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Assessment of the Covenant of Mayors initiative in the Southern Mediterranean region

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Contents

Abstract

In 2023 the Covenant of Mayors (CoM) turned 15 years since its launch. Initially started to support EU local authorities in reducing their greenhouse gas (GHG) emissions, it is today the world's largest urban climate change and sustainable energy initiative. Its growth in geographical coverage over the years has been accompanied by an acceleration in both the scope and relevance of the initiative.

This report focuses on the Mediterranean community of the CoM (CoM Med) and on the key role local authorities in this region can play in supporting international and EU's climate objectives. It summarises the findings from the assessment of 73 Sustainable Energy Access and Climate Action Plans developed by cities across 7 countries between 2021 and 2023.

Key findings show that the CoM Med community continues to grow, despite persistent local challenges, and to progress in terms of expertise and commitment of local authorities on three pillars of action – GHG emission mitigation, climate change adaptation and energy access.

Overall, commitments by cities in this region are in line with the national objectives, as expressed in the Nationally Determined Contributions (NDCs), and they are supported by consistent actions, addressing major emitting sectors and key vulnerabilities. Aggregate emission reduction that CoM Med cities plan to achieve by 2030 is 4.5 Mt CO_2-eq , mostly associated with the building and waste management sectors. As for adaptation, extreme heat and drought clearly emerge as the most relevant hazards in the region, affecting vulnerable sectors such as water, energy and health.

Acknowledgements

We would like to thank the European Commission's Directorate-General for European Neighbourhood Policy and Enlargement Negotiations (DG NEAR) for support and strategic guidance in the context of the Covenant of Mayors initiative in Southern Mediterranean Partner countries.

We also thank the Clima-Med project and its team members for taking care of relations with signatories, and for assisting them in the formulation and adoption of SEACAPs.

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Executive summary

The Covenant of Mayors (CoM) community[1] offers a wide landscape of experiences and the possibility of exchange about key opportunities and challenges in local energy and climate action planning. Since the start of the CoM initiative, the Joint Research Centre (JRC) of the European Commission (EC) has been in charge of providing technical support to the signatories and assessing the impact of city actions, while highlighting good practices in the Covenant Community. The JRC's recent assessment work includes: the contribution to Urban catalyst – A local Climate Global Stocktake: The 2023 Global Covenant of Mayors Impact Report (2023); Covenant of Mayors: 2022 assessment (2022); Covenant of Mayors 2022 Energy figures (2022); CoM EAST Overall assessment and in-depth SECAPs analysis (2022); The Covenant of Mayors: overall analysis and detailed evaluation of city Sustainable Energy Action Plans in the MENA Region (2018).

The present report summarises the main findings from the assessment of 73 Sustainable Energy Access and Climate Action Plans (SEACAPs) submitted by cities from Southern Mediterranean Countries between 2021 and 2023.

Policy context

In 2023 the Covenant of Mayors (CoM) initiative turned 15 years since its launch. Initially started to support EU local authorities in reducing their GHG emissions through the development of sustainable energy action plans (SEAPs), it is today the world's largest urban climate and energy initiative with over 11,000 signatories across the world. The growth in terms of geographical coverage was accompanied by an acceleration in both the scope and relevance of the initiative, which defined increasingly stringent emission reduction targets and currently addresses three pillars of action – emission mitigation, climate change adaptation and energy poverty/access. This report focuses on the Southern Mediterranean area to show the key role local authorities in this region can play in supporting both international and EU's climate objectives.

Key conclusions

The commitment to the CoM initiative of cities in Southern Mediterranean (CoM Med) is increasing as well as the relevance and impact of the actions proposed.

As reflected by the higher number of adhesions compared to previous assessment of SEACAPs in the same area, the CoM Med community continues to grow and to show the commitment of local authorities, despite persistent local challenges. Technical expertise and capacity for SEACAP development and implementation are also improving, although further enhancements are needed in relation to deployment of technical know-how and financial means.

In terms of contents, actions proposed in the SEACAPs are in line with national legal frameworks, objectives and priority actions. All the plans present commitments to be achieved by 2030/2040, including actions on both mitigation and adaptation.

The inclusion of the adaptation pillar represents a novelty for signatories that has been generally well received and addressed. Room for further improvement emerges in relation to the definition of adaptation goals and better contextualisation of adaptation actions and monitoring indicators.

[1] Expression used to describe the Community of stakeholders involved in the Covenant of Mayors; i.e. Signatories, Coordinators, Supporters and Associated Partners

Although the governance structure of signatories has been adapted, and often a local coordinator has been appointed as responsible for coordinating the SEACAP development and implementation, it is uncertain whether it will last in the absence of technical assistance and without dedicated financing mechanisms. In addition, fragmented legislation and ineffective monitoring mechanisms are generally reported as an important challenge for local authorities. The coming years will serve as a test on the progress on SEACAP implementation, monitoring and reporting. Putting into practice SEACAP actions often relies on external grants through national and international programs encouraging sustainable energy and climate projects. This, along with the political and socioeconomic context in the Southern Mediterranean region, may challenge SEACAP implementation and development of next steps.

Nevertheless, cities recognize the importance and the benefits of being signatories of the initiative. The CoM is seen as a lever for transfer of knowledge, a platform where signatories can benefit from the experiences and lessons learned by other municipalities in sustainable local energy planning.

Main findings

The CoM initiative in the Southern Mediterranean Neighbourhood expanded over the last few years, with 147 signatories and 73 cities that successfully developed a SEACAP across 7 countries. Overall, 5% of the population of these countries is covered by CoM SEACAP mitigation and adaptation actions.

GHG emission reduction targets are generally in line with the national objectives for the same period as expressed in the Nationally Determined Contributions (NDCs) submitted under the Paris Agreement, and they are supported by consistent mitigation actions, addressing major emitting sectors. Overall, the aggregate emission reduction that CoM Med cities plan to attain in their SEACAPs by 2030 is 4.5 Mt CO_2-eq, mostly to be achieved in the building sector, which represents about 40 % of total planned emission reduction, followed by the waste sector (25 %).

As for adaptation, extreme heat and drought & water scarcity area clearly identified as the most relevant hazards in the region, whereas the most vulnerable sectors are water, energy and health. In most cases, a consistent set of actions are proposed, articulated in a mix of strategic, technical and education/awareness interventions. Adaptation strategies and measures defined at the national level often represent the main reference of action to address climate change impacts, leaving room to further develop a vision on adaptation in line with the vulnerabilities of the urban territories.

Related and future JRC work

Given that the CoM initiative is still relatively new to the region, it is important to ensure continuous progress monitoring and assessment in the upcoming years. The JRC will continue to track progress through overall assessments of the initiative, based on future monitoring reports that municipalities should submit every 2-year, from their SEACAP submission. Such an analysis may reveal factors for successful implementation and help drawing further conclusions on the long-term commitment and capacities of local authorities. Moreover, the current analysis may inform on the upcoming JRC's revision of the regional guidebook. Finally, given the challenges experienced by signatories in the definition of adaptation goals, actions and monitoring indicators, the JRC may provide the necessary training to enhance local expertise and capacity building on the topic.

Quick guide

This report is organised in four chapters. Chapter 1 introduces the CoM initiative and the recent developments in the CoM Med region. Chapter 2 briefly presents the approach and methodology

used in this report. Chapter 3 gives an overview of the signatories that submitted the SEACAPs under assessment, and of the results of the evaluation on both mitigation and adaptation pillars, including examples and good practices. Chapter 4 closes the report, presenting the key findings and drawing lessons and recommendations for the future.

1 Introduction and context

1.1 The Covenant of Mayors

The Covenant of Mayors (CoM) initiative was launched in 2008 by the European Commission (EC) to support and assist local authorities in the design and implementation of sustainable energy policies. From its initial focus on climate change mitigation (with a minimum emission reduction target of 20% by 2020), the initiative subsequently grew in scope and ambition with the inclusion of the adaptation and the energy access/poverty pillars, and the definition of more ambitious emission reduction targets (40% by 2030).

In 2017, the CoM merged with the Compact of Mayors originating the Global Covenant of Mayors for Climate and Energy (GCoM), which currently represent the largest global alliance of cities[2] engaged in the fight against climate change. The distinct features of the initiative include the subscription of a voluntary political commitment by the municipal council, and the submission of a Sustainable Energy Access and Climate Action Plan – SEACAP – or simply Climate Action Plan (CAP), as well as regular monitoring reports (Table 1).

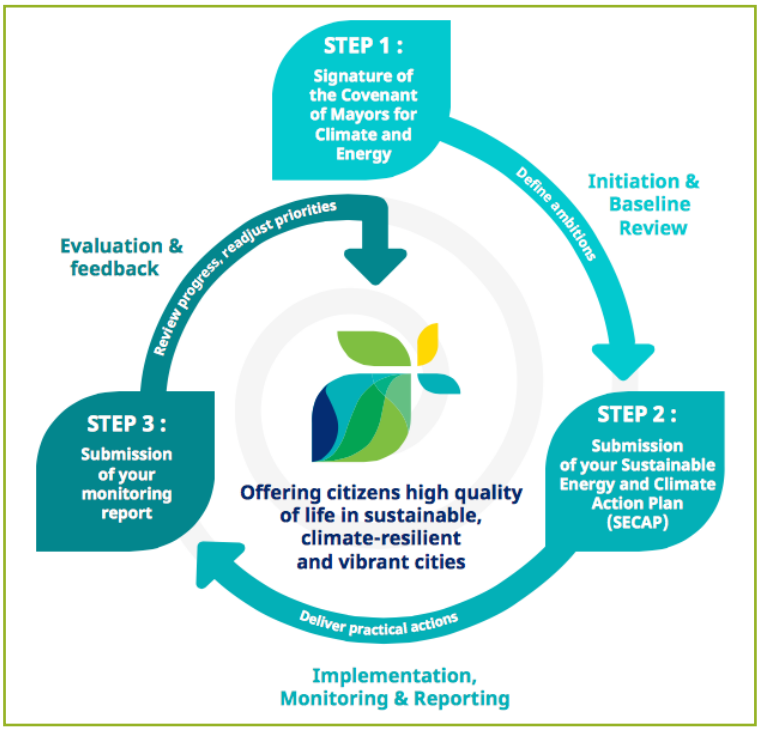
Table 1: Main steps and roles in the SEACAP process

Phase	Step
Initiation	Political commitment and signing of the Covenant
	Mobilize all municipal departments involved
	Build support from stakeholders
Planning phase	Assessment of the current framework: Where are we?
	Establishment of the vision: Where do we want to go?
	Elaboration of the plan: How do we get there?
	Plan approval and submission
Implementation phase	Implement the SEACAP
Monitoring and reporting phase	Monitor SEACAP actions
	Reporting and submission of the implementation Report Review

Source: (Rivas, 2018)

[2] In this document the term "city" is aligned with the definition provided in the GCoM Common Reporting Framework (GCoM 2023) and it refers to a geographical subnational jurisdiction ("territory") such as a community, a town, or a city that is governed by a local government as the legal entity of public administration. The terms "cities" and "local governments" are used understanding that the geo-political institutions of local governments may vary from country to country and terminology used may differ.

Figure 1: Key steps in the SEACAP process



Source: Bertoldi P. (editor) 2018

Since 2013, the EC has been supporting the Covenant of Mayors in the Southern Neighbourhood, which includes 10 Southern Mediterranean countries: Algeria, Egypt, Israel, Jordan, Lebanon, Libya, Morocco, Palestine*, Syria and Tunisia.

Signatories from Southern Mediterranean countries are part of the Covenant of Mayors for Mediterranean (CoM Med), which is a regional alliance of cities and local governments from the Middle East and North African (MENA) area[3]. Several municipalities in the area have adhered to the CoM Med and successfully prepared their Sustainable Energy Access and Climate Action Plans (SEACAPs) around three pillars:

- Climate Change Mitigation (the target has to be at least as ambitious as their Nationally Determined Contribution)
- Climate Change Adaptation
- Access to secure, sustainable and affordable energy.

* This designation shall not be construed as recognition of a State of Palestine and is without prejudice to the individual positions of the Member States on this issue.

[3] More information about Regional or National Covenants of Mayors are available at https://www.globalcovenantofmayors.org/our-regions/

Figure 2: CoM Med 3 Pillars

Source: Rivas et al 2018

The SEACAPs of CoM Med signatories have to comply with the following key requirements:

- *Suggested mitigation actions covering key sectors*: for climate change mitigation, actions are mandatory in the following sectors: (i) buildings – including municipal, residential and commercial buildings; (ii) transportation and equipment/facilities, and (iii) waste. The SEACAP may also include mitigation actions related to local electricity production and local heating/cooling generation, for example;
- *Suggested adaptation actions covering the most vulnerable sectors*: for adaptation to climate change impacts, the SEACAP should include actions in the sectors and areas that are identified as the most vulnerable to climate change by the local authority (hotspots);
- *Submission of the SEACAP by the local authority* (signatory) within two years after the signature of the political commitment;
- *Submission of the implementation reports* scheduled every four years to indicate the progress on the actions.

1.2 Framing the participation of the European Southern Neighbourhood region in the GCoM

In 2013, the European Commission extended the Covenant of Mayors to the European Southern Neighbourhood[4] by launching the "Cleaner Energy-Saving Mediterranean Cities" (CES-MED) project. From 2012 to 2018, CES-MED supported Southern Mediterranean cities in joining the CoM and committing to ambitious sustainable development policies. In a previous report, either the SEAPs or SEACAPS submitted by 22 of these signatories were analysed (Rivas et al 2018).

In 2018, through the Clima-Med project[5], a renewed support was granted to the transition of municipalities in the Southern Neighbourhood's partner countries towards sustainable, low-carbon

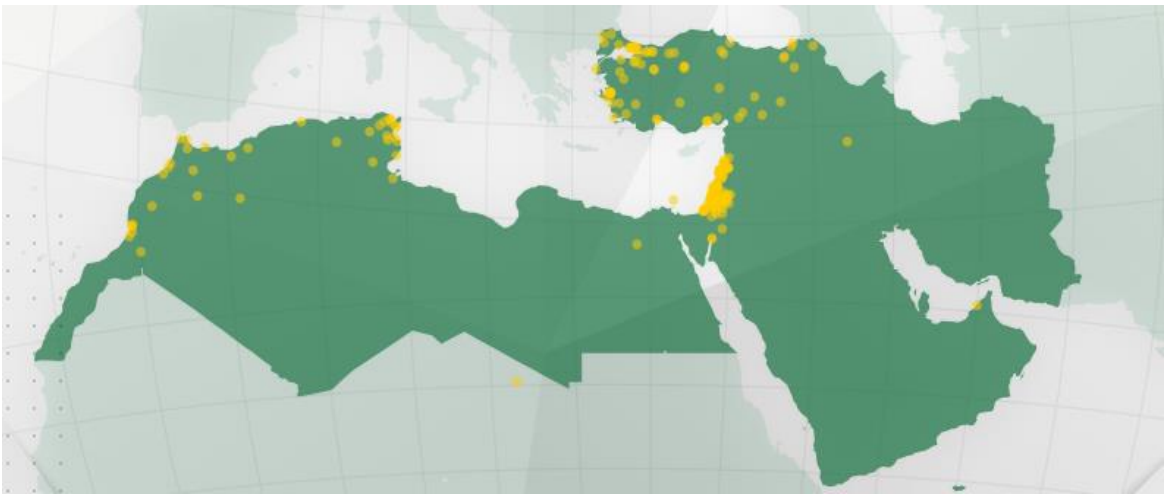
[4] The European Neighbourhood Policy (ENP) is the foreign policy framework aiming at bringing the European Union and its Eastern and Southern neighbours closer, to their mutual benefit and interest. More information available at https://www.eeas.europa.eu/eeas/european-neighbourhood-policy_en

[5] https://www.climamed.eu/

and climate-resilient development. The project offered assistance in the development of an ambitious number of SEACAPs through tailored technical support, trainings, workshops, peer-to-peer exchanges, stakeholder engagement, guidelines, awareness actions, research and more.

Currently, the CoM Med has 147 signatories from 8 countries (Figure 3).

Figure 3: Covenant of Mayors - Mediterranean Signatories (November 2023)



Source: Covenant of Mayors Mediterranean[6], active signatories, 9 November 2023

To better understand the approach to SEACAP development in the CoM Med framework, it is important to consider the peculiarities of the region. To give increased flexibility to signatories outside the EU, they have the possibility to set a GHG emission reduction target in relation to (i) a Business-as Usual (BAU) reference scenario; or (ii) the baseline year (either on an absolute or on a per capita basis). While in the EU CoM, the emission reduction target is always set in relation to the baseline year, CoM Med signatories can choose the option that is suitable for their context, while still fully adhering to the CoM Reporting Framework (Saheb, Kona, Maschio, & Szabo, 2014). The reasoning behind is to allow emerging economies to pursue their renewable energy and energy efficiency targets while on track for delivering the economic development and employment to their growing populations.

The Joint Research Centre of the EC (JRC) developed guidelines specifically for the CoM Med countries on how to implement this approach and in particular on how, in the absence of local specific parameters (e.g. growth rates of local population and economy), to use national coefficients derived from national NDC BAU scenarios (Lo Vullo et al 2021). This way, the SEACAP's emission reduction target also adequately reflects the city's contribution to the mitigation goal their country committed at the international level.

1.3 The role of the JRC and the aim of the present report

The JRC provides scientific, methodological and technical support to the CoM initiative. It has been charged with developing the methodologies for all Regional Covenants in collaboration with city networks, practitioners from local and regional authorities, energy agencies, academia and project

[6] www.com-med.org/en/

leaders in the spirit of the bottom-up approach of the CoM that aims to create a city-led and city-sustained initiative. The aim of the present report is to support the European Commission in drawing lessons and conclusions for future actions not only in the Southern Mediterranean region but also worldwide. The study can help to improve the way information about the CoM is designed and communicated, and it can serve as peer-learning material for local and regional authorities.

2 Approach and Methodology

2.1 Differentiation of Commitments by Signatories of the Covenant of Mayors

For CoM Med signatories, and according to the final alignments with the Global Covenant of Mayors (GCoM) recommendations, for climate change mitigation, actions in the following sectors are mandatory in the SEACAP: (i) Buildings, including municipal, residential and commercial buildings; (ii) urban transport and equipment/facilities, and (iii) waste. The SEACAP may also include actions related to local electricity production (development or improvement of local photovoltaic (PV), wind and combined heat and power (CHP) generation, for example), and local heating/cooling generation. In addition, the SEACAP should cover areas where local authorities can influence energy consumption on the long term (such as land use planning), encourage markets for energy efficient products and services (public procurement), as well as changes in consumption patterns (working with stakeholders and citizens). It is worth noting that the industrial sector is not a key sector in the Covenant of Mayors, so the local authority may choose to include actions in this sector or not.

For adaptation to the impacts of climate change, the SEACAP should include actions in the sectors and areas that are identified as the most vulnerable to climate change by the local authority (hotspots). Vulnerable sectors can considerably vary within urban perimeters, from one city to another, from more urbanized to more rural areas: this is why gaining a deep understanding of the hazards and vulnerabilities of the local authority is of paramount importance.

The SEACAP's bottom-up approach focuses on actions within the competence of the local authority and, where relevant, national authorities. For each sector, it considers actions and measures that are expected to influence energy production and consumption in the long-term, for example encouraging markets for energy efficient products and services, as well as changes in consumption patterns. To ensure effective implementation of the SEACAP, actions proposed should be within the framework of national plans and actions, such as the National Energy and Climate Plans (NECPs) in the case of EU cities, as well as regional plans and strategies, such as the Arab Sustainable Energy Strategy and the Pan Arab Strategy 2030, in the region analyzed in this report.

In particular, EU CoM cities commit to climate neutrality by 2050, while other cities (incl. those from the Southern Mediterranean countries) commit to meeting at least what is stated in the respective countries' Nationally Determined Contributions (NDCs) by 2030. Therefore, a SEACAP has to contain a clear outline of the strategic actions that the local authority intends to take in order to reach its commitments. The SEACAP may cover a longer period, but in this case, it should contain intermediate values and objectives for the year 2030. As mentioned, CoM signatories must submit their SEACAPs to the JRC for evaluation and approval within two years of signing the commitment.

Under the CES-MED project and *EU for Climate Action in the ENI Southern Neighbourhood* first, and the more recent Clima-Med and MINARET II projects, local authorities may submit their SEACAPs to the JRC for analysis[7] through the CoM-Med platform[8]. The JRC provides suggestions and recommendations for improvement when relevant. Prior to submission, local authorities should seek approval by the municipal council (or equivalent body, including national authorities). The prior formal approval by the municipal council is a key requirement in the CoM SEACAP submission. Finally, along

[7] Both SEACAPs and SEACAP templates can be uploaded in Arabic, English or French.

[8] https://www.com-med.org/en/plans-and-actions/action-plans.html

with the SEACAP elaboration and submission, CoM signatories must fill in an online template[9], which summarizes the results of the Baseline Emission Inventory (BEI), the Risks and Vulnerability Assessment (RVA), and other main elements of the SEACAP. The template is a valuable tool for local authority's visibility and for a quick but detailed assessment of implementation.

In their SEACAP, signatories need to report specific information and data, including but not limited to:

Vision and commitments for mitigation and adaptation

- Long-term vision
- Emission reduction target by 2030, clearly stating if against the BEI year or BAU scenario and the reduction target type (absolute reduction or per capita reduction)
- Adaptation goal, coherent with the identified vulnerabilities, risks and hazards
- Coordination and organizational structures created/assigned
- Staff capacity allocated
- Involvement of Stakeholder and citizens/ Participatory processes
- Overall budget allocated for implementation and financing sources
- Implementation and monitoring process
- Assessment of the adaptation options
- Strategy in case of extreme climate events

Baseline Emission Inventory (BEI) and related information:

- Inventory year
- Number of inhabitants in the inventory year
- Type of GHG emission factors (activity-based or life-cycle-based)
- Emissions reported for CO_2 only or GHG emissions (in t CO_2 or t CO_2-eq, respectively)
- Responsible body/department (main contact)
- Detailed BEI results in terms of final energy consumption and GHG emissions

Climate Change Vulnerability and Risk Assessment (RVA):

- Current and expected weather events and climate hazards particularly relevant for the local authority or region
- Vulnerabilities of the local authority or region

[9] Detailed information on how to fill in the SECAP template is available via "My Covenant", a password-protected area of the CoM website; click on "Instructions". The SECAP template and instructions document are publically available in the CoM website library at http://www.eumayors.eu/Covenant-technical-materials.html

— Expected climate change impacts in the city or region

— Assets and people at risk from climate change impacts

Mitigation actions and measures for the full duration of the plan, including for each measure/action (if possible):

— Description

— Department, person and/or company in charge of the implementation

— Timeline (start, end, major milestones)

— Cost estimation (Investment and running costs)

— Estimated energy savings and/or increased renewable energy production by target year (MWh/year)

— Estimated GHG reduction by target year (in tonnes CO_2 or t CO_2-eq per year)

— Indicators for monitoring

Adaptation actions and measures for the full duration of the plan. The actions should be coherent with outcomes of the city RVA. Include for each measure/action (if possible):

— Sector

— Title

— Description

— Responsible body/department/ and contact point

— Timing (end-start, major milestones)

— Action also affecting mitigation?

— Stakeholders involved/advisory group

— Impacts, vulnerabilities and risks tackled

— Costs (LC) (Investment and running costs)

— Indicators for monitoring

For both mitigation and adaptation, the level of detail in the description of each measure/action is to be decided by the local authority according to expected results, data availability and quality.

2.2 Methodological approach for the assessment

The assessment of the CoM initiative in the Southern Mediterranean partner countries involved an extensive review and analysis of the information and data submitted by signatories through their SEACAP templates and draft SEACAP documents.

This report, indeed, includes the assessment of both the SEACAPs submitted by the cities and received through the CoM-Med platform as well as the draft plan documents developed under the Clima-Med project and sent directly to the JRC. The first category includes only 2 plans, submitted by Ajloun, (Jordan) in 2021 and by Jdeideh El Chouf (Lebanon) in 2023. The remaining 71 plans were sent to the JRC, in the form of advanced draft documents, before the official submission, in agreement with the CoM regional office and European Commission's Directorate-General for European Neighbourhood Policy and Enlargement Negotiations (DG NEAR).

The reason for this choice lies on the opportunity for the municipalities to receive a preliminary evaluation of the key elements of the plan, at an earlier stage of its definition, in order to identify potential issues and fix them before submission and/or adoption of the plan. As for the JRC, the preliminary evaluation of the draft SEACAPs allows the support and strengthening of local authorities' and practitioners' capacities, and to help cities in preparing high-quality SEACAPS. The official evaluation and feedback report of the single plans by the JRC will be released after the SEACAPs submission in the CoM-Med platform. In the following text, both are referred as SEACAPs for simplification.

Data and key information from the draft SEACAP documents were extracted and transposed to a spreadsheet to be used in the aggregate analysis. Quantitative information included a wide set of data: from geodemographic statistics, to information on total and sectoral energy uses, and to emissions in the inventory and BAU scenario, as well as emission reduction targets in both percentage and absolute levels. More qualitative information was collected and categorized in relation to mitigation and adaption actions, sectors involved, type of hazards and vulnerable groups. The approach taken for the assessment, therefore, included a review of the information provided by municipalities, cross checking it with different sources, identifying points of discrepancies and inconsistencies, if any, and where possible, correcting for these in the overall quantitative aggregated analysis of the whole group of CoM Med signatories.[10] In addition, whenever possible a comparative review and analysis of signatories from the same country was performed to identify common and/or significant points for review and vigilance.

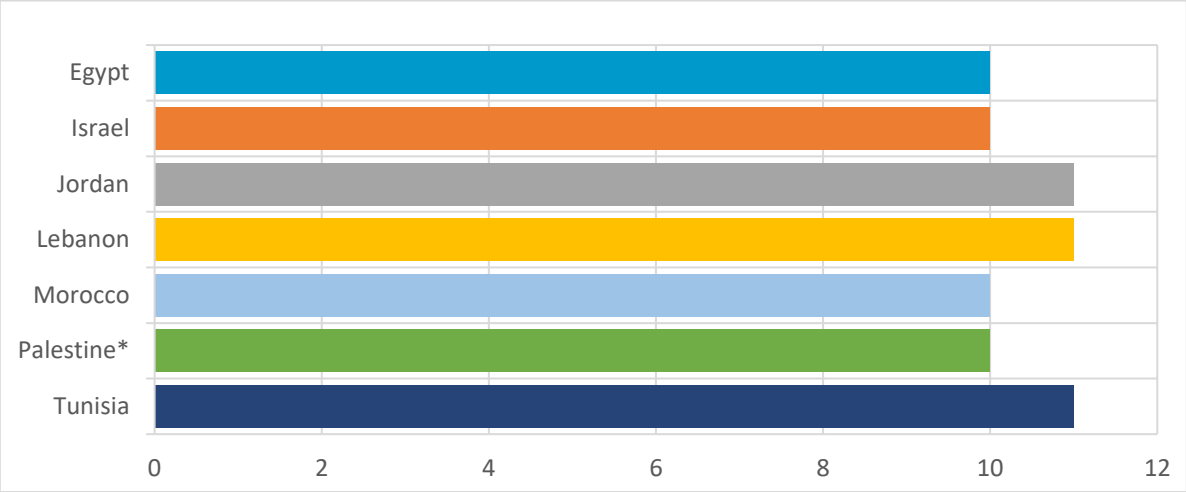
After correcting for inconsistencies in the data, a dataset summarising the key figures extracted from the 73 SEACAPs has been developed and it has been used to produce the results showed in the following sections. Due to the relatively limited number of SEACAPs and the fact that the analysis of draft textual documents prevented the collection of more granular and sectoral data, an in-depth statistical analysis was not performed.

2.3 Scope of the assessment

The analysis covers information on 73 SEACAPs, as submitted or received at the cut-off date of October 31st 2023.

[10] In the next sections, information and data from a signatory may present minor discrepancies, inconsistencies and/or be incomplete, given the different sources and types, as well as due to the process of transferring data/information from SEACAP draft documents to the draft templates.

Figure 4: Number of SEACAPs, by country

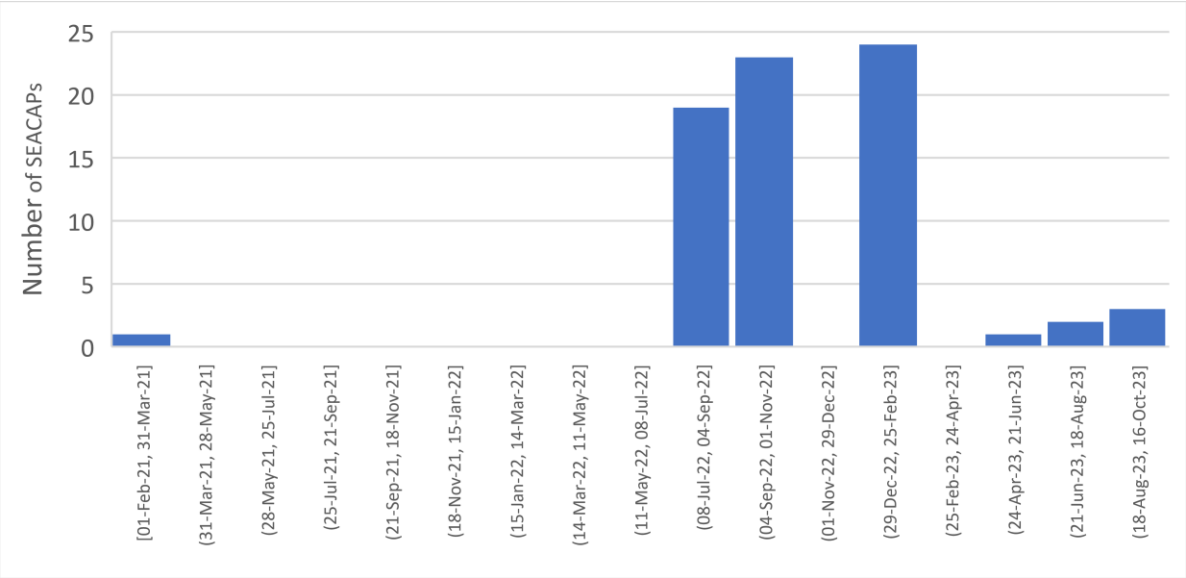


Source: JRC elaboration

As shown in Figure 4, the geographical distribution of the SEACAPs covers 7 countries and it is pretty homogenous, with Jordan, Lebanon and Tunisia presenting 11 plans each, whilst Egypt, Israel, Morocco, and Palestine* presenting 10 plans respectively.

The first SEACAP included in this assessment was submitted in February 2021, and the last in October 2023. However, the majority of the (draft) SEACAPS was received in three major batches between July 2022 and February 2023 (Figure 5).

Figure 5: SEACAPs submission timeline



Source: JRC elaboration

* This designation shall not be construed as recognition of a State of Palestine and is without prejudice to the individual positions of the Member States on this issue.

3 Assessment

3.1 Signatories

The total population reported by the 73 cities in their base year is 9,603,088 (Table 2), representing 5% of the overall population of the 7 countries. With an average of 132,000 inhabitants per city, they represent a heterogeneous sample of cities: from Tanger, in Morocco, which has the largest population with more than one million inhabitants, to Bechmezzin in Lebanon with 2,500 inhabitants.

Table 2 : Overview of CoM Med cities that submitted a SEACAP

	Country	Signatory Name	Population
1	Egypt	Al Bayadia	85,000
2		Al Qurna	122,428
3		Al Qusayr	50,023
4		Al Tod	110,000
5		Al Zayniyyah	65,000
6		Armant-Luxor	182,151
7		Esna	380,730
8		Marsa Alam	10,000
9		Ras Ghareb	42,619
10		Safaga	53,335
		Total	1,101,286
11	Israel	Ashdod	224,630
12		Bat Yam	128,744
13		Bnei Brak	198,000
14		Elad	47,865
15		Holon	190,000
16		Nof Hagalil	40,600
17		Or Yehoda	37,144
18		Petah Tikva	240,400
19		Ramat Gan	169,000
20		Yokneam	23,331
		Total	1,120,714
21	Jordan	Ajloun	65,378
22		Al Russeifa	650,000
23		Al Salt	143,626
24		Al Sarhan	29,780
25		Al Zarqa	886,970
26		Baalma	65,000
27		Deir alla	60,010
28		Greater Irbid	867,859
29		Maadaba	161,900
30		Muwaqar	89,980
31		Umm el Jimal	30,000
		Total	3,050,503
32		Baalbeck East	50,000
33		Baltoun	4,200
34		Bechmezzine	2,500

35	Lebanon	Donnieh cluster 1	45,862
36		Donnieh cluster 2	30,176
37		Donnieh cluster 3	14,697
38		Donnieh Cluster 4	14,895
39		Hasbaya	12,000
40		Jdeideh El Chouf	20,000
41		Khreibi	3,700
42		Mukhatara	3,900
		Total	201,929
43	Morocco	Al-Hoceima	57,315
44		Benslimane	55,910
45		Chefchaouen	42,786
46		Drarga	91,656
7		ER Rich	28,670
48		Kenitra	474,073
49		Oujda	484,901
50		Sefrou	90,338
51		Tanger	1,122,403
52		Tiznit	85,190
		Total	2,533,242
53	Palestine*	Al Ram	21,722
54		Bani-Suhaila	41,126
55		Bethlehem	31,000
56		Dura	39,128
57		Idhna	30,000
58		Khan Younis	250,000
59		Qalqilia	51,969
60		Ramallah	70,000
61		Salfit	12,000
62		Yabad	18,000
		Total	564,945
63	Tunisia	Bizerte	185,765
64		El Guettar	20,216
65		Hammam Sousse	44,777
66		Kairouan	139,070
67		Maamoura	8,859
68		Medenine	112,164
69		Monastir	93,306
70		Nabeul	78,725
71		Rades	69,499
72		Sisseb	34,675
73		Sousse	64,412
		Total	851,468
	Total		9,603,088

Source: JRC elaboration

* This designation shall not be construed as recognition of a State of Palestine and is without prejudice to the individual positions of the Member States on this issue.

The countries with the highest number of inhabitants covered by a SEACAP are Jordan and Morocco (representing respectively 32 and 26 % of the total population under analysis), whereas Lebanon and Palestine* have the smallest cities (2 and 6% respectively).

According to the information provided in the SEACAPs and regarding local governance, most municipalities, independently from their size, acknowledge the lack of technical know-how, human resources and financial means as well as fragmented legislation and ineffective monitoring mechanisms – all of which pose challenges to the implementation of climate change actions.

Overall, the main challenges faced by the Southern Mediterranean region appear specific to its geographic and demographic context. The situation of the CoM Med signatories is characterised by the need for a sustainable energy development that can match the population and industry growth, while simultaneously satisfying the economic needs and addressing the energy security of the region. The energy sector is witnessing fundamental changes, and it strives to balance out production, consumption and export revenue during turbulent economic conditions following political changes. Moreover, energy access is often challenging in countries in a fragile or crisis situation, where regeneration of livelihoods or creation of new services linked to energy, transport and water is critical.

Among the signatories, particularly critical is the case of cities in Palestine*, where the political and economic instability linked to conflicts further exacerbates a situation already characterized by high energy dependence, lack of water and sanitation infrastructure and limited transport networks. The recent escalation of the conflict in the area, will not only put at risk the implementation of SEACAPs in cities involved directly, but it is likely to affect neighbouring countries such as Egypt, Lebanon and Jordan as refugees try to resettle in these countries. In a context of migration and increasing humanitarian emergency, it is common that countries and communities lack the capacity and the means to recover and/or meet the energy needs of the population.

In this context, climate change adaptation remains a priority for all the Southern Mediterranean countries, where two thirds of the total population live in urban areas concentrated in coastal zones (CES-MED, 2018), which are highly vulnerable to climate change impacts.

At the local level, due to the political context in areas of conflict, data collection, monitoring and reporting, as well as SEACAP approval and implementation, might be difficult. It is acknowledged that the impact of the existing laws and regulations has been limited due to inconsistent enforcement in the region, where in some cases the power of local authorities is linked to unstable national dynamics.

Naturally, there are differences and similarities in the challenges for local authorities in the Southern Mediterranean region compared to the European, Eastern Partnership or Sub-Saharan African countries. The CoM Med cities differ from their neighbours in the local governance structure, which is, overall, characterized by lower levels of political and administrative decentralisation than in Europe. There is currently no common framework for action that can ensure an integrated approach for tackling the shared energy and climate change challenges. In view of this, the task of the CoM is even more important to provide a framework for local, regional and international collaboration. From this perspective, the region is also among the most promising ones where challenges can be turned into opportunities.

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3.2 Sustainable Energy Access and Climate Action Plans

This section presents the main outcomes of the review and analysis of the SEACAP contents and information, focusing on their key elements.

All the plans present a 2030 commitment, including actions on both mitigation and adaptation pillars. Cities in Palestine* submitted a mitigation goal with a time horizon in 2040, in line with their national NDC, but most of them also included an intermediary target in 2030, which is the one considered in this analysis.

Beyond climate mitigation and adaptation sections, all plans provide an overview of the city context, economic activities and social situation. Most of them include also a section on communication actions, which includes key steps to develop a Communication and Awareness Plan.

Overall, the SEACAPs analysed are composed of quality and well-detailed documents. It has to be noted, however, that some sections of some plans are identical across SEACAPs of different cities. This is due to the intervention of external consultants in the preparation of the plans, and to the use of regional figures and studies to compensate for the lack of reliable local data. Although this does not undermine the validity of the plan, in some cases it blurs the opportunity to highlight the specificities of the local context.

3.3 Mitigation pillar

This section provides an overview of the information submitted by signatories under the mitigation pillar, including final energy consumption and the GHG emissions of the Baseline Emissions Inventories (BEI), local energy production, mitigation targets and actions.

For this group of signatories, the GHG emission reductions estimated for the respective target years are also presented. It is worth noting that, the baseline year varies across the SEACAPs, starting from 2010, for cities such as Sousse and Kairouan (Tunisia) up to 2019. Most signatories chose 2018 (40 %) and 2019 (34 %) as their baseline year (Figure 6). The use of more recent base years may be attributed to better data quality and availability.

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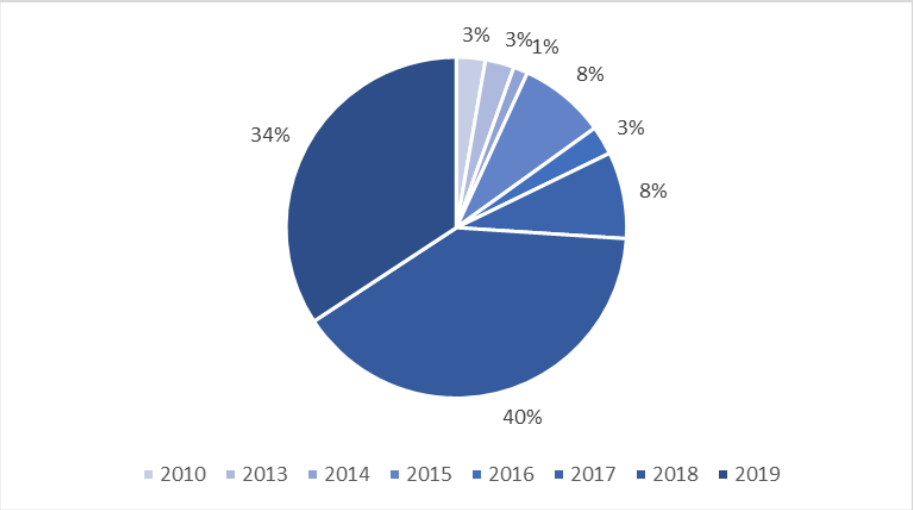
Figure 6: Distribution of baseline years

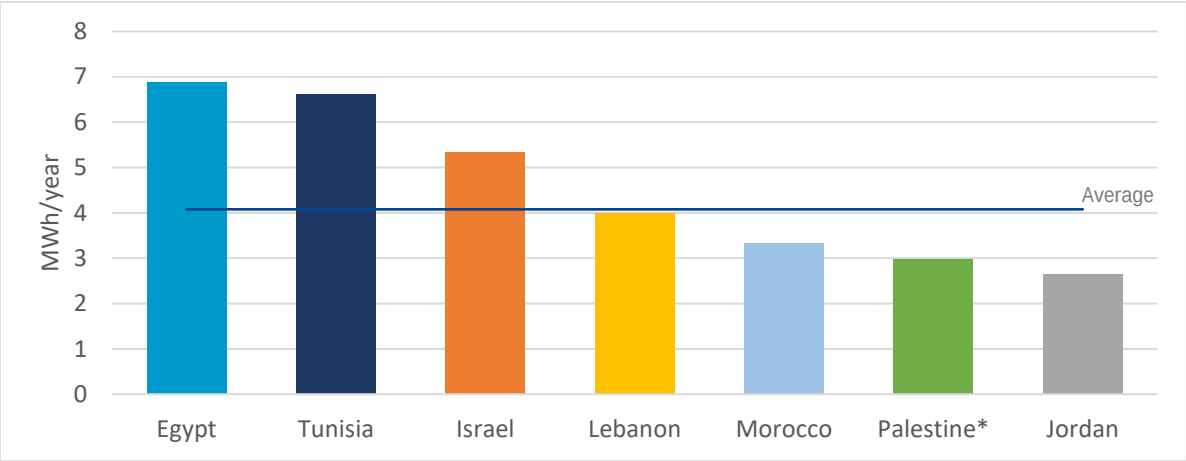


Source: JRC elaboration

3.3.1 Final energy consumption in Baseline Emission Inventories (BEIs)

The total final energy consumption in the base year, estimated by the 73 cities under analysis, is 37.8 TWh/year. The dominant sectors reported in the SEACAPs in terms of energy consumption are the building sector and the transport sector, accounting for 21.8 TWh/year and 15.6 TWh/year, respectively. Overall, the highest absolute levels of total energy consumption are reported by cities in Morocco, Jordan and Egypt, the lowest levels in Lebanon. When per capita energy consumption is considered, Egypt, Tunisia and Israel show the highest values, above the average (4 MWh/year), whereas Jordan and Palestine* are well below average (Figure 7).

Figure 7: Final energy consumption per capita (MWh/year) reported in BEIs.



Source: JRC elaboration

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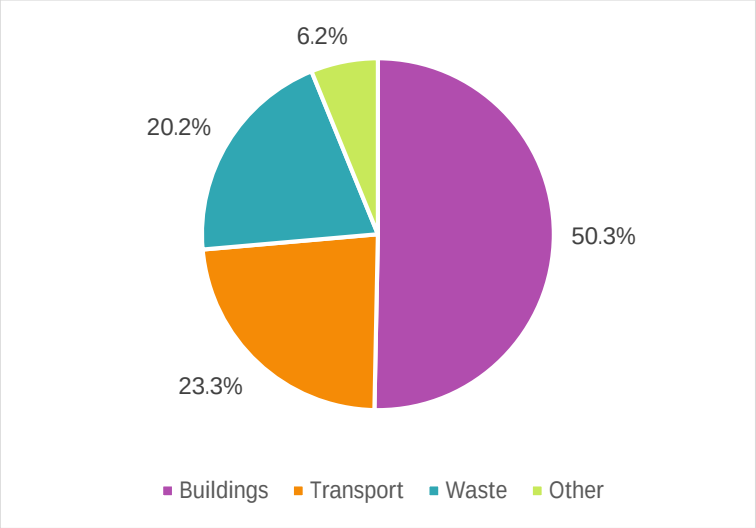
3.3.2 Greenhouse gas emissions in BEIs

Based on the data reported by the SEACAPs in their BEIs, aggregate annual GHG emissions reach 21.8 Mt CO_2-eq. Of these, 10.9 Mt CO_2-eq (50 %) are from the building sector (Figure 8), which includes emissions from municipal, residential and commercial buildings. The transport sector follows with a share of 23 % of the total emissions (5.1 Mt CO_2-eq), and emissions from waste are about 20 % (4.4 Mt CO_2-eq).

Figure 8: GHG emissions in BEIs, by sector (%)



Source: JRC elaboration

These figures are in line with the previous report analysing the SEACAPs in the area (Rivas et al. 2018) that, similarly, highlighted the great potential of implementing emission reduction action in the building sector as well as incentivising clean transport solutions. Emissions from the waste sector, which were not collected in the previous report, appear driven by high shares reported by cities in Israel and Morocco.

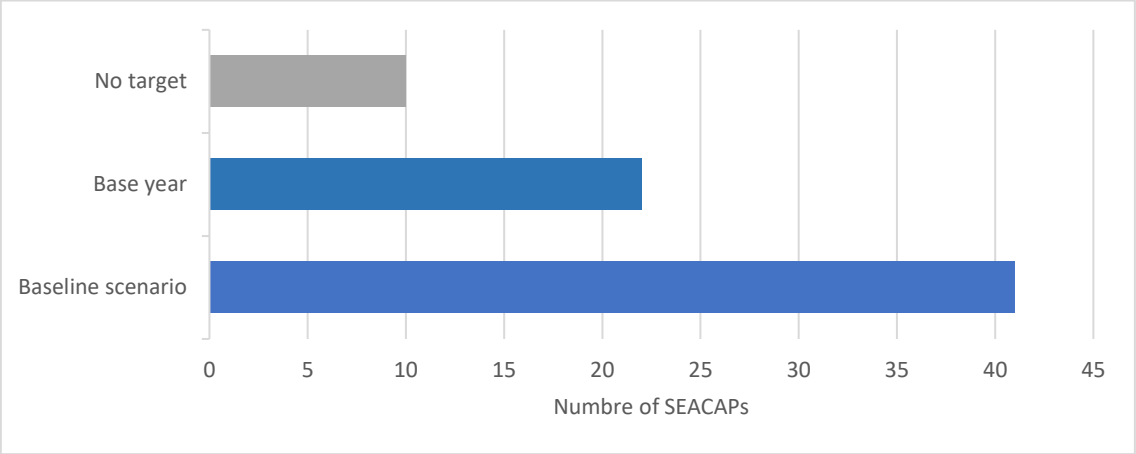
3.3.3 Local energy from renewable energy sources in BEIs

Overall, more than half of the signatories (37) do not report any local energy production in their base year. The total local energy production from the remaining cities accounts for 148,000 MWh.

3.3.4 Commitments on GHG emission reductions by 2030

63 out of 73 total signatories have included a quantitative emission reduction target in their SEACAP. As Figure 9 shows, the majority of them (41 cities) have proposed an emission reduction target in relation to a baseline scenario (i.e. BAU scenario), whereas the others (22 cities) proposed to reduce emissions compared to a base year (i.e. BEI). The draft SEACAPs of the 10 cities of Israel do not have clear mitigation targets.

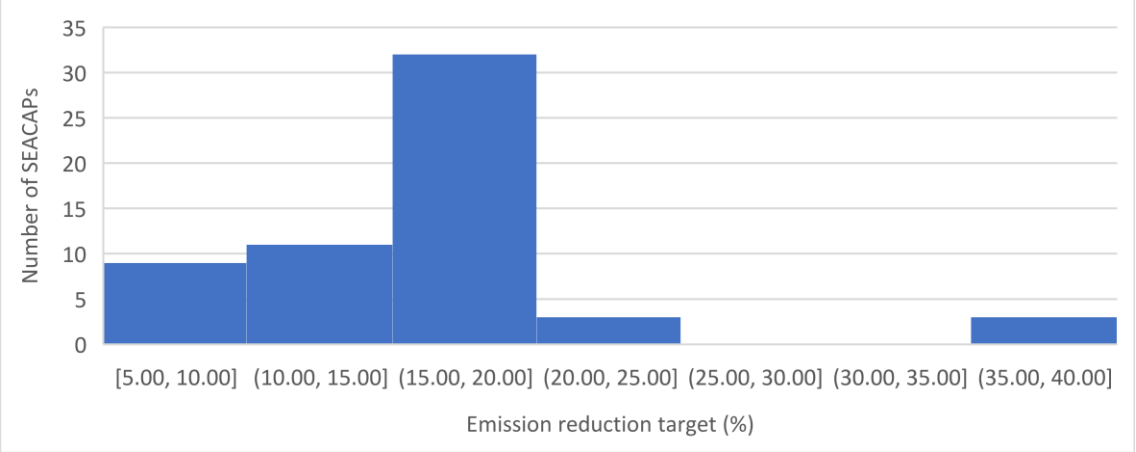
Figure 9: Signatories' emission reduction targets, by type



Source: JRC elaboration

On average, the municipalities committed to an emission reduction target of 17 % by 2030, with individual targets that range from 5 % to 40 % (Figure 10). The former is the 2030 intermediate target proposed by Bani-Suhaila (Palestine*), whose actual target to reduce emissions is 12.8 % by 2040, compared to 2019 levels; the latter is the emission reduction target submitted by three cities, namely Ajloun and Greater Irbid in Jordan, and Jdeideh El Chouf in Lebanon, and that refer respectively to 2019, 2015 and BAU scenario. It has to be mentioned that the target of Greater Irbid, as those of some others, is conditional to the availability of international financial aid and support, and that no unconditional target is provided.

Figure 10: Targets' emission reduction (%)



Source: JRC elaboration

Comparing the different emission reduction targets proposed by CoM Med cities, those in relation to a baseline scenario are slightly higher in terms of percentage than the ones related to a base year

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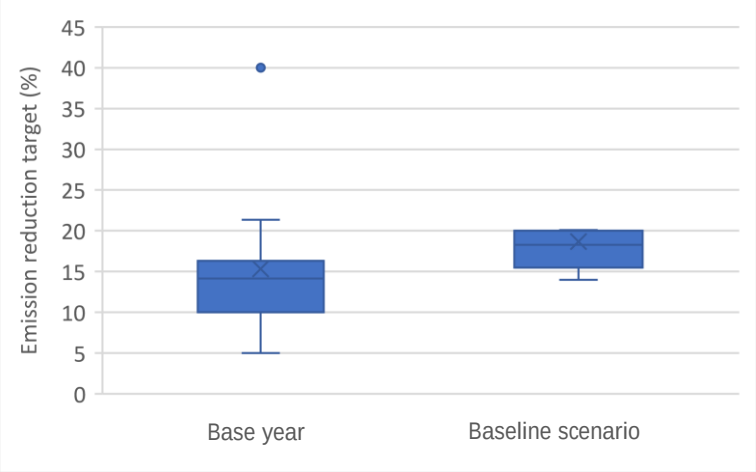
(and its respective BEI) (Figure 11). However, considering the different approach underlining the two types of target, their actual contribution and ambition will depend on the effective emissions in the target year.

Figure 11: Emission reduction of base year and baseline scenarios targets (%)

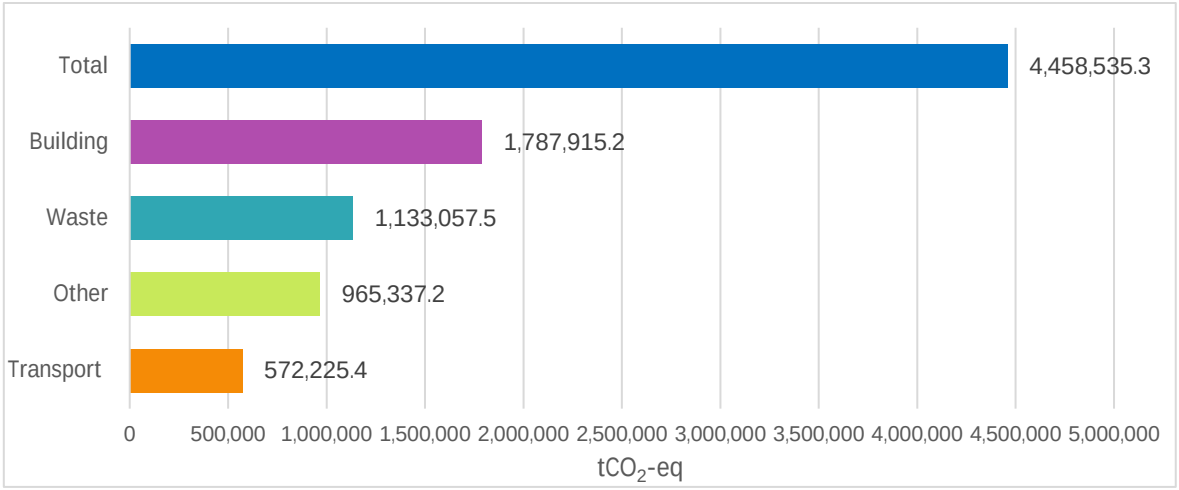


Source: JRC elaboration

As required, all targets are either compliant with, or more ambitious than, the emission reduction goals in the respective countries' NDCs, and they are covered or even surpassed by the estimated emission reduction proposed in the mitigation actions.

Overall, the aggregate emission reduction that CoM Med signatories plan to achieve in their SEACAPs by 2030 is 4.5 Mt CO_2-eq (Figure 12). Most of these reductions are expected to be achieved in the building sector, which represents about 40 % of total planned emission reduction, and confirms its high mitigation potential with an aggregate emission reduction expected to reach 1.8 Mt CO_2-eq.

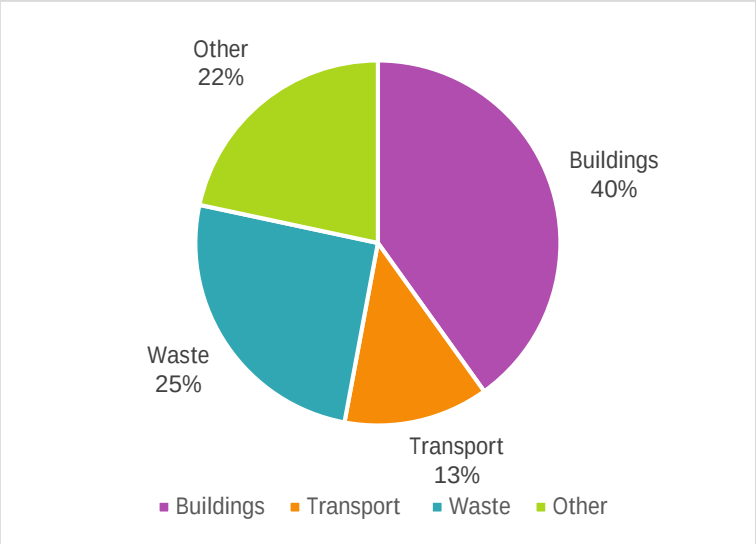
Figure 12: Estimated GHG emission reduction in target year, total and by sector.



Source: JRC elaboration

Emission mitigation in the waste sector follows with about 25 % of expected reductions (Figure 13). An additional 22 % of emission reductions are expected to be achieved from other sectors, which, in the SEACAPs evaluated in this report, mainly include the increase of local renewable energy production. The transport sector contributes to the emission mitigation with a share of about 13 % and an overall estimated reduction of 570 Mt CO_2-eq.

Figure 13: Estimated GHG emissions reduction by sector (%)



Source: JRC elaboration

Compared to the analysis of previous SEAPs/SEACAPs conducted in the area (Rivas et al 2018), the reduction of emissions associated with the waste sector gained relevance over transport measures. Although in terms of contribution in the BEIs the two sectors show similar figures (Figure 8), the actions planned to decarbonize the transport sector account for about half of the emission reduction of those in the waste sector (Figure 13). On the contrary, improvement in the solid waste management sector, toward more efficient and sustainable practices, is among the actions with the highest emission reduction potential, according to most of the SEACAPs. Due to the reduced methane emissions from landfill and increased avoided emissions through recycling, sustainable waste management actions represent for the municipalities “low hanging fruit” to achieve high emission reductions (see also chapters 3.3.5 and 3.3.6).

3.3.5 Mitigation actions and measures

Actions aimed at reducing GHG emissions proposed by CoM Med signatories include both short and long-term measures in key emitting sectors, as well as best practices. On average, SEACAPs include 15 mitigation actions each, proposing a wide range of solutions covering municipal, residential and tertiary buildings, street lighting, sustainable transport planning as well as waste management, agriculture and forestry.

Energy saving measures (such as encouraging behavioral change in energy use or the adoption of high-efficiency equipment through green procurement) and promotion of building codes are among common measures planned to address emissions from both existing and new buildings as well as the installation of photovoltaic (PV) and solar thermal panels on municipal building rooftops. LED solutions

and tele-management systems for public street lighting are also proposed to save energy at the municipal level.

As for transport, planned actions concern mainly the improvement in the management of road transport, the integration of transports modes and the promotion of more sustainable transport solutions and awareness. It is worth mentioning that the majority of signatories have no or limited public transport system in place and, therefore, sustainable mobility actions proposed in their SEACAPs are primarily aimed at minimising the use of conventional private vehicles, increasing occupancy of cars, and increasing cycling and walking options to cover short-distances. In a few cases (e.g. Tanger), the promotion of hybrid and electric vehicles is considered.

As discussed above, solid waste collection and treatment represent both an opportunity and a challenge for CoM Med signatories. As most of the SEACAPs acknowledge a system characterized by basic waste collection services and very low levels of recycling, reducing the amount of household waste going to landfills and increasing the share of recycled waste emerge as a priority, also due to the increasing population in urban areas. Actions on this regard include awareness-raising practices to decrease household waste, increase reuse and recycling, but also investments to improve the municipal solid waste collection systems, the increase of solid waste sorting plants and sorting-at-the-source.

Finally, local energy production from renewable sources is also widely proposed. Analysed SEACAPs, in particular, highlight the great potential of PV in the region as well as the possibility that this technology offers to cover the expected increase in electricity demand, and to provide sustainable energy access. Actions proposed in this regard include the installation of small PV modules on municipal buildings, the use of PV systems in connection with water pumping stations for drinking water and irrigation, but also the construction of PV solar farms. The major source of finance of these projects relies usually on the establishment of public-private partnerships or also support from international investors.

In some cases, the emission reduction impact of communication actions and increased awareness of sustainable practices are also quantified, as a single group of measures or linked to specific sectoral objectives.

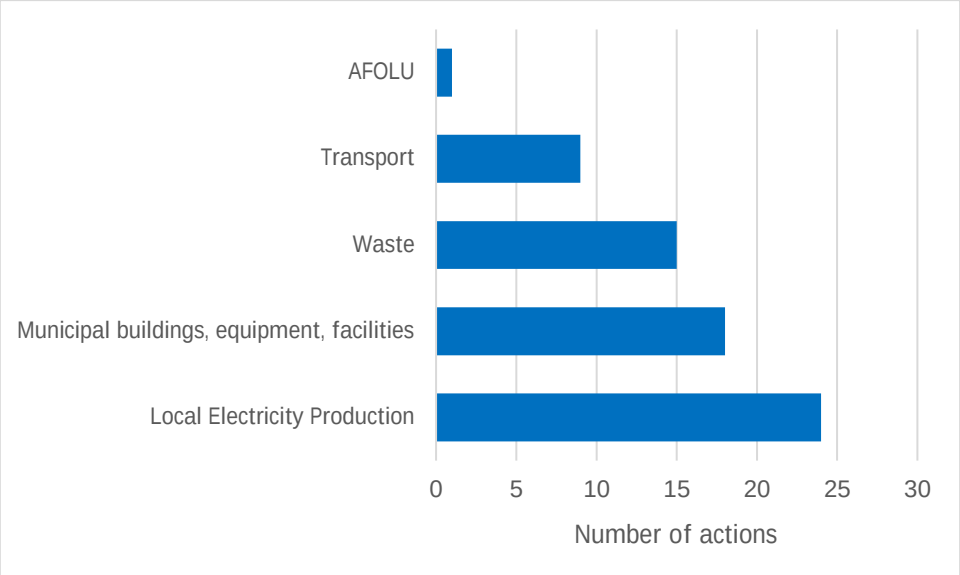
3.3.6 Focus on selected mitigation actions and good practices

Beyond mitigation actions on major emitting sectors, most of the SEACAPs highlight information on good practices, pilot projects and key actions that municipalities intend to prioritize, or for which more details are provided. Signatories in Morocco and Tunisia present the most detailed best practices with information on responsible implementation bodies, estimated impact and detailed action types. On the contrary, the majority of SEACAPs do not highlight clear best practices or they do not report complete key information. Also in these cases, however, one key action has been selected for each SEACAP in order to provide a complete overview of the types of relevant actions and good practices showcased by municipalities in their plans. This section starts summarising general information on selected actions and practices, and then provides some more detailed examples covering major sectors.

Local renewable energy production emerges as a solution getting high attention and priority. As per Figure 14 below, the renewable energy sector was selected as priority action or best/good practice in 24 plans. As mentioned above, these actions mainly involve the implementation of solar PV panels in buildings or farms, to take advantage of the high potential in the region. Another sector, highlighted as key in 18 SEACAPs, is the one related to municipal buildings, equipment and facilities. This category

includes emission reduction measures that cities plan to implement in the buildings under their control, as well as actions aimed at modernising and optimising municipal public lighting systems. The waste sector follows, due also the high room for improvement discussed in the previous chapter.

Figure 14: Focus sectors as mentioned in the selected mitigation actions and best practices



Source: JRC elaboration

The following boxes summarize detailed examples of actions covering the four key mitigation sectors emerging from the aggregated analysis. When available, information about timeframe, responsible body, costs and estimated impacts are reported. These examples come from SEACAPs of cities in different countries and with different population size in order to better represent the heterogeneity of the urban landscape in the region.

Box 1. 16MW utility-scale solar PV power plant

City: Greater Irbid	Country: Jordan
Population: 867859	Responsible body: Municipality of Greater Irbid
Sector: Local energy production	Timeframe: 2021 - 2026
Cost: 12.1Million JOD (15 Million EUR)	Estimated GHG reduction: 20,224 tCO_2-eq/y

Description:

Greater Irbid Municipality suffers greatly from the burden of its energy bill's increase due to the rising prices for the fuels used and the expansion of the Greater Irbid Municipality organizational area. The increase in energy consumption is attributed to the need for additional services, which are steadily growing.

The action aims to develop, finance, construct, operate and maintain large PV grid-connected solar power plants in the Irbid territory, with a cumulative installed capacity of 16MW by 2026.

The village of Al-Khanasri has been identified as characterized by high brightness and technical appropriateness for the establishment of this station, where the electricity will be transferred through national electricity grid.

The action is divided in 5 major phases:

STAGE 1 – Concept development and site Identification

STAGE 2 – Prefeasibility Study

STAGE 3 – Feasibility Study

STAGE 4 – Permitting, Contracts and Financing

STAGE 5 – Engineering, Procurement, Construction and commercial Operation

The objectives of the action are:

Reducing CO2 emissions;

Reducing the energy bill that reaches about JOD 4 million annually;

Using renewable energy sources and environmentally friendly clean energy;

The generated energy from the photovoltaic cells includes all the activities that require the electricity consumption for all sectors such as street lighting, buildings and various facilities, parks, travel agencies and other municipal facilities;

Raising citizens' awareness to utilize these techniques so that the photovoltaic cell system will be installed in the commercial, investment and residential buildings, taking the municipality as a good example.

The SECAP UNIT will follow the project along with Chief Electrical Engineer of the Greater Irbid Municipality and with assigned consultant for the project. Such project need coordination with following public partners: Municipality of Greater Irbid, Ministry of Environment, Ministry of Energy and Mineral Resources, Ministry of Municipal Affairs, Electricity Sector Regulatory Authority, Electricity Company, Ministry of Planning, Ministry of Finance.

Box 2. Replacement of street lighting with LED throughout the city	
City: Nof Hagalil	Country: Israel
Population: 40,600	Responsible body: Nof Hagalil Municipality
Sector: Municipal buildings and facilities	Timeframe: 10 years from 2017/2018
Cost: 9.4 Million NILS (2.4 Million EUR)	Estimated GHG reduction: N/A

Description:

The action consists of replacement of 6,696 street lamps in the city, and the installation of astronomical clocks to turn them on and off automatically at sunset and sunrise.

The use of LEDs and the control system allow to minimize electricity use for street lighting and to limit the turnover of the light bulbs. Thanks to their long lifespan, indeed, the use of LED bulbs reduces also hazardous waste generation, and therefore represents a particularly environmentally friendly choice. Moreover, an adequate street lighting, as provided by LED lamps, is very important for the residents' quality of life.

The developer of the action is the Nof Hagalil Municipality with the support of the Ministry of the Interior. The contractor is responsible for the annual maintenance cost.

Box 3. Develop a selective sorting system for household waste recycling and recovery	
City: El Maâmoura	Country: Tunisia
Population: 8859	Responsible body: Town of El Maâmoura
Sector: Waste	Timeframe: 2022 - 2027
Cost: 50000 EUR	Estimated GHG reduction: 890.12 tCO2-eq/y

Description:

The current management of household waste in the municipality of El Maâmoura is essentially based on the collection and recovery of waste, with a very negligible rate of recycling.

Faced with the rapid growth of the city, waste management poses an enormous challenge for the municipality. As part of the sustainable waste management plan of the municipality of El Maâmoura, this action aims at developing a selective sorting system for household waste at source for its recycling and recovery. Key measures include:

- Improving information and awareness of the population in different city areas, to be involved gradually in the development of selective sorting of household waste;

- Development of a financial mechanism to incentivize selective sorting;

- Involvement of local associations for the training informal waste pickers in the new selective sorting system.

The implementation of the project involves the following stages:

– Establishment of an agreement with the local environmental association INMA for the project management:

– Provision of a collection point;

– Raising awareness among citizens and rag pickers;

The development of a financial incentive mechanism for selective sorting.

The municipality will contribute to around 10% of the total cost of the action, the rest of the funds will be provided by international, national and private sources.

Box 4. Clean Transportation on the Luxor West Bank, starting with Al-Qurnah district

City: Al Qurna	Country: Egypt
Population: 122,428	Responsible body: Town of Al Qurna
Sector: Transport	Timeframe: 2023 - 2026
Cost: 271,000 EUR	Estimated GHG reduction: 1,273 tCO2-eq/y

Description:
The general goal of the action is to safeguard and enhance the value of the historical West Bank site and its monuments while providing comfortable environmentally friendly means of transportations for all users, tourists, and local community in Al-Qurna and the West Bank.

According to the Al Qurna's SEACAP, the West Bank is a very rich heritage site (hosting for example the Valley of the Kings, Queen Hatshepsut Temple, etc), with visiting tourists arriving in busses, microbuses, or coasters with an average peak visit of 400 vehicles per day. Major problem lies with the awaiting vehicles outside the heritage sites. The vibration and emissions produced by the vehicles (operating air conditioner) damage heritage sites and monuments, as well as increase GHG emission and air pollution.

Specific objectives of the action are:

To protect the World Heritage Site and its monuments;

To provide a safe sustainable way of transportation around heritage sites;

To reduce GHG emissions, mitigate the excess use of tourist-bus ACs by accommodating all awaiting groups of drivers which will minimise the excessive emissions caused by buses;

Converting diesel-based engines of microbuses into diesel-natural gas or electric based engine for all public transportations is the ultimate objective;

Extending microbus service to cover remote areas of the Bo'irat Village inhabitants in Habu & Ezbet Basil areas to serve the local community so to minimise their use of motorcycles.

Main partners of the action include Egypt's Ministry of Transport (MoT), and of Tourism & Antiquities (MoTA), Ministries of Local Development, and Directorates of Environment and Traffic of the Luxor Governorate, as well as private companies, such as the Egyptian Natural Gaz Company (GASCO). Stakeholders include tour operators, local individual investors (microbuses owners as well as owners of other vehicles interested in converting into natural gas or electricity).

Practically, the action plans to create 2 parking lots (to be divided into 4 stages) including waiting areas for drivers. In the first phase, the parking lot will be implemented covering 25% of the full peak capacity. The rest will be developed later, after regaining the pre-Covid level of tourism attraction.

3.4 Adaptation pillar

All the SEACAPs under evaluation include a section on adaptation. In this section, municipalities describe the results of their Risk and Vulnerability Assessment (RVA) as well as their commitments and key actions to cope with climate change impacts affecting the area under their authority. The inclusion and analysis of information on adaptation represent a novelty compared to previous assessments of SECAP/SEACAPs in the CoM Med region. Although important information is highlighted in this part of the plans, they show a lower level of maturity compared to the mitigation section, which has generally more details and reveals higher expertise in connection with the local context.

For the purpose of this analysis, both climate hazards and vulnerable sectors were re-classified and homogenised according to major categories as included in the CoM Common Reporting Framework (Global Covenant of Mayors, 2023). This was necessary because the terminology used by cities in the draft SEACAPs documents may differ slightly.

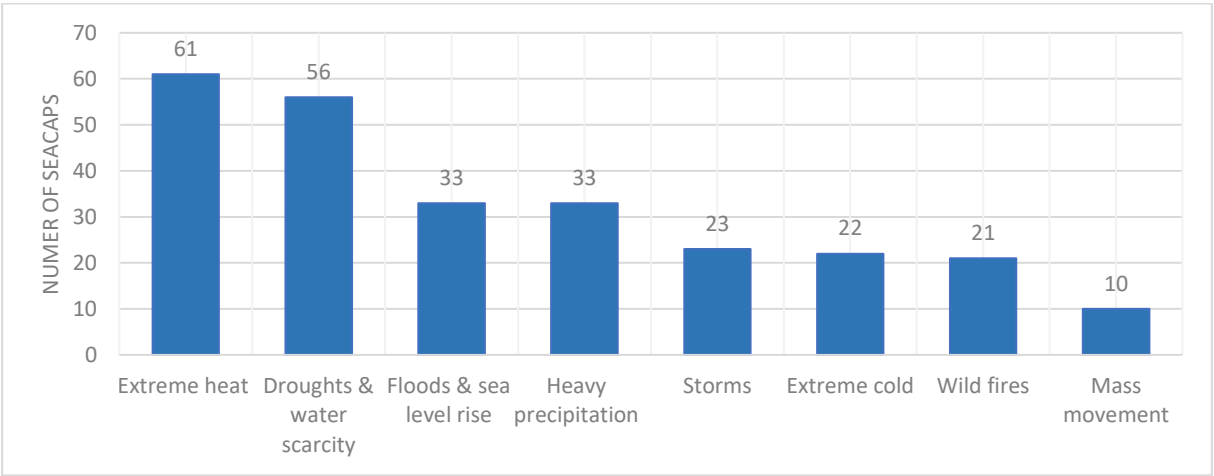
3.4.1 Risk and Vulnerability Assessments (RVAs)

The RVA represents a key element of the adaptation pillar in the definition of SEACAPs. It determines the nature and extent of risks by analysing potential climate hazards and assessing the vulnerability posed to people, property, livelihoods and the environment, and it allows to put in place targeted actions and to protect potentially vulnerable groups.

3.4.2 Climate Hazards

From the analysis of the climate hazards outlined in the RVAs by the CoM Med signatories, extreme heat clearly emerges as the most relevant in the region, as it is mentioned as a top hazard in 61 out of 73 plans and encompasses all countries in the area. Drought and water scarcity immediately follows as the second most important climate hazard, mentioned in 56 SEACAPs. Both floods & sea level rise and heavy precipitation are similarly identified among the main hazards, as they are mentioned in 33 of the plans followed, at a certain distance, by storms, extreme cold and wildfires (Figure 15).

Figure 15: Climate hazards as mentioned in the analysed SEACAPs

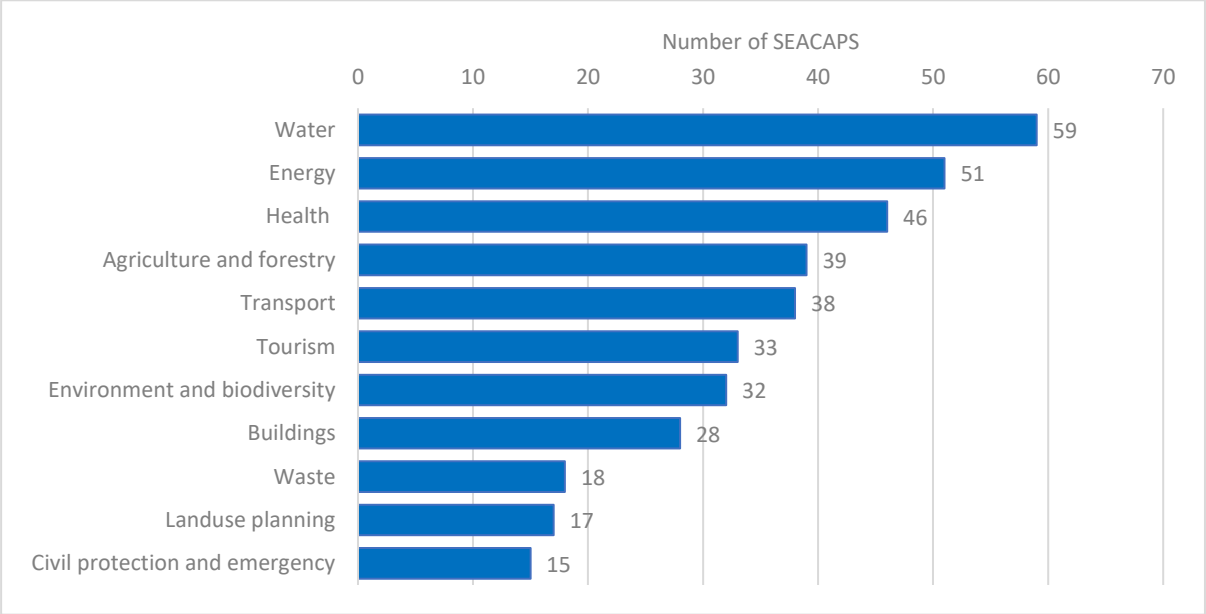


Source: JRC elaboration

3.4.3 Vulnerable Sectors

When evaluating the main vulnerable sectors, 59 SEACAPs mention the water sector as the most vulnerable sector to climate hazards, followed by the energy and the health sectors. In particular, extreme heat is, in most of the cases, associated with an increased water demand and energy use, as well as with additional pressure on the health system due to increased risk of deaths and heat related diseases. Also the transport sector is often regarded as vulnerable to extreme heat, which can cause damages to road networks and aggravate air quality problems, as well as to floods and landslides. The agricultural sector is also considered among the most vulnerable to climate change in more than a half of the municipalities, reflecting the importance of agriculture activities for the economy of the area. Similarly, tourism is considered at risk in many coastal and historical cities (Figure 16).

Figure 16: Sectors mentioned as highly vulnerable in SEACAPs



Source: JRC elaboration

3.4.4 Vulnerable groups

Vulnerable groups are not always identified in relation to climate hazards, missing the opportunity to understand and address the categories of the population that can be particularly impacted by climate change. In particular, they are omitted in the SEACAPs of municipalities in Israel, Morocco and Tunisia, whereas they are identified in most of the signatories from Egypt, Jordan, Lebanon and Palestine*. Among the most vulnerable groups recognised, there are the elderly, the children and infants, the workers in the outdoor environment as well as poorer families. In the case of the agricultural communities, also farmers, food industry and consumers are indicated as categories vulnerable to climate change impacts.

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3.4.5 Adaptation goal

A climate adaptation goal, which coherently addresses major climate hazards and the most vulnerable sectors and groups, is a crucial element of a good SEACAP. In this regard, it has to be recognised that the plans under analysis struggle in defining a clear adaptation goal. However, as the requirement to include at least one adaptation goal was introduced by the CoM in 2020, many cities are still in the process of defining and introducing it in their climate strategies.

The only city that provides a quantifiable adaptation goal is Al Sarhan in Jordan. In its SEACAP, Al Sarhan commits to reduce agricultural losses due to water scarcity by 10%. This is an important goal for a district renowned for its agriculture and livestock activities and whose income is already being threatened by increased extreme temperatures, droughts and floods.

Most of the signatories refer to national adaptation strategies or to the adaptation component of their countries' NDCs, falling short to define a vision and specific goals on adaptation, in line with the vulnerabilities identified in their territories.

3.4.6 Adaptation actions and measures

Most of the assessed SEACAPs include a set of actions aimed at fostering adaptation for the duration of the plan. Almost all of them (except SEACAPs from Israel) have proposed actions coherently addressing one or more among the most relevant hazards and the most vulnerable sectors, as identified in their RVA. Sometimes the actions are articulated in a mix of strategic, technical and education/awareness interventions. Al Salt city in Jordan has provided the highest number of actions (80+) actions, although, overall, all Jordan's cities proposed a high number of adaptation actions to be implemented in complementarity with national ones.

As an example, actions addressing extreme heat include developing health action plans, provide access to air-conditioned public buildings for citizens lacking protective infrastructure, reorganise working hours, develop early warning systems. Synergies with mitigation actions, such as promoting energy efficiency in buildings are also often taken into account.

Other examples of actions that are aimed at addressing vulnerabilities in the water sector include both structural measures such as increasing or modernizing water infrastructure to more creative options, such as recycling the water of swimming pools to wash cars and streets.

3.4.7 Focus on selected adaptation actions and good practices

Extreme heat and floods are the top hazards addressed in the best practice examples across cities. As for the vulnerable sectors, the water sector is the most mentioned, with actions evolving around water harvesting, building of water dams and collection of wastewater in different cities.

As in the case of mitigation, cities in Morocco and Tunisia provide details on best practices, pilot projects or good examples, with information on responsible bodies, hazard addressed, cost and time horizon. On the contrary, cities in Egypt, Jordan, Lebanon and Palestine* mostly do not highlight any particular best practice in their plans.

As in the case of mitigation, the boxes that follow summarize detailed examples of actions covering the top hazards emerging from the aggregated analysis. When available, information about

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timeframe, responsible body, costs and estimated impacts are reported. These examples come from SEACAPs of cities in different countries and with different population size in order to better represent the heterogeneity of the urban landscape in the region.

Box 5. Water Harvesting System

City: Dura	Country: Palestine*
Population: 39128	Responsible body: Municipality of Dura
Hazard: Drought and water scarcity	Timeframe: N/A
Cost: N/A	Estimated impact: N/A

Description:

According to the SEACAP, current water distribution network in Dura covers 85% of the city's area. The average water consumption per person in the city is approx. 80 litres/day. The water grid supplies 37 litres/day, the difference in need is covered by rainwater wells, or by public and private water tanks.

The city of Dura is suffering from insufficient water supply, drilling of underground wells is prevented by the authorities, and from the contamination of all springs and surface wells by wastewater as well as from the lack of water reservoirs and the deterioration of the old water network. To reduce water shortage for residents and farmers, the action aims at developing a multi-purpose water harvesting system including the construction of new reservoirs in farms, urban areas, streams, and valleys.

The action development and implementation steps are:

- Determine the location of the ponds or of the concrete reservoirs;
- Draft study plans with specialized engineers;
- Construct the water reservoirs or ponds as per plans;
- Construct a water distribution system to deliver the water to its proposed destinations;
- Equip the water harvesting system with PV cells to solar power the new pumping system.
- Collecting rainwater from natural seasonal streams during winter and spring season is important to secure a strategic amount of water needed for agriculture while reducing the use of ground water for a certain period of time.

Other objectives of the action include:

- Maintaining crop and livestock levels in the city;
- Controlling seasonal floods;
- Expanding tourism by increasing the green areas;
- Providing a model for nationwide application;
- Increasing green areas reducing air pollution, CO_2 emissions, and dust levels;
- Raising awareness among citizens and tourists on water harvesting to counter expected droughts.

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Box 6. Development of flood control measures

City: Kenitra	Country: Morocco
Population: 474073	Responsible body: Municipality of Kenitra
Hazard: Floods & sea level rise	Timeframe: 2023 - 2033
Cost: 8.3 Million EUR	Estimated impact: Reduction of floods risk and damages

Description:

According to the SEACAP, the city of Kenitra, located at the extreme downstream of the Sebou basin, is threatened by floods emanating from the overflows of the Sebou wadi and the floods of the Fouarat wadi. The average annual rainfall in the city of Kenitra is 555 mm over the past thirty years. The most marked floods in the last thirty years are those observed in 1996, 2009 and 2010 and which were recorded in several high-density neighbourhoods and basic infrastructure areas.

This action, therefore aims at developing a flood control plan, as a fundamental tool for preventing floods in the area during rainy periods. It aims at treating the flood risk in a comprehensive manner at the level of the risk zones of the municipality, combining the management of the hazard (rehabilitation of the zones of expansion of the floods, dynamic slowing down, protection works, etc.) and reducing the vulnerability of people, property and territories.

Main characteristics of the action are:

Construction of a dike to protect against flooding in Merjat Fouarat over a length of 6 km.

Construction of hydraulic works

Wall to raise the Fouarat canal

Construction of a dike in the Al Assam zone dedicated to the protection against flooding of the Sebou wadi of 5.8 km, which starts south of Merjat Sfassef and ends at the factory

Major objectives of the action include:

Protection of the city against flooding

Flood prevention and bringing the event forward

Protection of infrastructure, equipment, property and agricultural land

Development of actions to adapt all municipal infrastructures to flooding

Reduction of flood risks

Box 7. Set of actions to protect population and public health

City: Union of Eastern Baalbek municipalities	Country: Lebanon
Population: 50000	Responsible body: N/A
Hazard: Extreme heat	Timeframe: 2022 - 2028
Cost: N/A	Estimated impact: N/A

Description:
The SEACAP of the Union of Eastern Baalbek municipalities includes a set of adaptation actions aimed at addressing the public health issues connected to extreme heat.

Actions, to be implemented in complementarity with national and regional measures, include:

Strategic actions:

Develop a health action plan for extreme events the municipalities are facing (e.g., extreme heat);

Provide access to air-conditioned public buildings during heat waves or other extreme events for citizens lacking protective infrastructure (e.g., people living in underground apartments lacking AC during extreme temperatures);

Update building codes and landscaping laws to increase energy efficiency and improve the ability of buildings to protect against extreme heat events (e.g., green roofs and strategically located shade trees);

Reorganise working hours and reschedule the working time to avoid mid-day work;

Collaborate with regional medical services to increase preparedness level.

Alerts & Communication

Develop an early warning system to alert citizens of extreme weather events or natural disasters (e.g., heat waves, floods).

Educational

Conduct educational and awareness campaigns about health-related effects of heat waves, vector-borne diseases, etc. while informing residents on ways to protect their health and prevent infection or impact;

Provide instruction to the public on staying hydrated and avoiding strenuous outdoor exercise during heat alerts;

Provide easy access to public drinking fountains, swimming pools, and spray pads, also take preventive action like opening cooling centres where the public can gather for relief from the heat.

Technical

Clean and maintain sewage and drainage systems;

Identify potential hot spots for the development of vector-borne diseases;

Cultivate urban forests, including street and wooded areas;

Monitor frequently water and air quality.

4 Conclusion and recommendations

Cities and local governments have an important role in addressing climate change and its impacts on local populations. The continued development and expansion of the Covenant of Mayors initiative – including across the Southern Mediterranean countries – is therefore consistently supporting the achievement of global collective efforts.

Key conclusions, emerging form the analysis of the recently submitted SEACAPs, can be summarised as follows:

- There is increasing uptake of the CoM initiative across Southern Mediterranean countries. As reflected by the higher number of adhesions compared to previous assessment of SEACAPs in the area, the CoM Med community continues to grow, despite local challenges, and to show the commitment of local authorities. With 147 CoM Med signatories and 73 cities that successfully developed a SEACAP across 7 countries, more than 5% of the population of these countries is currently covered by SEACAP mitigation and adaptation actions.

- Based on the high proportion of active CoM Med signatories that participate in EU-funded projects (e.g. CES-MED, Clima-Med), it is clear that this additional support remains important for local authorities to adhere and to fulfil their targets, obligations and commitments.

- Overall, cities recognize the importance and the benefits of being a signatory of the initiative. The CoM is seen as a lever for transfer of knowledge, a platform where the signatories can benefit from the experiences and lessons learnt from other municipalities in sustainable local energy planning. SEACAPs represent powerful tools through which cities in Southern Mediterranean define and display their commitment toward global climate goals.

- The analysis of the SEACAPs' content shows a good compliance with the key commitments of the CoM. It confirms that there is not only a political will in the region to pursue climate objectives, but also a level of ambition that can potentially deliver consistent emission reduction as well as increase resilience of local communities.

- The level of expertise in defining and implementing SEACAPs' commitments and actions is also increasing, although cities still have to confront challenges related to lack of both economic and human resources as well as governance organisation.

- Overall, the actions proposed in the analysed SEACAPs are in line with national legal frameworks, objectives and priority strategies. All the plans present a 2030/2040 commitment, including actions on both mitigation and adaptation pillars.

- Actions aimed at reducing emissions proposed by CoM signatories include both short and long-term measures on key emitting sectors proposing a wide range of solutions as well as highlighting local examples and practices. Also, proposed 2030/2040 emissions reduction targets are consistent with national targets for this period as expressed in respective countries' NDCs.

- The great potential of reducing emissions in the building sector emerges clearly from the analysis of the mitigation section of the SEACAPs. Also the waste sector is perceived as an opportunity to reduce GHG emissions while improving municipality services for households and their quality of life. Actions in the transport sectors, on the contrary, would need to be further incentivised in order to deliver additional mitigation and fully exploit the potential in terms of health co-benefits and accessible transport services.
- Most of the assessed SEACAPs include a set of actions aimed at fostering adaptation for the duration of the plan, coherently addressing one or more among the most relevant hazards and the most vulnerable sectors relevant for the local context. Being relatively new compared to mitigation, the adaptation pillar shows the potential for further improvement and development of additional capacity in formulating adaptation goals and actions as well as identifying and protecting vulnerable groups.

Overall, this report increases the knowledge about the context, the commitments and the challenges of local climate action in the Southern Mediterranean region, highlighting factors of strength and weaknesses and informing future research and policy agenda.

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List of abbreviations and definitions

Abbreviations	Definitions
BAU	Business-as-Usual
BEI	Baseline Emission Inventory
CHP	Combined Heat and Power
CO_2	Carbon Dioxide
CO_2-eq	CO_2-equivalent
CoM	Covenant of Mayors for Climate and Energy
CoM EAST	Covenant of Mayors Eastern Partnership countries
CoM Med	Covenant of Mayors Mediterranean Partner countries
DG NEAR	European Commission's Directorate-General for European Neighbourhood Policy and Enlargement Negotiations
EC	European Commission
EU	European Union
GCoM	Global Covenant of Mayors for Climate and Energy
GHG	Greenhouse Gas
JRC	Joint Research Centre
kWh	Kilowatt Hour
LCA	Life-Cycle Assessment
MENA	Middle East and North Africa
Mt	Million metric Tonnes
MWh	Megawatt Hour
NECPs	National Energy and Climate Plans
NDCs	Nationally Determined Contributions
PV	Photovoltaics
RVA	Risk and Vulnerability Assessment
SEACAP	Sustainable Energy Access and Climate Action Plan
SEAP	Sustainable Energy Action Plan
SECAP	Sustainable Energy and Climate Action Plan
UNFCCC	United Nations Framework Convention on Climate Change

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Annex

Table A1: Detailed emission reduction commitments by CoM Med signatories

Country	*Signatory name*	*BEI Year*	*Target Type*	*Target Year*	*Ambition (%)*
Egypt	Al Qurna	2019	BAU	2030	14.4
	Al Qusayr	2019	BAU	2030	18.2
	Al Tod	2019	BAU	2030	10.9
	Al Zayniyyah	2019	BAU	2030	15.7
	Al-Bayadia	2019	BAU	2030	15.8
	Armant-Luxor	2019	BAU	2030	14.8
	Esna	2019	BAU	2030	12.6
	Marsa Alam	2019	BAU	2030	22.9
	Ras Ghareb	2019	BAU	2030	17.5
	Safaga	2019	BAU	2030	18.1
Israel	Ashdod	2018	No info	No info	No info
	Bat Yam	2018	No info	No info	No info
	Bnei Brak	2018	No info	No info	No info
	Elad	2018	No info	No info	No info
	Holon	2018	No info	No info	No info
	Nof Hagalil	2018	No info	No info	No info
	Or Yehoda	2017	No info	No info	No info
	Petah Tikva	2017	No info	No info	No info
	Ramat Gan	2018	No info	No info	No info
	Yokneam	2018	No info	No info	No info
Jordan	Ajloun	2019	BEI	2030	40
	Al Russeifa	2019	BEI	2030	17.3
	Al Salt	2018	BEI	2030	15.5
	Al Sarhan	2019	BEI	2030	14.3
	Al Zarqa	2018	BEI	2030	21.4
	Baalma	2018	BEI	2030	17.2
	Deir alla	2018	BEI	2030	15.8
	Greater Irbid	2015	BEI	2030	40
	Maadaba	2018	BEI	2030	15.9
	Muwaqar	2018	BEI	2030	16
	Umm el Jimal	2018	BEI	2030	14.8
Lebanon	Baalbeck East	2019	BAU	2030	20
	Baltoun	2015	BAU	2030	20
	Bechmezzine	2015	BAU	2030	20
	Donnieh cluster 1	2018	BAU	2030	20
	Donnieh cluster 2	2018	BAU	2030	20
	Donnieh cluster 3	2018	BAU	2030	20
	Donnieh Cluster 4	2018	BAU	2030	20
	Hasbaya	2015	BAU	2030	20

	Jdeideh El Chouf	2016	BEI	2030	40	
	Khreibi	2015	BAU	2030	20.1	
	Mukhatara	2015	BAU	2030	20	
Morocco	Al-Hoceima	2019	BAU	2030	19	
	Benslimane	2013	BAU	2030	18.3	
	Chefchaouen	2014	BAU	2030	20	
	Drarga	2018	BAU	2030	18.3	
	ER Rich	2018	BAU	2030	18.3	
	Kenitra	2019	BAU	2030	18.3	
	Oujda	2013	BAU	2030	20	
	Sefrou	2018	BAU	2030	18.3	
	Tanger	2018	BAU	2030	18.3	
	Tiznit	2018	BAU	2030	18.3	
*Palestine**	Al Ram	2017	BEI	2040	12.8	
	Bani-Suhaila	2019	BEI	2040	12.8	Intermediate 2030 target: 5%
	Bethlehem	2017	BEI	2040	17.5	Intermediate 2030 target: 10%
	Dura	2018	BEI	2040	17.5	Intermediate 2030 target: 10%
	Idhna	2019	BEI	2040	17.5	Intermediate 2030 target: 10%
	Khan Younis	2019	BEI	2040	12.8	Intermediate 2030 target: 7%
	Qalqilia	2018	BEI	2040	17.5	Intermediate 2030 target: 10%
	Ramallah	2017	BEI	2040	18	Intermediate 2030 target: 10%
	Salfit	2017	BEI	2040	19	Intermediate 2030 target: 10%
	Yabad	2018	BEI	2040	17.5	Intermediate 2030 target: 10%
Tunisia	Bizerte	2019	BAU	2040	15	
	El Guettar	2018	BAU	2030	16	
	Hammam Sousse	2018	BAU	2030	15.3	
	Kairouan	2010	BAU	2030	15	
	Maamoura	2019	BAU	2030	14.5	
	Medenine	2019	BAU	2030	16	
	Monastir	2016	BEI	2030	14	
	Nabeul	2019	BAU	2030	15	
	Rades	2019	BAU	2030	15.5	
	Sisseb	2019	BAU	2030	15	
	Sousse	2010	BAU	2030	14	

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