ENERGee Watch

Impact Assessment and Lessons Learned (Deliverable 5.4)

August 2023

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Preface

The overall aim of ENERGee Watch is to launch an easy and replicable peer to peer learning programme to enable regional and local authorities to timely and accurately define, monitor and verify their sustainable actions. The learning focused on regional/provincial authorities and their agencies that are responsible for collecting and overseeing the monitoring of mitigation and adaptation indicators to help them make use of best practices. The learning programme is structured in four (4) courses: i) data collection, ii) monitoring & verification, iii) indicators for adaptation to climate change, iv) data display, dissemination and validation by final users. By 2023, ENERGee Watch launched 4 courses per year (one for each topic, twelve in total) with a total of 70 participating mentees. The learning programme entailed tools such as mentoring, site visits, tailored guidebooks and guided practice exchange to enable the proper matching of peer groups, and proper knowledge replication.

No	Participant Name	Short Name	Country Code	Logo
1	Institute for European Energy and Climate Policy (IEECP)	NETHERLANDS	NL	
2	European Federation of Regions and Agencies for Energy and the Environment (FEDARENE)	BELGIUM	BE	
3	Technoeconomics of Energy and Environmental Systems Laboratory – University of Piraeus (UPRC – Teeslab)	GREECE	GR	
4	Auvergne-Rhône Alpes Energy Environment (AURA-EE)	FRANCE	FR	
5	Energy Agency of Savinjska, Šaleška and Koroška region (KSSENA)	SLOVENIA	SI	
6	Ile de France Regional Energy and Climate Agency (L'Institut Paris Region)	FRANCE	FR	
7	3 Counties Energy agency (SEEA)	IRELAND	IE	
8	Energy Agency of Plovdiv (EAP)	BULGARIA	BG	
9	Alba Local Energy Agency (ALEA)	ROMANIA	RO	
10	Cyprus Energy Agency (CEA)	CYPRUS	CY	

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Contents

Figures

Tables

List of abbreviations

EU	European Union
IEE	Intelligent Energy Europe
LC	Learning cycles
LP	Learning programme
SEAP	Sustainable Energy Action Plan
SECAP	Sustainable Energy and Climate Action Plan
M&V	Monitoring and Verification
MRV	Monitoring, Reporting and Verification
RES	Renewable Energy Systems

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Executive summary

With climate change remaining a pressing global challenge, affecting every part of the planet, public awareness and committed action at every level of government are becoming a central component of the climate policy both in the EU as well as across the globe. In 2015, countries across the world adopted the 2030 Agenda for Sustainable Development and its 17 Sustainable Development Goals (SDGs), which together with the Paris Agreement form the most comprehensive and integrated approach to a climate-resilient sustainable development to date. Both agendas, besides setting an ambitious universal vision, emphasise the need for more coordinated, "bottom-up" policy responses. This brings sub-national and urban action into the spotlight. But, do cities have the capacity to lead the way in climate action?

Although initially ignored by most climate-change analysts, many cities around the world are now gearing up to play a major role when it comes to climate change resilience and sustainable development (Cheung and Oßenbrügge 2020, Fuhr *et al.* 2018, Jaglin 2014). In the European Union (EU), where nearly three quarters of the population live in urban areas, many cities are leading the way in this regard, taking action to mitigate and adapt to risks exacerbated by climate change, or even acting as "living laboratories" of climate change-related innovation. However, not all cities are at the same level of engagement.

Independent of their dimension and geographical position, cities often face a series of challenges ranging from budgetary issues (a lack of finance or access to finance), to the optimisation of existing local instruments, processes and frameworks to track and report on the progress and effectiveness of local policies. The latter is particularly challenging for several reasons, especially due to the absence of concrete results that can be perceived as best practices or opportunities for cities to learn from.

Against this background, this report aims to present a collection of selected practical exemplars originating from the ENERGee Watch peer-to-peer learning program for local and regional authorities and their implementing agencies. To achieve this, our research approach builds upon several parallel strands, with special emphasis on getting feedback from the ENERGee Watch participants. In addition, useful insights from the ENERGee Watch partners, who all have long-standing experience in deploying and exchanging best practices regarding local and regional monitoring and verification (M&V) practices for both adaptation and mitigation policies, were taken into special consideration. The aforementioned sources of information provided the basis for building the ENERGee Watch "Database of M&V best practices", gathering as of today 55 best practices identified throughout the ENERGee Watch project lifetime.

The objective of this paper is not to provide an exhaustive or representative picture of all the exemplars found in the ENERGee Watch database itself but to compile the most concrete ones according to certain selection criteria. In doing so, it offers essential and targeted information on the formulation and implementation of more advanced data management and M&V procedures, with the ultimate purpose to facilitate practical knowledge and expertise exchanges between local governments and other sub-national organisations.

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1. Introduction

From its inception, ENERGee Watch seeks to provide new insights into climate and energy data management at the sub-national level in the EU by involving experts and consolidating emerging information and practical examples. The overarching goal is to offer reliable knowledge on collecting, monitoring, verifying and reporting of climate and energy data for sustainable energy action plans, make it broadly accessible to local and regional authorities and their implementing energy agencies. Thus, enabling cities and local administrations to enhance, upgrade or complement their data management processes in the most effective way.

To deliver on this, ENERGee Watch put forward and executed a unique capacity-building learning program for cities and regions, based on the principles of peer learning in public policy (Andrews & Manning, 2016), and focused on exchanging practices for data management for urban sustainable policies and measures. In brief, the ENERGee Watch peer-to-peer learning program, throughout its three iterative learning cycles (LCs), enabled experience and expertise sharing among participants on four specialised thematic areas, which cover the entire process from data collection to monitoring, evaluation and reporting:

1. Data collection (acquisition and treatment),
2. Data monitoring and validation,
3. Indicators for adaptation to climate change,
4. Data display, dissemination, and validation by local authorities.

Aside from the mentoring sessions, each of the four topics was also explored through additional replication activities, ranging from learning materials for municipalities on formulating and integrating improved data management systems into their planning processes, to a series of national and EU- level replication events held in the final year of the project. All were meant, apart from strengthening participants' knowledge base and capacity, to both disseminate and provide a significant pool of well-established M&V methodologies and tools, which in turn fed back into a unified database of best practices and lessons learned identified alongside the ENERGee Watch learning program. The latter is expected to form a valid and well-founded source of inspiration and guidance for cities and regions beyond the ENERGee Watch participants and the duration of the project, on how to develop similar structures.

1.1 Objectives and Scope of the Deliverable

This deliverable (D5.4) constitutes a strategic output of the ENERGee Watch project, which falls under the scope of WP5 "Replication Assessment and planning" and aims to guide and support local governments address challenges and explore a multitude of opportunities to improve their institutional capacity in tracking and assessing impacts of their planned climate and sustainable actions. It, therefore, addresses mainly local decision-makers, municipal staff and energy agencies involved in planning, implementing, monitoring and communicating urban climate change mitigation and adaptation or other sustainable development projects, and interested in following the latest standards and/or replicating available solutions.

This report synthesises the main findings of the ENERGee Watch project, in relation to the implementation of data management systems and analytics tools, identified throughout the successful execution of its unique peer-to-peer learning program and a series of national and EU-level replication activities. Additional information was acquired via an online survey launched at

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various stages of the ENERGee Watch learning program to obtain a wider range of views and lessons learned from those participants, who entered and successfully finished it. Both helped to identify successful practical examples in proven energy and climate data management procedures within existing municipal planning processes, as well as useful insights on drivers for local potential replication or up-scaling, and factors that may block or restrict relevant action.

1.2 Structure of the Deliverable

The remainder of this deliverable is structured as follows:

Section 2	Reflects on the rationale behind the need of developing and implementing robust management and monitoring procedures for climate and energy data, drawing from the latest literature in this emerging field of practice. It also highlights an assortment of common complexities and hindering factors, which are not necessarily unique to sub-national level, but do present a distinct set of challenges to those seeking to undertake relevant action citywide.
Section 3	Describes the methodological approach followed within the framework of the ENERGee Watch project for the identification of existing practical exemplars and the creation of the relevant inventory representing the ENERGee Watch participants' concerted effort to establish effective procedures for monitoring and assessing the performance of their local climate and sustainable actions. Results and key lessons learned originating from the research analysis carried out are also discussed in this section.
Section 4	Sets forth a collection of selected cases that can stand out as best practices for data management and tracking the progress of local climate and sustainable actions. In doing so, it aims to help cities and regions beyond those participating in the ENERGee Watch learning program to benefit from the lessons learned and the overall experience gathered by their peers.
Section 5	Closes this deliverable with the conclusion remarks summarising the main points around the applied methodological approach and the key findings resulting from our study. Corresponding messages drawn from them are expected to inform subsequent initiatives and endeavours looking at ways to advance local governments' expertise to replicate and integrate proven data management and monitoring practices into their planned sustainable strategies, and shape the future of municipal and regional related action around the EU.

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2. Data Management: Why does it matter?

Data management is key to tracking policies effectiveness and monitoring trends over time and urban energy and climate planning is no exception. If successfully implemented, sound data management procedures provide an unprecedented potential to track and evaluate the performance and the wider impact of the planned climate actions in more detail, as well as offer reliable and targeted information to the public, making the city accountable for its activities and increasing local actors' confidence. They also provide the potential to enable new information and lessons learned, thus driving future decision-making at all levels.

Albeit a challenging process, the ability of cities to demonstrate clear progress and quantify the benefits of their climate action planning can lead to greater access to national and international funding, while securing higher support from key stakeholder groups on the city level (Dinshaw *et al.*, 2014, Fisher *et al.*, 2015, UNFCCC, 2010). Furthermore, it can allow for knowledge sharing between cities and with experts, potentially enabling comparisons across different regions, depending on the level of the details provided, and encouraging replication of successful projects (Pringle, 2011).

2.1 Common Terms Used in this Report

Climate and energy data management can occur at a range of scales from individual projects in a specific locality to larger programmes and policies beyond the local or regional boundaries and can be interpreted in different ways. For the purposes of this report, we use the terms "Monitoring", "Verification", "Evaluation" and "Reporting", when referring to data management procedures, practices or approaches for sustainable climate and energy projects at the subnational level, treating them as distinct, yet closely linked processes. **Error! Reference source not found.**below explores these three terms as being used throughout this report.

Table 1. Monitoring, Evaluation and Reporting terms clarifications

Terms	Clarifications
Monitoring	The ongoing process of measuring or tracking the effects and implementation progress of a city's sustainable energy and/or climate plan (SEAP/SECAP), including also examination of the context and environment, within which the plan occurs. This may entail measurement of actual GHG emissions, estimating emissions or emissions reductions, and other sustainable development effects, such as changes in environmental, social, and/or economic conditions that occur as a result of the planned measures. Typically, this is done "by using systematic collection of data on specified indicators and reviewing the measure in relation to its objectives and inputs, including financial resources" (EEA, 2014, p. 98).
Verification	The confirmation, through the provision of objective evidence, that a city's sustainable energy and/or climate plan (SEAP/SECAP) continues to be as effective as when it was first validated and that specific requirements have been fulfilled. Typically, this is done by periodically subjecting the reported information and data to a review analysis or independent assessment to ensure completeness, reliability and accuracy of any established procedures or meaningful feedback for future improvements (Singh. *et al*, 2016).

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Evaluation	The systematic and objective process by which a city assesses the effectiveness of its sustainable energy and/or climate plan (SEAP/SECAPs) and their associated actions, measures, and goals, and thus understand changes made over time in line with the defined indicators and against an established baseline. The process is usually undertaken at a defined point in the project's implementation cycle, drawing upon a range of quantitative and qualitative data, including those gathered through monitoring (EEA, 2014).
Reporting	The process by which monitoring and/or evaluation information is formally communicated, often across different governance and geographical scales, spanning national, EU and international borders. It involves presenting data and analysis to key stakeholders inside and/or outside the coordination team for information, decision making, or knowledge sharing, thus facilitating the assessment of sustainable energy and/or climate plans (SEAP/SECAP) performance and enabling learning. Reporting can be voluntary or a legal requirement, depending on the governance context or the mechanism employed (EEA, 2014).

2.2 Purposes and Applications

A number of common purposes and applications are identified as having catalysed efforts to develop robust data management procedures at a range of scales (Bours *et al*., 2014a**,** OECD, 2015, Spearman & McGray, 2011). The most significant ones are presented below in **Table 2**.

Table 2. Purposes and applications of data management procedures

Purposes and Applications of Data Management Procedures	
Effectiveness and efficiency	Data management procedures can help understand whether (or not) an action plan and the implemented interventions have been effective in achieving their objectives and whether (or not) these objectives have been achieved efficiently. Among others, the latter often involves weighing up the costs and benefits (including value for money), the encountered risks and the timeliness of actions' implementation.
Accountability	Accountability or providing proof and evidence for the "value for money" of the implemented climate change and sustainability actions is closely linked to the effectiveness and efficiency considerations. It responds to the decision-makers' need to be aware of the economic implications of the selected course of actions, while supporting the case for future funding. On this ground it is increasingly identified as another core purpose of data management systems, especially at the local or regional level, along with transparency, clarity and credibility regarding the resources allocation, use and results achieved through the planned measures.
Assessing outcomes	Detection and assessment of the prescribed outcomes or the detected changes in a defined statistical manner is often viewed as useful stepping stones to reach an understanding of the achieved impact of the implemented policy and its associated actions or measures. Similarly, detecting or attributing likely causes for those outcomes with some defined level of confidence can inform next following decision-making on how to

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	best adapt to and/or mitigate future climate change effects. For those reasons, outcomes are placed at the heart of any data management system.
Learning/ Knowledge-sharing	Data management procedures, in particular evaluation and reporting, can potentially offer promising avenues for promoting experience-based learning and generating new knowledge in support of more informed climate policymaking and practices. That, together with efficient and effective ways of communicating, can help cities raise awareness among the general public, which can strengthen climate actions and political support.
Equity	Data management procedures, if implemented in a more holistic approach can enable a comprehensive understanding of the social and distributional impacts of climate policies, and thus identifying and prioritising opportunities that simultaneously address climate action and development needs. This can be particularly pertinent in cities where extreme vulnerabilities and social conflicts exist.
Transparency	Linked closely to accountability and equity, the purpose of transparency is to ensure clarity regarding the allocation, use and results achieved through a specific program or portfolio of sustainable energy and/or climate change adaptation/mitigation interventions.

2.3 Challenges

In practice, designing and/or implementing a data management process is methodologically knotty and relevant literature highlights a number of interlinked challenges that require specific reflection if monitoring, evaluation and reporting are going to be effective (Bours *et al.*, 2014a, Brown *et al.*, 2011, Lamhauge *et al.*, 2012**,** Preston & Stafford-Smith, 2009, Villanueva, 2011). The nature of these challenges is mostly context specific and may vary depending on whether data management practices are implemented individually or in combination.

Table 3. Challenges of data management procedures in urban climate planning

Challenges of Data Management Procedures in Urban Climate Planning	
Lack of a standard practical methodology framework	In most cases, practical experience supported by a standard methodology on data monitoring and management for climate adaptation and mitigation interventions is limited or missing. Despite some attempts made to design and implement generic frameworks and processes, the trend has been rather to supplement or provide general guidance on context-specific procedures designed for each project. That said, the main challenge here lies in the capacity to identify the most suitable suite of potential options, understand the different drivers and purposes underpinning them, and determine how these can be best adjusted or applied in the specific project to capture its impacts adequately.
Lack of universal indicators	In the absence of a meaningful standard metric framework, mitigation and (most importantly) adaptation projects' surveillance relies on either more generic or strictly localised indicator schemes. While both can lead to more nuanced and realistic indications of the derived impacts, limitations may exist in either describing the results directly attributed to each activity or opportunities for further replication respectively. Obvious as that may seem, the challenge here resides in finding good proxy indicators or in

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	normalising the baselines for existing indicators used as proxy indicators of impact, all of which are often time- and resource-consuming or unfamiliar to local staff and local actors typically involved in data management procedures.
Establishing a counterfactual baseline scenario	Typically, the definition of distinct baselines for adaptation and mitigation is a highly approximate exercise, given that both are not easily distinguishable in an already dynamic development process. Against this, the definition of a counterfactual baseline scenario which compares impacts to a basic "before project situation", can be a powerful tool in its own right. At the same time, it can be challenging mainly due to three different reasons: uncertainty, "shifting" baselines and data availability.
Uncertainty	Concerns about setting a counterfactual baseline scenario are often revolving around the uncertainty of the timing and the severity of climate change impacts, as well as the particular unfolding of those impacts locally. However, experience has shown that the time, effort and cost expended on the proper planning, design and implementation of data management activities can influence the quality and credibility of the reported impacts of a planned adaptation or mitigation intervention.
"Shifting" baselines	To capture "shifting baselines", or a number of factors such as a complex array of unpredictable climate and non-climate drivers surrounding the field of climate change as a whole and its resulting impacts in situ, through "normal" indicators places further emphasis on the capacity to normalise the evaluation metrics for changing climatic and environmental conditions. Nevertheless, such normalisation requires sufficiently long baselines and a comprehensive data set which is not always readily available, mainly due to a lack of prior experience with climate impacts.
Data availability	Baseline data for local climate adaptation and mitigation monitoring are not always suitable or fully available in the same format, on the same scale or over a coherent timescale. In the best-case scenario, they can be scattered across multiple existing sources beyond the city level, which may provide instrumental tools and a strong basis for assessing the progress and performance of the related urban expenditures. However, assembling, coordinating and combing information from so many sources can be challenging and time- and resource-consuming.

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Resource constraints	Different resource constraints, ranging from lack of appropriate investments both in data management processes, frameworks and tools, and in human and technical capacity to perform and maintain such processes and the associated analyses, are not unusual in practice, especially in local and regional contexts. In addition, given that the responsibility and costs of ambitious actions on limiting and adapting to climate change span across different sectors and departments in a city, difficulties in ensuring the effective and efficient allocation of resources further challenge both the implementation of a standard city climate action plan and the monitoring and verification of its progress.

As we unpack these challenges, further complexities may become evident, which if well appreciated can form the basis for further discussions around existing approaches and results-based frameworks with well-thought-out logic frames that are working well at all scales of application, thus being useful in informing current and future initiatives and decision-making, rather than discouraging local practitioners. In terms of ENERGee Watch, we define them as "best practices" on data management and monitoring procedures for sustainable energy projects at local and regional levels.

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3. Best Practices Identification and Collection

Already from its early stages, the ENERGee Watch project, has foreseen a dynamic exploration methodology to guide the process of collecting best practices and lessons learned from different EU cities that have developed or begun to develop approaches on MRV. Its fundamental mechanism revolves around two different, yet interconnected, sets of activities that have been carried out at the various stages of the ENERGee Watch project. The first one builds upon the cohesive "**Database of M&V best practices**", a specialised .xls-based template prepared at the early stage of the learning programme to compile and report the most successful data management practical examples around Europe brought by representatives of local authorities, who actively participated in the ENERGee Watch learning activities, in all four modules throughout the three LCs. The latter rests on the **verification of participants' experiences** done through a **survey form** available on the **EU Survey platform**.

This section briefly outlines the main elements of the project's exploration methodology and the way they have been employed to identify and rank both the emerging best practices and the related trends. Then a synthesis of the key takeaways and applicable lessons learned is provided.

3.1 Exploring the "Database of M&V Best Practices"

The "Database of M&V best practices" developed and established under Task 4.2 (Database of M&V best practices) has the aim to provide a unified list of the monitoring and evaluation methods, tools and processes for both adaptation and mitigation policies identified during the project's lifetime[1]. At the given time, it features 55 such cases originating from the ENERGee Watch participants' hands-on practical experiences and supplementary sources suggested from the ENERGee Watch project partners.

All of them have been carefully chosen through a thorough analysis and according to specific evaluation criteria, which were developed to ascertain whether an M&V approach, scheme or mechanism that can be of real use to local practitioners, is included in or proposed by. As a next step, the examined approaches have been further analysed and classified into "innovative", "good" or "promising" practices taking into account the extent to which the proposed evaluation criteria are satisfied by each case, either entirely or partly.[2] Special attention was given to the transferability and replicability potential of the proposed M&V practices to a wider audience, beyond the ENERGee Watch participants.

[1] The ENERGee WATCH "Database of M&V best practices" will be made publicly available via the ENERGee WATCH official website (https://energee-watch.eu) by the end of the project's duration.

[2] More information about the analytical framework for mapping and analysing the identified best practices and the implemented procedure is provided in the upcoming report of the ENERGee Watch project regarding the "Database of Replicable Monitoring and Verification Practices" (Deliverable 4.2).

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In this way, 2622 innovative practices were identified across the four ENERGee Watch thematic modules followed by 19 good and14 promising practical examples. **Table 4** below provides a quick "snapshot" of all of them. In terms of this report, a follow-up investigation of the above practices was carried out in an attempt to distinguish those that could best serve as testbeds for innovation to enable all EU cities to follow suit in the future. These practices concern the innovative and good ones identified earlier and are presented in detail in **Section** Error! Reference source not found..

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Table 4. Practices featuring the "Database of M&V best practices"

Case Studies		M&V Practices						
		ENERGee Watch Thematic Area				Classification		
		Data collection (acquisition & treatment)	Data monitoring & validation	Indicators for adaptation to climate change	Data display, dissemination, & validation	Innovative	Good	Promising
1	Waterford city and County Council (Ireland): Waterford Digital Strategy 2022-2026	X				X		
2	Dún Laoghaire-Rathdown County Council (Ireland): Climate Change Action Plan 2019-2024		X				X	
3	Dorida Municipality (Central Greece): Sustainable Energy Action Plan 2016			X		X		
4	Genoa Municipality-Liguria Region (Italy): Genoa 2050-Action Plan for a Lighthouse City				X	X		
5	Dijon, Bourgogne-Franche-Comté (France): Lighthouse city plan			X		X		
6	Alba Iulia/Alba County (Romania): The Energy Strategy of Alba County, 2018-2023	X				X		
7	Sofia Municipality (Bulgaria): Sustainable Energy and Climate Action Plan 2021-2030				X		X	
8	Alba Iulia/Alba County (Romania): Sustainable Energy and Climate Action Plan (SECAP), 2018-2023				X		X	
9	Piemonte Region (Italy): Regional Energy Plan		X					X

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10	Medjimurje Energy Agency-MENEA (Croatia): Raising capacity of cross-border public institutions in sustainable energy planning and management and climate change mitigation (SEPlaM-CC)		X					X
11	Municipality of Patras (Western Greece): Regional Plan for Adaptation to Climate Change			X				X
12	The eensight tool		X			X		
13	The Regionale Klimaatmonitor Databank		X			X		
14	The CLIMACT Prio tool			X		X		
15	The DATA4ACTION guidebook		X			X		
16	The TerriSTORY® decision-making web-tool				X	X		
17	The AdaptaVille mobilisation platform				X	X		
18	The ClimaSTORY® board game for raising awareness on climate change adaptation				X		X	
19	Resource Manager Catalogue (RM), Customer Energy Manager Catalogue (CEM), Aggregation & Market Integration from RESONANCE EU project	X						X
20	The GÉODIP mapping tool	X				X		
21	The EUCF (European City Facility) initiative			X		X		
22	The BeCoop Toolkit				X	X		
23	The IN-PLAN capacity building programme			X		X		
24	The Climate Protection Planner online tool		X			X		

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25	The MICATool		X			X		
26	The SocialWatt Decision Support Tools		X			X		
27	The CERVINO Alpine Energy Data platform	X						X
28	The Climate Change Adaptation Scoring Tool (ADAQA)			X		X		
29	The DiscoMap geographic information system				X	X		
30	The PROSPECT EU project Repository of Replicable Practices			X			X	
31	The SEAP Data Access Guidebook (for Ireland)				X		X	
32	The Climate Information portal			X		X		
33	The School of Bioclimatic Design for Adaptation and Mitigation (SBAM)			X			X	
34	The European Climate Adaptation Award (ECA)	X					X	
35	The Climate-ADAPT Urban Adaptation Map Viewer				X		X	
36	The Smart Density tool				X	X		
37	The European Climate Risk Assessment (EUCRA)		X					X
38	The ANERGO Observatory	X					X	
39	The ADAPTNOW Guidebook and Support Services Pack			X			X	
40	The Porto Energy Hub	X					X	
41	The RENOWABE investment programme			X			X	
42	The Collective Renovation Programme (CoachCopro)		X				X	

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43	The EXCITE project		X				X	
44	EKSyd-Energy Coaching for SMEs				X		X	
45	SHAREs Energy Communities and Collective Actions				X			X
46	The REMARKABLE Climate Leadership Programme (CLP)				X		X	
47	ROSE – Regional Observatory for Energy and GHG Emissions	X					X	
48	The ECOSPEED Region software		X				X	
49	The REGILIENCE self-assessment tool to spot risks for maladaptation.	X						X
50	The CLIMaterisk And vulnerability Assessment framework and toolboX (CLIMAAX)			X				X
51	The crossCert (Assessment of Energy Certificate in Europe) – KxC: Knowledge Exchange Centre			X				X
52	The MATRYCS Modular Toolbox	X						X
53	The BioScreen CEE			X				X
54	The GIS Heating Refurbishment Tool				X			X
55	The ClimAct CEE tool	X						X

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3.2 Exploring Participants' Experiences

Apart from creating a useful portfolio of M&V practices suited to the city or region level, it was deemed essential to reflect carefully and identify factors that can accelerate and encourage an increased application of those concrete exemplars, proven to work well in one setting, to different local contexts. To do so, an online questionnaire, referred to as the Mentee Experience Survey, was distributed to the ENERGee Watch participants in the aftermath of each LC. Our main intention was to further investigate what can best motivate local authorities to continue to share their experiences, explore and innovate.

In principle, the questionnaire focused on the participants' perspectives on the replicability of lessons learned and current practices analysed throughout the peer activities in the ENERGee Watch project, while asking whether they have found an appropriate M&V approach that best meets their requirements or represents a real value for them. The survey was thus mostly designed with open-ended questions setting up the context and allowing respondents to provide their feedback without bias and more qualitatively. Next to that, a number of closed-ended questions allowed us to detect on a more quantitative basis aspects related to priorities, needs and expectations as well as critical challenges and barriers that might impede effective application and/or replication of the finest M&V practices at a given country and policy type.

Overall, 34 answers were received, which corresponds to a 40.9% answer rate and makes a good result, given that the survey was relatively long[3]. Answers came from all ENERGee Watch courses through all LCs, as shown in **Table 5**.

Table 5. Number of respondents per course and learning cycle

Courses	LCs	Respondents
Course 1: Data collection (acquisition and treatment)	LC1	6
	LC2	3
	LC3	1
Course 2: Data monitoring and validation	LC1	1
	LC2	2
	LC3	1
Course 3: Indicators for adaptation to climate change	LC1	7
	LC2	5
	LC3	2
Course 4: Data display, dissemination and validation	LC1	3
	LC2	3
	LC3	0

[3] The survey consisted of a total of 16 key mandatory questions, including those asking more administrative information (7 questions), and 6 supportive questions providing extra explanation on matters not fully covered by the main initial answers.

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The diversity of cities and types of local officers that finally took part provided rich views on M&V practices for sub-national sustainable policies across Europe and made it possible to draw valuable conclusions for ENERGee Watch, in terms of its ability to act as a strong promoter of regional peer-to-peer learning tools and a focal point for expert knowledge sharing in this emerging field. This is expected to lead to the successful take-up of the ENERGee Watch's significant results by the largest possible number of regional and local authorities and their agencies for further replication.

3.3 Key Takeaways and Lessons Learned

The methodological approach followed in the light of this report highlighted a number of interesting trends and interlinked challenges and support needs, which seems to be pertinent to those having established and implementing or just begun to develop approaches to monitoring, evaluation and reporting at sub-national level. The precise nature of these findings is context specific and tailored to the city's experiences, as being collected from the ENERGee Watch participants' feedbacks.

This section provides a more detailed description of the above-mentioned topics which are sketched out as a good deal of practical lessons learned for local governments looking to develop, refine and improve data management systems. In this regard, the produced information, although not exhaustive, can be used to support policy and practice as well as to generate added value for future projects and further advancements in similar fields.

3.3.1 Coverage and effectiveness of the ENERGee Watch best practices

Key finding: Having the ENERGee Watch peer-to-peer learning program spanned within 62 organisations in 22 EU countries has laid the groundwork for greater impacts and replicability of its overall results, with special emphasis on the best practices identified through the implemented learning exchanges. The final best practices collection offers a "smorgasbord" of proven solutions that can be applied in many jurisdictions and under various circumstances in different localities.

Despite the fact that the concept of M&V related to urban sustainable policies and programmes is challenging and multifaceted, 55 best practices have been identified and selected during the ENERGee Watch's lifespan, as mentioned earlier. However, a special hindering factor witnessed is the insufficient amount of innovative and/or good practices coming from the ENERGee Watch participants, especially those originating from "smaller" European cities, in terms of area and population. In particular, in many cases:

- Limited evidence was found that novel M&V protocols and/or innovative elements of mitigation and/or adaptation had been embedded in mentees' plans,
- Whereas innovation for monitoring local climate mitigation and/or adaptation performance existed, limited evidence was found that the practice was well-known or used among local policy makers (transferability).

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These sub-optimal outputs can be indicative of the availability and the research/policy implementation progress on data management and monitoring procedures for sustainable energy actions at a local/regional level in the cases examined. This can be due to language barriers, such as papers and studies available only in native languages. As a result, limited insights into exactly what each of these cities is doing to advance M&V and address the related challenges were provided.

In response, the coverage of the innovative/and or good M&V practices has improved by members of the ENERGee Watch consortium, who had some insights beforehand about interesting cases and practical exemplars coming from a variety of key source of information and reflecting how this relatively new field proceeds or how it can be supported further. Within most of them monitoring, evaluation and reporting is identified as a critical step, enabling new information and lessons learned to shape future decisions.

On the whole, a number of the identified practices can be considered rather aspirational or emerging, yet many of them provide a good rationale, including descriptions of the information, analytical methods and key tools or mechanisms used. They also cover the entire data management procedure, from data collection to the monitoring, verification and reporting, hence the four ENERGee Watch modules, showing what works well, under which circumstances and for what reasons is vital.

3.3.2 Learning for improving current M&V practices

Key finding: Knowledge gaps are commonly seen as a major challenge to improved action in the field of data management and M&V practices for local sustainable interventions, with medium and small-sized cities presenting a stronger need for technical assistance, also with regard to facilitating exchange with peers on both national and the European level.

With holistic technical awareness on M&V for local climate and energy action lacking in many municipalities, there is now a growing emphasis on ensuring that learning and experience sharing is placed at the heart of cities' efforts to improve existing data management procedures. This constitutes a typical challenge, especially for regions that are still at the beginning of their adaptation and mitigation process or medium and small-sized municipalities with limited resources. Still, the same challenge also applies to cities that, although they have de facto sustainable measures in place, need to provide a more coherent and robust picture of the progress of their political action, hence a stronger evidence of policy effectiveness. This is perhaps not surprising given that advanced M&V mechanisms, if well adopted or incorporated into local action plans can accurately inform the allocation of related resources, while boosting the case for future adaptation funding (Fisher et al., 2015, UNFCCC, 2010).

Accordingly, feedback collected from the mentees' survey revealed a number of relevant considerations around the issue at hand, with most respondents indicating their keen interest in learning either to improve their internal capacity or personal knowledge. Also, identification and/or dissemination of good replicable practices has been indicated as a good reason for joining the ENERGee Watch peer-to-peer learning program. At a more general level, these findings may mean that most cities and regions would rather learn from practice than theory to avoid pitfalls and to find inspiration for their own local projects.

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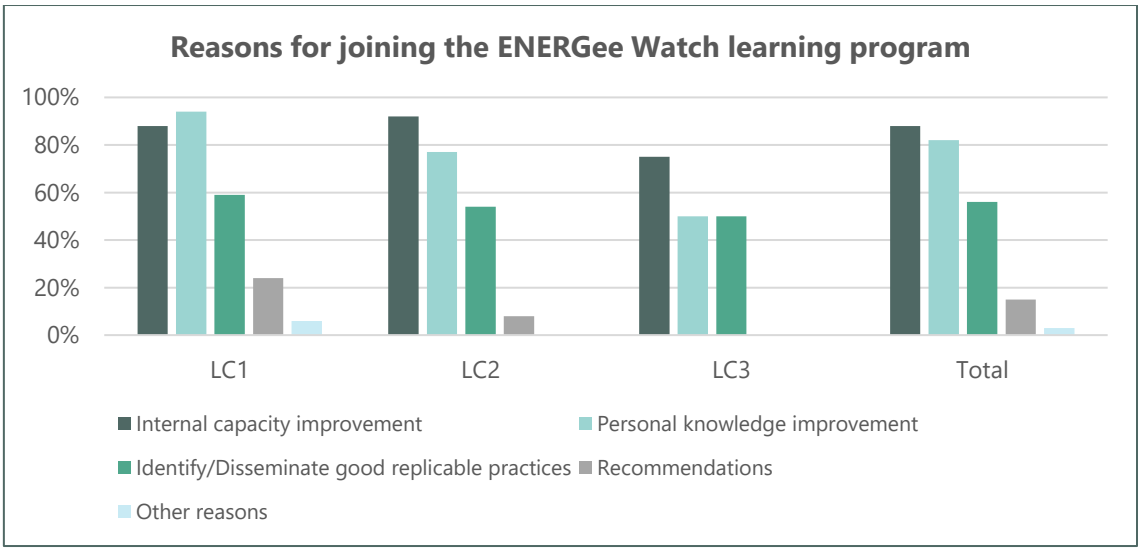

Figure 1. Perspectives on the reasons for joining the ENERGee Watch learning program

Indeed, exchanging practical knowledge and experiences among peers seems to present a valuable and mutually reinforcing opportunity for cities to inter alia reflect upon several methods applied in a range of different situations and localities. This in turn can facilitate new insights on process and strategy development for improvements in what is actually happening "on the ground". These conclusions were drawn from reviewing respondents' feedback when asked about if and how they have benefited from the peer-to-peer exchanges and the practical know-how gained through the ENERGee Watch learning program. On the flip side, evidence has been collected that some mentees might need further support to bring the range of M&V methodologies they have learned into the local planning process. Two factors leading to this output might be the lack of a clear mandate to municipal employees and departments to inform the revisions of data management procedures drawing upon emerging practices, or by the city's limited capacity to appropriately tailor certain frameworks to the context and programme at hand. Both viewpoints were particularly highlighted in some cases but were indirectly reaffirmed by almost all of the respondents.

3.3.3 Difficulties and barriers to develop or replicate best M&V practices

Key finding: To date, many cities have concentrated their efforts on advancing their data management activities, which reflects their intention for more accurate monitoring and evaluation results in their sustainable climate plans. However, several barriers and methodological challenges constrain such endeavours from being fully developed, especially when it comes to the definition and the assessment of the effectiveness of the implemented policies.

The past few years have seen an emerging focus on exploring and assessing local climate mitigation and adaptation performance, with an increasing number of EU cities taking action toward enhancing their data management procedures. However, progress varies considerably across different regions, mainly because successful experiences are limited, given that few cities have robust M&V frameworks in place, whereas most of these have only been established recently. In addition, cities' efforts to implement a sound monitoring, reporting or evaluation system are hindered by a number of barriers and constraints across or within particular sectors.

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Such obstacles, as perceived by the ENERGee Watch mentees include a mix of technical and organisational issues mainly concerning:

- lack of access to reliable data or technical knowledge for data processing and visualisation, which represented a major difficulty for most of the respondents,
- limited stakeholder engagement, which speaks to cities' ability to give greater exposure to their plans and the progress being made toward the long-term outcomes set, and
- bureaucracy, meaning the administrative system governing the way municipal departments typically function.

All three factors are also highlighted in the respective literature and have received more attention in recent years (Bours *et al*., 2014a, Brown *et al*., 2011, Lamhauge *et al*., 2012, Preston & Stafford-Smith, 2009, Villanueva, 2011). Nevertheless, taking into account the feedback received, data problems were pinpointed as the most critical issue for any M&V effort (79%), raising various needs for support in municipalities.

Many cities often lack data that is downscaled to the sub-national level since climate observations are usually made at the regional or national level, thus not being produced to serve the needs of municipal planning. On the other hand, municipalities may lack the capacity to interpret data in light of sustainable action planning, which is especially challenging for medium or small-sized cities with fewer resources available or not always correctly equipped to get meaningfully involved in monitoring and reporting procedures. This last aspect is often intertwined with the other two barriers identified, that are the capacities for awareness-raising and building trust among different municipal departments, so overcoming any encountered bureaucratic obstacle, as well as experts and other stakeholders across or within particular sectors. Both are indeed essential if different sectoral data and their interpretation are to be taken into account, especially from higher governance levels.

3.3.4 Motivational factors and support needs

Key finding: Recognition of cities' commitment on local climate mitigation and/or adaptation action is generally rated as a significant motivational aspect for initiating progress on how the extent to which their actions are effective and efficient is measured. However, with no specific support in place, a framework providing assistance, especially in the sub-national contexts, can give momentum and structure efforts by municipalities to achieve, monitor and assess climate resilience targets performance.

In general, the lack of practical examples and urban case studies to provide lessons learned on setting up climate and energy data management systems is indicated as a major challenge not only for cities that are just beginning to consider M&V for mitigation and/or adaptation, but also for those with more established approaches. Respectively, exchanging knowledge and experiences is perceived by the ENERGee Watch mentees as a crucial activity to improve action in such a dynamic field of practice.

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Despite that, only two respondents clearly stated their intention to further exploit the ENERGee Watch learning program for delivering national and local training sessions intended to enable easier and more successful implementation of their planned policies. This might lead to the conclusion that cities normally need support to initiate peer-to-peer exchanges for best practices, as this is not always a recognised priority for municipalities. Feedback gathered from the majority of respondents also reinforced such an assumption, with some of them raising specific concerns that successful examples need to be tailored to the policy analysed, taking into account its objectives, as well as the local or regional contextual background each time.

Combining both views results that promoting or replicating useful lessons and practices to other (non-participant) actors is among possible solutions to tackle barriers to M&V for local climate sustainable plans provided that each organisation is free to choose if and how to use them. Following that, the ENERGee Watch learning program seems to be viewed as a valuable tool "*in specific cases in the public sector [citywide]*" (Participant 1, Course 1, LC2) and "*extremely necessary for the future*" (Participant 1, Course 1, LC3), as it can help "*harmonise practices on a voluntary, yet solid basis*" (Participant 3, Course 4, LC2).

Ultimately, such findings speak for the effectiveness of the ENERGee Watch learning program in terms of having reached its long-term targets and mission, while meeting participants' expectations. As for the latter, almost half of them definitely found, during their mentoring sessions, a specific M&V practice or tool that could best fit their sustainable energy programs or be replicated at their local level. Also in a considerable percentage, mentees have already integrated or intend to integrate this specific M&V practice or tool into their professional tasks and activities. As a result, almost all of them show a strong will to recommend ENERGee Watch learning practices and outcomes to other local authorities or their work colleagues.

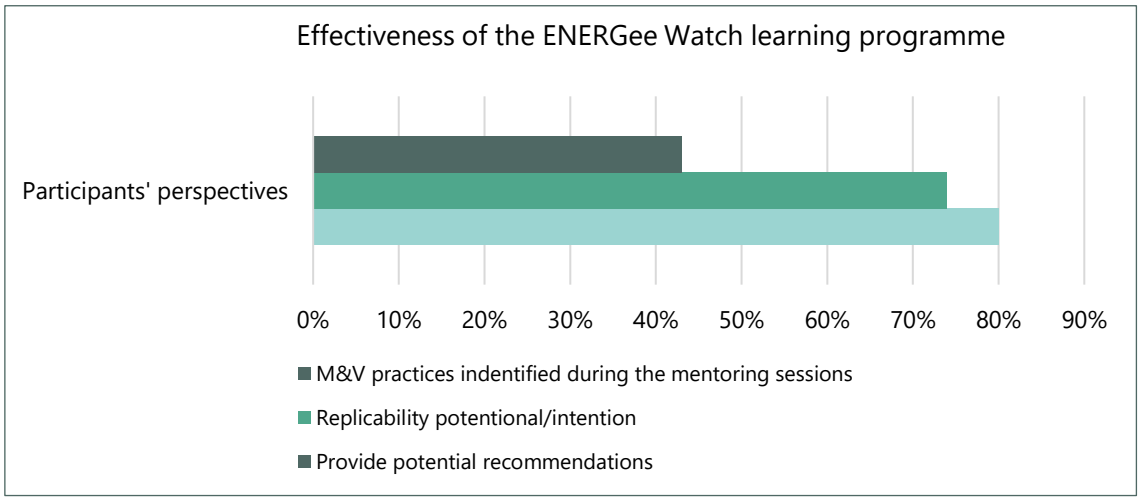

Figure 2. Perspectives on the effectiveness of the ENERGee Watch learning programme

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4. Best Practices Leading the Way

The best practices featuring in this section were thoughtfully chosen out of the 55 ones that are included in the ENERGee Watch "Database of M&V best practices", and identified as the main front-runners specifically for sub-national level M&V planning. That said our report concerns only findings which:

- are perceived as "innovative" or "good" practices[4],
- are currently implemented by municipalities and/or deployed by other initiatives to support local climate change and sustainability actions,
- may present approaches integrated into other policy documents and instruments or projects and other measures and/or comprehensive stand-alone methodological M&V framework or relevant technological solutions.

Additional criteria applied here correspond to the following requirements:

- The practice should be transferable and not an isolated one.
- The practice should be well documented not only in its original language, but also preferably have information available in English.

Based on these indices, a total of 28 innovative and good M&V practices were shortlisted. All of them are presented below.

Table 6. Selected innovative and good practices from the "Database of M&V best practices"

Waterford Digital Strategy, 2022-2026 | Ireland			
Organisation	Waterford city and County Council		
Description	The strategy provides a roadmap for the implementation of the long-term "Smart Waterford" strategy for enabling communities and businesses to reap the full rewards of a digitally enabled society.		
ENERGee Watch Focus	Data collection (acquisition & treatment).		
Scope of Innovation	Green and digital transformation.		
Objectives	• Ensure Waterford makes best progress on Broadband roll out and maximises the benefits that it can bring to all citizens especially in rural areas; • Build and promote Waterford's role as a Smart City within the South East region; • Provide a focus for the Council's engagement with a range of external stakeholders including local "digital champions"; • Leverage the "digital" actions already identified in a range of other Council strategies and help align/ co-ordinate the digital strategies of other public agencies at local level; • Facilitate access to online Council services; • Lay the ground for enhanced job creation prospects because of the digital economy.		
Stakeholder Engagement	10 remote working hubs: Arclabs, Boxworks, Dungarvan Business Centre, Dungarvan Enterprise Centre, Dunhill Ecopark, Fumbally Exchange, Innovation House, South East BIC Ltd, Tallow Enterprise Centre, Waterford City Community Enterprise Centre CLG.		
Level of Engagement	Regional; Citizens & community.		
Implementation Status	Active	**Implementation Framework**	5 years
Range/Classification	Innovative		
Source	https://www.waterfordcouncil.ie/media/meetings/2022/plenary/june/5.%20Draft%20Digital%20Strategy%202022-2026%20Plenary%209th%20June%202022.pdf		

[4] A more comprehensive version of the analysis guidelines can be found in the upcoming report of the ENERGee Watch project regarding the "Database of Replicable Monitoring and Verification Practices" (Deliverable 4.2).

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Dún Laoghaire-Rathdown: Climate Change Action Plan, 2019-2024 | Ireland			
Organisation	Dún Laoghaire-Rathdown County Council		
Description	Documentation of the occurrence of past climatic events, their frequency and the associated risks, as well as the level of vulnerability of specific areas in Dún Laoghaire-Rathdown. Because of the shifting adaptation baseline highlights, emergency planning needs to be continually updated in line with extreme weather events.		
ENERGee Watch Focus	Data monitoring and validation.		
Scope of Innovation	Annual monitoring and reporting; Counterfactual (shifting) baseline scenario.		
Objectives/Outcomes	• Establishment of four Climate Action Regional Offices (CAROs), each led by a local authority; • Implementation of 144 actions in total, across the five theme areas of Energy & Buildings, Transport, Flood Resilience, Nature Based Solutions and Resource Management; • Continuous collaboration between the Council and the Eastern and Midland Regional Assembly (EMRA) in the EU funded PROGRESS project where they developed a mapping approach to provide enhanced information and to improve decision-making regarding the management of existing green infrastructure.		
Stakeholder Engagement	This Climate Change Action Plan has been prepared by the Dublin energy agency Codema, in partnership with the Climate Change and Energy Strategic Policy Committee and the Elected Members of Dún Laoghaire-Rathdown County Council.		
Level of Engagement	Local level within a city/region; Regional/Territorial.		
Implementation Status	Active	**Implementation Framework**	5 years
Range/Classification	Good		
Source	https://www.dlrcoco.ie/environment/climate-change-action-plan-2019-2024		

Dorida Municipality: Sustainable Energy Action Plan (SEAP), 2015-2020 | Central Greece			
Organisation	Municipality of Dorida		
Description	The plan envisages the achievement of the overall reduction of CO_2 emissions in the Municipality of Dorida, which is expected to reach 25%. The largest overall savings, as well as the largest reduction in emissions, are planned to come from interventions in the building sector (public, private and residential) and in transportation.		
ENERGee Watch Focus	Indicators for adaptation to climate change.		
Scope of Innovation	• Vertical and horizontal integration; • Cross-border dialogue facilitating mutual learning, collaboration, and sharing of good practices and knowledge through participation in funded programmes and similar initiatives (i.e., BEACON project);		
Objectives/Outcomes	Develop a vision and mainstream climate action via: • Internal restructuring and cooperation; • Facilitating collaboration with local stakeholders; • Implementing new climate action measures; • Setting up a monitoring and energy management system (ISO 50001) to monitor energy data of buildings and the municipal car fleet; The latter was planned with the support and inspiration from the BEACON project.		
Stakeholder Engagement	Centre for Renewable Energy Sources and Saving (CRES), which supported the development of Dorida's SEAP. Additional stakeholders reached: Energy Cities, Energy Cities Romania (OER); ENVIRON Association; FCiências.ID – University of Lisbon; National Trust Ecofund Bulgaria (NTEF); SEVEn; The Association of Municipalities Polish Network (PNEC); 34 municipalities and 57 schools within the BEACON project.		
Level of Engagement	Local; National.		
Implementation Status	Finished	**Implementation Framework**	5 years
Range/Classification	Innovative		
Source	https://mycovenant.eumayors.eu/docs/seap/15823_1477056171.pdf https://www.euki.de/wp-content/uploads/2021/10/BEACON_from_action_to_impact_Final_Brochure_EN.pdf		

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Genoa Municipality-IRE Liguria | Genoa 2050-Action Plan for a Lighthouse City (Italy)			
Organisation	Municipality of Genoa- IRE Liguria (Energy Agency of Liguria Region)		
Description	Genoa 2050 Action Plan is revolving around three assets, three pillars, six focuses and 12 actions, which aim to achieve a better governance of the city system, to strengthen the urban fabric and to innovate the development of infrastructures, networks, services and communications.		
ENERGee Watch Focus	Data display, dissemination and validation.		
Scope of Innovation	Development of: • an online platform for dissemination, information sharing and training purposes; • an innovative indicator framework, inspired by the opportunities offered by investment in urban resilience and the progressive development towards the Doughnut Economy, which are the expression of the urban strategy's transversal systems.		
Objectives/Outcomes	The online platform is open to everybody and operates as a place for sharing and training, allowing for : • accessing and downloading contents from the Strategy and Genoa 2050 Action Plan, and • being updated on the activities carried out by the Office on the topic of sustainable and resilient urban development. The Lighthouse framework consisting of 170 indicators, which make it possible to: • measure both the state of the art and the level of advancement of the city's quality and resilience, also via simulations, and • disclose overall the path and progress towards a Lighthouse city. It operates as an interconnected system of characteristics/themes that must be placed in synergy with each other to achieve the best results for the citizen and the city as a whole. Each of them is divided into sub-themes, defined by precise performance indicators.		
Stakeholder Engagement	The Office collaborates at the national level with numerous Universities and other Research Centers including i.e. the University of Genoa, the University of Turin and the IUAV University of Venice.		
Level of Engagement	Local; Regional; National.		
Implementation Status	Active	**Implementation Framework**	30 years
Range/Classification	Innovative		
Source	https://circularcitiesdeclaration.eu/fileadmin/user_upload/Images/Pages_Images/Genoa/GENOVA_2050_-_ActionPlan_light_Eng_town_approval_06052021.pdf		

Dijon, Bourgogne-Franche- Comté: Lighthouse City Plan | France	
Organisation	Dijon metropolis
Description	The French city of Dijon pilots a unique Lighthouse City Plan funded by the EU RESPONSE project, which brings together 8 cities (active signatories of the Covenant of Mayors - CoM for Climate and Energy Initiative) sharing a common vision for accelerating the decarbonisation of their territories. Dijon Metropolis (DM) is highly committed to achieving the necessary energy transition by inventing the territory of tomorrow through its comprehensive digitalisation strategy.
ENERGee Watch Focus	Indicators for adaptation to climate change.
Scope of Innovation	Creation of a leading digital public authority through the: • engagement into the "OnDijon" smart city dynamic and, • definition of a pioneer data e-governance strategy.
Objectives	OnDijon project is hinged around a connected control centre, which, thanks to public services digital data, makes it possible to: • simplify and better coordinate the metropolis' service maintenance operations in the public space; • remotely manage all urban amenity equipment across all territory's municipalities; • ensure the safety and security of the public space; • coordinate transport modes and journeys throughout the territory; • foster transparency in terms of the way the Metropolis and its services are managed. In addition, Dijon Metropolis implements a proactive open data policy providing access to public service data and sharing it with digital economy players. This includes, but not limited to: • the annual monitoring and computing of statistics on the energy consumed and GHG emissions at the scale of the territory by the local energy and air quality agency ATMO BFC;

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	• the OPTEER Climate, Air and Energy platform, developed by the ATMO BFC; • an integrated and interconnected open data platform, to facilitate communication and data sharing.		
Stakeholder Engagement	Areas' municipalities, Local/Regional stakeholders from different sectors, Citizens.		
Level of Engagement	Local level within a city/region; Regional/Territorial; National; Citizens & community.		
Implementation Status	Active	**Implementation Framework**	5 years
Range/Classification	Innovative		
Source	https://h2020response.eu/cities-of-focus/lighthouse-cities/#dijon https://h2020response.eu/wp-content/uploads/2022/05/D1.5-Master-City-Plans-for-TA3-Sustainable-Energy-Storage.pdf https://h2020response.eu/wp-content/uploads/2022/05/D3.2-RESPONSE-Data-Governance-and-CIP-Operational-Framework.pdf		

Alba Iulia Municipality: The Energy Strategy of Alba County, 2018-2023 | Romania			
Organisation	Municipality of Alba Iulia/Alba County		
Description	Through the implementation of its Energy Masterplan, currently refreshed into The Energy Strategy of Alba County 2018-2023, Alba Iulia aspires to address the city's challenges related to urban mobility, energy and environmental issues in a more harmonised way. To that end, Alba Iulia counts on EU funding, including its participation in a multitude of EU funded projects such as the SIMPLA HORIZON 2020 project, which offers local authorities an innovative, comprehensive approach to harmonise energy, transport and mobility planning in the frame of wider urban development and land-use planning, providing a step-by-step methodology described in the chapters of these guidelines. The present plan has been prepared by Local Agency for Energy Alba (ALEA) in cooperation with the Tractebel Engineering.		
ENERGee Watch Focus	Data collection (acquisition and treatment)		
Scope of Innovation	Integrated SECAP (harmonised SEAP, adopted in 2019, and SUMP, adopted in 2020); Harmonised data exchange and common databases.		
Objectives/Outcomes	In the elaboration of the Masterplan the principles followed were: • increasing energy efficiency in all types of human activity; • use of renewable energy sources where their potential had already been identified; • systematic promotion of energy management. Indicator development for monitoring and evaluation of the impact of the implementation of the Masterplan, in relation to: • the decrease in energy intensity; • the amount of emissions of greenhouse gases; • the share of green energy in the energy total;		
Stakeholder Engagement	Alba County Council, ALEA, Local Councils, County School Inspectorate (ISJ), CL, CJ, Public service operators, SC DEE Electrica Distribuţie Transilvania Sud, Electrica Furnizare Transilvania Sud – Supply operator, E.ON Gaz Distribuţie, Public transport operators, Industrial parks, Agriculture departments/associations, „1 Decembrie 1918" University, Private partners.		
Level of Engagement	Local; Regional; Citizens & community.		
Implementation Status	Active	**Implementation Framework**	5 years
Range/Classification	Innovative		
Source	https://alea.ro/media/2015/02/The-Energy-Masterplan-of-Alba-County-Executive-Summary.pdf https://projects2014-2020.interregeurope.eu/fileadmin/user_upload/tx_tevprojects/library/file_1571695730.pdf		

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Sofia Municipality: Sustainable Energy and Climate Action Plan (SECAP), 2021-2030 | Bulgaria			
Organisation	Municipality of Sofia		
Description	The plan envisages developing an information system and the monitoring and analysis of the "adaptation" indicators as part of the Cohesion and Development Tools for Strengthening the Interregional Cooperation in the Balkan area. In addition, it aims to develop and promote a vision for "Sofia 2050" as a compact, diverse and adaptable city, able to skilfully manage its resources and involve citizens in the decisions for the future. Thus, seeking to create and maintain a variety of opportunities for development and high quality of life. In accordance with these identified priorities for development, the strategic document identifies seven main areas of development (urban environment, economy, people, environment, identity and culture, transport, management) for each of which long-term development goals have been formulated.		
ENERGee Watch Focus	Data display, dissemination and validation.		
Scope of Innovation	Integrated approach to the planning and reporting on the energy and climate activities, combining the municipal policies on climate change mitigation and adaptation, energy efficiency and renewable energy use.		
Objectives/Outcomes	• The establishment of the "Climate, Energy and Air" Directorate which will perform the general coordination of the planned activities; • The facilitation of the full set of climate data provision through the study of the full spectrum of eco-system services and their benefits; • The design and pilot implementation and evaluation of payment schemes for benefits from ecosystem services in selected neighbourhoods; • Facilitate investment in technical and green infrastructure, buildings and public works with a focus on the protection of tall public and multifamily residential building facades; • The monitoring and control of the plan implementation; • The implementation of a special communication strategy to promote the actions for the municipal climate policy implementation and the engagement of the broad public; • The implementation of 29 mitigation measures and 36 adaptation measures.		
Stakeholder Engagement	Climate and Energy Council with experts from MoEW, ME, MRDPW, SEDA, the Sofia Regional Administration, UACEG, St. Kliment Ohridski Sofia University and the Technical University of Sofia.		
Level of Engagement	Local		
Implementation Status	Active	**Implementation Framework**	9 years
Range/Classification	Good		
Source	https://balkanforumthess.mathra.gr/wp-content/uploads/2021/10/3_Teodora-Polimerova.pdf https://www.sofia.bg/documents/20121/675793/2023-03-09-1.+SECAP_Sofia_2021-2030-EN.pdf/9bab8cff-1549-c0a8-ec2a-c6e4fcba0114		

Alba Iulia Municipality: Support Sustainable Energy Action Plan (SEAP), 2014-2020 | Romania	
Organisation	Municipality of Alba Iulia/Alba County
Description	Alba Iulia Municipality, through implementation of the present Action Plan, is expected to improve the energy efficiency, smart energy management and renewable energy use in public infrastructure. This main objective was further divided into two specific targets: • Promotion of best practices in the green public buildings and inform and engage the population to participate actively, and • Embed low-carbon targets into decision-making processes at city/regional level, related to green public buildings. The implementation of the Action Plan was also based on the proposed transnational Pilot Action that was submitted in the framework of LOCARBO, a European partnership project active from April 2016 to March 2021.
ENERGee Watch Focus	Data display, dissemination and validation.
Scope of Innovation	Bottom-up activities and innovative tools/methodologies, proposed under the LOCARBO project to integrate energy transition and climate change policies with a structured process of raising awareness among citizens and political decision-makers.
Objectives/Outcomes	Five important results were expected from the Action Plan implementation:

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	• Promotion of exemplary study cases of green public buildings; • "Improving behaviour" campaigns; • Public buildings refurbished in an energy efficient way; • New ideas for improving POR Axis 3.1 (financing activities to increase the energy efficiency of residential buildings); • New plan for energy efficiency improvement of Alba Iulia Municipality.		
Stakeholder Engagement	• Center Regional Development Agency, which is responsible for the policies' implementation: • Local associations and NGOs which aim to contribute to the sustainable development of the city: PAEM ALBA FOUNDATION, Alba Agency for Local Energy ALEA; • Private architecture/construction companies and firms: Enerom Sebes, Architectural Office "STRAJAN". • Decisionmakers: Agency for Environment Protection; • Actors involved in the refurbishment process, namely associations or other references working with the municipalities for the refurbishment activities of buildings: Energy Auditorium Body – Alba County • Other public institutions: University Alba Iulia, Technical University of Cluj Napoca (Alba Iulia Branch).		
Level of Engagement	Local; Regional; National; Citizens & community.		
Implementation Status	Finished	**Implementation Framework**	5 years
Range/Classification	Good		
Source	https://projects2014-2020.interregeurope.eu/fileadmin/user_upload/tx_tevprojects/library/file_1657182517.pdf https://projects2014-2020.interregeurope.eu/fileadmin/user_upload/tx_tevprojects/library/file_1549024862.pdf		

The CLIMACT Prio tool | Cities Alliance			
Organisation	Cities Alliance is a global partnership fighting urban poverty and supporting cities to deliver sustainable development that support national and local governments to develop appropriate policy frameworks, strengthen local skills and capacity, undertake strategic city planning, and facilitate investment.		
Description	CLImate ACTions Prioritization (CLIMACT Prio), created and distributed by researchers at the Institute for Housing and Urban Development Studies at Erasmus University Rotterdam, is a climate awareness, decision support and capacity-building tool for screening, prioritisation and evaluation of local climate change actions. Its main purpose is to guide city planners and decision-makers to justify decisions on a specific course of actions considering all possible values and objectives underlying climate change and broader environmental planning.		
ENERGee Watch Focus	Indicators for adaptation to climate change.		
Scope of Innovation	A Multi-Criteria Analysis (MAC)-based tool that supports informative decision-making and actions prioritisation for sustainable urban planning.		
Objectives/Outcomes	CLIMACT tool serves as a support tool in real-life decision-making and sustainable development action prioritisation analysis at city level, without however displaying or suggesting an optional opinion. It rather requires users to draw conclusions and scrutinise their priorities at project or policy level by assessing and/or comparing multiple alternatives considering different socio-economic or climate scenarios. To that end, it utilises a multi-criteria, both quantitative and qualitative, impact analysis framework, against which a wish-list of actions based on cities' vulnerability profiles, broader development goals and visions is assessed. The outcome is a weighted presentation of acceptable and/or unacceptable possibilities that express the overall valuation of users regarding the feasibility of each selected action.		
Stakeholder Engagement	Local authorities, Regional authorities, National governments, Urban planners, City managers, Academic and Research Institutions in the field of climate change in urban areas.		
Level of Engagement	Local; Regional; National.		
Implementation Status	Finalised/Active	**Availability**	Free
Range/Classification	Innovative		
Source	https://city-development.org/tool-19-climact-prio/#1472660365357-fe4ea7fa-1d8b7466-96d4		

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The DATA4ACTION Guidebook | Data4Action Intelligent Energy Europe funded Project			
Organisation	Data4Action: A co-funded Intelligent Energy Europe (IEE) project, which aims to foster collaboration models in energy data exchange between public authorities and energy data providers, which will in turn lead to sustainable energy planning at regional and local level. The project was led by the Agence Régionale de l'Energie et de l'Environnement en Rhône-Alpes (RAEE), the regional energy and environment agency of the Auvergne Rhône-Alpes region of France.		
Description	DATA4ACTION guidebook is a data access guidebook for Sustainable Energy Action Plans (SEAPS) designed to help users: • identify and access reliable and accurate energy data in their region or territory; • develop and implement win-win collaboration models in energy data sharing; • establish a Regional Energy Data Centre providing data services to public authorities for sustainable energy planning; • develop policies supporting energy data sharing for sustainable energy planning by public authorities; • develop and monitor an informed Sustainable Climate and Energy Action Plan, with energy planning tools that reflect the needs of municipalities and communities in their region; • engage with regional and local stakeholders during the preparation and monitoring phases of their plans in order to get their buy-in and support, thereby ensuring measurable, long-term benefits for their territory.		
ENERGee Watch Focus	Data monitoring and validation.		
Scope of Innovation	Establishment of long-term data exchange models in sustainable energy planning through cooperation between public authorities and energy data providers.		
Objectives/Outcomes	Guide and support the successful implementation and monitoring of SEAPS through • identification of transferable models of collaboration;, • improved energy data access and sharing; • implementation of long-term win-win collaboration models through bilateral data exchange cooperation agreements; • establishments of one-stop shop" regional data centres or observatories.		
Stakeholder Engagement	The Guidebook has been primarily developed for: • Public Authorities that are seeking better access to local, accurate energy data within their territory for use in sustainable energy planning; • Energy Planning Facilitators wishing to support the development of advanced collaboration models between public authorities' data providers such as Regional Data Centre or Energy Observatory; • Energy Data Providers willing to play a positive role in the development and implementation of Regional and Local Energy Policies.		
Level of Engagement	Local; Regional.		
Implementation Status	Finalised/Active	**Availability**	Free
Range/Classification	Innovative		
Source	https://fedarene.org/wp-content/uploads/2021/11/valide-16-04-2017D4A-D6.6_SEAP_Data_Access_Guidebook_UK.pdf		

The TerriSTORY® Decision-making Web-tool | AURA-EE	
Organisation	Auvergne-Rhône-Alpes Energy Environnent Agency (AURA-EE)
Description	TerriSTORY® is Reference Decision-Making Web-tool for Territories in Transition supporting them with cartographic multi-thematic data (energy, climate, economy, etc.) visualisation and analysis. TerriSTORY® is • regularly updated with new data sets and new functionalities; • present in 6 French regions and is becoming a reference tool at national level.
ENERGee Watch Focus	Data display, dissemination and validation.
Scope of Innovation	Support online data visualisation and territorial planning
Objectives/Outcomes	Thanks to its dynamic and interactive visual interface, TerriSTORY® helps to understand the territory, identify its potential and the priority action levers. On that basis, the tool allows to: • simulate prospective scenarios, by measuring their socio-economic and environmental impacts;

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	• build a territorial path that meets the territorial challenges ahead; • organise in an educational way the dialogue between stakeholders within a territory in a shared territorial project logic.		
Stakeholder Engagement	A mix of professionals from different scales and sectors involved in planning, implementing, monitoring and communicating urban climate change mitigation and adaptation or other sustainable development projects.		
Level of Engagement	Local; Regional/Territorial; National.		
Implementation Status	Finalised (Regularly updated)/Active	**Availability**	Free
Range/Classification	Innovative		
Source	https://terristory.fr/		

The ClimaSTORY® board game | AURA-EE			
Organisation	Auvergne-Rhône-Alpes Energy Environnent Agency (AURA-EE)		
Description	ClimaSTORY® was first showcased at the EU Strategy for the Alpine Region EUSALP event as part of the French presidency in Chamonix-Mont-Blanc on 30 September 2020. It is a playful medium created by AURA-EE in 2019 with the contributions of many partners, for facilitating collective reflection on climate change and adaptation action around 5 sectors of economic activities: • Agriculture and Forest; • Industry; • Tourism, Trade and Crafts; • Health and Safety; • Development, and Management of Resources and Biodiversity. An English version of the game is now available, whereas AURA-EE is currently preparing a training programme to become ClimaSTORY facilitators. These facilitators will be available to communities and stakeholders, who would like to organize a collective brainstorming session on adaptation to climate change in their area.		
ENERGee Watch Focus	Data display, dissemination and validation.		
Scope of Innovation	An ideal solution to encourage: • collective reflection ideal for raising awareness among people with little or no knowledge on climate change adaptation, • initiate cross-departmental work in project mode, • project implementation teams to defocus and consider their activity from a new angle.		
Objectives/Outcomes	Designed for use by all types of territorial actors, ClimaSTORY® proposes to consider a fictitious territory from the angle of climate change and adaptation solutions. The game is divided into 10 tables and participants work in thematic pairs around a map of a fictional large-format territory. Guided by an animation protocol, and with the help of facilitators, participants are led to: • Appreciate the chain impacts of climate change; • Express tensions or cooperation between themes; • Identify adaptation solutions; • Define a response plan for the community. AURA-EE is currently testing an evolution of the process towards a support tool for the territories, with two local authorities committed to the TACCT approach (Territorial climate change adaptation trajectory) of the ADEME: the Chamonix-Mont-Blanc Community of communes and the Urban Community of Puy-en-Velay. This new version can serve as a classic animation session allowing all actors to work on the solutions as closely as possible to their reality.		
Stakeholder Engagement	Local authorities and actors; Regional authorities and actors; Agencies and professionals at urban level; Initiated public.		
Level of Engagement	Local; Regional/Territorial; Citizens & community		
Implementation Status	Active	**Availability**	Free
Range/Classification	Good		
Source	https://www.auvergnerhonealpes-ee.fr/passer-a-laction/adaptation-au-changement-climatique/climastory		

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The European City Facility (EUCF) | Energy Cities, Climate Alliance, adelphi, ENVIROS, ICLEI, GNE Finance			
Organisation	The EUCF is a European initiative composed by a consortium of 7 EU partners : Energy Cities (coordinator), Climate Alliance, FEDARENE, adelphi, ENVIROS, ICLEI (Local Governments for Sustainability) and GNE Finance. The Board, which is responsible for strategic steering of the EUCF, is composed of representatives of all European city networks that are leading the Covenant of Mayors Office (Energy Cities, Climate Alliance CEMR, Eurocities and ICLEI). In addition, an Investment Advisory Group (IAG) is part of the EUCF Governance bodies, ensuring a solid link between the EUCF operation and outcomes and the expectations of potential investors. From 2019 until 2024, the European City Facility has received funding from the European Union's Horizon 2020 research and innovation programme, whereas from 2022 until 2027 the initiative is co-funded by the European Union through the LIFE Programme.		
Description	EUCF has a clear mission to provide tailored technical guidance and financial support (in the form of a EUR 60,000 grant) to its beneficiaries in order to enable them build comprehensive sustainable energy investment programmes at local level.		
ENERGee Watch Focus	Indicators for adaptation to climate change.		
Scope of Innovation	Bridge two fundamental barriers for sustainable energy investments at the local level: • lack of financial and legal capacity to transform local long-term energy and climate strategies into sufficiently mature investment concepts, • lack of technical capacity to aggregate fragmented smaller projects into larger investment portfolios, and thus mobilising subsequent or additional financial resources.		
Objectives/Outcomes	The specific objectives of the EUCF are to: • Provide hands-on locally rooted technical and financial expertise, inspired by 'best in class' European practice, to municipalities, local authorities and local public entities aggregating municipalities/local authorities to deliver credible and scalable investment projects, which should trigger public and private investment; • Build the capacity of municipal staff to develop substantial project pipelines and provide them with tools, networking and knowledge transfer opportunities, which will facilitate and accelerate the IC implementation, including via innovative financing mechanisms and project aggregation. • Facilitate access especially for small and medium-sized municipalities, to private finance, EU funding streams and similar facilities, such as the European Structural and Investment Funds, EU Project Development Assistance programmes and the European Investment Bank's (EIB) European Local Energy Assistance) and advisory services such as the EIB Advisory Hub to realise and amplify the expected investments. • Use the successful investment concepts and the knowledge of EUCF beneficiaries to reach out to more than 10,000 local governments, encourage replication and catalyse further action across European cities.		
Stakeholder Engagement	Municipalities/local authorities, their groupings and local public entities aggregating municipalities/local authorities.		
Level of Engagement	Local; Regional/Territorial.		
Implementation Status	Active	**Availability**	Free
Range/Classification	Innovative		
Source	https://www.eucityfacility.eu/about/what.html		

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The BECoop Toolkit | BECoop project			
Organisation	The BECoop project, funded by the European Union's Horizon 2020 Research and Innovation programme is backed by a multidisciplinary consortium of 12 partners across the EU: WHITE Research and Consulting (coordinator), GOIENER, Karditsa Energy Community, GMINA OBORNIKI SLASKIE, Federazione Italiana Produttori di Energia da Fonti Rinnovabili, SÜDTIROLER ENERGIEVERBAND, CIRCE Research Centre for Energy Resources and Consumption, CERTH Centre for Research and Technology HELLAS, Institute for European Energy and Climate Policy, Wroclaw Universitt of ENvironmental and Life Sciences, Q-PLAN International, CBS (Coppenhagen Business School).		
Description	BECoop aims at providing the necessary conditions, technical as well as business support tools, for unlocking the underlying market potential of community bioenergy, fostering new links and partnerships.		
ENERGee Watch Focus	Data display, dissemination and validation.		
Scope of Innovation	Equip administrative authorities with support schemes (replication guidelines, networking with more advanced regions, self-assessment tools, evidence from real practice) and skills (capacity building) so as to enable them to introduce and promote enabling frameworks for community bioenergy.		
Objectives/Outcomes	The BECoop Toolkit is a comprehensive suite of open access tools and supplementary resources providing valuable knowledge and support to a broad range of bioenergy communities actors, from technology providers to policymakers. It consists of: • a self-assessment tool for enabling non-specialised users to assess current status and future potential for market uptake in their region, and • an online inventory of differently categorised existing open-source tools that can complement the support services required for community bioenergy project development (technical tools, business model tools, community tools and related projects). Two additional tools have been developed and made publicly available by the BECoop project: • The e-market environment, which is designed to connect supply chain stakeholders and support them when developing a community bioenergy project. • The Knowledge Exchange Platform, an online repository of supporting resources in the field of community bioenergy heating that allows knowledge and experience sharing.		
Stakeholder Engagement	Local government/authorities; Actors within the community bioenergy logistic chain, raw biomass producers, biomass fuels producers, final biomass users, transportation/ storage companies; Citizens Energy Communities (CECs).		
Level of Engagement	Local; Regional/Territorial; Citizens & community.		
Implementation Status	Active	**Availability**	Free
Range/Classification	Innovative		
Source	https://becoop.fcirce.es/toolkit https://becoop-kep.eu/		

The IN-PLAN capacity building programme | IN-PLAN project	
Organisation	IN-PLAN (Integrated Energy, Climate and Spatial Planning) project, co-funded by the European Union through the LIFE Programme, is composed by a consortium of 9 EU partners: North-West Croatia Regional Energy Agency-REGEA (coordinator), Institute for European Energy and Climate Policy-IEECP, Urban Innovation Vienna Gmbh-UIV, Technological University of the Shannon: Midlands Midwest-TUS, Innovatum Progress AB-EKV, Area di Ricerca Scientificae Tecnologica di Trieste-ARE, Alba Local Energy Agency-ALEA, Tipperary Energy Agency-TEA, FEDARENE
Description	The project aims 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 and climate plans 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. From its onset, the IN-PLAN will engage 15 local and regional authorities – the Lighthouses – to co-create, implement and refine the IN-PLAN practice, its operational guidelines and the capacity-building

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	programme, whereas 30 more authorities – the Pilots – will also partially benefit from the IN-PLAN practice.		
ENERGee Watch Focus	Indicators for adaptation to climate change.		
Scope of Innovation	Empower local and regional authorities in developing and implementing integrated energy, climate, and spatial planning in their territories through a 6-steps approach: • Create a governance structure plan to ensure vertical and horizontal cooperation. • Assess the local context for opportunities and barriers. • Engage stakeholders and citizens from the very beginning. • Use data/Define a data collection and management plan to ensure consistency, reliability and accessibility of data. • Create 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, clear goals and foresee challenges and opportunities.		
Objectives/Outcomes	IN-PLAN sets forth a two-step capacity-building programme for local and regional governments and their agencies, which involves: • Train the trainers: empowering energy, climate and/or development agencies from across Europe to become IN-PLAN Multipliers. • Pass on the knowledge to local and regional governments, the Replicators, which will be tutored either by the five national project partners or by the trained multipliers.		
Stakeholder Engagement	Local/Regional governments; Local/Regional agencies involved in implementing, cordinating and facilitating urban energy and environment policies.		
Level of Engagement	Local; Regional/Territorial.		
Implementation Status	Active	**Availability**	Free
Range/Classification	Innovative		
Source	https://fedarene.org/project/in-plan/capacity-building-process		

The Climate Protection Planner Online Tool | Climate Alliance			
Organisation	Climate Alliance		
Description	The Climate Protection Planner online tool is an internet-based software, which entered the market in early 2016 and is available for use by all interested local authorities in Germany, helping them to monitor their municipal and/or communal climate protection action. It was developed by Climate Alliance eV, ifeu - Institute for Energy and Environmental Research Heidelberg and Institute for Decentralized Energy Technologies (IdE), and funded by the Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB).		
ENERGee Watch Focus	Data monitoring and validation.		
Scope of Innovation	Enable cities and regions to create energy and greenhouse gas emissions balances and inventories according to the Germany-wide standardised BISKO method.		
Objectives/Outcomes	The Climate Protection Planner online tool: • comes with comprehensive and up-to-date statistics, factors and other key figures, thus reducing data collection needs, and • is flexible enough to allow for the input of more precise local data should this be available. The benchmarking module within the tool employs both qualitative as well as quantitative aspects of climate action monitoring, helping municipalities to see how their progress compares to others.		
Stakeholder Engagement	Development of the Climate Protection Planner for German municipalities began in 2012and carried out by the three project partners Climate Alliance eV, ifeu - Institute for Energy and Environmental Research Heidelberg and Institute for Decentralized Energy Technologies (IdE) and funded by the Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB). The tool entered the market in early 2016 and is now available for use by all interested local authorities		
Level of Engagement	Local; Regional/Territorial.		
Implementation Status	Active	**Availability**	Free
Range/Classification	Innovative		
Source	http://www.climatealliance.org/activities/projects/climate-proctection-planner.html		

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The MICATool | MICAT project			
Organisation	MICAT (Multiple Impacts Calculation Tool) is an EU HORIZON 2020 funded project aiming at highlighting the additional value of energy efficiency measures and investments by estimating Multiple Impacts of Energy Efficiency (MI-EE) that could help close the energy efficiency gap, and thus facilitating better energy-relevant decisions and policymaking.		
Description	The MICATool seeks to enable policymakers and practitioners to conduct simplified analyses for different data and policy scenarios, in order to compare and assess the relevance of the multiple impacts and strengthen reporting and monitoring at all governance levels. The methodological approach employed builds on existing concepts for quantifying Energy Efficiency (EE) impacts and the role of their Multiple Impacts (MI-EE).		
ENERGee Watch Focus	Data monitoring and validation.		
Scope of Innovation	Develop a comprehensive approach to estimate Multiple Impacts of Energy Efficiency (MI-EE).		
Objectives/Outcomes	The MICATool enables holistic analyses of MI-EE at the European, national and local levels to: • strengthen the climate strategy of the Energy Union, and • accelerate an affordable and just sustainable energy transition by addressing the challenges and needs of important target groups: policy makers, practitioners and evaluators. Results can be used to report on target progress at the EU level, for Integrated National Energy and Climate Plans (NECPs) or other reporting requirements at national levels, as well as in local reporting on energy efficiency within Sustainable Energy and Climate Action Plans (SECAPs).		
Stakeholder Engagement	Experts, policy makers, representatives of public administrations and institutions, universities and institutes, businesses and civil society.		
Level of Engagement	Local; Regional; National; Citizens.		
Implementation Status	Active soon in August 2023	**Availability**	Free
Range/Classification	Innovative		
Source	https://micatool.eu/micat-project-en/		

The SocialWatt Decision Support Tools | SocialWatt project	
Organisation	SocialWatt is an EU HORIZON 2020 project aiming at enabling obligated parties under Article 7 of the Energy Efficiency Directive across Europe to develop, adopt, test and spread innovative schemes to alleviate energy poverty.
Description	In terms of the Social Watt project, three decision support tools are developed with the aim to help utilities and energy suppliers: effectively identify energy poor households, and implement and monitor schemes that focus on increasing the energy efficiency of these houses: • SocialWatt Analyser, to identify energy poor households. • SocialWatt Plan, to elaborate Energy Poverty Action Plans. • SocialWatt Check, to monitor and assess the energy poverty schemes.
ENERGee Watch Focus	Data monitoring and validation.
Scope of Innovation	Support obligated parties under Article 7 to fulfil energy efficiency obligations and enhance Corporate Social Responsibility strategies.
Objectives/Outcomes	• SocialWatt Analyser, is a user-friendly decision support tool designed for helping utilities, energy providers and energy service companies to identify energy poor households by collecting and combining users' consumption and cost data at the household level. It also uses readily available data (e.g., climate data, income data), computed data (e.g. energy needs) and other consumers' data (e.g. arrears on utility bills). • SocialWatt Plan incorporates an optimisation process that is structured in a Multi-objective Programming framework, developed to consider a set of targets and constraints, and to minimise investment costs from the uses' perspective with the aim to maximise energy savings. It is designed to enable utilities, energy providers, energy service companies, and other interested parties to evaluate the performance of different schemes and actions to tackle energy poverty. • SocialWatt Check tool aims to monitor the effectiveness of schemes implemented by all interested parties and evaluate their impact, in terms of energy savings, CO2 emission reductions, increases in

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	renewable energy production. The tool can also estimate the long-term impact of schemes based on their current performance.		
Stakeholder Engagement	Energy agencies and all obligated parties under Article 7 of the Energy Efficiency Directive across Europe.		
Level of Engagement	Local; Regional; National.		
Implementation Status	Active/Regularly updated	**Availability**	Free
Range/Classification	Innovative		
Source	https://www.socialwatt.eu/en/socialWatt-tools		

The Climate Change Adaptation Scoring Tool | EURO-LCP			
Organisation	EURO-LCP (Local Climate Plans) initiative.		
Description	The Climate Change Adaptation Scoring Tool collects local climate plans and policies in European cities and assesses their content with respect to important plan quality criteria, ambition levels, sectoral scope and depth, integration and mainstreaming.		
ENERGee Watch Focus	Indicators for adaptation to climate change.		
Scope of Innovation	Provide and assess information about the quality and relevance of adaptation processes and actions.		
Objectives/Outcomes	The Climate Change Adaptation Scoring Tool is designed to assess the quality of adaptation planning processes and related documents against three indices developed under the ADAptation plan Quality Assessment index (ADAQA). Accordingly, the tool measures the • depth, particularly in relation to fact base and measures (ADAQA-1); • breadth, mainly with regard to adaptation measures (ADAQA-2); • combination of consistency and justice between risks, measures, monitoring and evaluation, and participation (ADQUA-3). The ADAQA quality assessment index is based on six well-established principles of plan quality: 1. fact base; 2. goals; 3. measures; 4. implementation; 5. monitoring & evaluation of measures; and 6. societal participation.		
Stakeholder Engagement	Scholars, policy makers, decisionmakers and practitioners across different governmental levels and sector from European cities.		
Level of Engagement	Local; Regional; National.		
Implementation Status	Finalised/Active	**Availability**	Free
Range/Classification	Innovative		
Source	https://climatechangeadaptationscoringtoolv.azurewebsites.net/Identity/Account/Login?ReturnUrl=%2F https://www.nature.com/articles/s42949-023-00085-1		

The Climate Information Portal | WMO,WCRP,GCF	
Organisation	Developed by the Swedish Meteorological and Hydrological Institute (SMHI) on behalf of World Meteorological Organization (WOM), World Climate Research Programme (WCRP) and Green Climate Fund (GCF).
Description	The portal is designed to facilitate climate information and guidance for adaptation and mitigation activities via three online tools: • Site-specific report, which provides an instant climate change overview for any location worldwide; • Data access platform, which enables easy access to a number of pre-calculated indicators and the exploration of interactive maps and graphs; • Climpact, which calculates climate indicators using localised weather and climate data.
ENERGee Watch Focus	Indicators for adaptation to climate change.
Scope of Innovation	Climate science information for effective climate action and decision-making.
Objectives/Outcomes	The online service provides: • Instant summary reports of climate change for any site on the globe. • Easy access to number of pre-calculated climate indicators, based on state-of-the-art in climate science, of the past, present and future.

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	• Climate information guidance.		
Stakeholder Engagement	A mix of professionals from different scales and sectors, involved in planning, implementing, monitoring and communicating urban climate change mitigation and adaptation or other sustainable development project.		
Level of Engagement	Local; Regional; National.		
Implementation Status	Finalised/Active	**Availability**	Free
Range/Classification	Innovative		
Source	https://climateinformation.org/		

The School of Bioclimatic Design for Adaptation and Mitigation | ANCI Emilia-Romagna, AESS			
Organisation	ANCI Emilia-Romagna (Regional Association of National Italian Municipalities, and AESS (Agency for Energy and Sustainable Development)		
Description	SBAM-School of Bioclimatic Design for Adaptation and Mitigation is an outreach and training opportunity aimed at: • responding to the need of local authorities to develop new skills concerning urban climate adaptation; • launching training courses with a focus on climate resilience, addressing public officers and technicians; • creating a network of competent professionals ready to implement adaptation strategies.		
ENERGee Watch Focus	Indicators for adaptation to climate change.		
Scope of Innovation	SBAM has seen a lasting social network development among public servants, thanks to various meetings that naturally activated an exchange of experiences and best practice.		
Objectives/Outcomes	• Develop participants' knowledge base on the conscious design of public spaces using nature-based solutions (NbS) and sustainable urban development • Allow for widespread climate change adaptation actions that can significantly improve the comfort of urban areas. Such actions may involve mitigating the heat island effect, avoiding local flooding, improving air quality, and stimulating social inclusion.		
Stakeholder Engagement	A mix of professionals from different scales and sectors, involved in planning, implementing, monitoring and communicating urban climate change mitigation and adaptation or other sustainable development project.		
Level of Engagement	Local; Regional; National		
Implementation Status	Finalised/Active	**Availability**	Active
Range/Classification	Good		
Source	https://managenergy.ec.europa.eu/school-bioclimatic-design-adaptation-and-mitigation-sbam-2023-06-08_en		

The Climate-ADAPT Urban Adaptation Map Viewer | Climate ADAPT	
Organisation	Climate ADAPT initiative, a partnership between European Commission (EC) and the European Environment Agency (EEA).
Description	The Climate-ADAPT Urban Adaptation Map Viewer is part of the European Climate Adaptation platform and is designed to provide information on adaptation planning and actions of European cities assessing: • current and future climate hazards at the city level; • cities' vulnerability to these hazards; • cities' adaptive capacity. It makes it possible to compare individual cities to each other, and to identify other cities in similar situations.
ENERGee Watch Focus	Data display, dissemination and validation.
Scope of Innovation	Comprehensive overview of the current and projected climate impacts in European cities.
Objectives/Outcomes	The Climate-ADAPT Urban Adaptation Map Viewer collates information from various sources, combined with the Urban Audit city factsheets, as to provide a thorough analysis on: • the observed and projected spatial distribution and intensity of high temperatures, flooding, water scarcity, wildfires and vector-borne diseases; • the causes of cities' vulnerability and exposure to these hazards;

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	• cities' characteristics and population, and • cities' climate action planning. It also suggests additional sources of information, such as illustrative case studies and relevant indicators, for learning more about the climate risks to European cities.		
Stakeholder Engagement	All local and regional governments and a mix of professionals and experts from a range of scales and sectors across Europe.		
Level of Engagement	Local; Regional; National.		
Implementation Status	Finalised/Active	**Availability**	Free
Range/Classification	Good		
Source	https://climate-adapt.eea.europa.eu/en/knowledge/tools/urban-adaptation		

The Smart Density tool | Chalmers, BTH, SLU, Boverket, Norrköping Kommun			
Organisation	The tool is the result of two research projects, Density and Sustainability: Norms in Practice and the Results of Research, and Smart Density. financed by Formas, the government research council for sustainable development. In both projects researchers specialized in urban density from three Swedish universities collaborated: Chalmers University of Technology, Blekinge Institute of Technology (BTH) and Swedish University of Agricultural Sciences (SLU). Further, Swedish National Board of Housing, Building and Planning (Boverket) participated in the project and Norrköping municipality, where the tool was tested.		
Description	The Smart Density tool enables urban planners explore the effectiveness of higher density (as a means) for achieving sustainable urban development (the goal), and to balance these two, while at the same time acknowledging the need for some form of densification to handle current urbanisation rates. The idea is that the tool shall provide decision support and advice when choosing measures.		
ENERGee Watch Focus	Data display, dissemination and validation.		
Scope of Innovation	Offer more accurate descriptions of the positive effects of density on public infrastructure, mobility and economics and, on the other hand, the negative environmental, social and health impacts, by providing: • support in trade-offs, and • motivation for compensatory measures that can eliminate or mitigate any negative effects.		
Objectives/Outcomes	The Smart Density tool consists of an interactive web-based database, which builds upon the results of a meta-study of 229 empirical peer-reviewed studies and breaks down density impact on a six areas, public infrastructure, mobility, economy, environment, social impact and health impact. By choosing a category, an overview of results is presented including text, tables and diagrams showing: • the percentage of studies that point to a positive effect of densification, and • percentage of studies that point to a negative effect. There are three levels to assess the results: • First level: Provides an overview of the density impacts on the six main categories, while enabling comparison of results from studies in Asia, North America and Europe and access to the published papers within each main category. • Second level: Provides an overview of the results within each main category, while allowing comparison of results from studies using data gathered at different resolutions and access to the published papers within each sub-category. • Third level: Provides access to all the published papers.		
Stakeholder Engagement	Professionals in general and detailed planning; Other practitioners, who work with community development issues, on a generalist as well as a specialist level.		
Level of Engagement	Local.		
Implementation Status	Finalised (Regularly updated)/Active	**Availability**	Free
Range/Classification	Innovative		
Source	https://www.smog.chalmers.se/smartdensity		

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The ANERGO Observatory | ALEA			
Organisation	ANERGO, the Alba Energy Observatory was established in the framework of a European project, as a structure within ALEA, the Alba Energy Agency. The management of the observatory is carried out by the Regional Steering Committee and its members that represent all types of the stakeholders involved in, mainly energy data providers and facilitators and local/regional authorities.		
Description	ANERGO facilitates the exchange of energy and climate data between municipalities and energy services providers, public transport, and other sectors within Alba County. As of today, it is considered a successful example as a result of its expertise and capacity to: • produce aggregated reports at local/county level such as charts, diagrams on energy consumption and GHG emissions, for different consumer sectors (e.g., public lighting, municipal buildings), and • support and assist municipalities in the implementation and monitoring of their local action plans for climate resilience and sustainability (e.g., SEAPs,SECAPs etc).		
ENERGee Watch Focus	Data collection (acquisition and treatment)		
Scope of Innovation	Aggregate energy consumption and climate data at local and regional level, per sectors for territorial-administrative units.		
Objectives/Outcomes	One of the key roles of ANERGO observatory is monitoring: • final Energy consumptions at county level, and • energy production from renewables. Other significant long-terms objectives involve: • Building and adapting the online energy data files for local authorities, energy data providers and individual consumers; • Enhancing partnerships with existing observatory partners and attracting new partners; • Identifying new ways towards a better partnership management at regional level; • Elaborating Baseline Emissions Inventories – BEIs for local authorities; • Setting up Monitoring Emission Inventories – MEIs that will represent trusted sources of energy data for the local authorities; • Carrying out experience exchanges and enhancing cooperation with other energy observatories already established in Europe, while sustaining the development of new ones; • Implicating individual consumers in the process of better understanding and adjusting the average consumption levels of residential areas, as well as providing feedback based on their input.		
Stakeholder Engagement	Local authorities, Regional authorities, Energy data providers, energy facilitators and citizens.		
Level of Engagement	Local; Regional/Territorial; Citizens & communities.		
Implementation Status	Finalised/Active	**Availability**	N/A
Range/Classification	Good		
Source	https://anergo.alea.ro/ https://alea.ro/anergo/misiune-obiective https://energee-watch.eu/wp-content/uploads/2021/04/ALEA_ANERGO-final.pdf		

The Porto Energy Hub | PortoEnergy ElevatoR (PEER) EU project	
Organisation	The Porto Energy Hub was born from the Porto Energy ElevatoR (PEER) project, funded by the EU's HORIZON 2020 Research and Innovation Programme, and backed by a consortium of 4 EU partners: AdEPorto - Porto Energy Agency (coordinator), S317 Consulting, TELLES De Abreu E Associados - Sociedade De Advogados, and RdA Climate Solutions.
Description	Committed to mitigate energy poverty, the PEER project features the Porto Energy Hub, which is envisioned to be a centre for knowledge dissemination, advice, monitoring, and quality guarantee to support the implementation of energy efficiency projects and the harness of renewable energies, in the housing sector, individual dwellings, municipalities and overarching housing stock. This advice point is already available both online and in physical modes, to ensure the service is available for all. In addition, a mobile unit (van) is moving around the territory reaching areas in situation of energy poverty, particularly vulnerable households.

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	In a first phase, the focus is on the building material, in particular social and low-income housing both private and public owed, in the North of Douro river region the Porto Metropolitan Area AMP-ND. However, the Porto Energy Hub intends to extend its support to the entire Northern Region and to other territories that wish to benefit from the PEER project's approach. The idea is to promote energy efficiency in buildings - responsible for 30% of CO_2 emissions in the AMP-ND - and to encourage self-consumption of energy, individually and collectively, from clean sources in particular, through the promotion of about 12 MW of renewable energy systems. As of today, three other similar initiatives have been implemented in three other municipalities of the region: Matosinhos Energy Hub; Trofa Energy Hub; Valongo Energy Hub.		
ENERGee Watch Focus	Data collection (acquisition and treatment)		
Scope of Innovation	Develop a bold renovation programme to fight energy poverty and improve living conditions through: • the deployment of novel business and procurement models for the market, and • the creation of physically or virtually based advisory tools for both citizens and homeowners as well as and professionals such as designers, and contractors, helping them to plan renovation works in all their aspects.		
Objectives/Outcomes	The Porto Energy Hub acts as "One-Stop-Shop" (OSS) for integrated services and tools that promote: • the ongoing renovation of the AMP-ND region's social housing building stock, and • the awareness of municipal technical employees and decision-makers regarding the need to foster renewable energy communities that include vulnerable settings. The services provided range from sharing information on technical issues to mainstreaming alternative financial, business and contractual (legal) models to: • foster private investment • help citizens to better engage in energy efficiency and renewable energy production. The goal is to guide citizens throughout the whole renovation process following all steps of an energy efficiency project, starting from raising their awareness up to the implementation and the quality assurance and monitoring. All actions are supported by capacity building, communication and dissemination activities, which among others aim at boosting synergies and easing market barriers wherever necessary.		
Stakeholder Engagement	Low-income homeowners; Public and private building owners; Project developers; ESCO; Financial institutions; Municipalities.		
Level of Engagement	Local; Regional/Territorial, National.		
Implementation Status	Active	**Availability**	Free
Range/Classification	Good		
Source	https://portoenergyhub.pt/en/homepage		

The European Energy Award-Central and Eastern Europe municipalities| EXCITE EU project	
Organisation	EXCITE is an Horizon 2020 Research and Innovation project that supports the successful take-up of the European Energy Award (eea) in Bulgaria, North Macedonia, Romania, Slovenia and Ukraine by providing direct technical assistance for 3 pilot cities in each country. On top, it delivers specialised training for local energy managers, tailored business models for local climate actions, and broad civil engagement campaigns.
Description	The European Energy Award (eea) is a comprehensive quality management and awarding system for municipalities and regions designed to promote exemplary energy and climate policy and implementation activities with a long-term view at a local level, while enabling benchmarking between municipalities at national and European level. The process and the tools provided support local authorities in establishing interdisciplinary planning approaches and implementing more effective and context-specific energy and climate policy measures, and makes municipalities' success in energy efficiency and climate protection measurable and visible. Furthermore, participating municipalities and districts appreciate a number of additional benefits, such as coaching by external energy experts and regular reviews of their energy & climate activity programme based on both quantitative and qualitative indicators.
ENERGee Watch Focus	Data monitoring and validation.
Scope of Innovation	Set up a well-established energy management framework based on the eea methodology in Central and Eastern Europe municipalities, helping them:

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	• become trusted partners for investors, • engage local communities for deliberate climate action, and • gain Europe-wide public recognition for their efforts.		
Objectives/Outcomes	To achieve its overarching goal, EXCITE: • brings over best practices in energy management of eea winners and recommended citizen engagement tools, • develops a dedicated online capacity building platform offering opportunities for blended learning, qualification and certification of municipal energy managers by local and international eea consultants, • delivers a review of business and financing models relevant to eea methodology.		
Stakeholder Engagement	Municipalities and local governments in Bulgaria, North Macedonia, Romania, Slovenia and Ukraine.		
Level of Engagement	Local; Regional/Territorial; National.		
Implementation Status	Active	**Availability**	Free
Range/Classification	Good		
Source	http://www.excite-project.eu https://www.european-energy-award.org		

The REMARKABLE Climate Leadership Programme (CLP)| REMARKABLE EU project			
Organisation	REMARKABLE is a Horizon 2020 Research and Innovation project aiming at supporting local leaders in seven regions across Europe to translate strategic aspirations and policies into concrete measures towards carbon neutrality by 2050. The project is backed by a consortium of 10 EU partners: Technological University of the Shannon-TUS (coordinator), Auvergne-Rhône-Alpes Energy Agency-AURA-EE, European FEDARENE, ESCAN, Institute for Innovation and Development of the University of Ljubljana-IRI UL, Energikontor Norr, REGEA, EnerGap, Tipperary Energy Agency (TEA), Upper Austria Energy Agency-OÖ Energiesparverband.		
Description	REMARKABLE puts forth an innovative Climate Leadership Programme (CLP) designed with and for leaders who, through their actions and inspiration, are expected to drive their communities and public authorities towards climate solutions. The CLP is an innovative training and co-creation programme for existing and emerging local (municipal) climate leaders designed as a service to increase their skills and capacities in implementing transformational roadmaps and innovative solutions to achieve the strategic goal of climate neutrality. CLP participants will become the core of the REMARKABLE Leaders Circle, a network of Climate Leaders at local, regional, national, and EU level, who will continue to engage and replicate and the project's activities beyond its lifetime.		
ENERGee Watch Focus	Data display, dissemination and validation.		
Scope of Innovation	Develop the REMARKABLE Climate Leadership Programme (CLP) based on insights generated through ethnography-inspired qualitative research and focus-group co-creation workshops.		
Objectives/Outcomes	Through its CLP activities, remarkable will deliver and facilitate: • the training of 120+ actors from multiple sectors, • the establishment of 60+ territorial roadmaps, • 14 new Climate Neutrality Services and Solutions (CNSS) for the 7 Regional Energy Agencies involved, helping them expand their roles as change agents in the Clean Energy Transition, • a network of more than 300 REMARKABLE Leaders, who will create synergies with relevant existing networks and initiatives, and continue support local authorities, communities and regions to effectuate their ambitious climate neutrality goals. • a new leadership capacity across Europe		
Stakeholder Engagement	Municipalities; Regional Energy Agencies; Public authorities; Communities.		
Level of Engagement	Local; Regional/Territorial; National		
Implementation Status	Active	**Availability**	Free
Range/Classification	Good		
Source	https://climateleaders.eu/		

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The ROSE – Regional Observatory for Energy and GHG Emissions | AREC			
Organisation	The Île-de-France Regional Energy and Climate Agency (AREC)		
Description	ROSE, is the official regional energy and GHG observatory of Ile-de-France, and is co-managed by the Île-de-France Regional Council and the French State. It is a network, created in 2008, that is involved in the elaboration of the regional plan for climate, while helping municipalities across the region with: • the evaluation phase of their Climate and Energy Plans; • monitoring regional policies such as Regional Plan Climate Air Energy (SRCAE).		
ENERGee Watch Focus	Data collection (acquisition and treatment).		
Scope of Innovation	ROSE energy-climate data is available through its dedicated tool: ENERGIF.		
Objectives	ROSE is providing data to local authorities in the Paris region dealing with their territorial energy and climate plan, by monitoring: • Final energy consumption, energy production (mainly from renewable and recovery sources) and energy distribution (district heating mainly) • Energetic and non-energetic GHG emissions, including CH_4 emissions from the agriculture sector. The main input data used are real data from regional and local levels based on statistical data, average energy consumption rates and GHG emissions rates due to energy consumption on the territory. Rose also works on: • the valorisation of local actions made by local communities about Renewable energy and energy efficiency, • dissemination and communication of practical examples to other local communities.		
Stakeholder Engagement	Local and regional public authorities; Energy planning facilitators; Energy data providers and a mix of relevant professionals.		
Level of Engagement	Local; Regional/Territorial.		
Implementation Status	Active	**Availability**	Free
Range/Classification	Good		
Source	https://www.roseidf.org/ http://sigr.iau-idf.fr/webapps/cartes/rose/?op=trsp		

5. Concluding Remarks

This report constitutes the background report for the work done under Task 5.3 of the ENERGee Watch project (Recommendations & lessons learned). Primarily, this involved offering a carefully selected menu of high-impact practical examples on data management and M&V practices and processes, with a focus on climate and sustainable urban planning, which could with confidence be pursued by cities and regions around the EU. Furthermore, outlining critical lessons learned and recommendations for local governments that, if well-considered, could facilitate the uptake of those proven exemplars at the speed necessary to meet looming climate related impacts at the sub-national level. Overall, the ultimate purpose was to equip local practitioners with clear and practical guidance, to facilitate them devising robust M&V and data management frameworks that fit their actual programs, contexts, and purposes.

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To achieve this, the report began with a context-setting section aimed at explaining how to better approach data management for local climate change adaptation and mitigation, with emphasis on how typical M&V methods are utilised and what are the key challenges surrounding them. It continued with describing the research approach applied for the identification of a number of pragmatic M&V solutions at the city and/or regional level drawing from the ENERGee Watch participants' hands-on experience and their perspectives on practical issues that might enable or create barriers to developing, implementing or exploiting their full potential. Our analysis combined two key sources: The ENERGee Watch "Database of M&V best practices" and a specialised online survey carried out to capture respondents' viewpoints in more depth.

With respect to the first one, all information of the "Database of M&V best practices" was further reviewed, which allowed us to select the 28 practices featured in more detail in this report. The latter, despite not being representative of all well-recognised best practices across the EU, cover a good diversity of cities and types of stakeholders, thus providing rich qualitative views about different application opportunities across the four ENERGee Watch thematic areas that all EU cities can follow. As such, they can serve well as a basis for further experience sharing, which can in turn feed back into an enhanced revision of existing local M&V frameworks over time.

ENERGee Watch participants' feedback showed that there is a need to strengthen the knowledge base about how to best track progress and assess measurable achievements from urban climate resilience planning, through initiatives that foster learning and expertise-sharing among peers. While data problems and effective resource allocation, including coordination of activities across different departments and governance levels, were pointed by many respondents as critical issues for any M&V activity, connecting to and learning from various networks are possible solutions to tackle barriers to more optimised monitoring, reporting and evaluation procedures.

Ultimately, our findings, although based on a relatively small sample and so need to be further tested, clearly reaffirm the overall mission of the ENERGee Watch project, which revolves around the key objectives of:

- ✓ Establishing a unique peer-to-peer learning program, where local and regional authorities and their implementing agencies can interactively learn from their peers, and
- ✓ Creating the most favourable conditions for its replication and sustainability beyond the project's lifetime.

In this regard, they speak for the effectiveness of the whole intervention logic, in which the ENERGee Watch courses were to go beyond the mere provision of information, and therefore yielded numerous outputs in terms of technical know-how transfer potential and the identification of a compendium of replicable M&V practices (innovative, good, promising). We can assume then that the peer learning proposed and implemented by ENERGee Watch indeed is a good capacity building example, which opens a window of opportunity for new initiatives and future support structures to successfully build upon.

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