Spatial Planning Processes: A Case Study in the Stockholm Region, Sweden, 2021.*

[33] *Raine Mäntysalo, Johanna Tuomisaari, Kaisa Granqvist and Vesa Kanninen, The Strategic Incrementalism of Lahti Master Planning: Three Lessons, Planning theory & practice, 2019.*

enhanced policy coordination, there has also been policy integration: previously separate land policy and housing policy have been integrated into master planning and its implementation programme.

Key in this strategic use is a radical approach to statutory master planning: updating master plans incrementally instead of having them perform as long-term blueprints. In Lahti, this has been achieved by shifting the focus from the level of 'strategic plans' to how the making of these plans is framed in the ongoing broader policy of the city's strategy work. This is the second lesson. In the iterative policy of Lahti, the processes of overall city strategy-making are interlinked with master planning in council term cycles and backed by a continuously updated and developed system of georeferenced datasets and procedures for public participation. A new master plan is produced every four years, fixing certain land uses and programming implementation in a short term in a regulative manner, while justifying these 'increments' with strategic insights in the longer term. In Lahti the strategy does not lie in the master plans themselves but in the broader strategic policy in which their preparation is integrated with the four-year city council terms.

A set of indicators on sustainable urban and regional structure, developed by the Finnish Environment Institute, were used as monitoring tools for the implementation, thus providing feedback for the update of the master plan in the next cycles.

Also, master planning is approached as a platform for participatory strategic deliberation. In spring 2014, four evening sessions with residents were held in different parts of the city, inviting the residents to envision the future, comment and present ideas on their living areas, everyday mobility and availability of services. At the start of the ongoing master planning cycle in 2017, scenario planning was introduced with the aid of a consultant firm. The alternative scenarios were discussed in participatory events. The colloquial story format has been applied in drafting the master plan report, an open-access document describing the living conditions in the target year as a story. The report accompanies the actual legally binding master plan.

The city government identified master planning as an important learning process to discuss and implement the city strategy, for the planners as well as the other city administrators, politicians, stakeholders, and citizens. Alongside assessment of the master plans in terms of content, the planning processes are continuously assessed, and methods and procedures are altered if need be. The master plan is referred to as a tool that is being tested and developed according to experiences and feedback gained. Equally important to the quality of the plan, is the collaboration and interaction during the process.

In 2016, the City of Lahti received an award for its innovativeness in strategic master planning from the Finnish Society of Urban Planning, and its iterative master planning policy is now being applied in some other Finnish cities, too (e.g. Tampere and Riihimäki).

3.2.3 The Climate Plan 2018-2030 of Barcelona

Barcelona is the capital of Catalonia and located on the coast of the North-Eastern part of Spain. Around 1.6 million people live in the city with a rich artistic and architectural history. In 2020, the city declared

climate emergency with commitment to investing €563 million over the next five year [34]. At the same time, Barcelona faces many spatial challenges, as it is a densely populated city with housing shortage.

In 2018, the city of Barcelona released the Paris Agreement compatible Climate Plan 2018–2030. According to the plan, the city wants to reduce its emissions by 45% on route to be climate-neutral by 2050. The comprehensive plan integrates four strategic lines of action: mitigation, adaptation, climate justice and citizen action, putting the most vulnerable people at the centre of its policies (Figure 5). It was coproduced with citizens and more than 1 800 organisations have already signed the Citizen Commitment to Sustainability.

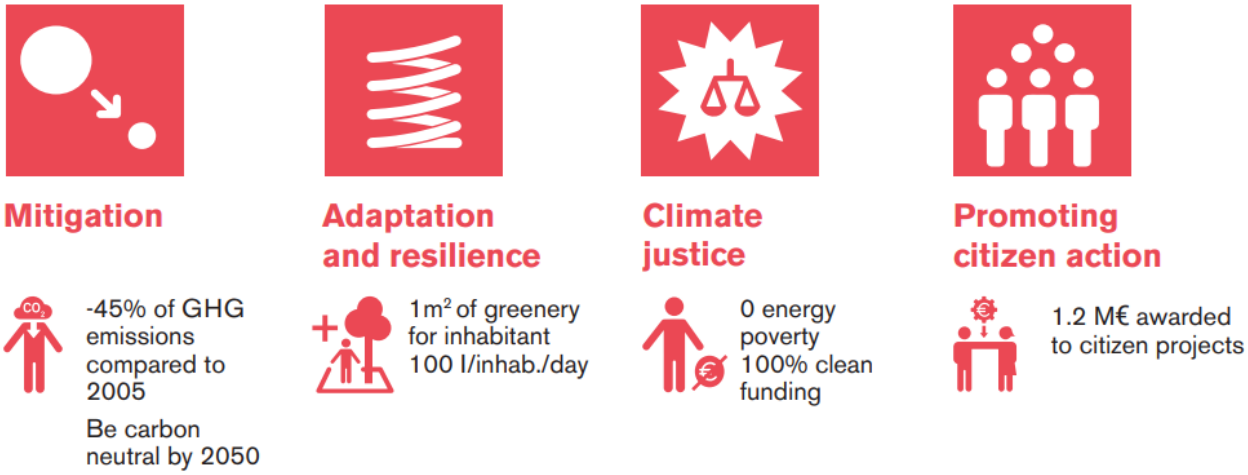


Figure 5 - Climate Plan critical areas (Source: https://www.barcelona.cat/emergenciaclimatica/en/)

The forerunner of the Climate Plan was Barcelona's Commitment to the Climate. In 2015, Barcelona established a working group among the network of 141 organisations that signed the Citizen Commitment to Sustainability to define the city roadmap on climate change and collaborative projects for 2015-2017. In the framework of the initiative, Barcelona has entered a Barcelona Climate Commitment. In 2017, the City Council initiated a citizen co-production process aimed to provide "a space for the general public to express their opinions and make contributions to the Climate Plan" [35]. The city held four participatory sessions, which resulted in strategic measures and (priority) projects to be implemented in two years' time. Citizen projects were defined in specific teams where citizens received specialist training and advice on how to draw up a project and present it. The various teams met at least five times to give shape to their project and 135 people from 86 organisations took part. The planning process is a good example for inclusive climate action.

In accordance with the Covenant of Mayors for Climate and Energy, the City Council initiated the drafting of the Climate Plan, which specifies the goals, targets, strategic lines and actions. The Climate Plan 2018-2030 has five areas and 18 lines of action, as shown in Table 19Table 18Table 19 - Barcelona's Climate Plan: Areas and Lines of Action . The plan integrates several themes from food, nature preservation to transportation. Today, there is a Climate Office that monitors and implement

[34] *The Barcelona Climate Emergency Portal: https://www.barcelona.cat/emergenciaclimatica/en/.*
[35] *The City of Barcelona Climate Plan 2018-2030.*

the plan, a department coordination that integrated the actions into strategic plans and budgets and community outreach, including the work with non-governmental organisations.

Table 19 - Barcelona's Climate Plan: Areas and Lines of Action (Source: Barcelona Climate Plan 2018-2030)

AREAS	LINES OF ACTION
people first	1. Taking care of everyone 2. No cuts 3. Preventing excessive heat
starting at home	4. Better than new buildings 5. Recovering terrace roofs
transforming communal spaces	6. Planning with a climate focus 7. Many more green areas 8. Not a single drop wasted 9. Renewables in public areas 10. Getting around easily 11. Conserving the seafront
climate economy	12. Virtuous circle 13. Responsible consumption 14. Zero Waste 15. Food sovereignty
building together	16. Cultural action for the climate 17. Climate cooperation 18. Let's get organised

The Climate Plan received the Covenant of Mayors for Climate and Energy award for the best initiative by a large European city. The award was given due to its integrity and effectiveness and its holistic approach, combining mitigation, adaptation, climate justice and promoting citizen actions.

In addition, sustainability is also an integral part of the urban planning. There are overlapping themes with the Climate Plan, specifically with regard to create liveable districts, create more green spaces, renovate buildings and enable public engagement [36].

Barcelona has signed several agreements, including the Barcelona's Commitment to the Climate (2015), the Paris Declaration committing cities to the fight against climate change (2015) and Global Covenant of Mayors for Climate & Energy (2017).

[36] *Ecology. Urban Planning, Infrastructures and Mobility Portal of the City of Barcelona: https://ajuntament.barcelona.cat/ecologiaurbana/.*

3.2.4 Katowice's planning from coal industry-city into a modern city

Katowice is the capital of the Silesian Voivodeship in Poland with a strong cultural and industrial heritage. It has a population of about 302,000 inhabitants. Once the city of mining and heavy industry, Katowice has been transformed into a modern city of the future. In 2018, the city hosted the 24th Conference of the Parties (COP23) to the United Nations Framework Convention on Climate Change (UNFCCC). In 2022, Katowice hosted the World Urban Forum (WUF11) - global conference on sustainable urbanisation.

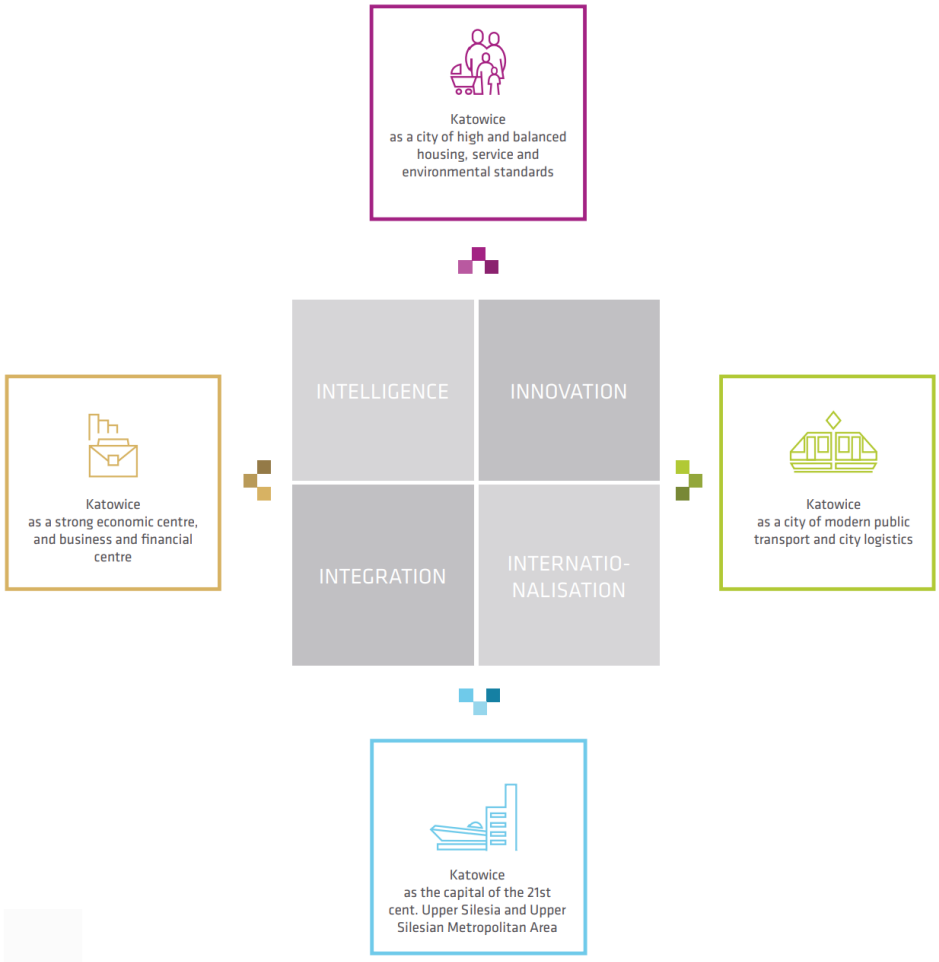


Figure 6 - 4i concept (Source: The City Development Strategy 2030 of the City of Katowice)

The citizens are themselves the ambassadors of the enormous changes the city has undergone. To address issues such as biodiversity, air quality and public space, Katowice uses apps and digital campaigns to engage citizens in the transformation of their city. For example, the *NaprawmyTo* app (LetsFixIt app) allows residents to report defects, and the *wCOP drzewo* app allows them to point out locations where new trees should be planted. In the KATO obywatel (KATO resident) project, for example, citizens can submit their own project ideas for a cleaner, greener and safer city and apply for

funding for their project ideas via a (green) participatory budget. These planning processes follow the principle of transparency and involving residents to provide input and effect change. Such an approach puts cities in charge of their environment. The KATO resident project was awarded a prize by the Polish Press Agency in a competition entitled "Innovative Local Government". An important document for urban development is the Katowice 2030 City Development Strategy[37]. The strategy consists of the four interconnected, focal points: “Quality of Life”, “Transport and City Logistics”, “Entrepreneurship and Economic Growth” and “Metropolitan Nature and the City Centre Area”. “Integration” is one of the four I’s shaping the strategic vision for the city’s development, as shown in Figure 6 and Figure 7.

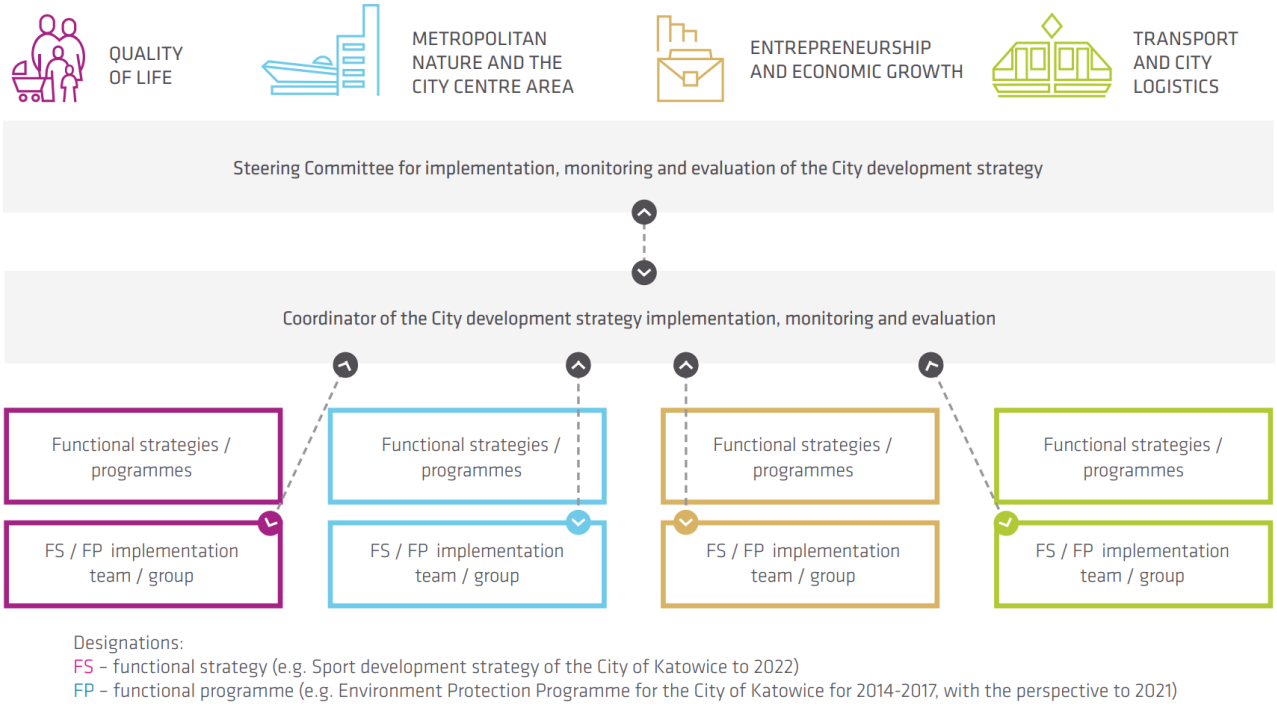


Figure 7 - Coordinating Strategy implementation, monitoring and evaluation model (Source: The City Development Strategy 2030 of the City of Katowice)

In the area of transport, for example, Katowice’s vision is an “internally and externally integrated, sustainable and effective transport and logistics system”. Concrete objectives and lines of action are shown in Table 19. The strategic principle to enable this is the “spatial cohesion of the functional area of the city”.

Table 19 - Objectives and lines of action for transport and city logistics (Source: The City Development Strategy 2030 of the City of Katowice)

STRATEGIC OBJECTIVES	LINES OF ACTION
Technologically advanced transport and logistics infrastructure	Establishing road, railway and air communication hubs

[37] *The City Development Strategy 2030 of the City of Katowice.*

	Extension of urban transport corridors
Environmentally friendly forms of movement in urban space that are competitive with individual automotive transport	Improvement of comfort of travel by public transport
	Improvement of freedom of pedestrian and bicycle traffic
High effectiveness of transport and municipal service provision	Building intelligent transport and city logistics systems

The strategy outlines key areas for the city development. The document also underlines the importance to adapt the concept later to new trends and policies occurring at national and European levels. Furthermore, Katowice has adopted climate and energy plans. In 2019, the city adopted the Katowice City Adaptation Plan to Climate Change by 2030. The plan includes a vision, goals and objectives related to four critical sectors of the city: public health / vulnerable groups, undeveloped areas with green structure, transport and water management. The plan was developed under public participation. It is a reference point for further adaptation activities for Katowice and a basic tool for shaping an urban policy aimed at increasing the city's resilience to the effects of these changes and strengthening its adaptive capacity[38].

Furthermore, the SECAP is a strategic document that establishes short- and long-term actions for the city. The aim is to reduce emissions by 40% compared to the baseline. The inventory of actions and emission reduction is a crucial element of the plan. Katowice joined the CoM in 2019.

[38] *The City of Katowice Website: https://katowice.eu/.*

4. Final recommendations for integrated energy, climate and spatial planning

Integrated energy, climate and spatial planning is an essential tool to support and implement decarbonisation efforts. Such efforts should be equitable and contribute to the well-being of European communities as a whole, with a positive impact widely diffused and with widespread support from policymakers and citizens, in order to guarantee the EU climate objectives of a 55% cut in emissions by 2030 and climate neutrality by 2050 are met by the foreseen deadlines. Integrated plans must support everyone and focus on those most vulnerable to sustainability challenges.

The information gathered in this stock-take report allowed to identify three main dimensions to be taken into consideration for an effective and efficient integrated planning:

- Cooperation among different municipal/regional departments (based on political support to the integrated planning process) is crucial to develop a common (action) plan to be developed in a synergic way by the different departments involved;
- Participatory processes enable the viewpoints and needs of citizens and other stakeholders to be taken into account;
- Analysis of the context, policy, planning and territorial systems and studies, as well as the collection, management and analysis of data and the monitoring and related tools, models and methodologies are important and shall be performed as tasks to build on existing structures and capacities.

To guarantee concrete collaboration among different departments, political support to integrated planning shall be secured and clearly channelled vertically and horizontally across departments as well as adequate financing to cover all the foreseen measures across the different areas involved. Innovative financing and funding schemes play a fundamental role to make the green transition possible and to implement integrated planning measures with dedicated budget lines.

New delivery mechanisms such as the Climate City Contract foreseen in the Horizon Europe Mission 100 climate-neutral and smart cities by 2030 help reaching and actively involving a growing number of stakeholders, local actors and citizens, such mechanisms shall be further enforced and applied.

A smart approach based on innovative technologies and digitalisation processes is also needed, to reach climate neutrality, helping citizens, public administrations and companies alike and as a mean for an improved and more efficient data collection, management, analysis and monitoring but also as a support to the decision-making process. Smart and digital technologies and the use of data have the potential to facilitate efficiency in use of resources and better decision-making, including by making use of urban systems modelling for mobility and energy consumption in buildings.

From the stock-take study, we draw 6-key steps (Figure 8) that we recommend to local authorities and urban planner to use to achieve a successful integrated planning outcome:

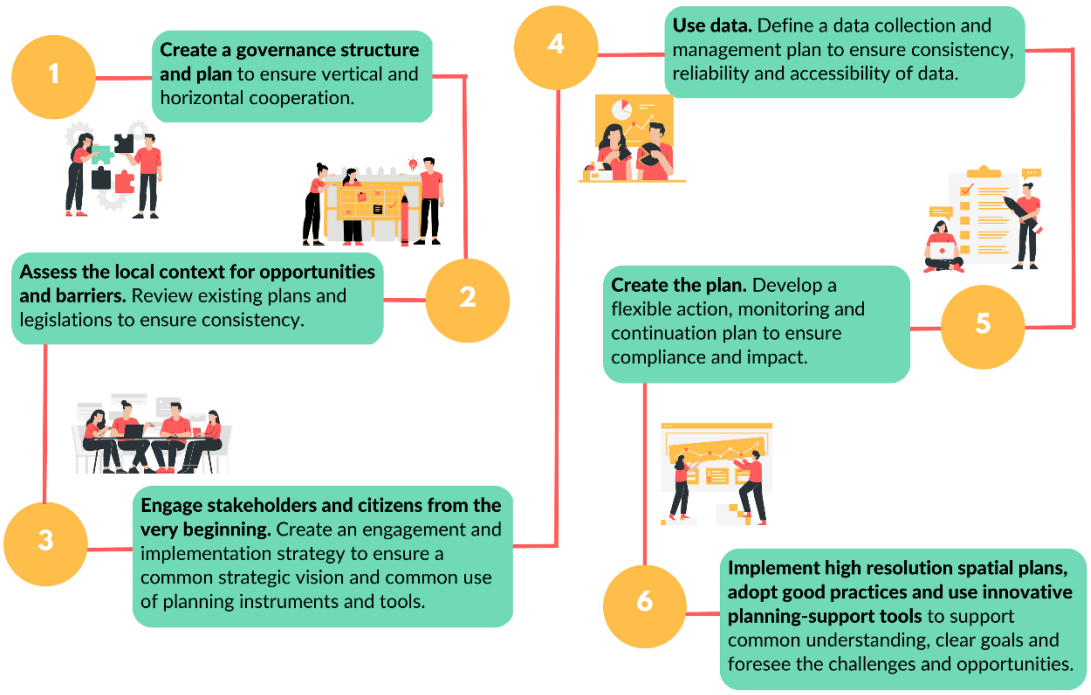


Figure 8 – The six recommendations for a successful integrated planning outcome

1) Create a governance structure and governance plan to ensure vertical and horizontal cooperation

The integrated planning approach starts by building a common understanding and a shared vision defined by the political level. A municipal team of the municipal departments relevant to the planning process must be formed (e.g: urban development and planning, land use and district planning, infrastructure, energy, construction, housing, mobility, and green space departments). It is essential to secure political commitment, that includes the allocation of the necessary human and financial resources, the setting of a team leader (or coordination person), and the formalisation of the process by the mayor or city council written approval. Setting the appropriate data collection method and shared data management system is essential.

The practices explored in this report suggest forming flexible interdisciplinary, cross-departmental local discussion groups made of departments' representatives, that should meet frequently for targeted discussion topics. These sessions should include knowledge transfer, in depth analysis, negotiation, definition of roles and responsibilities (including the definition of a coordinator acting as project manager), addressment of challenges and opportunities, and conclude with a meeting outcome report inclusive of the elements resulted from the meeting, and of successive action steps.

A further step is keeping the joint working groups active also after the approval of the plans in order to achieve a coordinated and successful implementation and monitoring of the actions of the integrated plans.

From the experiences of successful countries, having a National Planning Framework in place, that defines the roles and responsibilities, as well as the planning steps and general conditions, and gives mediation, supervision and coordination usually result in a successful integrated planning outcome. If there is no vertical planning framework in place, consistency between the existing plans must be pursued and relevant policy makers must be pressured for the adequate instrument alignments.

2) **Assess the local context for opportunities and barriers. Review existing plans and legislations to ensure consistency**

To identify opportunities and barriers, an initial context analysis must be made, which includes the identification of the local characteristics and circumstances, the territory's geography, environment, demography, socio-economic situation, industry, history, local/regional regulations and the energy profile.

Furthermore, an analysis and thorough understanding of the planning processes and of the governance structure to-date (governance structure, planning phases, stakeholders, etc.), the existing strategic and planning instruments (urban development, spatial plans, traffic and mobility plans, SEAP/SECAPS, SUMPs, regional and national strategies and plans, etc.) and of the relevant legislations and frameworks (at national, regional, and local) must be completed.

The availability, reliability, completeness, accessibility, consistency of the relevant territorial data and of the existing tools and instruments (energy maps, data repositories, etc.) must be performed.

A collection of local and non-local good and bad practices related to integrated spatial planning (energy, climate, environment, etc.) should be made.

3) **Engage stakeholders and citizens. Create an engagement and implementation strategy to ensure a common strategic vision and common use of planning instruments and tools**

The involvement of partners and stakeholders since the very beginning of the planning process is essential for the successful outcome of the integrated planning approach. Stakeholders are all actors whose interest, activities, knowledge, resources and expertise are critical for the successful integrated planning outcome. A bottom-up approach is needed in order for the plan to account for issues raised by local stakeholders and to propose solutions they can accept and support in the implementation phase.

The stakeholders to be included are public authorities at all governance levels, civil society organisations, energy agencies, local businesses and their associations, local industry, financial institutions, private/public transport companies, energy suppliers/utilities, building companies/developers, consumer associations, academic institutes, etc.

Even before of their actual involvement, their contribution in terms of knowledge, solutions, and overall added value to the planning process should be assessed. A clear and transparent strategy, tailored to each stakeholder, must be arranged. Stakeholders can be approached by meeting, phone calls and e-mails, or online platforms. The role and expectations within the planning process of each member should be clear.

Working groups should be formed, made by the representatives of each stakeholder group. Regular and targeted follow-up meetings should follow, with local adaptations regarding the size and composition of the working group, the number of meetings, and the meeting agenda. Some techniques for

coordinating working groups are interviews, questionnaires, focus groups, advisory boards, workshops, reviews, and role play. Stakeholder engagement should be a dynamic and flexible process that should endure the life cycle of the planning process (planning, evaluation and implementation, and post-implementation).

It has emerged from this study that building a well-defined and well-functioning stakeholder network is a slow and time-consuming process, sometimes taking decades, and requires patience and mutual learning.

4) **Use data. Define a data collection and management plan to ensure consistency, reliability and accessibility of data**

It is recommended creating a common repository and clear methods and responsibilities for the collection, storage and updating of the data relevant to the integrated spatial planning process, to avoid loss, duplication or misinterpretation of it. The sources of the data, including inputs, workflows, hand-offs, etc., should be verified, as well as the availability, reliability, completeness, accessibility, consistency of the data.

It is important to share with the stakeholders the common data sets, data collecting methods and standards (especially for BEI/MEI), contacts, site links, and assure also relevant support to stakeholders for data gathering. The contributions of each stakeholder must be collected.

In case of data that are not feasible/possible to collect directly common methodologies to estimate them should be jointly established.

5) **Develop a flexible action, monitoring and continuation plan to ensure compliance and impact**

The action plan should be developed in a participated manner and should include: the local/regional authority's vision, objectives and targets; the description of the local context, and of the national, regional and local policies and plans; an assessment of the territory's greenhouse gas emissions and of climate change risks; mitigation and adaptation actions and their implementation (key steps, funding, engagement, etc.) and monitoring process. The action plan should be submitted for approval by the relevant political body.

When designing the actions, the strengths, and weaknesses of each sector should be defined, and special focus should be invested to investigate high carbon footprint or climate vulnerable sectors, evaluating the potential impact of the actions for each sector by setting milestones/targets. Also, an estimate of the needed resources and sources of financing. An action schedule should be made (e.g.: a Gantt chart).

Once the implementation of the plans has begun, it is important to monitor and control it and should describe the process for its updating and continuation. It can be done by participatory observation, focus groups, ad interviews and should deliver a final report. The idea is that each planning cycle improves the expertise and effectiveness of the next planning process.

6) Implement high resolution spatial plans, adopt good practices and use innovative planning-support tools to support common understanding, make clear the goals and describe the challenges and opportunities to be faced

Higher spatial resolution plans that are consistent with higher hierarchy plans can facilitate the implementation and benefit the integrated spatial planning process. Sometimes policy and decision makers, stakeholders and citizens lack a basic understanding of the territorial systems, their interrelations, and a common vision for the long-term objective. Many innovative planning-support techniques and tools exist, such as urban energy maps, environmental maps, climate maps, and other spatial and temporal visualisation tools, are available to support basic understanding vision sharing, and objective definitions. Furthermore, it is important to learn from others (e.g.: in peer-to-peer learning programmes) and assess opportunities and challenges. Some good practices found in this study are Energy Atlas, GEOPORTAL, Energy Supply Plans, EcoDistrict Labels, SRS models for monitoring, Sustainable Development Plans, public development competitions, Energy saving partnerships, Positive Energy Territories, Smart City information centres, living labs, smart apps for sustainability, etc.

A better understanding of the territorial systems, their interrelations, and a common vision for the long-term objective as mentioned above is the key to secure political support from higher governance-levels, to push local action and to guarantee the political commitment necessary to mobilise resources to implement plans and to foster synergies among ongoing actions.

In sum, existing approaches and experiences of integrating spatial, climate and energy planning exist on which municipalities can build on. However, more efforts are needed to share experiences across regions and municipalities to accelerate local climate and energy actions.

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