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CoM East overall assessment and in-depth SECAPs analysis

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Abstract

The Covenant of Mayors initiative in the Eastern Partnership countries (CoM East) was launched in 2011. Since then, it has evolved, and its scope has enlarged. Today, hundreds of local authorities are part of the initiative in the Eastern Partnership region committed to acting against climate change. The Joint Research Centre provides scientific and technical support to DG ENEST and is in charge of evaluating the Sustainable Energy and Climate Action Plans (SECAPs). This report provides an assessment of the status of implementation of the initiative since its inception. Results show that the CoM East initiative continues raising interest among local authorities in the region. Technical expertise and capacity for SECAP development show increasing improvement, although further enhancement would be needed especially in countries, where involvement of municipalities remain low. The emission reduction commitment proposed are ambitious, usually in line or higher than the minimum target for the area. As for adaptation to climate change impacts, the most common hazards are extreme heat, heavy precipitations and droughts & water scarcity. Almost all sectors are reported to be vulnerable to extreme heat which is consistently the most targeted climate hazard by adaptation actions.

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Authors

Davide, M., Melica, G., Palermo, V., Sukhodub I., Rybak, O.

Executive summary

The Covenant of Mayors (CoM) initiative, initially started to support local authorities in the European Union (EU) developing sustainable energy actions, today counts over 13 000 signatories across the world. It represents the world's largest alliance for city climate leadership with increasingly stringent targets currently covering three pillars of action: greenhouse gas emission mitigation, climate change adaptation and energy poverty/access.

Since the start of the CoM initiative in 2008, 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 and good practices. JRC recent assessment works include: the Covenant of Mayors: 2023 assessment (Melica et al., 2024), Assessment of the Covenant of Mayors initiative in the Southern Mediterranean region (Davide et al., 2024), Global Covenant of Mayors: A Comprehensive Assessment of Climate Adaptation Plans (Treville et al., 2025), Global Covenant of Mayors: Aggregation Report on Energy Access and Energy Poverty (Pittalis et al., 2025).

Policy context

The Covenant of Mayors in the Eastern Partnership countries (CoM East) was launched in 2011. Since then, hundreds of local authorities have joined the initiative. Their increased commitment, and the wide range of local energy and climate action practices, represent important components of the CoM ambition and international objective as well as a crucial support to the EU broader strategic agenda for the region. Indeed, actions and investments included in the action plans align with the new EU Black Sea Strategy, which aims to enhance connectivity, growth and environmental protection, while supporting security, sustainability, and regional prosperity. These efforts also complement the EU candidacies of Ukraine and Republic of Moldova. Local energy planning tools thus serve as essential elements to translate high-level political commitments into concrete, locally owned investment actions on the ground. This report provides an assessment of the signatories' progress towards their commitments and analyse the Sustainable Energy and Climate Action Plans (SECAPs) in the CoM East countries (i.e. Armenia, Azerbaijan, Georgia, Republic of Moldova and Ukraine).

Key conclusions

The assessment shows that the CoM East initiative continues raising interest among local authorities in the Eastern Partnership (EaP) region, with an increasing number of signatories, especially from the Republic of Moldova and Ukraine. Despite the current geopolitical challenges, local authorities in Ukraine are actively involved in terms of action plans submission as they represent 66 % of the total analysed action plans.

Out of 540 signatories (representing 31.49 million inhabitants) considered in this report, 49 % of them (covering 73 % of the CoM East population) have submitted at least an action plan. Most of the municipalities submitted a SECAP with integrated 2030 mitigation and adaptation commitments, representing 56 % of all CoM East signatories with an action plan and 32 % of the CoM East population. In terms of quantified emission reduction targets, commitments for 2030 show an average target of 34 %, while a smaller but growing group of municipalities committed to long-term carbon neutrality target by 2050. Since the introduction in 2016 of the adaptation pillar, a significant share of signatories started to include adaptation goals in their SECAP, although there are still some areas for improvement, especially in identifying clear and quantified adaptation targets and in planning actions consistently addressing major hazards and vulnerable sectors. Due to the relatively recent introduction of the adaptation pillar, cities may have faced some initial lack

of technical skills and competencies in this area. Although reporting on energy access and poverty became mandatory in 2025 and therefore it is not covered by this report, some integrated actions addressing the three pillars together already started to emerge.

The overview provided in this report highlights past and current trends, as well as potential gaps and barriers faced by signatories of the initiative in the EaP countries. This could foster further reflection on future developments of the initiative and adoption of long-term commitments while revealing key factors for successful implementation and capacity building of local authorities.

Main findings

The CoM East initiative covers a population of over 31 million people and includes cities of different size, from very small cities to large metropolises and capitals. The emission reduction commitment proposed in the SECAPs analysed in this report are in line with the required minimum target of 30-35 % by 2030 commitment for the area, with a share of signatories (23 %) proposing even more ambitious mitigation targets in the range of 36–45 %. In terms of reported emissions in the baseline emission inventories (BEIs), 58 % of total emissions come from the residential building sector, followed by transport and the tertiary building sector. Fossil fuels remain the dominant source of GHG emissions, accounting for 41 % of total emissions reported in the BEIs, followed by electricity and district heating and cooling. Cities planned mitigation actions targeting the building sectors, and especially the municipal buildings: this is linked to the prominent and exemplary role of municipal assets and properties in local climate action. Actions addressing the transport sector are also relevant while local electricity and heat production, industry, and waste represent significantly smaller shares. Although planning and reporting on the energy poverty pillar is still in its infancy, signatories have started embedding energy poverty considerations when planning climate change mitigation actions, which highlights local authorities' interest in the topic. As for adaptation to the impacts of climate change, the most common hazards identified in the risk and vulnerability assessments (RVAs) with medium or high probability and impact are extreme heat, heavy precipitation, droughts & water scarcity, and floods & sea level rise. The most frequently reported vulnerable sectors are agriculture & forestry, followed closely by buildings. Almost all sectors are reported to be vulnerable to extreme heat, which, consistently, it is the most targeted climate hazard by climate adaptation actions.

Related and future JRC work

This report updates and complements the previous JRC assessments of the CoM East (Bertoldi et al., 2020, Palermo et al., 2022; Davide et al., 2025). The JRC will continue to track progress of the initiative, based on future SECAPs submission and subsequent monitoring reports. Given the challenges and gaps highlighted in this report, JRC may also provide tailored support to local authorities in their path towards a decarbonised, resilient and just future. Finally, current analysis may inform the revision of the regional guidebook.

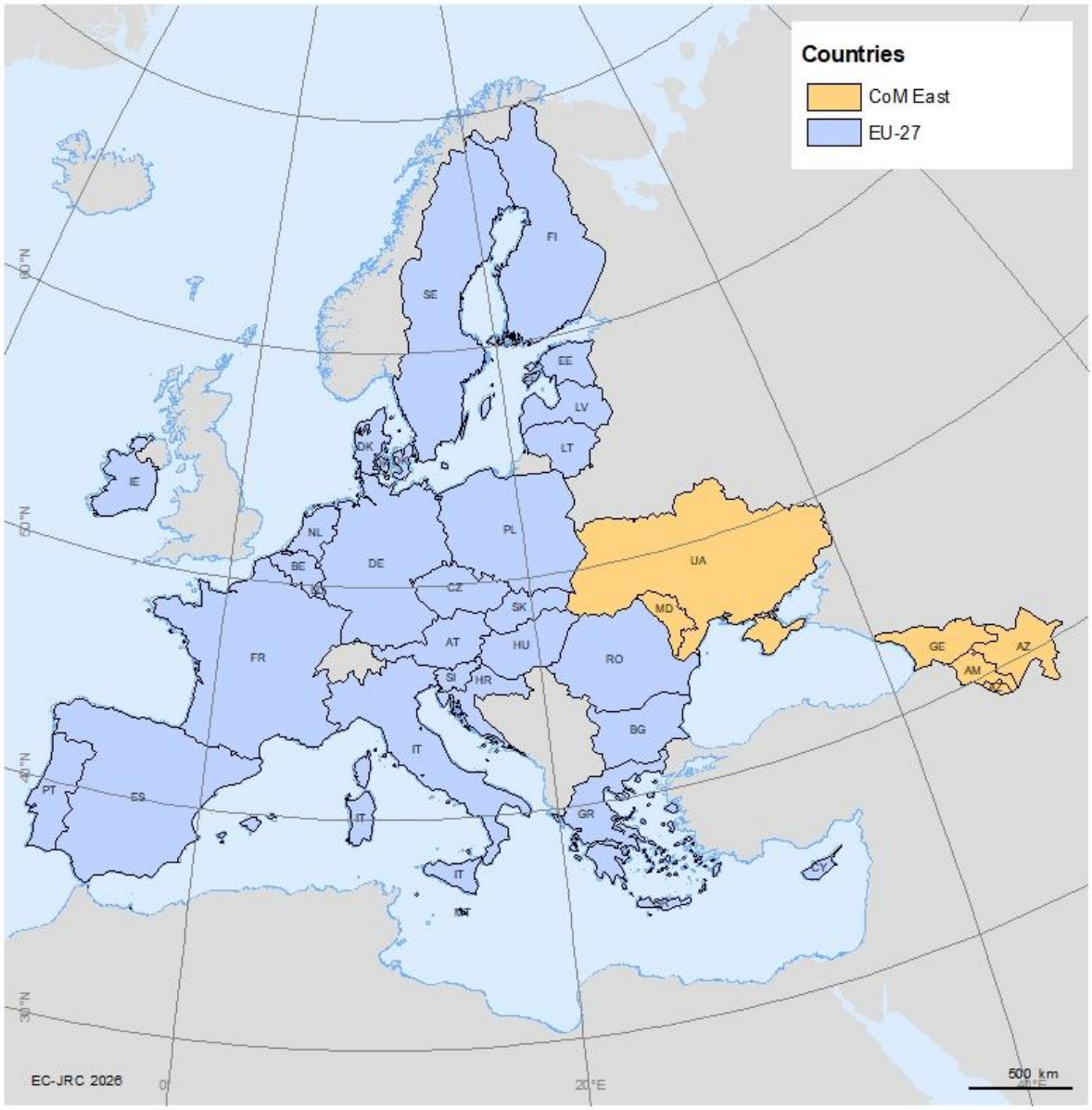
Quick guide

This report is organised in five chapters. Chapter 1 introduces the CoM East initiative and the recent developments in the EaP region. Chapter 2 briefly presents the data and the methodology used to develop the assessment. Chapter 3 gives an overview of the signatories under assessment and their mitigation and adaptation commitments. Chapter 4 analyses the SECAPs, including key elements (i.e. the BEI and RVA, targets and goals as well as actions and measures) of both mitigation and adaptation pillars. Chapter 5 closes the report, presenting the key findings and conclusions.

1. Introduction and background

The Covenant of Mayors initiative in the Eastern Partnership countries (CoM East) was launched in September 2011. In its first phase (2011-2015), 11 countries of Eastern Partnership and Central Asia regions were involved. Since 2017, the initiative was tailored to the specific needs of the Eastern Partnership (EaP) countries, and currently covers Armenia, Azerbaijan, Georgia, Republic of Moldova and Ukraine (Figure 1).

Figure 1. Map of current CoM East countries (yellow) and the European Union (blue)



Source: JRC elaboration

The CoM East supports cities from these five countries in their efforts to develop local policies addressing climate challenges, based on sustainable energy principles, which also strengthen energy security. As such, it is in line with the objective of the EU Eastern Partnership of working together with EaP countries towards environmental and climate resilience. This is especially relevant as it fosters regional cooperation and bottom-up engagement on local climate and energy

action supporting global goals as well as it promotes the development of climate change legislation and capacity-building in the candidate countries of the region (i.e. Republic of Moldova and Ukraine).

Local authorities in these countries, who voluntarily join the CoM East, commit to taking action against climate change in their territories to achieve climate and energy targets by 2030. The initiative, which has evolved through time, is nowadays grounded on three pillars: climate change mitigation, climate change adaptation and energy poverty (the latter became mandatory in 2025). Therefore, cities commit to decarbonising their activities and making their territories and communities more resilient, as well as ensuring affordable energy and a just transition. Strategies and actions developed by signatory local authorities to achieve their targets are collected in their Sustainable Energy and Climate Action Plan (SECAP), which is a core political-technical document, and are reported through one of the official Reporting Platforms: MyCovenant or CDP-ICLEI Track[1].

The initial focus of the CoM initiative was on energy and climate change mitigation, with signatories committed to reducing at least 20 % of their greenhouse gas (GHG) emissions by 2020 and to developing and implementing a Sustainable Energy Action Plan (SEAP). From 2016, the mitigation commitment has become more ambitious, setting – for CoM East - an emission reduction target of 30 % by 2030, and the climate adaptation pillar was also integrated. With the broadening of the scope of action, cities' commitments transitioned from SEAP to SECAP (Sustainable Energy and Climate Action Plan). As of 2021, the CoM East emission reduction target further increased to 35 % by 2030 .

Currently, the regional long-term commitment aims at reducing CO_2 (and possibly other GHGs) emissions by at least 60 % by 2050 compared to 1990 emission levels, or by at least 40 % by 2050 compared to emission levels in a baseline year after 2005, with efforts to adopt more ambitious long-term targets in line with Nationally Determined Contributions (NDC) commitments and to achieve climate neutrality by 2050. In addition, signatories commit to take actions to increase resilience of their territories by adapting to the impacts of climate change, as well as to tackle energy poverty as one key action to ensure a just transition and access to affordable, secure and sustainable energy.

The Joint Research Centre (JRC) of the European Commission provides scientific, methodological and technical support to the Covenant of Mayors initiative. The JRC, as an independent body, is in charge of the evaluation of the SECAPs providing tailored feedback to the local authorities and in-depth evaluation of selected plans. Moreover, several studies have been developed so far to support the scientific development of CoM East (e.g., (Bertoldi et al., 2014; Kona et al., 2018); others have focused on the initiative development and progresses (e.g. Palermo et al., 2022).

This document follows the last CoM East Overall assessment report (Davide et al., 2025), and it analyses the SECAPs submitted by EaP signatories, including information on municipalities, their commitments and the key elements of the SECAPs across the mitigation and adaption pillar.

[1] Signatories may choose to report to the MyCovenant reporting platform, owned by the European Commission or to the CDP-ICLEI Track reporting platform managed by CDP and ICLEI.

2. Data and report methodology

The assessment of the CoM East initiative involved a review and analysis of the information and data submitted by signatories in their SECAP templates.

This report uses data present in the MyCovenant reporting platform at the cut-off date of January 1st, 2025 and included in the 6th release of the GCoM dataset (Bezerra et al., 2025). The GCoM dataset represents a collection of action plans and monitoring reports that have been uploaded over the years by local authorities to the MyCovenant platform and has a global coverage. After a rigorous quality-harnessing procedure applied by the JRC to ensure data accuracy and coherence (Franco et al., 2024), the dataset is published and made available in the JRC data catalogue[2].

For this report, a selection of signatories that are part of the EaP countries (Armenia, Azerbaijan, Georgia, Republic of Moldova and Ukraine) is applied. Data and key information from signatories and SECAPs are extracted, including quantitative information such as geodemographic statistics about signatories, and key information about both mitigation and adaptation pillars, such as total and sectoral energy consumption with associated emissions and emission reduction targets for mitigation, hazards and vulnerable sectors identified by the risk and vulnerability assessment and adaptation goals for adaptation. Other information includes details on mitigation and adaption actions such as sectors addressed, targeted hazards, vulnerable sectors and groups. The approach taken for the assessment, therefore, includes a review, elaboration and analysis of the data provided by municipalities and overall quantitative aggregated analysis of the whole group of CoM East signatories. Whenever possible, a comparative review and analysis of signatories from individual countries, including examples, are performed to identify common and/or significant attention points.

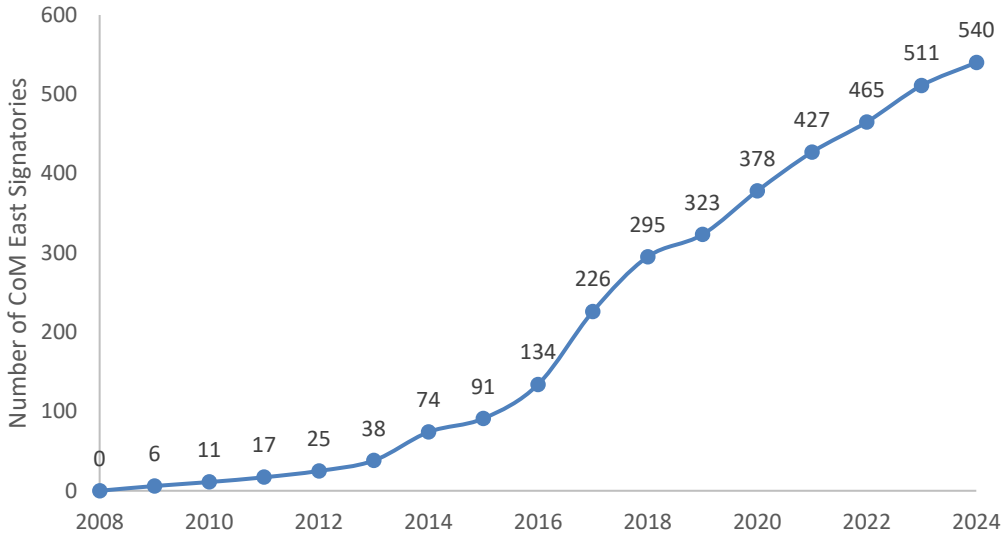
[2] Global Covenant of Mayors - A complete collection of action plans and monitoring reports from MyCovenant reporting platform, available at https://data.jrc.ec.europa.eu/collection/id-00354

3. Signatories and reporting progress

3.1. General statistics on signatories

At the cut-off date for the analysis (January 1st, 2025), a total of 540 CoM signatories were part of the CoM East initiative. As Figure 2 shows, the number of CoM signatories in the EaP region increased over the years since 2008 and especially from 2016 onwards.

Figure 2. Number of CoM East signatories since 2008



Source: JRC elaboration

Table 1 shows the number of signatories, their population and the type of commitments by country. The total population covered by the CoM East initiative, as reported in the baseline inventories, is 31.49 million. Most of signatories are from Ukraine, which accounts for 64 % of the total, with 347 signatories, representing 76 % of the signatories' population. Moldova follows with 120 signatories (22 % of signatories) covering 7 % of total CoM East population; 33 signatories are from Georgia (covering 8 % of the total population) followed by Armenia with 31 signatories (covering 6 % of the total population) and Azerbaijan with 9 signatories (covering 3 % of the total population).

Table 1. Signatories in the CoM East by country, population and commitment

Countries	Number of signatories	Population (adhesion year)	CoM 2020	CoM 2030	CoM 2050
Armenia	31	1 853 153	13	27	-
Azerbaijan	9	981 286	1	8	1
Georgia	33	2 528 184	12	30	2
Moldova	120	2 315 118	32	102	6
Ukraine	347	23 810 259	120	250	49
Total	540	31 488 000	178	417	58

Source: JRC elaboration

As described in Section 1, the Covenant initiative has evolved over time in terms of ambition and coverage. Signatories have therefore undertaken different commitments:

— 178 signatories have a commitment to 2020 (CoM 2020), which included only mitigation with a minimum 20 % emission reduction target by 2020;

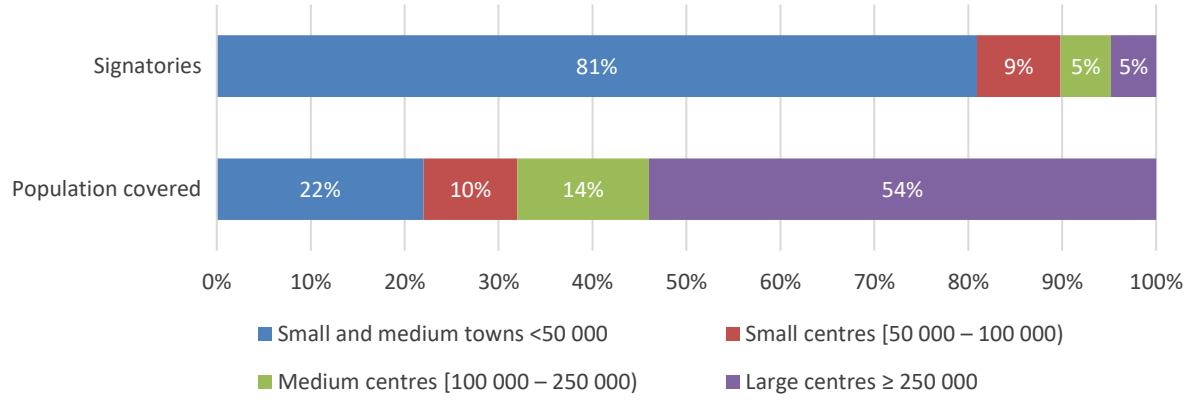
— 417 signatories, representing 77 % of the total have a commitment to 2030 (CoM 2030) which combined both mitigation and adaptation, with a minimum mitigation target of 30 -35 % (depending on the date of adhesion) by 2030;

— 58 signatories (11 % of the total) committed to 2050 (CoM 2050) including an adaptation goal combined with a long-term mitigation target by 2050 and a recommended interim target of 35 % emission reduction by 2030.

Overall, about half of the CoM East signatories that joined with a 2020 commitment have renewed their commitment for 2030 or 2050, while 85 municipalities (representing 16 % of total signatories) have not done it yet.

The initiative includes municipalities of different sizes: from very small cities, as for example the Municipality of Greblesti, in Moldova, with 672 inhabitants, to large metropolises and capitals such as Kyiv, Kharkiv (Ukraine), Tbilisi (Georgia) and Yerevan (Armenia). Overall, the majority of the CoM East signatories (81 %) are small- and medium-sized towns with a population of less than 50 000 inhabitants. However, as shown in Figure 3, 54 % of the CoM East population live in large urban centres, with a total population of over 17 000 000 inhabitants.

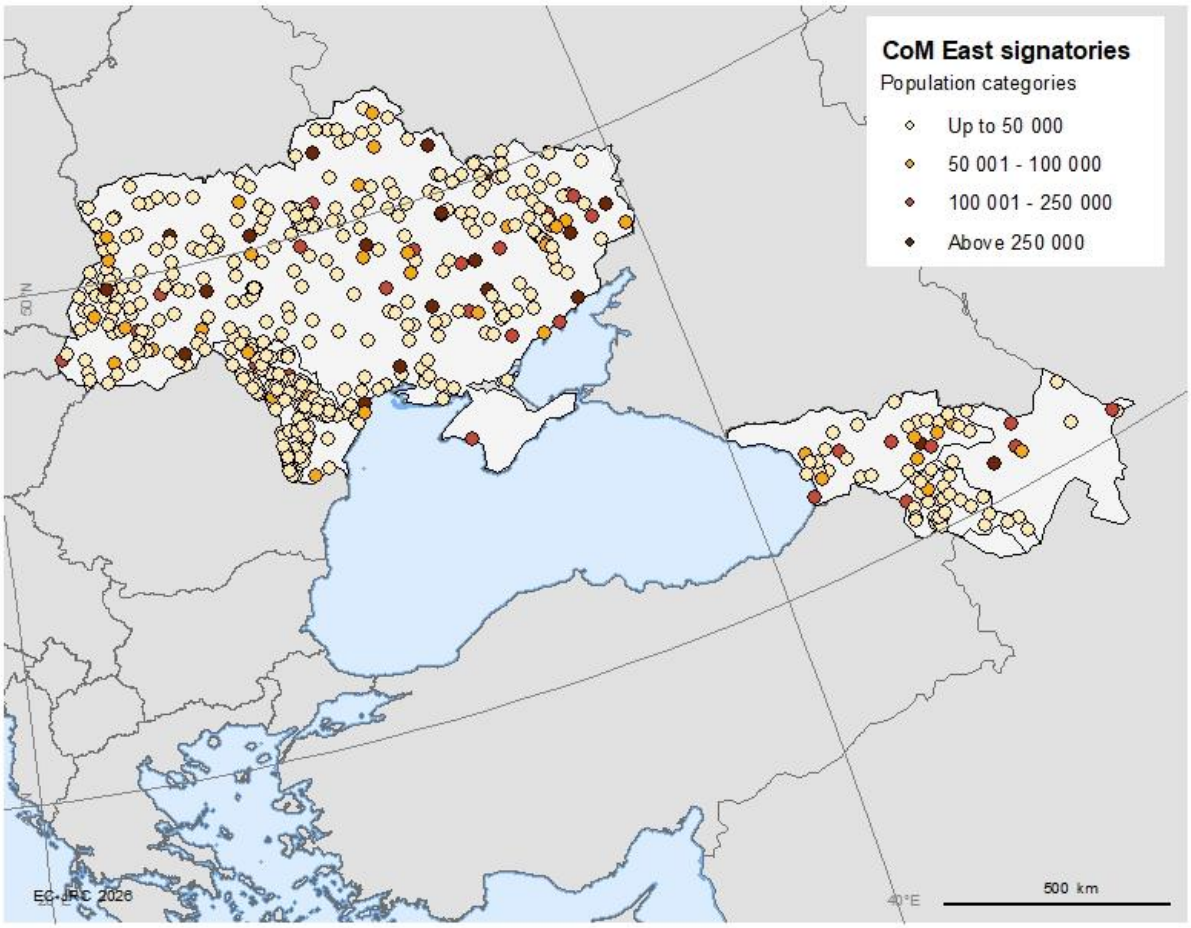
Figure 3. Share of signatories (N=540) and population covered by size



Source: JRC elaboration

The map of signatories, classified according to four population size categories, is shown in Figure 4.

Figure 4. Location of CoM East signatories (N=540) by population size



Source: JRC elaboration

3.2. Progress on action plan submission

Among all the CoM East signatories, 264 (49 % of total, covering 73 % of the CoM East population) have submitted at least an action plan (Table 2). The total number of submitted action plans is 283, with some signatories having more than one plan, including different combinations of commitment types (2020 SEAPs, 2030 and/or 2050 SECAPs and Adaptation pillar).

The highest number of signatories with a submitted action plan is observed among Ukrainian municipalities (175 signatories, representing 50 % of country's signatories and covering 74 % of population), followed by Moldova (48 signatories, 40 %, 26 % of population), Georgia (20 signatories, 61 %, 87 % of population), Armenia (14 signatories, 45 %, 82 % of population) and Azerbaijan (7 signatories, 78 %, 93 % of population). Details about the number of signatories per country and their population coverage in the baseline inventory year as well as the number of action plans are summarised in Table 2.

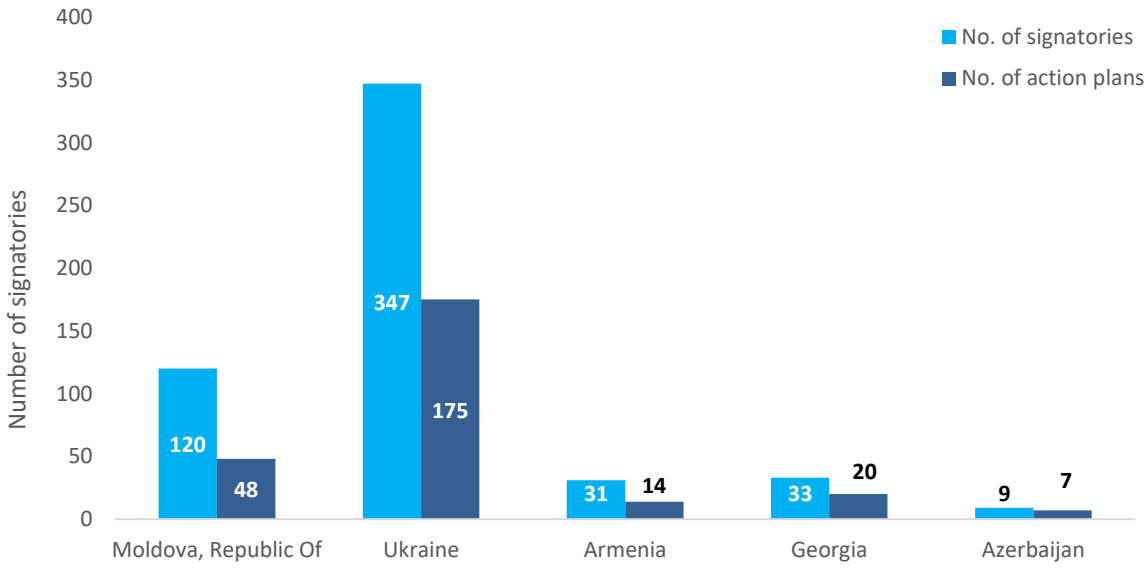
Table 2. Statistics about signatories with at least an action plan submitted, per country and total

Country	Number of signatories	No. of signatories with at least an action plan	Share of signatories with at least an action plan	Population covered by action plans	Share of CoM population covered by action plans
Armenia	31	14	45 %	1 524 233	82 %
Azerbaijan	9	7	78 %	916 686	93 %
Georgia	33	20	61 %	2 209 905	87 %
Moldova	120	48	40 %	593 678	26 %
Ukraine	347	175	50 %	17 730 060	74 %
Total	540	264	49 %	22 974 562	73 %

Source: JRC elaboration

Figure 5 graphically shows the distribution of signatories with an action plan over the total, by country.

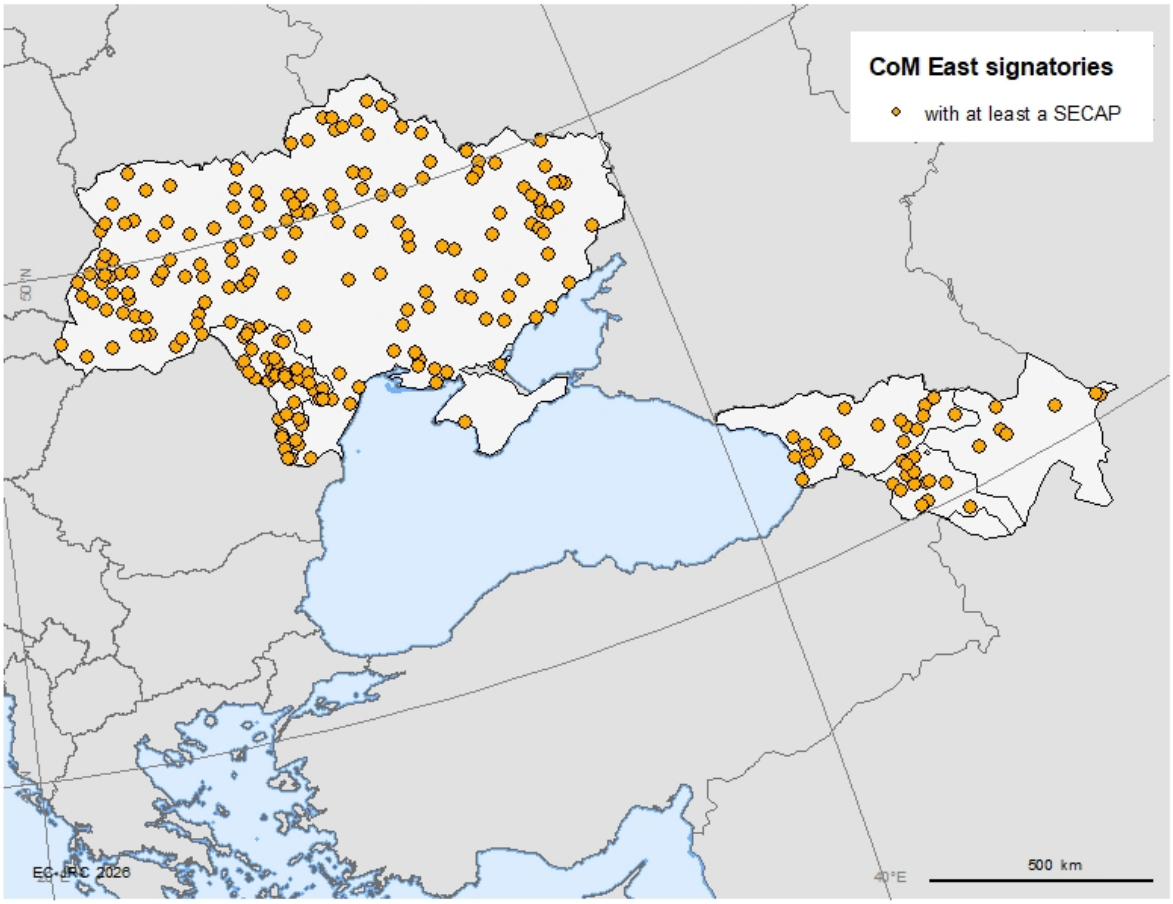
Figure 5. Number of CoM East Signatories with a submitted action plan, by country



Source: JRC elaboration

The total number of inhabitants covered by at least an action plan is 22.97 million or 73 % of the total CoM East population as of adhesion year. The geographical distribution of the signatories with submitted action plans is shown in Figure 6.

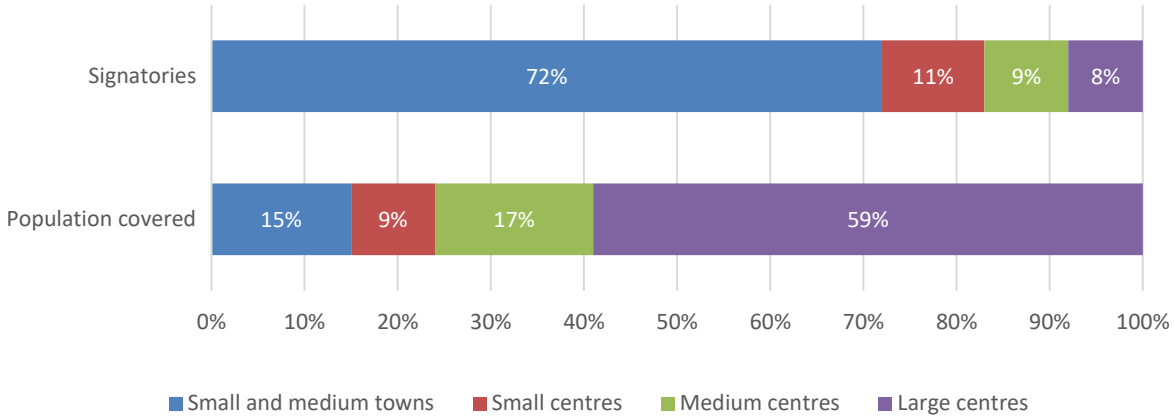
Figure 6. Location of signatories with at least one submitted action plan (N=264)



Source: JRC elaboration

Most signatories with submitted action plans are small and medium towns, which represent 72 % of the total number of signatories (Figure 7). In terms of population, the highest share (59 %) of signatory's inhabitants belongs to large urban centres with a population of over 250 000 inhabitants.

Figure 7. Share of signatories with at least one action plan (N=264) and population by size



Source: JRC elaboration

As a result of the introduction of increasingly ambitious targets and the integration of the adaptation pillar in the CoM methodological framework[3], the information about signatories in this section has been further detailed to reflect the different types of action plans and ambition.

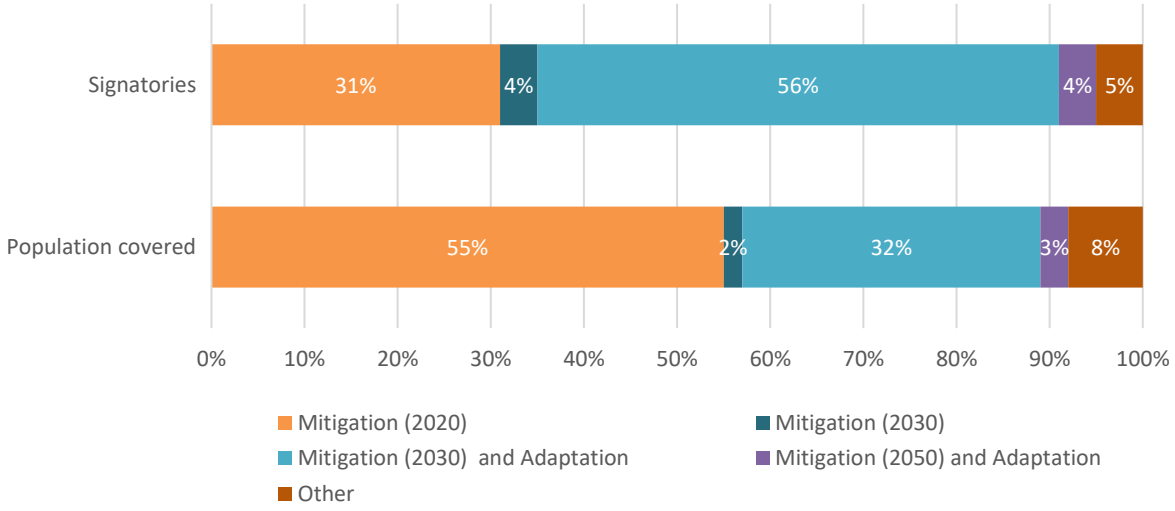
According to the distribution of action plans by commitment type shown in Figure 8, signatories exhibit distinct patterns in both population coverage and participation. The largest group of signatories submitted a SECAP with integrated 2030 mitigation and adaptation commitments, representing 56 % of all municipalities part of CoM East. Signatories submitting a SEAP and therefore committing only to 2020 mitigation targets account for 31 % of signatories, while those committed solely to an action plan with 2030 mitigation goals make up 4 %. Long-term SECAP committing to 2050 mitigation and adaptation pillars represent another 4 %, while the remaining 5 % fall into Other categories (which include different combination of abovementioned commitments).

When analysing the share of population covered by action plans, a different distribution emerges. The largest share of population (55 %) is associated with 2020 mitigation commitment (SEAP), indicating that more than a half of CoM East population represented in the initiative fall under this earlier mitigation target. Another 32 % of the population is represented by signatories committed to a 2030 integrated mitigation and adaptation commitment (SECAP 2030), making it the second most significant category in terms of demographic reach. Smaller population shares correspond to only 2030 mitigation commitment (2 %) and long-term frameworks, with mitigation and adaptation 2050 SECAPs, representing 3 %. Other types of commitments account for 8 % of the total population.

Overall, the distribution of commitments demonstrates a shift from a 2020 mitigation focus toward a more ambitious integrated mitigation and adaptation framework for 2030, and even long-term carbon neutrality objectives. Although higher in absolute numbers, signatories with a 2030 commitment cover a smaller population share and therefore are represented by smaller centres compared to those with a 2020 commitment. While the number of signatories with long-term targets is still limited, their presence indicates an emerging trend toward long-term climate planning.

[3] In October 2015, the EU-funded CoM initiative announced a new longer-term vision, and the inclusion of the adaptation was the result of the merging of Mayors Adapt and the Covenant of Mayors.

Figure 8. Share of signatories (N=264) and population covered by commitment and target year



Source: JRC elaboration

CoM signatories are free to set a more ambitious GHG emissions reduction target than the minimum target proposed by the initiative. When looking at the average targets, it emerges that signatories with 2020 commitments have proposed an average reduction target equal to 22 %, which is slightly above the minimum CoM requirement of a 20 % reduction by 2020. For the 2030 commitments, the average mitigation target increases to 34 %, demonstrating higher ambition among these signatories, covering a population of over 8.3 million inhabitants. All the signatories with a 2050 commitment propose a target of 80 % reduction, showing readiness to align with climate-neutrality objectives.

As signatories frequently have multiple types of commitments, the data presented in the Table 3 may include overlaps between commitment categories.

Table 3. Mitigation targets proposed by signatories across commitments

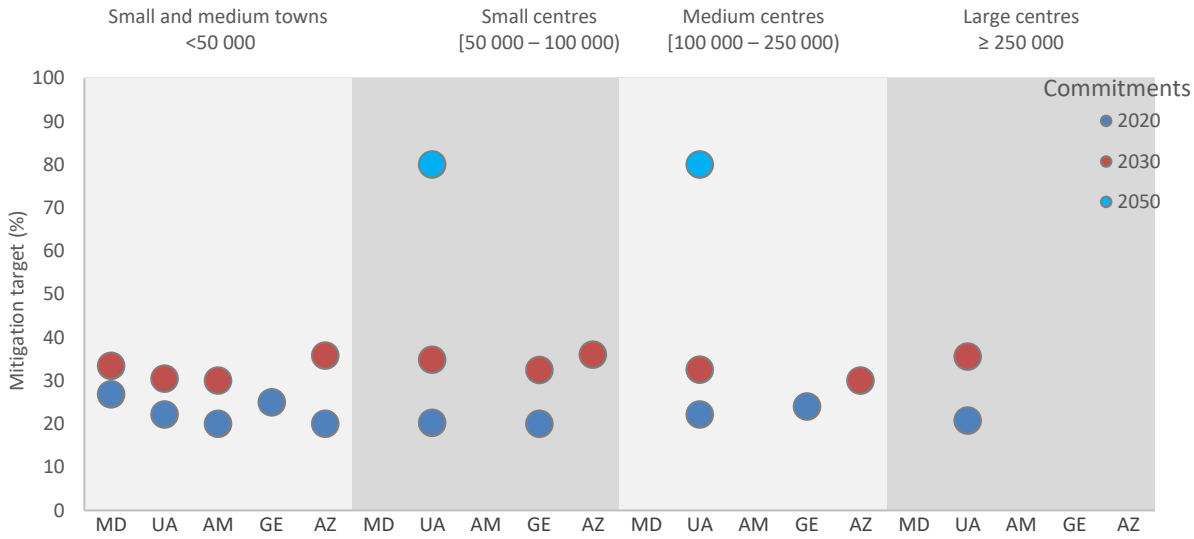
Commitment type	**Number of action plans**	**Population**	**Average GHG emission reduction [%]**
2020	112	12 959 275	22 %
2030	170	8 330 142	34 %
2050	5	443 903	80 %

Source: JRC elaboration

Focusing on average commitments categorised by different city size groups (Figure 9), it can be seen that, among the signatories with 2020 commitments, the highest emission reduction targets are proposed by small and medium towns, although all cities sizes are represented. Regarding 2030 commitments, the level of mitigation targets is homogeneous across city groups ranging between 30 and 36 %. Among 2050 commitments, the highest average emission reduction refers to both small and medium urban centres in Ukraine, where the target is 80 %, representing the highest level of ambition across all groups. In terms of mid-term commitments, the highest average

mitigation targets are recorded among large urban centres with 250 000 inhabitants or more, which show an average mitigation target of 54 %.

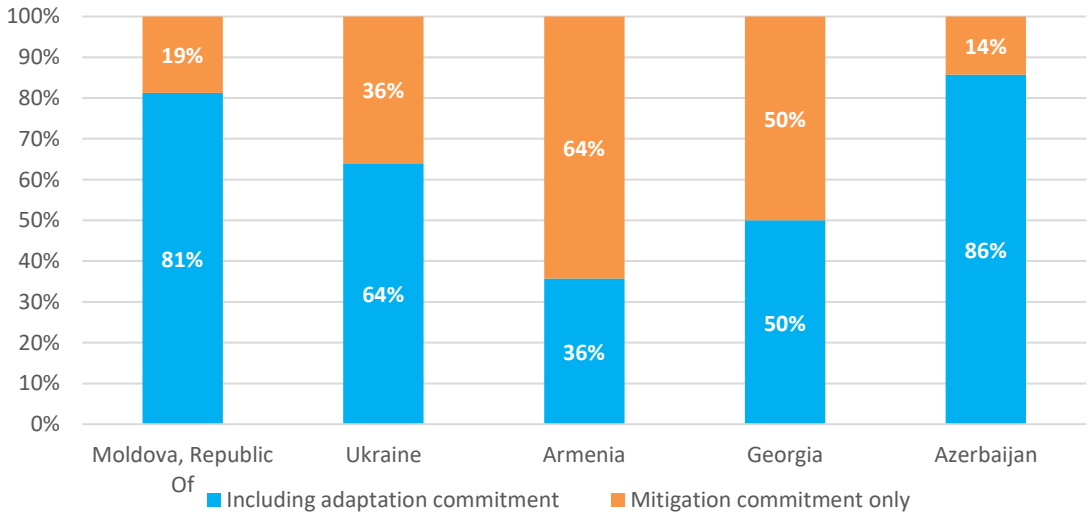
Figure 9. Mitigation targets by country average, signatory city's size and type of commitments.



Source: JRC elaboration

As the climate adaptation pillar was introduced in 2020 and subsequently integrated in SECAPs from 2021, figures reflect the recent efforts of municipalities in progressing toward its implementation. On average, 65 % of CoM East signatories have included climate adaptation in their plans, although with some differences at the country level (Figure 10). Municipalities in Azerbaijan and Moldova show the greatest shares, with more than 80 % of their plans addressing adaptation, followed by Ukraine and Georgia with a share of 64 and 50 % respectively, and by Armenia, where, with 36 % of adaptation commitments, the focus on mitigation remains prevalent.

Figure 10. Share of action plans including the adaptation pillar



Source: JRC elaboration

3.3. Monitoring reports

Based on the values presented in the tables below, a total of 53 signatories has submitted at least one monitoring report (either light, i.e. mainly including qualitative information on actions' implementation, or complete, i.e. including a monitoring emission inventory), covering 8.24 million inhabitants. This represents 24 % of all signatories with an action plan and 26 % of the population covered by action plans—figures suggest that many signatories are either still before the reporting deadline or face challenges with monitoring and reporting procedures. Importantly, these percentages do not account for whether signatories had already reached the official deadline for submitting their first monitoring report. A smaller subset – 24 signatories (corresponding to 9 % of signatories with action plans) – submitted at least one complete monitoring report. These complete reports cover 4.21 million inhabitants, or 13.4 % of the population in cities with action plans. This highlights that while many signatories have started monitoring, only a limited share has progressed to full emissions reporting.

At the country level, Ukraine shows the highest engagement, with 46 monitoring reports (26 % coverage) including 20 complete reports (11.4 % coverage). Moldova follows with 7 monitoring reports and 3 complete reports, while Georgia has 1 complete monitoring report. In contrast, Armenia and Azerbaijan have not yet submitted any monitoring report, indicating early stages of SECAP implementation or limited reporting capacity.

Overall, these figures reveal substantial variation across countries and an overall need for further support to signatories aimed at strengthening monitoring systems.

Table 4. Number of signatories with at least one submitted monitoring report (MR)

Country	Signatories with at least a MR	Share of MR over action plans	Signatories with at least a complete MR	Share of complete MR over action plans
Armenia	0	0 %	0	0 %
Azerbaijan	0	0 %	0	0 %
Georgia	1	5 %	1	5 %
Moldova	7	15 %	3	6.3 %
Ukraine	45	26 %	20	11.4 %
Total	53	20 %	24	9.1 %

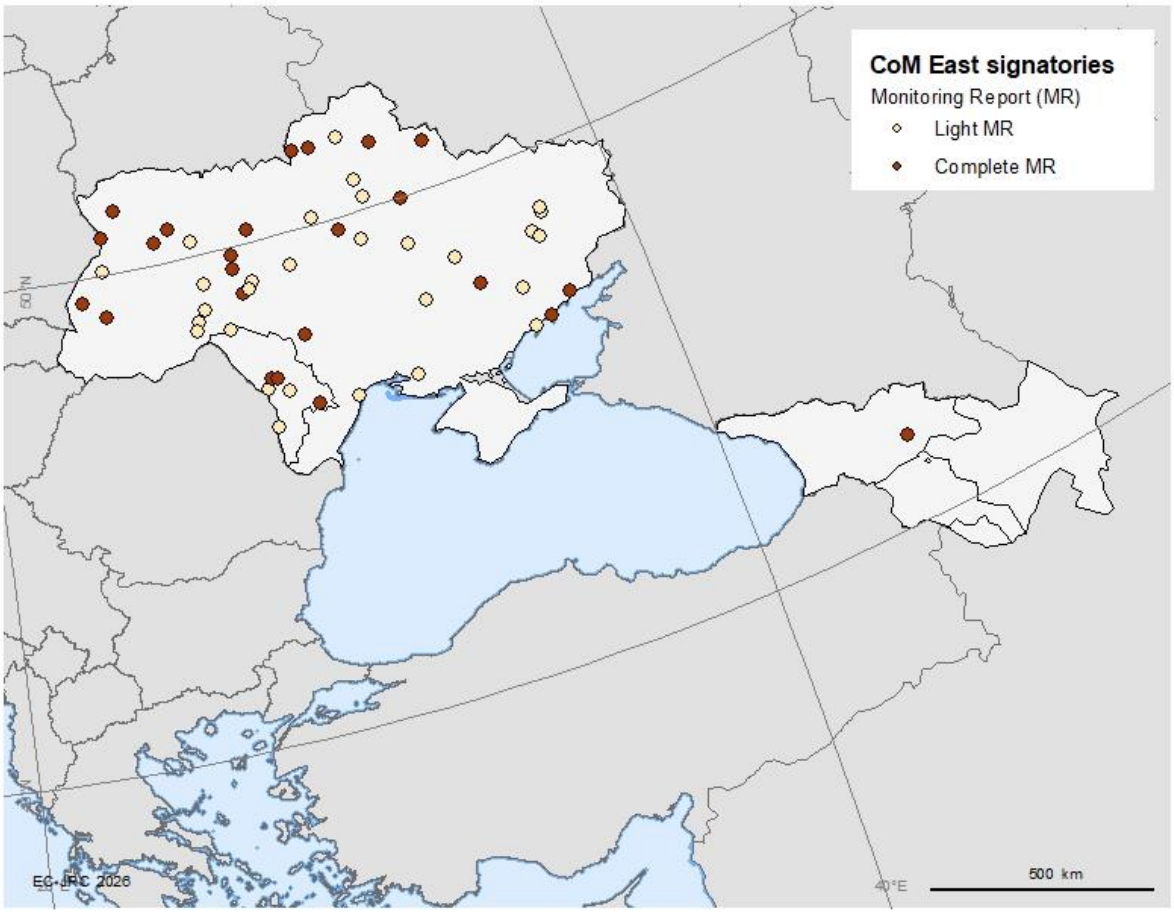
Source: JRC elaboration

Table 5. Number of inhabitants in signatories with submitted monitoring reports (MR)

Country	Population covered by at least a MR	Share of population covered by MR over action plans	Population covered by at least a complete MR	Share of population with complete MR over action plans
Armenia	0	0 %	0	0 %
Azerbaijan	0	0 %	0	0 %
Georgia	1 100 000	44 %	1 100 000	43.5 %
Moldova	117 911	5 %	22 196	1 %
Ukraine	7 022 284	29 %	3 091 878	13 %
Total	8 240 195	26 %	4 214 074	13.4 %

Source: JRC elaboration

Figure 11. Overview of signatories with at least one submitted monitoring report, either qualitative (light MR) or quantitative (complete MR)



Source: JRC elaboration

Box 1. Highlights from CoM East signatories and their commitments

540 signatories representing 31.49 million inhabitants.

The high participation of small and medium-sized towns below 50 000 inhabitants (81 % of the signatories) confirms the important role of small municipalities in climate change action.

49 % of signatories (264 signatories accounting for 22.97 million inhabitants) submitted a SEAP/SECAP.

Most of the signatories are committed to 2020 and 2030 mitigation target.

Out of 264 signatories with a SEAP/SECAP, 65 % include an adaptation component.

4. Sustainable Energy and Climate Action Plans

This section provides an in-depth focus of mitigation and adaption pillars' key information included in the SECAPs, which propose commitments for 2030 and 2050. On mitigation, the analysis focuses on emission reduction targets, baseline emission inventory (BEI), monitoring emission inventory (MEI), emissions reduction achieved and planned actions. On adaptation, the analysis focuses on information about adaptation goals, risk and vulnerability assessment (RVA), including information on climate hazards, vulnerable sectors and vulnerable groups, and planned actions.

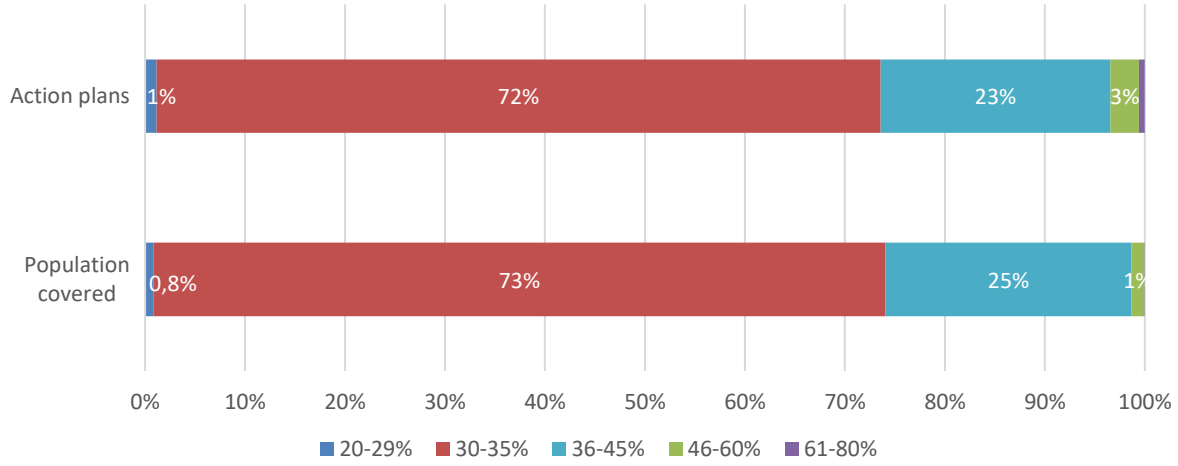
4.1. Mitigation pillar: emission inventories, targets and progress

4.1.1. Emission reduction targets

To provide a consistent overview of mitigation targets, this section focuses on SECAPs with a 2030 commitment as well as those with a 2050 commitment that propose a 2030 mid-term target, for a total of 174 CoM East signatories. Overall, these signatories committed on average to reduce GHG emissions by 34 % by 2030. Looking more in detail at their mitigation targets (Figure 12), it can be observed that the majority of signatories (72 %) set a mitigation target in the range between 30 and 35 % followed by a smaller share, 23 %, whose targets are in the range of 36-45 %. Only 3 % of the signatories opted for a mitigation target in the 46–60 % window.

In terms of population coverage, figures follow similar patterns: the emission reduction targets between 30 and 35 % represent the highest share, covering 73 % of inhabitants with a 2030 target in the area. Overall, the dominant trend for SECAPs with a 2030 target is the adoption of a mitigation reduction in line or moderately higher than the minimum commitment levels required by CoM East.

Figure 12. Number of action plans and population coverage as a function of the emission reduction target level



Source: JRC elaboration

Comparing the emission reduction targets with the emissions declared by signatories in their baseline emission inventories, CoM East estimated targeted annual emissions in 2030 account to 16 million t CO_2-eq/year, accounting for a 36.8 % average emission reduction in 2030 (Table 6).

Table 6. Estimated baseline and 2030 GHG emissions based on mitigation targets

Country	Total emissions in BEIs [t CO2-eq/year]	Targeted emissions in 2030 [t CO2-eq/year]	Committed reduction by 2030
Armenia	146 373	97 476	33.4 %
Azerbaijan	2 569 054	1 630 584	36.5 %
Georgia	339 387	236 884	30.2 %
Moldova	372 209	235 340	36.8 %
Ukraine	21 931 101	13 816 149	37.0 %
Total	25 358 124	16 016 433	36.8 %

Source: JRC elaboration

Looking at the GHG emission reductions planned by signatories in their actions overview, the aggregated figures changes slightly (Table 7). Total emissions reported in their baseline inventory are 23.1 million t CO_2-eq/year, whereas estimated targeted emissions in 2030 account for 15.3 million t CO_2-eq/year. Comparing these figures, the emission reduction planned in 2030 is 33.9 % on average, although with some regional variations. In particular, actions planned by Azerbaijan and Georgia's municipalities are more ambitious than the committed targets, while emissions reduction planned by Moldova, Ukraine and Armenia fall short from reaching it.

Table 7. Estimated baseline and 2030 GHG emissions based on planned actions overview

Country	Total emissions in BEIs [t CO2-eq/year]	Targeted emissions in 2030 [t CO2-eq/year]	Planned reduction by 2030
Armenia	146 373	97 816	33.2 %
Azerbaijan	2 569 054	1 282 963	50.1 %
Georgia	13 741	8 186	40.4 %
Moldova	330 809	232 079	29.8 %
Ukraine	20 085 518	13 669 044	31.9 %
Total	23 145 494	15 290 087	33.9 %

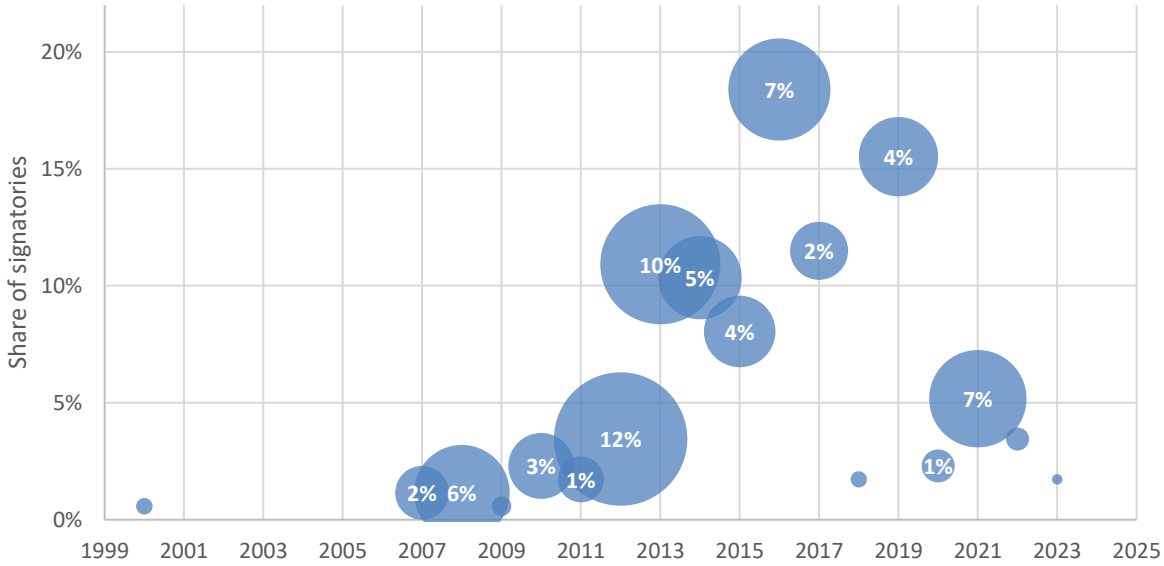
Source: JRC elaboration

4.1.2. BEI

4.1.2.1. Statistics on baseline years

Signatories are free to choose the base year against which their emission reduction target is measured. Thus, different BEI years might be used. Overall, 76 % of signatories chose a BEI year between 2013 and 2019, also reflecting the greater availability and reliability of more recent data. As Figure 13 shows, a very small share of signatories selected a BEI year before 2010, with individual values not exceeding 1–2 %. The highest concentration of BEI years is observed in 2016, which has been chosen in 18 % of SECAPs, followed by 2019, which is present in 16 % of them. The frequency of years from 2020 shows a decreasing trend, with 12 % of signatories selecting very recent BEI years.

Figure 13. Percentage of SECAPs per BEI year



Bubble size and label represent the population's share.

Source: JRC elaboration

4.1.2.2. Quantification of aggregated and sectoral energy and emissions figures on baseline years

Table 8 and Figure 14 illustrate the overall GHG emissions reported in the BEIs across the CoM macro-sectors. The three most emitting sectors are residential buildings, transport, and tertiary buildings, accounting for 14.7 Mt CO_2-eq/year (58 %), 3.1 Mt CO_2-eq/year (12 %), and 3.5 Mt CO_2-eq/year (13.6 %), respectively (Figure 14). Municipal buildings contribute an additional 2.6 Mt CO_2-eq/year (10.3 %).

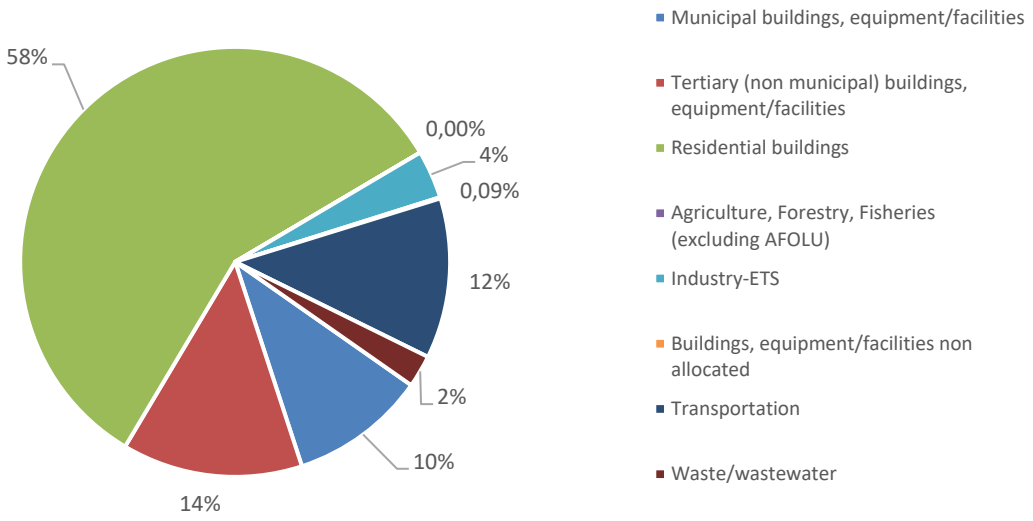
With an aggregated share of 82 %, the building sector as a whole represents the dominant source of emissions within local inventories. Among the non-mandatory reporting sectors, the industry sector represents 0.1 Mt CO_2-eq/year (3.6 %), while waste and wastewater account for 0.62 Mt CO_2-eq/year (2.4 %). Other sectors, including agriculture, forestry, and non-allocated facilities do not reach relevant shares.

Table 8. GHG emission by macro-sectors reported in BEIs

Macro-sector	Sector	GHG emissions in BEIs, [Mt CO2-eq/year]
BUILDINGS, EQUIPMENT, FACILITIES & INDUSTRIES	Municipal buildings, equipment/facilities	2.599
	Tertiary (non-municipal) buildings, equipment/facilities	3.445
	Residential buildings	14.695
	Agriculture, Forestry, Fisheries (excluding AFOLU)	0
	Industry-ETS	0.920
	Buildings, equipment/facilities non allocated	0.023
TRANSPORT	Transportation	3.059
OTHER	Waste/wastewater	0.618
	Other	0
TOTAL		25.358

Source: JRC elaboration

Figure 14. GHG emissions in CoM sub-sectors reported in BEIs

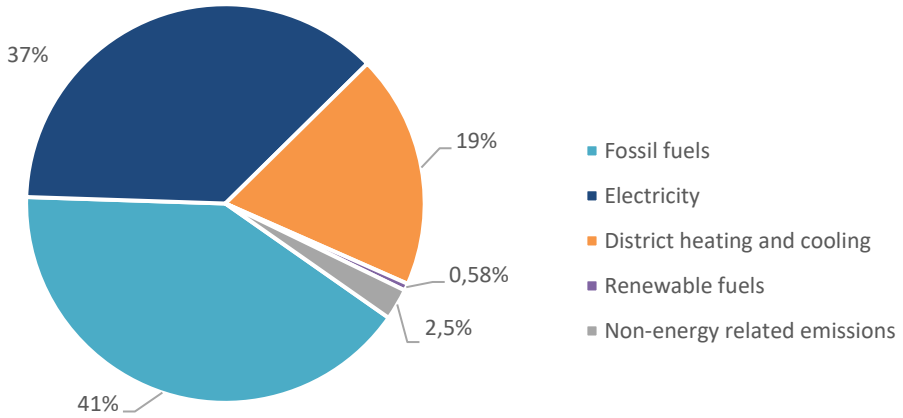


Source: JRC elaboration

Analysis of aggregated GHG emissions by energy carriers shows that fossil fuels remain the dominant source of GHG emissions, accounting for 41 % of total emissions reported in the BEIs (Figure 15). Electricity represents 37 % of emissions, while district heating and cooling contribute

19 %. Renewable fuels account for 0.6 %, and non-energy related emissions represent a negligible share of total emissions.

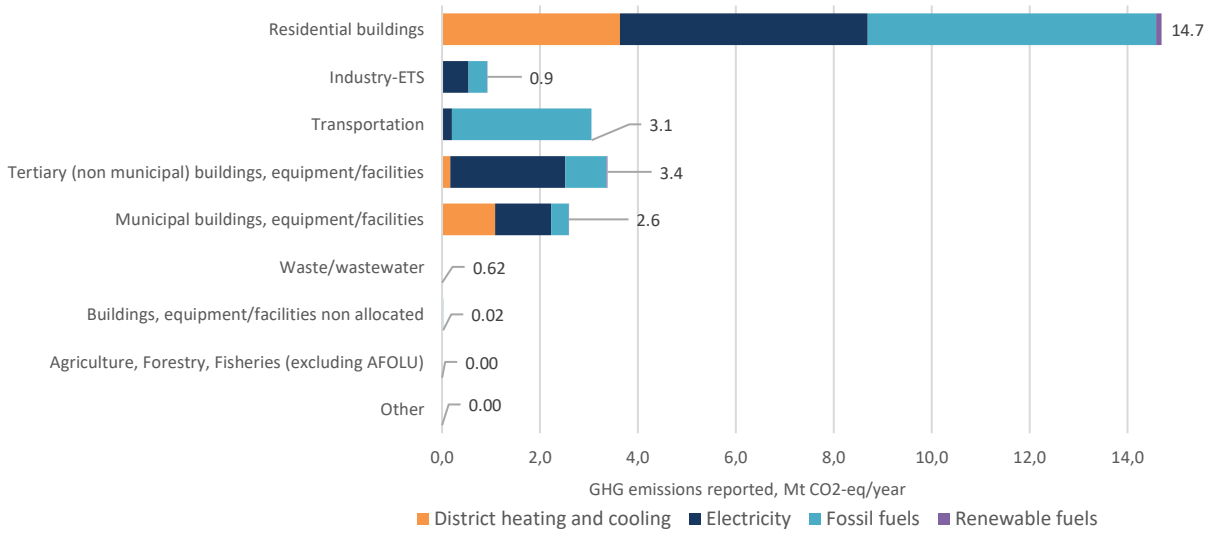
Figure 15. GHG emissions per carrier type



Source: JRC elaboration

The highest fossil-fuel-related emissions originate from the residential building sector, followed by transport and tertiary (non-municipal) buildings, equipment/facilities. Emissions associated with district heating are concentrated in residential, municipal, and tertiary buildings, while electricity-related emissions are mainly linked to residential, tertiary and municipal buildings. A breakdown of the GHG emissions by macro-sectors and energy carriers is presented in Figure 16.

Figure 16. Aggregated GHG emissions by sectors and energy carriers in BEIs

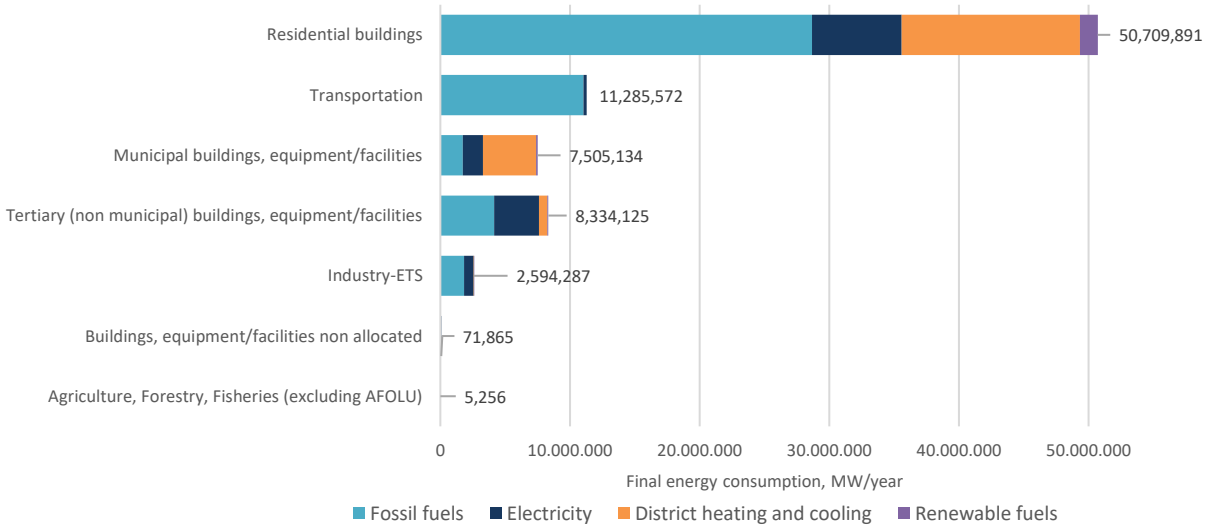


Source: JRC elaboration

Overall, figures show that emission inventories in CoM East cities are largely driven by conventional energy sources, with minimal contributions from renewable fuels.

The total final energy consumption reported in SECAPs amounts to 80.5 TWh/year. Also in this case, the residential buildings sector is by far the dominant consumer, representing 63 % of the total (50.7 TWh/year). This is followed by the transport sector, which accounts for 14 % (11.3 TWh/year). Tertiary buildings represent 10 % (8.3 TWh/year) of total final energy use, while municipal buildings 9 % (7.5 TWh/year). Industry contributes to a much smaller share of 3 % (2.5 TWh/year). Other sectors, including agriculture, forestry and non-allocated facilities, represent about 1 %. On this regard, it is worth mentioning that sectors like industry, agriculture and forestry are usually beyond the control of municipalities, which are not obliged to report this information under the CoM. A breakdown of final energy consumption by sectors and type of energy carriers is presented in Figure 17.

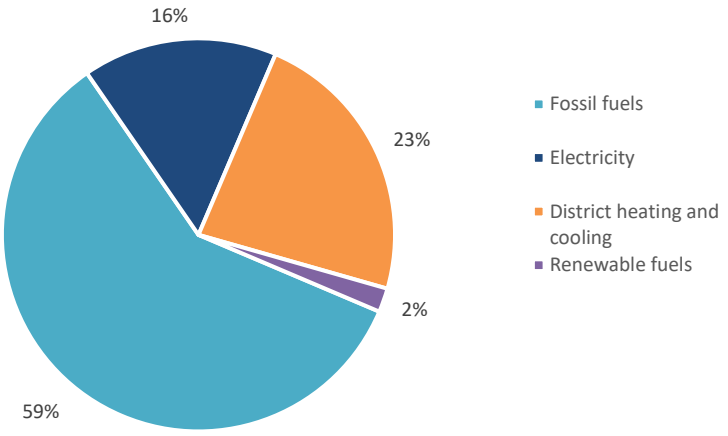
Figure 17. Final energy consumption by sectors and energy carriers in the BEIs for 2030 commitment



Source: JRC elaboration

As shown in Figure 18, fossil fuels remain the dominant energy carrier over the total final energy consumption, accounting for 59 % of the total reported values. District heating and cooling represent the second-largest share with 23 %, indicating a substantial contribution from centralised thermal systems. Electricity follows with 16 %, reflecting the continued reliance on grid-supplied energy. Renewable fuels constitute 2 % of total final energy use, highlighting their still marginal role in the current energy mix. Overall, the distribution confirms that the energy profile of signatories is still reliant on fossil fuel use, with limited penetration of renewable and clean energy alternatives.

Figure 18. Energy carriers in CoM sub-sectors reported in BEIs



Source: JRC elaboration

Information on total and per capita final energy consumption of CoM East SECAPs and the associated total emissions are presented in Table 9

Table 9. Final energy consumption and final GHG emission, total and per capita

	Final energy consumption in BEIs [MWh/year]	**Final GHG emission in BEIs [CO2-eq/year]**
Total	80 506 131	25.36 Mt
Per capita	9.12	2.87 t

Source: JRC elaboration

4.1.3. MEI

Signatories are free to choose the monitoring years for their Monitoring Emissions Inventory (MEI). Although it is recommended to have the first MEI within four years since the submission of the SECAP, usually it requires more time. According to the data presented in Table 10, 94 SECAPs with a 2030 commitment (54 % of the total) are already beyond the MEI recommended timeline. Only 4 signatories, representing 4 % of those that are beyond the timeline, have submitted a complete monitoring report including an emission inventory and they are all located in Ukraine.

Table 10. Number of SECAPs according to recommended MEI timeline (four years after SECAP submission)

Country	SECAPs ahead of the MEI timeline	SECAPs beyond the MEI timeline	SECAPs with a MEI
Armenia	4	1	0
Azerbaijan	4	2	0
Georgia	9	0	0
Moldova	32	8	0
Ukraine	31	83	4
Total	80	94	4

Source: JRC elaboration

Overall, signatories are struggling in complying with the monitoring requirement, highlighting the need for stronger institutional capacity to ensure continuous emissions tracking.

4.2. Mitigation actions and measures

4.2.1. Overall emission reduction of planned actions

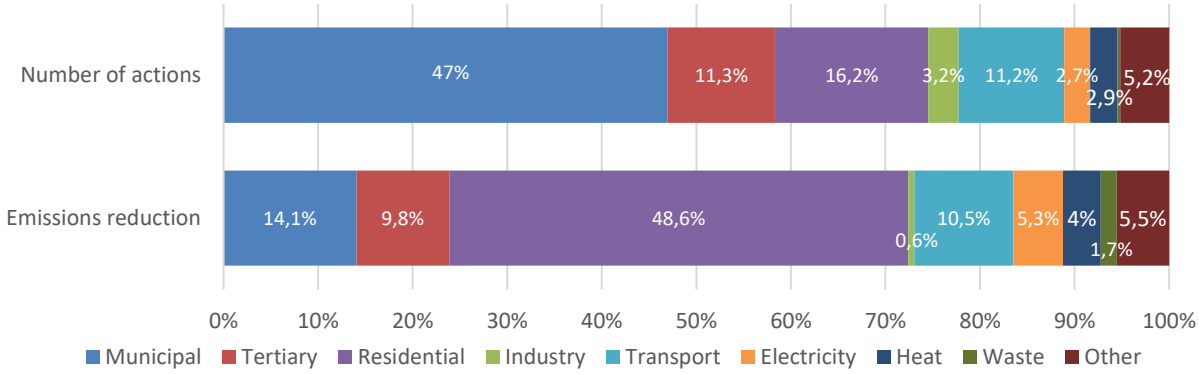
As part of the reporting to the initiative, CoM East signatories provide information on the estimated emission reduction and energy saving per sector, associated with their sectorial planned actions.

When analysing the number of actions planned for 2030, most of the mitigation actions target the municipal buildings sector (47 %), followed by the residential buildings (16.2 %), the tertiary buildings (11.3 %) and the transport sector (11.2 %). Actions addressing local electricity and heat production, industry, waste and other represent significantly smaller shares (Figure 19).

However, when looking at estimated emission reductions associated with the actions, the picture changes substantially. The residential buildings sector contributes the largest share of expected emission reduction (48.6 %). Municipal buildings account for 14.1 % of total reductions, followed by transport (10.5 %) and tertiary buildings (9.8 %) The local electricity production sector represents 5.3 % of the expected emission reductions, despite representing 2.7 % of the actions. Waste-related actions are almost negligible in terms of both number of actions (0.3 %) and emission reduction (1.7 %).

Overall, these figures show that measures addressing buildings, especially the residential sector, along with local public infrastructure and mobility interventions are expected to play important roles in achieving 2030 targets.

Figure 19. Number of actions and estimated GHG emissions reduction by sector



Source: JRC elaboration

Looking at the absolute numbers, emission reductions expected from actions implemented in the residential buildings sector account for 3.98 million t CO_2-eq/year (Table 11). Municipal and transport sectors are estimated to deliver 1.15 million and 0.86 million t CO_2-eq/year, respectively. The tertiary building sector contributes 0.8 million t CO_2-eq/year, while actions aiming at local electricity and heat production deliver together 0.76 million t CO_2-eq/year. The industry sector contributes to 0.053 million t CO_2-eq/year, whereas actions targeting the waste sector remain very limited, contributing 0.14 million t CO_2-eq/year.

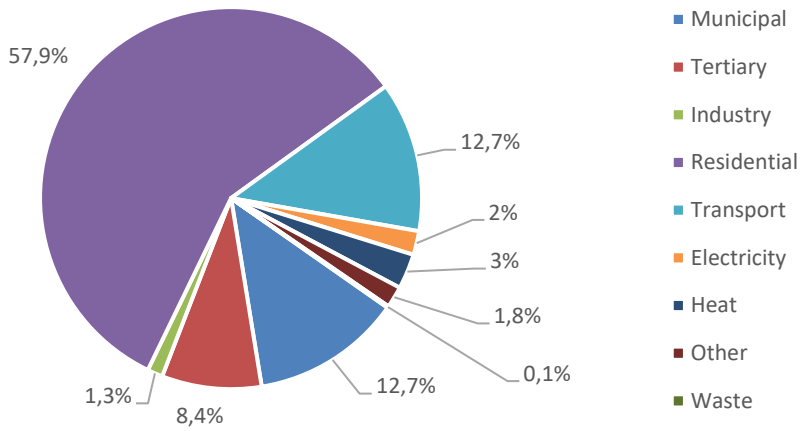
Table 11. Estimated GHG emission reduction in 2030, by country and sector (in t CO_2- eq/year)

Country	Municipal	Tertiary	Residential	Industry	Transport	Electricity	Heat	Waste	Other
Moldova	11 448	4 105	32 745	390	5 246	37 626	1 531	123	5 517
Ukraine	1 074 928	731 723	3 422 971	52 633	661 571	60 978	324 744	650	439 585
Armenia	2 725	69	38 059	0	2 211	1 629	0	0	3 863
Georgia	797	1 201	2 268	0	1 108	0	0	0	182
Azerbaijan	65 547	66 106	489 654	0	188 804	330 876	725	140 107	4 272
Total	1 155 446	803 204	3 985 696	53 023	858 940	431 109	327 000	140 879	453 418

Source: JRC elaboration

Figure 20 shows the related energy savins planned in SECAP actions. Similarly to emission figures, residential sector represents the largest share of estimated energy savings, accounting for about 58 % of the total. Municipal and transport sectors follow with equal contributions of 12.7 % each. The tertiary sector contributes to 8.4 % of estimated savings. Smaller shares are associated with local heat production (3 %), local electricity-related measures (2 %), industry (1.3 %) and waste (0.1 %), reflecting their comparatively limited influence in the overall saving potential. Overall, the data demonstrates that estimated energy savings of SECAPs actions are strongly concentrated in residential measures, with municipal services and transport representing the second tier of contribution.

Figure 20. Estimates energy savings by sector related to 2030 commitments



Source: JRC elaboration

For a greater detail, Table 12 reports data on estimated energy savings by sector and by country.

Table 12. Estimated energy savings in 2030 (in MWh/year), by country and sector

Country	Municipal	Tertiary	Residential	Industry	Transport	Electricity	Heat	Waste	Other
Moldova	25 054	13 947	108 044	516	20 128	2 482	0	26	2 254
Ukraine	2 782 566	1 714 161	11 378 104	307 165	2 228 686	17 790	697 133	230	404 486
Armenia	8 463	55	170 188	0	10 047	0	0	0	9 508
Georgia	3 190	5 917	9 673	0	4 408	0	0	0	1 737
Azerbaijan	172 648	252 952	1 951 584	0	734 888	455 391	3 591	31 863	8 976
Total	2 991 921	1 987 033	13 617 594	307 681	2 998 157	475 663	700 724	32 119	426 962

Source: JRC elaboration

4.2.2. Actions by sector and areas of intervention

A more detailed analysis has been conducted on the actions reported by signatories through the reporting platform, which allows cities to categorise actions by sector and describe them including information on the area of intervention and type of policy instrument. The mitigation actions considered in this analysis are 4877, representing an average of 28 individual actions reported per SECAP.

As the areas of intervention of actions are specific for each macro-sector, the analysis that follows presents the four macro-sectors separately:

— Stationary energy

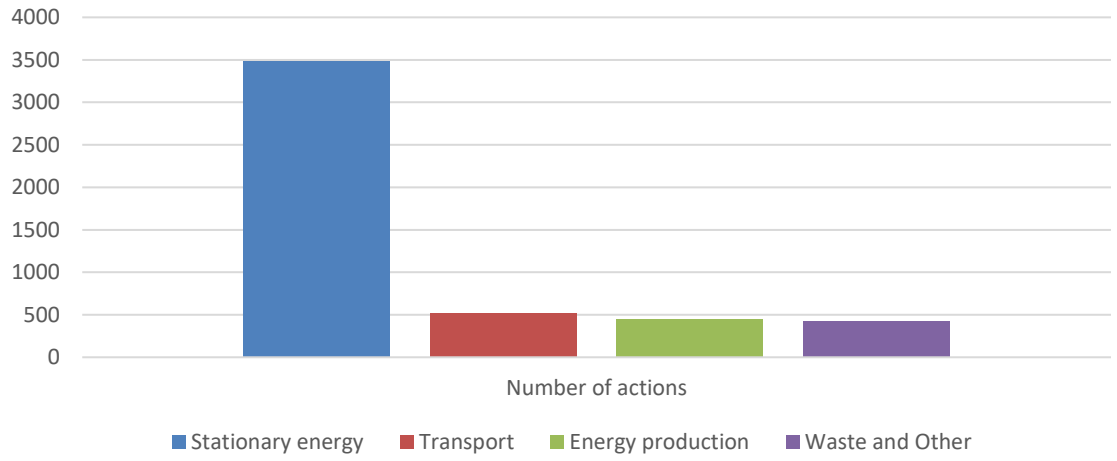
— Transport

— Energy production

— Waste and Other

Stationary energy represents by far the sector with the highest number of mitigation actions with 3485 reported actions, which include municipal, residential and tertiary buildings as well as industry. Transport is the second largest category of actions, although with a significant lower number of actions (520), energy production, including both local electricity and heat/cooling production accounts for 452 actions. Finally, the waste and others sector accounts for 420 actions (Figure 21).

Figure 21. Number of actions by sector



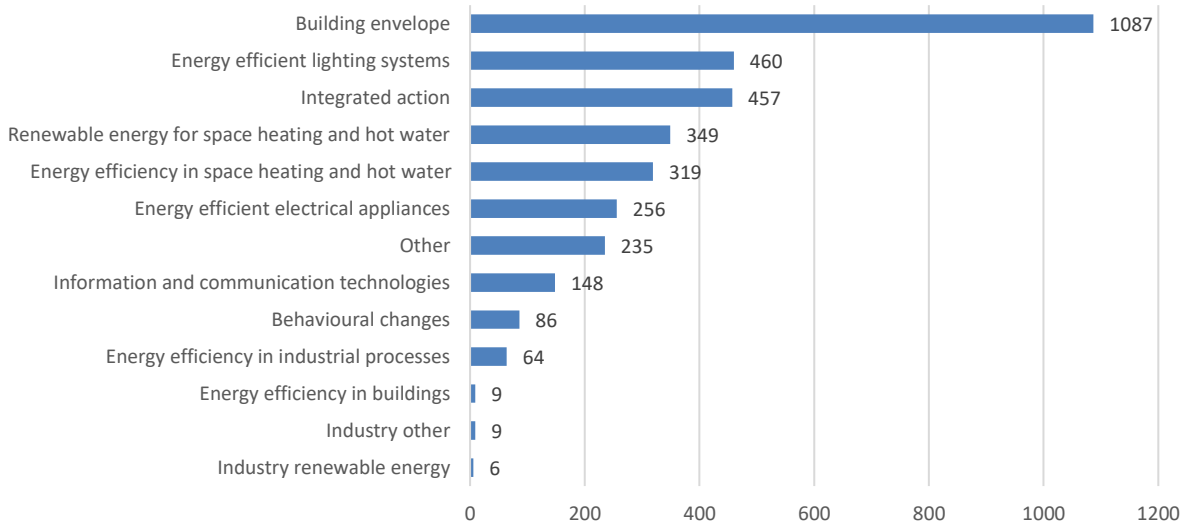
Source: JRC elaboration

The stationary energy sector shows the highest concentration in interventions pursuing improvements in the building envelope, which account for 1 087 actions (Figure 22). This reflects a strong focus on reducing energy demand through insulation improvements, better glazing, and overall enhancement of the thermal performance of municipal, residential and tertiary buildings. The second largest category is energy-efficient lighting (460 actions), immediately followed by integrated actions combining multiple intervention types (457 actions).

A significant number of measures target renewable energy for space heating and hot water (349 actions), as well as the deployment of energy efficiency measures in space heating and hot water (319 actions). Actions focusing on energy efficient electrical appliances (256 actions), other unspecified measures (235 actions) as well as information and communication technologies (148 actions) are less common but still relevant. Actions related to behavioural changes (86 actions), energy efficiency in industrial processes (64 actions), other measures for energy efficiency in buildings (9 actions) and other industrial measures (9 actions) and renewable energy in industry (6 actions) are also reported. Overall, the distribution clearly shows that actions in the stationary

energy sector are primarily concentrated on improving building energy performance and reducing heating demand, while industrial interventions remain limited.

Figure 22. Stationary energy sector actions by area of intervention



Source: JRC elaboration

Box 2. Renovation of residential buildings in Bilopillya (Ukraine)

Signatory: Bilopillya | Country: Ukraine | Population: 27 433 | Adhesion: 2021

Complex thermos- modernization of residential buildings are planned in Bilopillya. Including insulation of the facade, roof, basement, replacement of windows and doors, installation of heating systems, flushing, hydraulic balancing of the system, replacement of windows on stairwells, restoration of thermal insulation of pipelines, repair of roofs, measures to rehabilitate engineering networks (private funds and funds of the "Warm House" Program).

Investment costs: 1 233 200 EUR

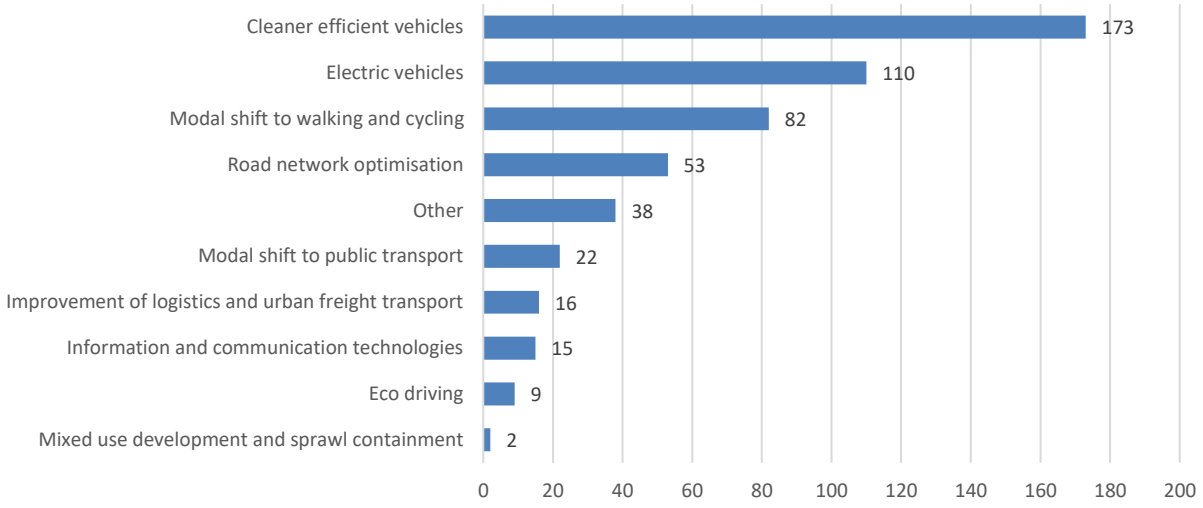
Energy savings: 7 584 MWh/a

CO_2 reduction: 2 758 tCO_2/a

In the transport sector (Figure 23), the majority of planned actions focuses on supporting the use of cleaner and more efficient vehicles, with 173 measures as well as the promotion of electric vehicles with 110 actions, indicating that local authorities primarily rely on gradual fleet renewal and electrification as key strategies to reduce emissions from transport. The choice to implement actions on modal shift toward walking and cycling (82 actions) and targeting road network optimisation (53 actions) highlight municipalities' efforts to reduce transport demand and dependency on private vehicle use. A number of actions (38 actions) are classified under "Other", capturing a mix of interventions such as planning measures not directly linked to a specific technology. Actions supporting modal shift toward public transport (22 actions), urban logistics improvements (16 actions), ICT (15 actions) are present but less widespread. Actions supporting eco-driving are present only 9 times, whereas only 2 actions are linked to land-use planning

interventions such as mixed-use development and sprawl containment, suggesting that structural urban planning measures remain underrepresented.

Figure 23. Transport sector actions by area of intervention



Source: JRC elaboration

Box 3. Establishing an improved and sustainable transport system in Ganja (Azerbaijan)

Signatory: Ganja | Country: Azerbaijan | Population: 330 744| Adhesion: 2020

Transport sector contributes to 25% of Ganja's emissions. The SECAP aims at reducing emissions implementing a road asset planning and management with sustainable mobility measures. The objectives are:

- Combat social exclusion by providing the opportunity to travel for all in rural areas;

- Improve access between urban centers;

- Optimise resources by efficient routing, ride-matching, and dispatching;

- Integrate rural transport services with existing transport options.

The measures include i) a long-term vision for road asset management at the township level, securing road connectivity to form a continuum of arterial field paths, and reliable access to social, economic, and administrative services; ii) improvement of road network planning to develop rural areas based on best practices iii) road asset management and improvement of network efficiency, such as introducing roads hierarchy, integrating other transport modes, and incorporating economic growth and strategic requirements; iv) introduce sustainable mobility measures, such as active mobility to shift habits from car to walking and cycling, shared/collective mobility to promote public transport use and shared options (car-, bike-, ride-sharing, demand-responsive transport), mobility awareness to shift travel attitudes and support the uptake of the hard infrastructure measures.

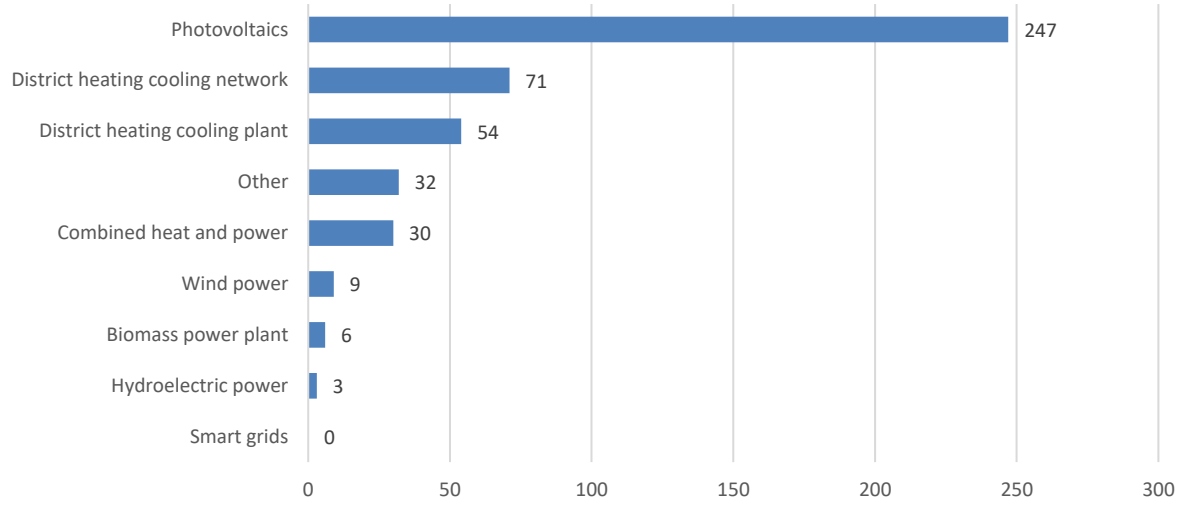
Investment costs: 77 000 000 EUR

Energy savings: 315 829MWh/a

CO_2 reduction: 80 839tCO2/a

Looking at the actions that address the energy production sector (Figure 24), it emerges a strong focus on the installation of photovoltaic systems for local energy production. With 241 actions this type of interventions accounts for more than a half of the energy production planned measures. District heating/cooling systems also represent a substantial share of interventions, including the development or extension of district heating and cooling networks (71 actions), and actions related to new or upgraded district heating and cooling plants (54 actions). Other renewable and low-carbon technologies receive less attention: other measures (32 actions), combined heat and power (30 actions), wind power (9 actions), biomass plants (6 actions), and hydroelectric installations (3 actions). No actions refer to smart grids, indicating that digitalisation and grid innovation are still absent areas within SECAP energy production planning.

Figure 24. Energy production sector actions by area of intervention



Source: JRC elaboration

Box 4. Cotova's commercial photovoltaics farm (Republic of Moldova)

Signatory: Cotova | Country: Republic of Moldova | Population: 2 954 | Adhesion: 2021

Cotova municipality planned the construction of 0.7 MW commercial photovoltaics farm. The land with an area of 1.2 ha in the middle of Cotova village can be used for the construction of a photovoltaic park. The mayor's office will attract investment for its construction. The advantage of the area is that a 35kV power line passes near the planned park. A 35/10kV power station is close to where energy can be generated in the grid. The amount of electricity generated annually is 840 MWh.

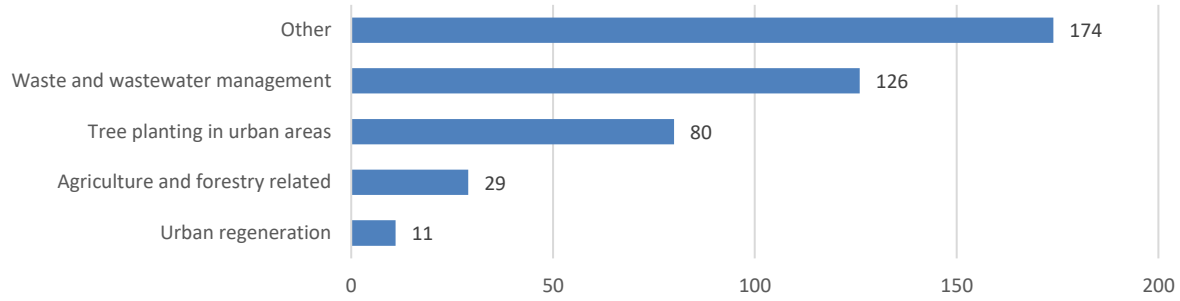
Investment costs: 700 000 EUR

Renewable energy production: 840 MWh/a

CO_2 reduction: 372.4 tCO2/a

The last group of measures, covering waste and other non-energy sectors (Figure 25), shows a more diverse distribution of actions. The most frequent interventions are "Other" (174 actions) reflecting cross-sectoral or non-classified initiatives. The second largest category of actions is waste and wastewater management (126 actions), indicating municipal interest in circular economy practices and improved waste handling. Tree planting and greening in urban areas (80 actions), follow, confirming the increasing importance of nature-based solutions that support both mitigation and adaptation objectives. Agriculture and forestry-related measures (29 actions) represent a smaller share, followed by urban regeneration, which counts for 11 actions, suggesting that only some signatories are integrating climate considerations into broader urban development strategies. Overall, this heterogeneous group demonstrates expanding diversification of climate actions beyond traditional energy sectors.

Figure 25. Waste and Other sectors' actions by area of intervention



Source: JRC elaboration

Box 5. Solid waste management system in Giurgiulești (Republic of Moldova)

Signatory: Giurgiulești | Country: Republic of Moldova | Population: 2 866 | Adhesion: 2022

The city of Giurgiulești planned a solid waste management and sorting system (with an efficiency of 50 %), including technical assistance and consultation services, financial support and subsidies, information and awareness campaigns, training sessions, organization of Local Days on Waste Management, selective collection, and recycling.

Investment costs: 122 000 euros

Energy savings: 13.1 MWh/a

CO_2 reduction: 22 tCO2/a

4.2.3. Actions by policy instruments

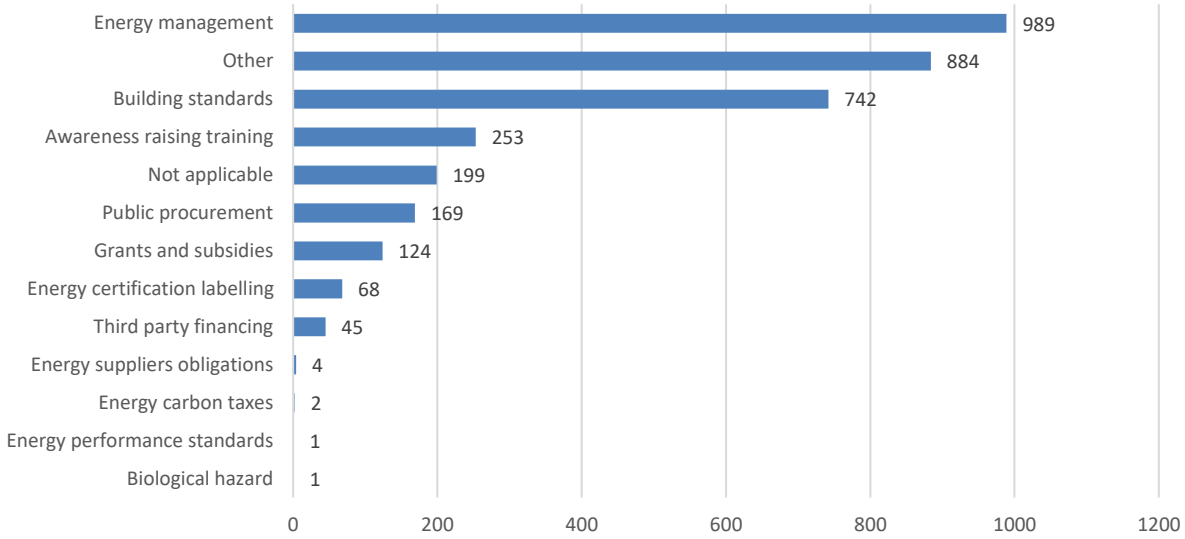
Signatories can also identify the policy instrument related with each of their reported mitigation actions. Similarly to previous section, also in this section actions falling under each macro-sector are grouped for analysis purposes.

Figure 26 shows the policy instruments assigned to actions and measures targeting the stationary energy sector. The most frequently used policy instrument is energy management, associated with 989 actions, and primarily applied to municipal buildings, where monitoring and optimisation

systems can significantly reduce energy consumption. Building standards, accounting for 742 actions, is also among the preferred instruments to improve building sector's energy performance, followed by awareness-raising and training (253 actions), mainly aimed at the residential building sector. Less frequently but relevant applied instruments include public procurement (169 actions) and grants and subsidies (124 actions). Instruments such as energy certification/labelling (68), and third-party financing (45) are also used by signatories, especially to improve energy performance in municipal and residential buildings. On the contrary, energy suppliers' obligations, energy carbon taxes, along with energy performance standards and biological hazard, appear in very few action plans, suggesting that such mechanisms may be less accessible or less commonly used at the local level.

Notably the widespread use of instruments classified as "Other" (884) and those classified as "Not applicable" (199), which together represent one third of stationary energy actions, indicate a range of local approaches that do not fall into predefined or traditional categories, may include mixed policy instruments or are difficult for cities to classify.

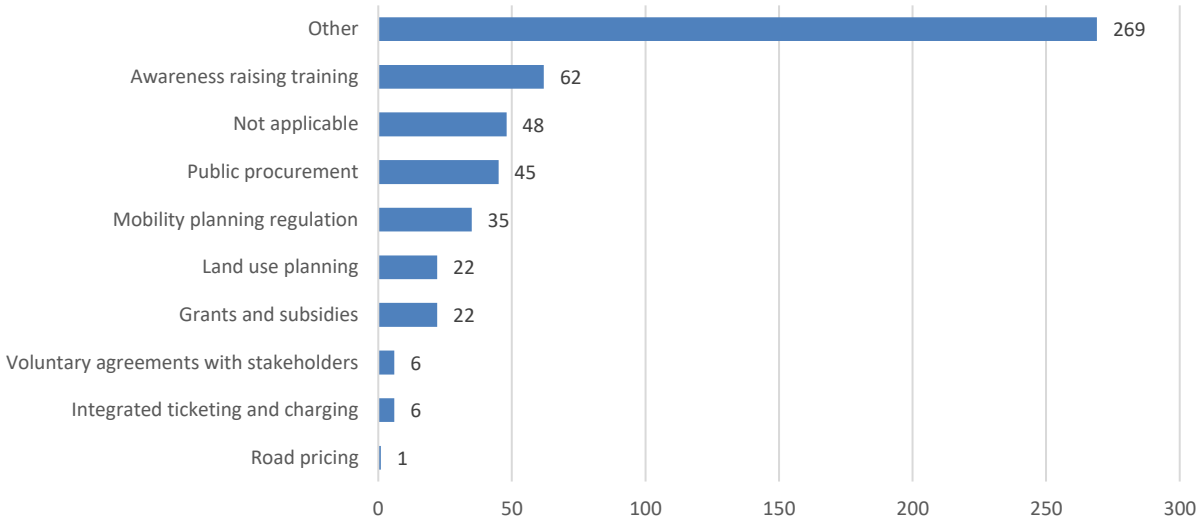
Figure 26. Stationary energy sector actions by policy instrument



Source: JRC elaboration

In the transport sector (Figure 27), the most frequently used policy instrument is classified as "Other," covering 269 actions, which indicates a high variety of local approaches that do not fall under predefined categories. The second most common instrument are awareness-raising and trainings, which appear in 62 actions, confirming that behavioural change and communication campaigns remain a relevant supporting measure. Public procurement follows with 45 actions, showing that many municipalities address transport emissions through the gradual renewal of their municipal or public transport fleets. Similarly, mobility planning regulation (35 actions), reflect the importance of strategic planning, zoning rules and traffic regulations in shaping sustainable mobility patterns at the local level. Less frequently applied instruments include land-use planning and grants and subsidies (22 actions each), suggesting limited availability of financial incentives or regulatory leverage for transport-related measures in smaller cities. Instruments such as voluntary agreements with stakeholders (6), integrated ticketing and charging (6) and road pricing (1) appear only occasionally, likely because these mechanisms are more relevant to larger metropolitan areas with extensive public transport systems and higher traffic density.

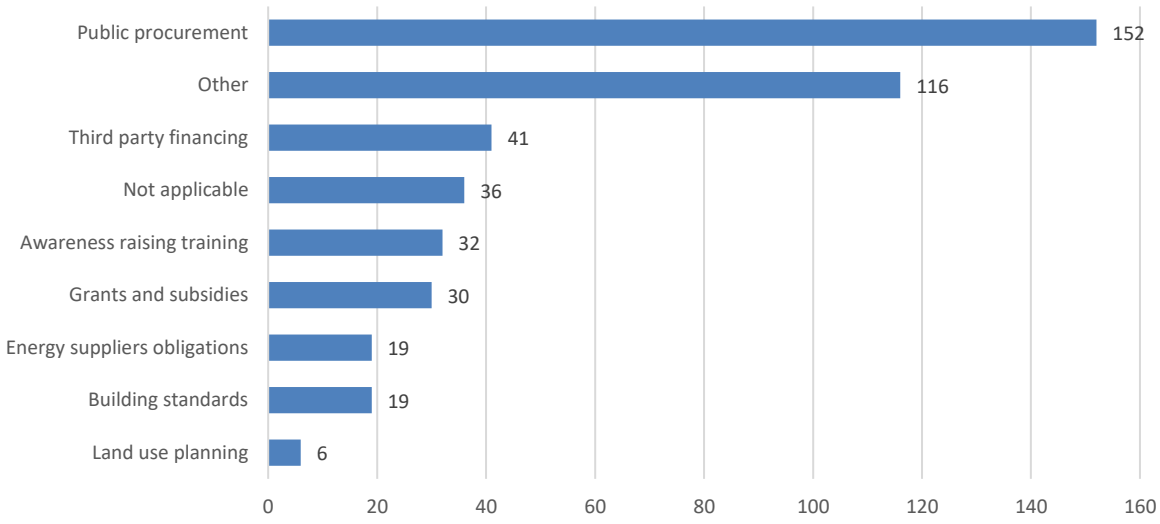
Figure 27. Transport sector actions by policy instrument



Source: JRC elaboration

In the energy production sector (Figure 28), the most frequently used policy instrument is public procurement (152 actions), which suggests that many municipalities promote sustainable energy production through the acquisition of renewable energy systems or related infrastructure. The second largest category is classified as "Other", accounting for 116 actions, indicating that a wide range of measures do not fall within predefined or traditional instrument categories. Third-party financing is represented by 41 actions, awareness-raising and trainings by 32 actions followed by grants and subsidies (30 actions). Energy suppliers' obligations and building standards appear less frequently with 19 actions each, reflecting potential for further use of regulatory requirements for local energy providers and construction companies. Land-use planning regulation (6 actions) is the least common instrument, indicating that spatial planning tools are rarely applied in the context of local energy production measures.

Figure 28. Energy production sector actions by policy instrument

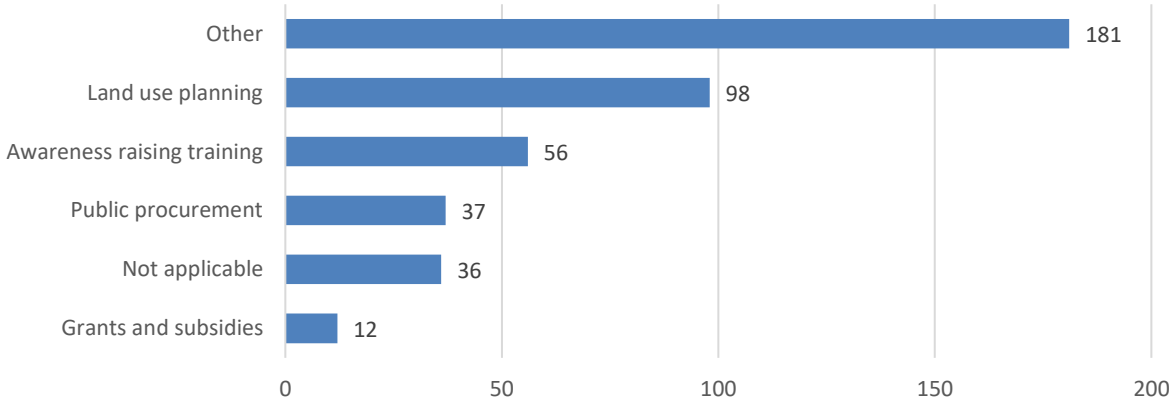


Source: JRC elaboration

As Figure 29 shows, in the waste & other sector the most frequently applied policy instrument is categorised as Other, accounting for 181 actions, which reflects a broad range of locally specific or cross-sectoral interventions that do not fit into standard policy classification. The second most common instrument is land-use planning, which recurs 98 times, showing that spatial regulation and planning frameworks play a relevant role. Awareness raising and trainings are the focus of 56 actions, indicating that behavioural change, community engagement, and capacity building remain central components of municipal strategies in this sector. Public procurement is used less frequently (37 actions), and grants and subsidies are the least utilised instrument, with 12 actions, highlighting limited use of financial incentives to stimulate change in cross sectoral or waste-related interventions.

Actions whose type of instrument is labelled as "Not applicable" are 36, suggesting either missing information or measures not associated with a clearly defined instrument type. Overall, figures suggest that local authorities primarily rely on flexible or non-standardised approaches, while more formalised economic or regulatory tools are applied to a much lesser extent.

Figure 29. Waste and other sectors - Actions/measures by policy instrument.



Source: JRC elaboration

4.3. Adaptation pillar: risk and vulnerability assessment and goals

A key step of the adaption pillar of a SECAP is the risk and vulnerability assessment (RVA), which identifies the most relevant climate hazards and vulnerabilities affecting the local territory, to inform the development of an adaptation strategy and the identification of appropriate adaptation actions to address such risks. Aggregated results are presented in the following sections.

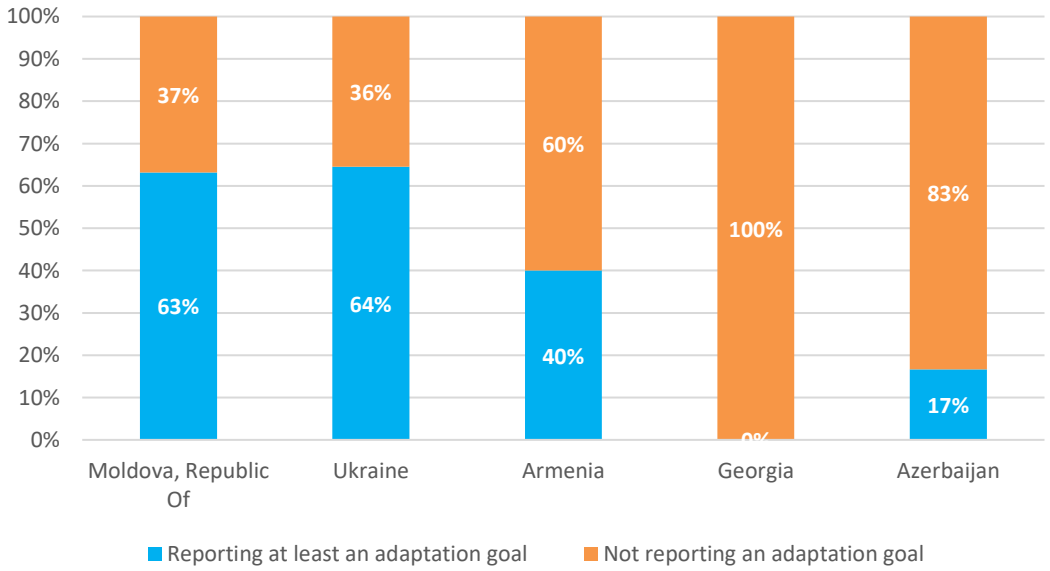
4.3.1. Adaptation goals

Adaptation goals constitute a core component of local climate planning and are established following the completion of the RVA. These goals are expected to specify a baseline year, identify priority climate hazards, and define a timeframe for implementation, thereby enabling systematic monitoring of progress. Although the CoM guidelines do not prescribe a uniform structure for adaptation goals, signatories are encouraged to formulate measurable targets supported by key performance indicators (KPIs) to ensure transparent tracking.

Since the requirement to define a minimum of one adaptation goal was introduced in 2020, municipalities have demonstrated uneven progress in applying this guidance. A significant share of SECAPs includes broadly formulated goals that often lack explicit links to reducing climate-related risks through decreased exposure or vulnerability. In many cases, reported goals reflect general intentions (e.g., “improve resilience” or “enhance preparedness”) rather than actionable objectives tied to specific climate hazards.

Overall, among 165 signatories that submitted a SECAP with a 2030 commitment, 96 have provided information on their adaptation goals, representing 58 % of the total. The share of signatories reporting at least a climate adaptation goal for each country is presented in Figure 30.

Figure 30. Share of signatories with the adaptation goals reporting status



Source: JRC elaboration

The reporting rate of adaptation goals varies significantly among CoM East countries. Ukraine demonstrates the highest share of signatories that reported adaptation goals with 64 % of SECAPs,

followed closely by Moldova with 63 %, indicating relatively strong integration of adaptation planning in both countries. Armenia shows a moderate level of reporting, with 40 % of signatories submitting adaptation goals. In contrast, Azerbaijan reports a noticeably lower engagement level, with only 17 % of signatories providing adaptation-related commitments. No municipalities in Georgia have reported an adaptation goal at the cut-off date of the database.

4.3.2. Climate hazards

While the minimum reporting requirement for CoM East signatories is to assess at least one climate hazard, SECAPs averagely identify six hazards, and the dataset includes 1050 reported hazards and sub-hazards. A sub-hazard is a more specific, detailed category of a broader climate hazard. It is used in the CoM methodology to ensure that municipalities identify not only the general type of hazard (e.g. wildfires) but also its distinct forms (e.g. land fire and forest fire), because each form may have different drivers, impacts, and required adaptation measures. Sub-hazards are reported optionally, and signatories can select more than one per category.

Each climate hazard must be complemented by the following associated information, which is mandatory for at least one level 1 climate hazard, and optional for sub-hazards (level 2):

- Level 1 (L1) hazard or level 2 (L2) sub-hazard
- Current hazard probability: high, medium, low, not known
- Current hazard impact: high, medium, low, not known
- Expected change in hazard intensity: increase, no change, decrease, not known
- Expected change in hazard frequency: increase, no change, decrease, not known
- Timeframe: short-term, mid-term, long-term, not known (not possible to define).

Based on the cleaned dataset of reported climate hazards, signatories most frequently identify extreme temperatures, split between extreme heat, with 153 occurrences, and extreme cold, with 102. The second most reported category is heavy precipitation (150 records), which includes heavy rainfall (40), heavy snowfall (16), hail (10), and isolated case of Fog (1). Droughts & water scarcity represent 150 reported hazards, showing that water-related stress remains a significant concern across signatories (Table 13).

Floods & sea level rise account for 128 reported hazards, with sub-hazards such as flash/surface flood (17), river flood (16), sea level rise (16), groundwater flood (8), coastal flood (5), and permanent inundation (2), highlighting increasing hydrological risks. Wildfires are also relevant, with 117 records, including forest fires (23) and land fires (15). Storms follow with 133 occurrences, where severe wind (33) and lightning/thunderstorm (11) are the reported sub-hazards.

Less frequent but still present are mass movement & geological hazards (68), including landslides (21), rockfall (5), subsidence (1). Biological & ecological hazards (27) include water-borne disease (13), airborne disease (6), vector-borne disease (4), and insect infestation (4). Chemical & atmospheric changes (10) are rarely reported, mostly atmospheric CO_2 concentration (5) and saltwater intrusion (1). Across all categories, 12 hazards were classified as other because they did not fit predefined categories.

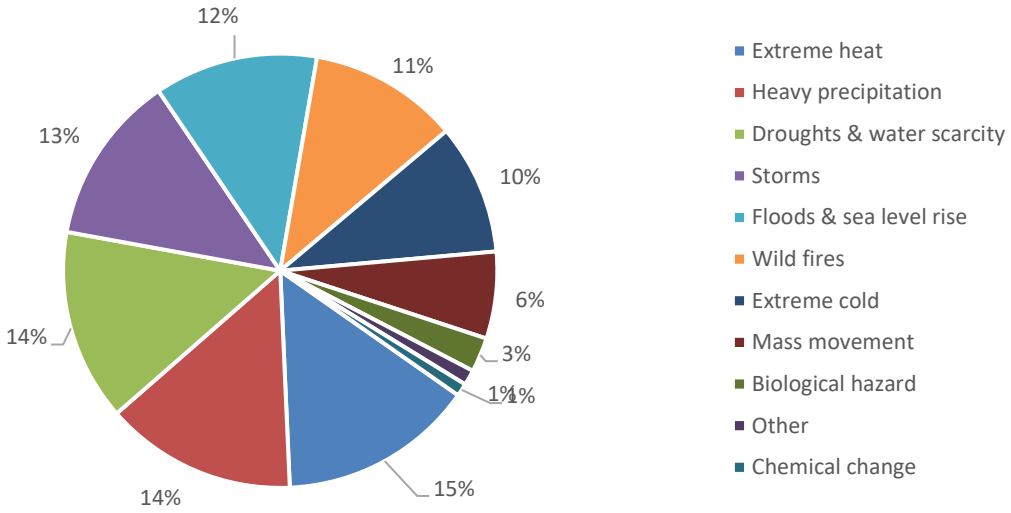
Table 13. Climate hazards reported: level 1 hazards and level 2 sub-hazards

Climate hazard	Count
Extreme heat	**153**
Extreme cold	**102**
Heavy precipitation	**150**
Fog	1
Hail	10
Heavy snowfall	16
Heavy rainfall	40
(Unspecified)	83
Droughts & water scarcity	**150**
Floods & sea level rise	**128**
Coastal flood	4
Flash / surface flood	17
Groundwater flood	8
Permanent inundation	2
River flood	16
Sea level rise	16
(Unspecified)	65
Wildfires	**117**
Forest fire	23
Land fire	15
(Unspecified)	79
Storms	**133**
Lighting / thunderstorm	11
Severe wind	33
(Unspecified)	89
Mass movement	**68**
Landslide	21
Rockfall	5
Subsidence	1
Avalanche	0
(Unspecified)	41
Biological hazard	**27**
Airborne disease	6
Water-borne disease	13
Vector-borne disease	4
Insect infestation	4
Chemical change	**10**
Atmospheric CO2 concentration	4
Saltwater intrusion	0
(Unspecified)	6
Other	**12**
Total	**1050**

Source: JRC elaboration

In terms of percentage, the most frequently reported Level-1 climate hazards in signatories' RVAs are extreme heat (15 %), heavy precipitation (14 %) droughts & water scarcity (14 %) and storms (13 %) (Figure 31). Together, these four categories account for 56 % of all reported hazards, indicating that they are very relevant in the regional context. Other hazards such as floods & sea level rise (12 %), wildfires (11 %), and extreme cold (10 %) remain relevant but are mentioned less frequently. Categories like mass movement & geological hazards (7 %) biological & ecological hazards (3 %), chemical & atmospheric changes (1 %), and other (1 %) appear only sparsely, suggesting that signatories in the area do not identify them as primary climate concerns in their RVAs.

Figure 31. Most reported climate hazards



Source: JRC elaboration

Another perspective on the way to analyse reported climate hazards is to count how frequently each hazard appears across SECAPs' risk and vulnerability assessments (RVAs). Avoiding double counting, this approach allows to have an overview of the hazards more relevant for cities.

Table 14 confirms a very strong dominance of temperature-related hazards. Extreme heat is, indeed, the most recurrent hazard, mentioned by 56 % of signatories (92 out of 164), followed, although with a much lower share, by droughts & water scarcity (37 %) and heavy precipitation (32 %). Other hazards appear in 30 % or less of RVAs, including floods & sea level rise, extreme cold chemical change, storms, wildfires, biological hazard and mass movement.

Overall, the results confirm extreme heat, heavy precipitation and droughts as the top three climate hazards identified across reporting signatories.

Table 14. L1 climate hazards reported in RVAs

Climate hazard	Number of SECAPs reporting it	Share of total SECAPs
Extreme heat	92	56 %
Droughts & water scarcity	60	37 %
Heavy precipitation	52	32 %
Floods & sea level rise	50	30 %
Other	45	27 %
Extreme cold	42	26 %
Chemical change	31	18 %
Storms	30	17 %
Wildfires	27	16 %
Biological hazard	27	16 %
Mass movement	23	13 %
Total of cities with RVA	164	100 %

Source: JRC elaboration

In their RVAs, municipalities report the risk associated with climate hazards by describing for each of them the probability of occurrence and the level of impact, both in the present and expected in the future.

The two following figures include the current level of probability (Figure 32) and impact (Figure 33) of climate hazards reported by signatories. In order to avoid double counting and homogenise datasets some data elaboration was conducted.[4]

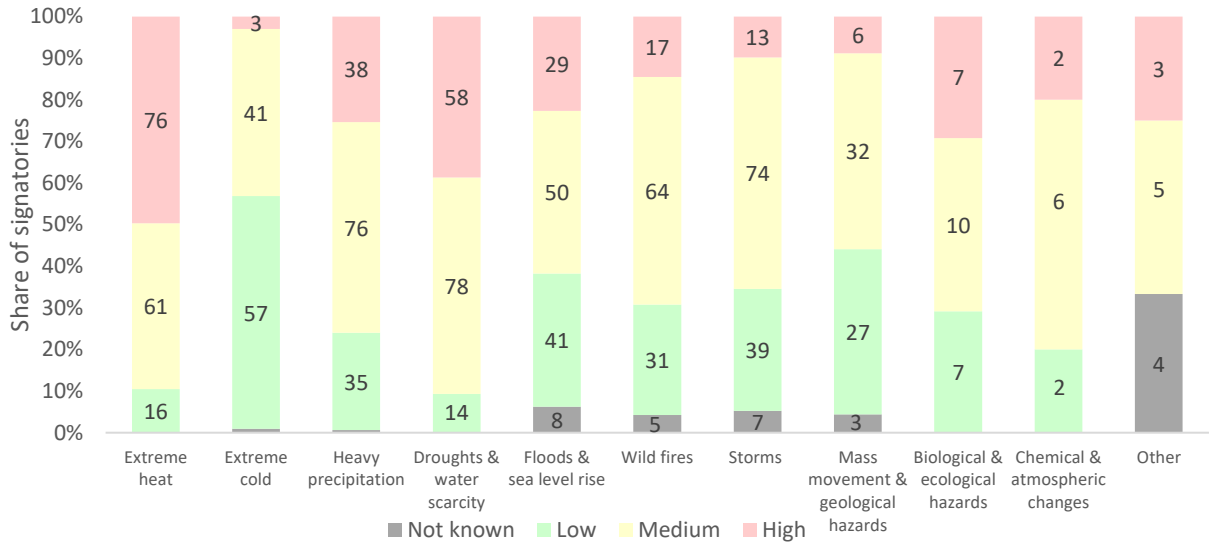
Based on the combined reported values, it is observed that major climate hazards — extreme heat, droughts & water scarcity, heavy precipitation — are predominantly assessed with medium or high probability and impact, confirming that signatories perceive these categories as the most significant and recurrent threats.

By contrast, hazards such as extreme cold, mass movement, floods & sea level rise, wildfires, biological & ecological hazards show comparatively lower probability and impact levels, suggesting that they are either less widespread or less systematically assessed across reporting signatories.

Floods & sea level rise and storms show the highest numerical values of “Not known” for both probability and impact, indicating some uncertainty or data gaps in municipal assessments.

[4] The shares are based on percentage cover proportionally within the same category; absolute values are reported in the figures.

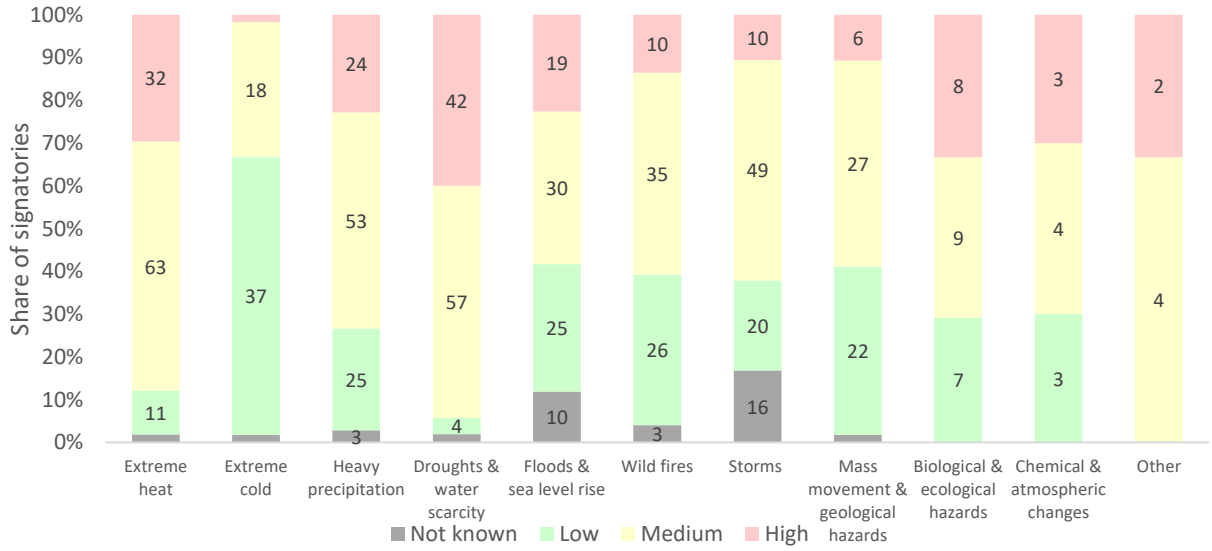
Figure 32. Reported probability of occurrence of climate hazards in the present



High = extremely likely that the hazard occurs (e.g., greater than 1 in 20 chance of occurrence).[5]
Medium = likely that the hazard occurs (e.g., between 1 in 20 and 1 in 200 chance of occurrence).
Low = unlikely that the hazard occurs (e.g., between 1 in 200 and 1 in 2 000 chance of occurrence).
Not known = city has not experienced or observed climate hazards in the past or has no way of accurately reporting this information based on evidence or data.

Source: JRC elaboration

Figure 33. Reported level of impact of climate hazards in the present



High = the hazard represents a high (or the highest) level of potential concern for your jurisdiction: when it occurs, the hazard results in (extremely) serious impacts to the jurisdiction and (catastrophic) interruptions to day-to-day life.
Medium = the hazard represents a moderate level of potential concern for your jurisdiction; when it occurs, the hazard results in impacts to your jurisdiction, but these are only moderately significant to day-to-day life.
Low = the hazard represents a lower (the lowest) level of potential concern for your jurisdiction; when it occurs, the hazard results in impacts to your jurisdiction, but these are deemed less significant (or insignificant) to day-to-day life.
Not known = city has not experienced or observed climate hazards in the past or has no way of accurately reporting this information based on evidence or data.

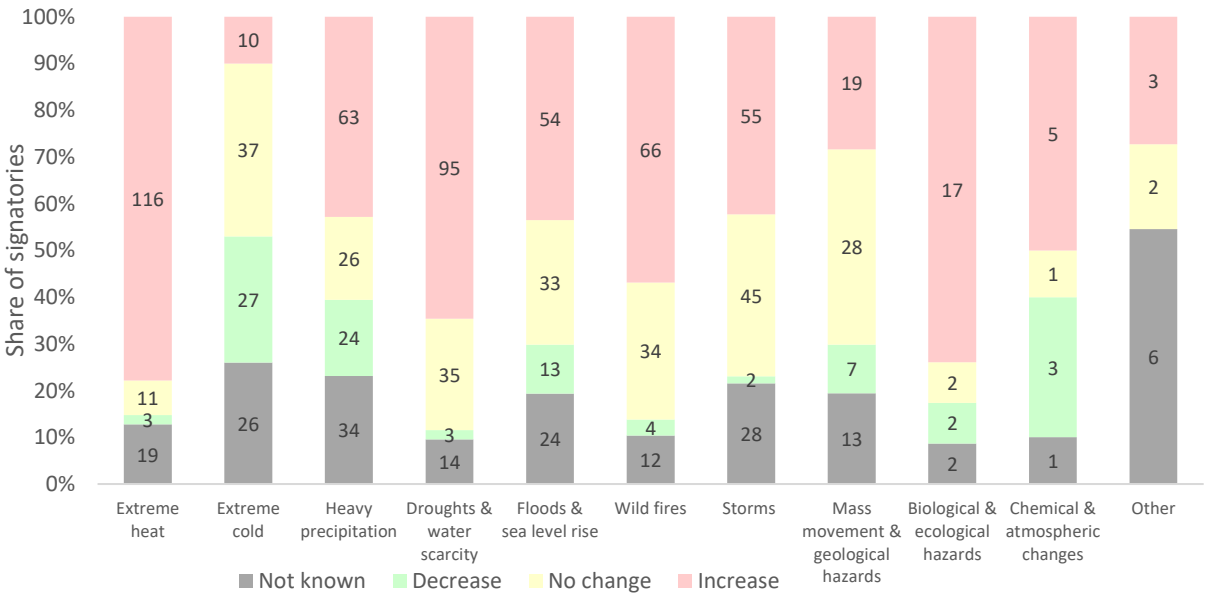
Source: JRC elaboration

[5] The classification of the levels for the assessment of probability and impact reflect those in the CoM guidelines.

The two following figures show the future expected change in hazard intensity (Figure 34) and frequency (Figure 35) as reported by signatories in their RVAs. Analysis of the expected change in intensity and frequency highlight that most climate hazards are projected to worsen across reporting signatories' assessment.

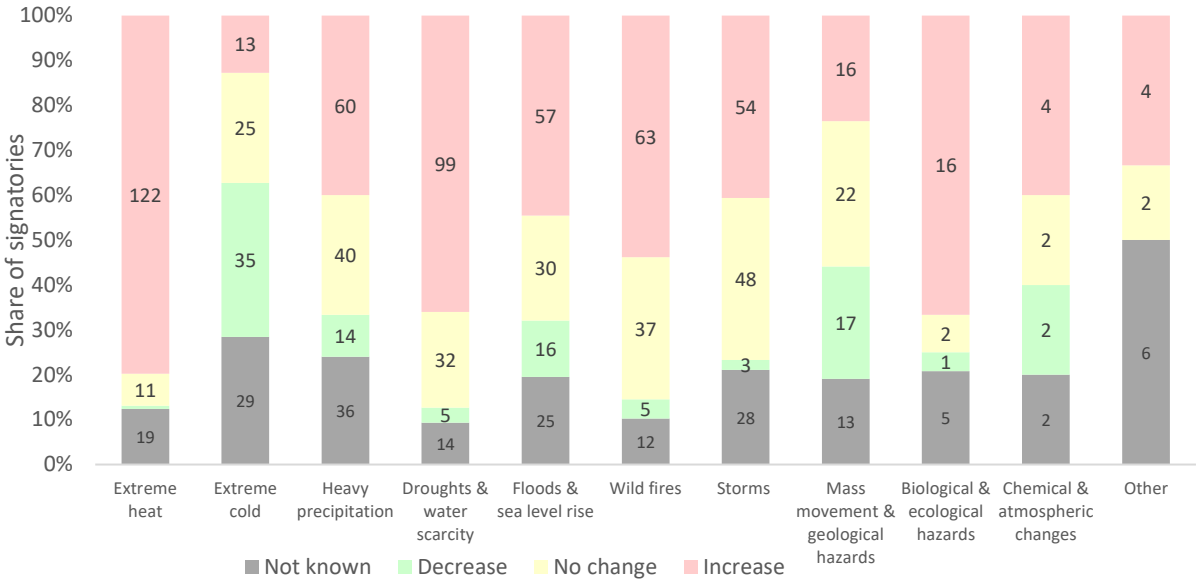
Extreme heat shows the strongest perceived escalation, with 116 cases of expected increase in intensity and 122 cases of expected increase in frequency, representing the highest absolute and relative values among all hazard categories. Biological & ecological hazards, droughts & water scarcity, and wildfires display predominantly upward trends in both intensity and frequency, with the majority of assessments indicating an expected increase and only a very limited number of "decrease" responses. Heavy precipitation and floods & sea level rise also show a strong tendency toward increasing severity and recurrence, although they are reported proportionally with higher "not known" values (besides the "other" hazard category). Chemical & atmospheric changes and extreme cold have the highest reported values of expected decrease in intensity with the latter also showing the highest relative value of expected decrease in frequency.

Figure 34. Future expected change in hazard intensity



Source: JRC elaboration

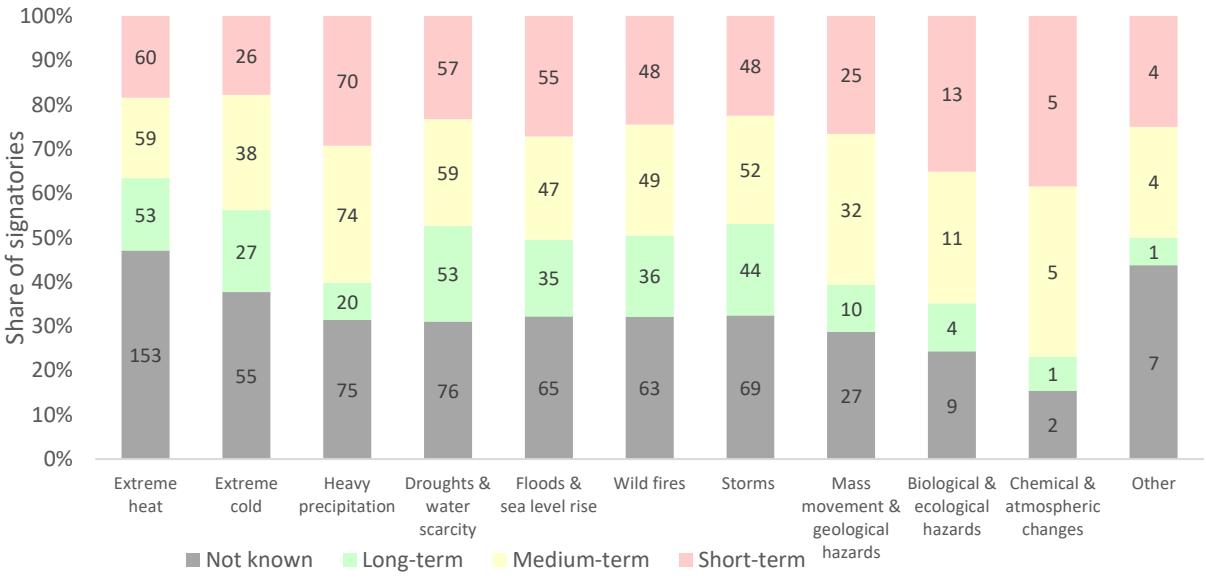
Figure 35. Future expected change in hazard frequency



Source: JRC elaboration

Figure 36 illustrates the expected timeframe change of future climate hazards reported in the RVAs. The results show that most hazards are expected to occur in the medium term. However, chemical & atmospheric change, biological & ecological hazards, mass movement & geological hazards, and heavy precipitation show the highest proportional values in the combined short-medium timeframe, suggesting that these hazards are already emerging or are expected to materialise soon. Droughts & water scarcity along with storms and wildfires show the highest shares of expected changes in the long-term. Extreme heat shows both absolute and relative high values of "Not known", reflecting uncertainty in predicting its future evolution. Overall, relevant shares of changes reported in a "Not known" timeframe are common across all hazards.

Figure 36. Timeframe of reported climate hazards



Source: JRC elaboration

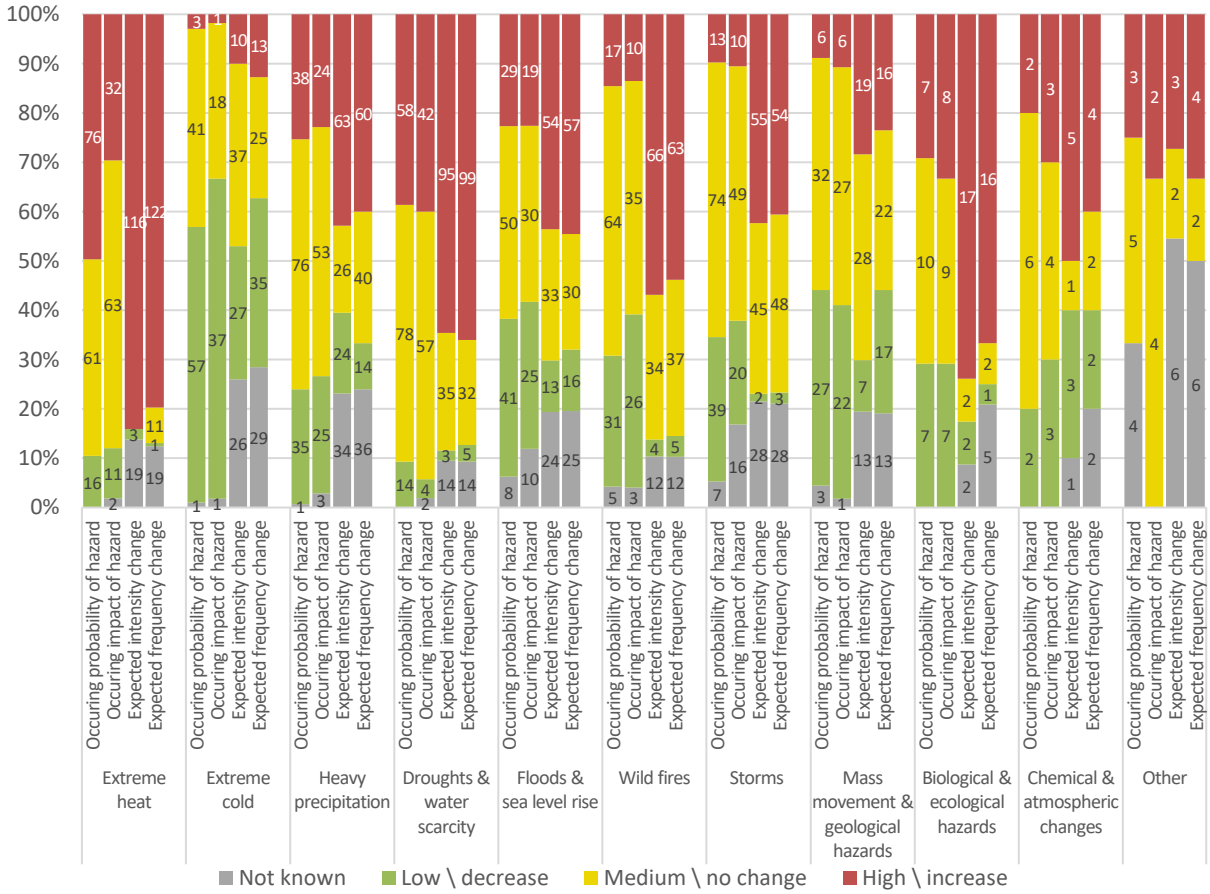
Figure 37 provides a combined comparison of current hazard conditions (probability and impact) with expected future trends (intensity and frequency).

High/medium impact and expected increase in intensity/frequency dominate across all hazard categories, except for extreme cold, confirming that most signatories already perceive these hazards as relevant and consequential. Looking at the shift from current to future (first two bars vs last two bars), extreme heat, wildfires and biological & ecological hazards show the highest expected change (increase) in future intensity/frequency, followed by storms and droughts & water scarcity. Droughts & water scarcity is also the hazard with the lowest shares of both current low impact/probability and future decrease in intensity/frequency (green bars), whereas extreme cold has the highest. Considering the grey bars (not known), it can be noted that it is harder for municipalities to estimate the future conditions of some hazards, in particular for extreme cold, heavy precipitation, storms, floods & sea level rise, reflecting significant informational gaps in RVAs.

In summary, the combined analysis shows that:

- Current conditions are dominated by medium/high probability and impact across most hazard types;
- Future projections display a strong and widespread shift toward worsening conditions.

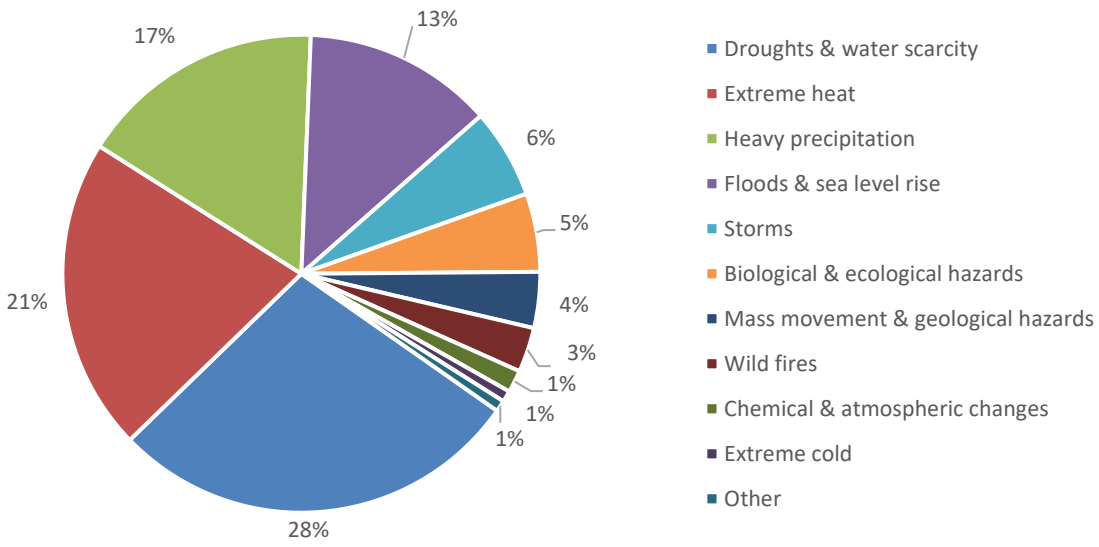
Figure 37. Hazards and their attributes as reported by signatories



Source: JRC elaboration

Only a limited share of all reported climate hazards can be classified as high-risk hazards, defined as those simultaneously assessed with both high probability and high impact. A total of 132 records fall into this category. As shown in Figure 38, the most frequently reported high-risk hazards are droughts & water scarcity (28 %), extreme heat (21 %), heavy precipitation (17 %), and floods & sea level rise (13 %). These categories together represent nearly 80 % of all high-risk entries, highlighting that the most critical threats perceived by signatories are linked to water scarcity, extreme heat, intense rainfall, and flooding. Other hazards appear far less frequently within the high-risk subset: storms (6 %), biological & ecological hazards (5 %), mass movement & geological hazards (4 %), wildfires (3 %), chemical & atmospheric changes (1 %), extreme cold (1 %).

Figure 38. Most reported high risk climate hazards.



Source: JRC elaboration

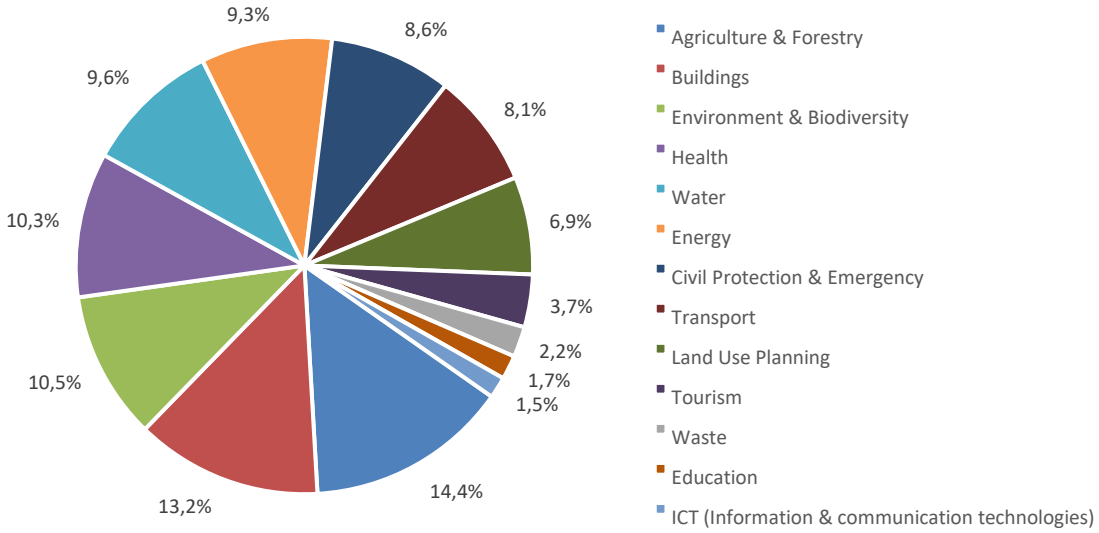
4.3.3. Vulnerable sectors

Based on the reported information, 3 112 sectoral local vulnerabilities are identified by the signatories. As shown in the Figure 39, the most frequently reported vulnerable sectors are agriculture & forestry (447 records, 14.4 % %) followed closely by buildings (411 records, 13.2 %). Other highly represented categories include environment & biodiversity (326 records, 10.5 %), health (319 records, 10.3 %), water (300 records, 9.6 %), and energy (289 records, 9.3 %).

Sectors such as civil protection & emergency (269 records, 8.6 %) and transport (253 records, 8 %) also show substantial vulnerability, indicating that climate hazards have implications on urban mobility and emergency response infrastructure. Less frequently mentioned sectors include land use planning (215 records, 6.9 %), tourism (116 records 3.7 %), waste (67 records, 2.2 %), education (53 records, 1.7 %), and ICT (Information & communication technologies, 47 records,

1.5 %), suggesting that while these domains are affected, they are not yet a primary focus of vulnerability assessment in most municipalities.

Figure 39. Most reported vulnerable sectors



Source: JRC elaboration

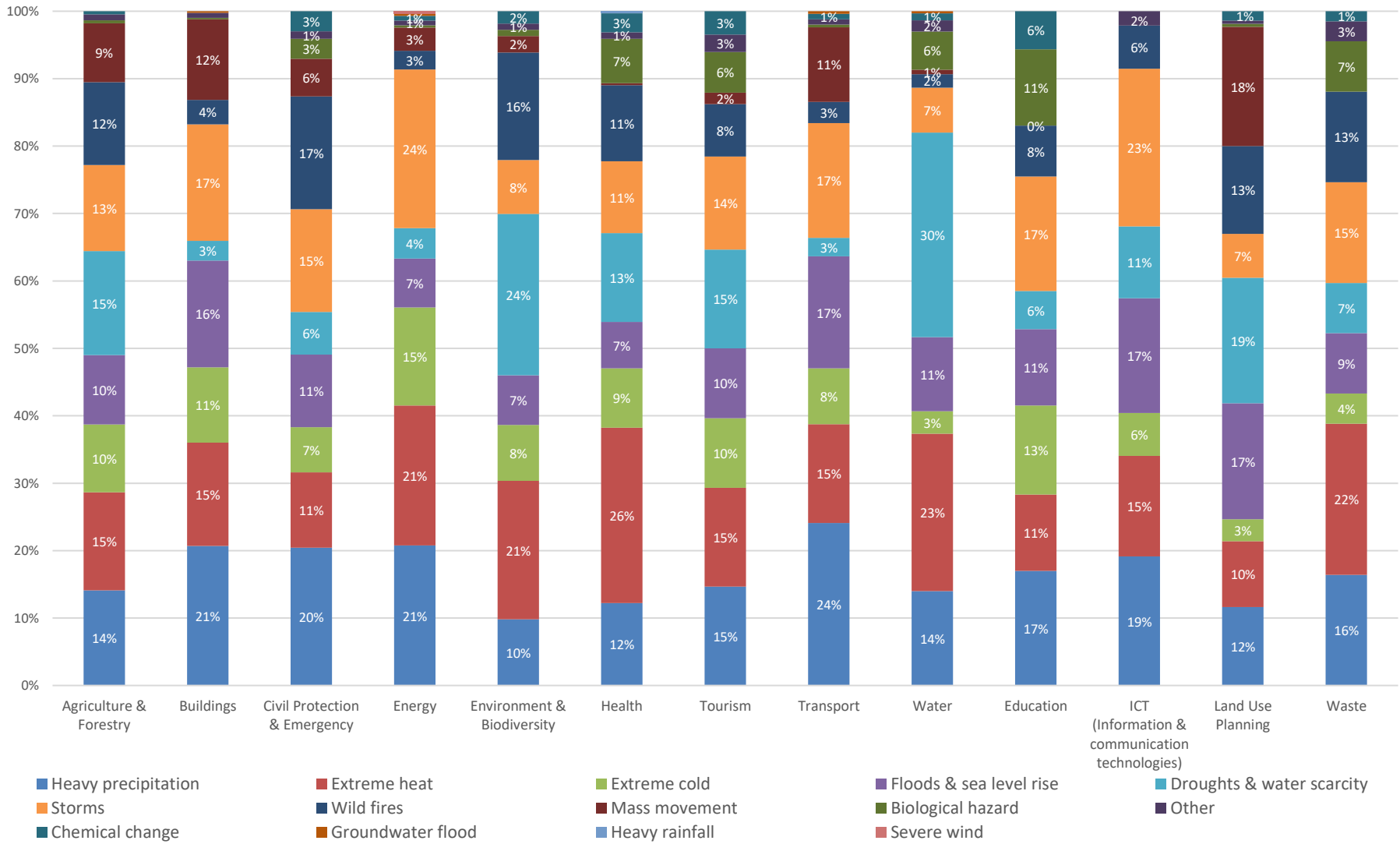
Because each sector is reported as vulnerable to a specific climate hazard, it is possible to analyse the most reported hazards per sector. Figure 40 shows that:

- Agriculture & forestry is predominantly exposed to droughts & water scarcity (15 %), extreme heat (15 %), and heavy precipitation (14 %), confirming the sector's dependence on extreme climatic conditions.
- Buildings sector is most affected by heavy precipitation (21 %) and storms (17 %), which aligns with risks of infrastructure damage and service disruption.
- Civil protection & emergency sector is most affected by heavy precipitation (21 %) and wild fires (16 %), which aligns with risks of infrastructure damage and service disruption.
- In the energy sector, the leading vulnerabilities are storms (24 %), extreme heat (21 %), and heavy precipitation (21 %), reflecting the sector's high exposure to both meteorological extremes and hydrological impacts.
- Environment & biodiversity shows higher exposure to droughts & water scarcity (24 %) and extreme heat (21 %), consistent with risks to ecosystems and habitat degradation.
- Health and tourism are both most vulnerable to extreme heat (26 % and 15 % respectively), underscoring the human and economic implications of rising temperatures.
- Transport is mainly impacted by heavy precipitation (24 %), storms (17 %), and floods & sea level rise (16 %) confirming the influence of water-related hazards on urban connectivity and land management.

- Water sector is mostly vulnerable at droughts & water Scarcity (31 %) and extreme heat (24 %) revealing direct sensitivity to prolonged dry and hot periods.
- Education and ICT are both associated with storms (17 and 23 % respectively) and heavy precipitation (17 % and 18 % respectively).
- Land use planning sector shows exposure to droughts & water scarcity (18 %) and mass movement (17 %) indicating that both water-related shortages and terrain instability are key drivers shaping land development decisions and spatial planning priorities.
- Finally, the waste sector shows higher shares of extreme heat (23 %) and heavy precipitation (16 %), which may exacerbate sanitation and management issues.

Overall, the results demonstrate that droughts & water scarcity, heavy precipitation, and extreme heat are the most recurrent hazards across multiple sectors, highlighting the cross-cutting importance of integrated adaptation and resilience planning.

Figure 40. Vulnerable sectors and climate hazards



Source: JRC elaboration

Another way of analysing the reported vulnerable sectors is to examine how frequently each sector is mentioned across signatories, counting each sector only once per city regardless of the number of associated hazards. This removes the bias of multiple hazard–sector linkages and clearly highlights which domains are structurally most exposed to climate risks. According to the data presented below (Table 15), water stands out as the most recurrent vulnerable sector, reported by 93 % of signatories (111 out of 120), followed by buildings, mentioned by 88 % of signatories (105 out of 128), and health, which appears in 82 % of RVAs (98).

Agriculture & forestry and energy (77 % each) also show very high recurrence, indicating widespread recognition of their sensitivity to climate impacts. Environment & biodiversity is reported as vulnerable in 76 % of RVAs, underscoring the strong interdependence between energy systems and climate risks. Mid-range recurrence is observed for transport (62 %), civil protection & emergency (58 %) and land use planning (58 %), which nonetheless remain key components of urban resilience. Sectors with lower recurrence include tourism (29 %), waste (21 %), ICT (14 %), and education (14 %), suggesting either lower perceived exposure or less developed assessment frameworks in these domains. Overall, the distribution shows that essential services — particularly water supply, buildings, health systems, natural ecosystems, and energy infrastructure — are consistently recognised as the most climate-vulnerable sectors across signatories. The obtained results correspond to information in Figure 39, where the most reported vulnerable sectors (agriculture & forestry, buildings, environment & biodiversity, health and water) also appear frequently among the signatories.

Table 15. Sectors reported as vulnerable/impacted and number of signatories mentioning each sector and respective share (N=120)

Vulnerable /Impacted Sector	Number of cities mentioning the sector	Share of cities
Water	111	93 %
Buildings	105	88 %
Health	98	82 %
Agriculture & Forestry	92	77 %
Energy	92	77 %
Environment & Biodiversity	91	76 %
Transport	74	62 %
Civil Protection & Emergency	70	58 %
Land Use Planning	70	58 %
Tourism	35	29 %
Waste	25	21 %
Education	17	14 %
ICT (Information & communication technologies)	17	14 %

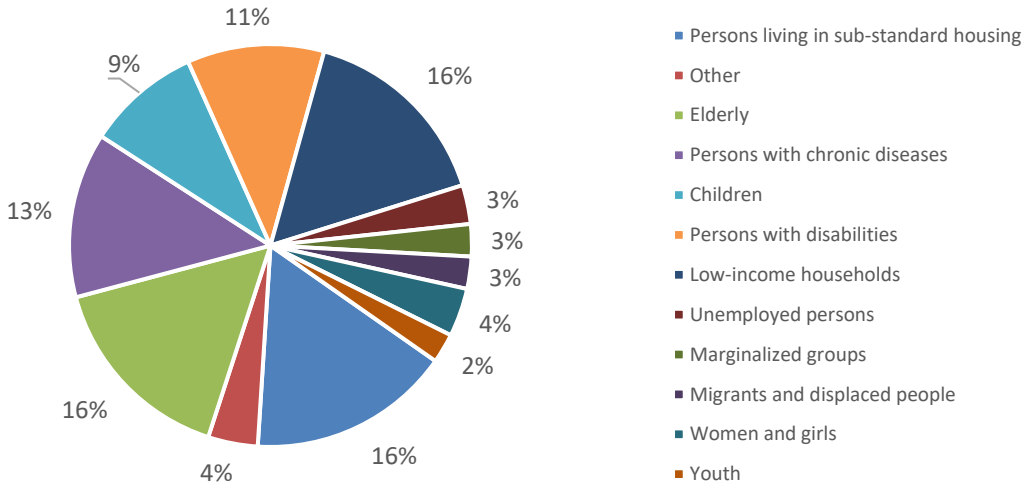
Source: JRC elaboration

4.3.4. Vulnerable population groups

When reporting their RVAs, signatories can also identify specific vulnerable population groups that might be more vulnerable to the identified climate hazards. Low-income households, persons living in sub-standard housing and elderly people appear with equal prominence as the most vulnerable groups to climate risks, accounting each for 16 % of total reported vulnerable groups (Figure 41). They are followed by persons with chronic diseases (13 %) and persons with disabilities (11 %). Other identified groups include children and women and girls, each representing smaller but still relevant shares. Migrants and displaced people, unemployed persons, marginalised groups and youth account for the lowest percentages.

Overall, the results indicate that climate risks can disproportionately affect socially vulnerable and socio-economically disadvantaged populations, particularly those with limited resources or reduced adaptive capacity. The "All" category was excluded from the analysis to ensure a proper representation of the distribution among the other categories.

Figure 41. Most reported vulnerable population groups



Source: JRC elaboration

Based on the reported climate vulnerabilities of population groups (Figure 42), clear patterns emerge regarding sensitivity to specific climate hazards:

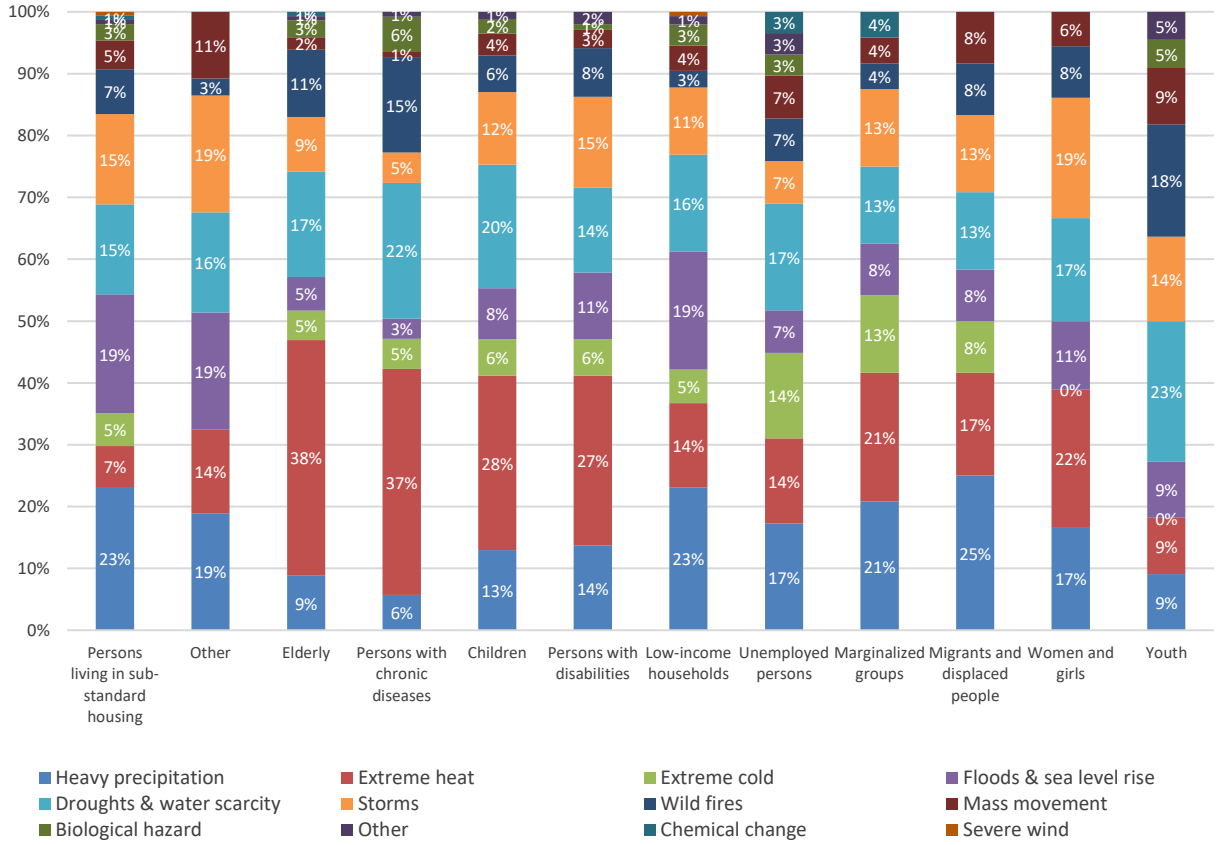
- Elderly, children, persons with chronic diseases, women and girls, and persons with disabilities are most frequently associated with vulnerability to extreme heat, confirming that heat-related hazards disproportionately affect groups with reduced adaptive capacity and health limitations.
- Low-income households are vulnerable mainly to heavy precipitation and floods & sea level rise, showing that climate impacts combine with socio-economic vulnerability.
- Persons living in sub-standard housing are predominantly linked to heavy precipitation and floods & sea level rise, indicating higher sensitivity to water infiltration, structural damage, and related health risks.

— Marginalised groups show the highest vulnerability to extreme heat and heavy precipitation, indicating that social exclusion often coincides with exposure to climate-related shocks and insufficient access to protective infrastructure.

— Migrants and displaced people are most frequently associated with heavy precipitation, reflecting increased risk due to temporary or inadequate housing and lower access to protective infrastructure.

— Unemployed persons are reported as most vulnerable to heavy precipitation and droughts & water scarcity, showing that economic instability reinforces exposure to disruptions in basic services and resources.

Figure 42. Vulnerable population groups and climate hazards



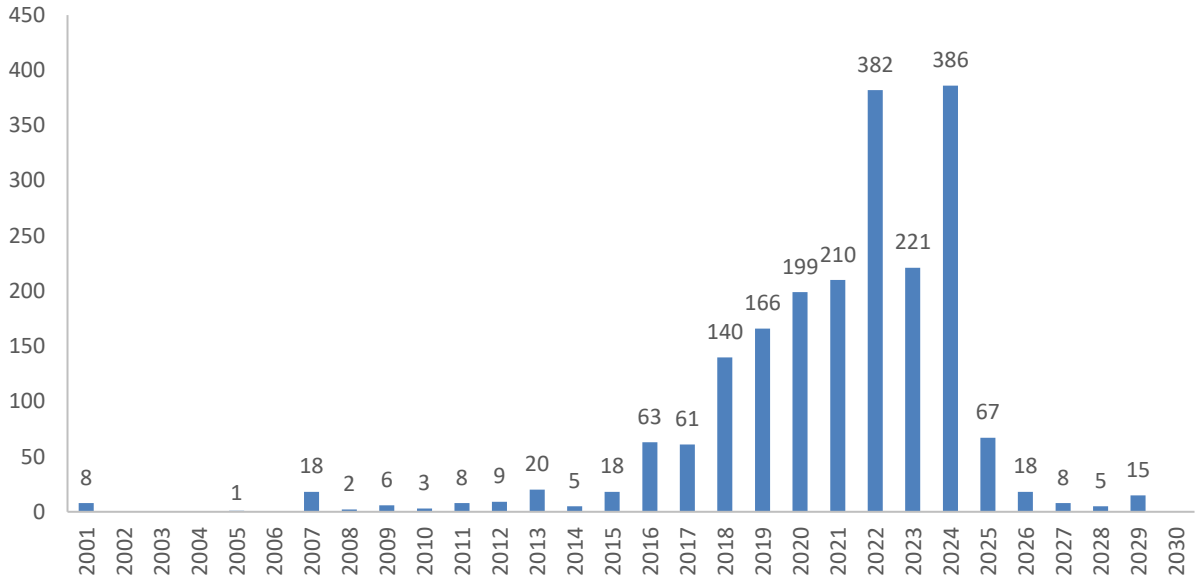
Source: JRC elaboration

4.4. Climate adaptation actions and measures

Similarly to mitigation actions, the adaptation actions reported by signatories include information that allow to analyse them in detail. A total of 2 040 adaptation actions are reported in SECAPs with a 2030 commitment and are analysed in this section. According to Figure 43, the number of planned adaptation actions started to grow after 2015 and increased consistently from 2016, when the adaptation pillar was introduced, with a sharp and continuous growth between 2018 and 2022. The peak occurred in 2024, with 386 actions, marking the highest reporting levels in the dataset.

After 2024, however, the number of new actions dropped significantly, falling to 67 in 2025. This pattern suggests a slowdown after an intensive period of planning activity in 2022–2024.

Figure 43. Number of adaptation actions with their reported implementation start year



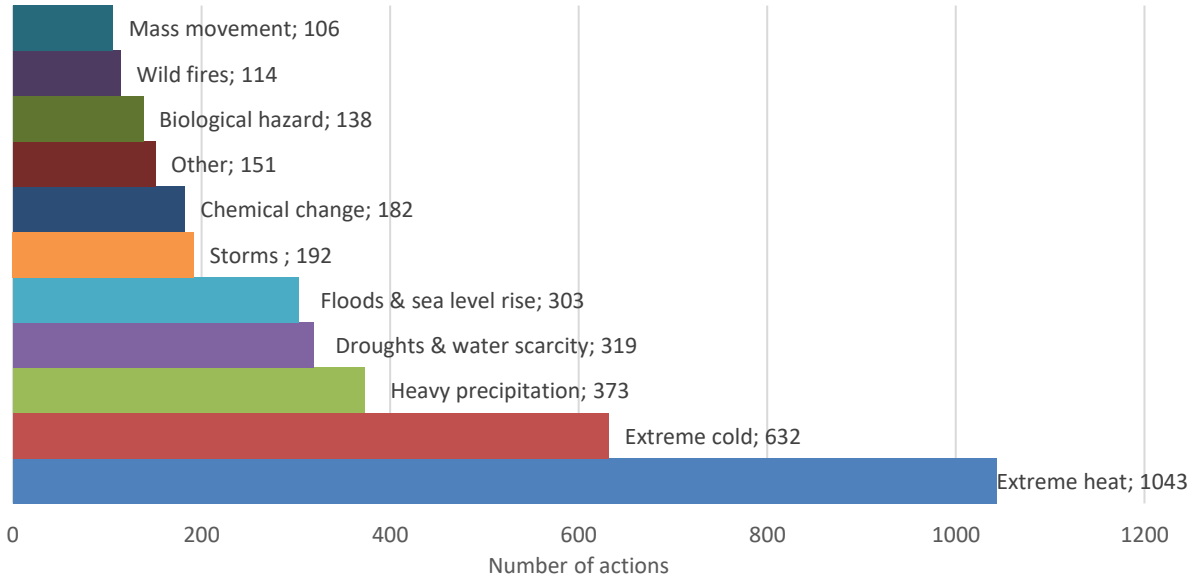
Source: JRC elaboration

4.4.1. Actions by climate hazard

According to the information reported by signatories, a total of 1 603 out of 2 040 adaptation actions (79 %) include details on which climate hazard(s) they address. Multiple hazards can be selected for each action.

As shown in Figure 44, the most frequently climate hazard addressed by adaptation actions is extreme heat, with 1 043 linked actions, followed by extreme cold (632 actions) and heavy precipitation (373 actions). Droughts & water scarcity (319 actions) and floods & sea level rise (303 actions) also represent major adaptation priorities. Other hazard categories — such as storms (192 actions), chemical change (182 actions), other (151 actions) biological hazards (138 actions), wildfires (114 actions) and mass movement (106 actions) — are addressed less frequently. Meanwhile, severe wind, heavy rainfall, and groundwater flood register zero linked actions, indicating very limited or absent targeted adaptation measures for these specific hazards.

Figure 44. Adaptation actions and most addressed climate hazards



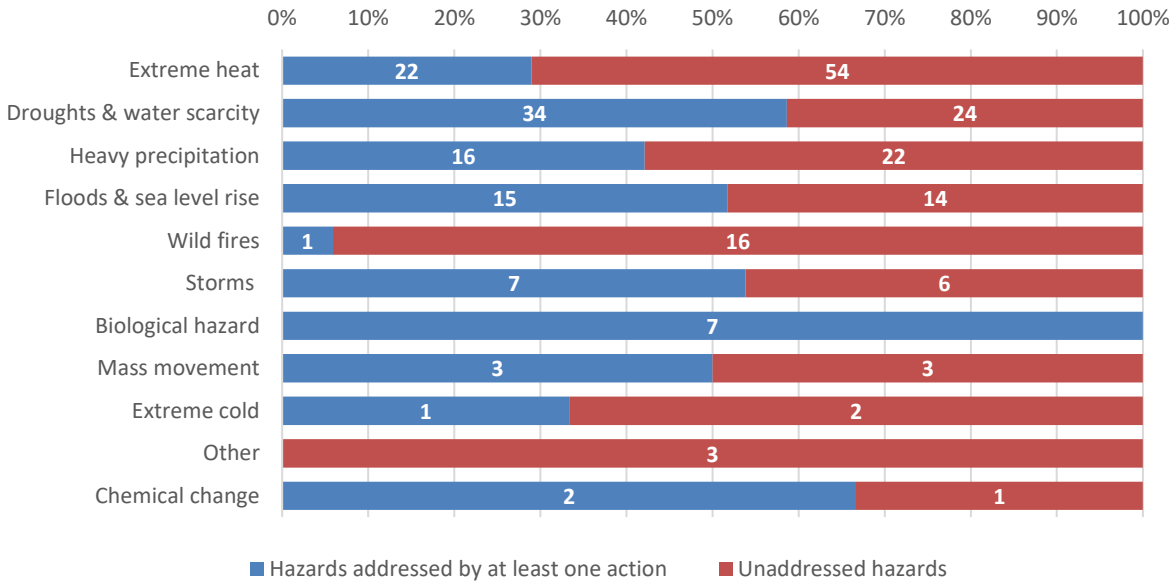
Source: JRC elaboration

Figure 45 presents coverage of high-risk climate hazards by adaptation actions. While some hazards receive significant attention, others remain largely unaddressed by action plans.

- Droughts & water scarcity are frequently covered high-risk hazards, with 59 % (34 out of 58) of reported high-risk cases addressed by at least one action.
- Floods & sea level rise are also frequently covered high-risk hazards, with 52 % (15 out of 29) of reported high-risk cases addressed by at least one action.
- Extreme heat also shows relatively high action coverage: 29 % (22 out of 76) of high-risk occurrences are addressed by adaptation measures.
- Heavy precipitation is also highly addressed by adaptation measures: 42 % (16 out of 38).

Overall, the distribution shows that while signatories tend to prioritise adaptation measures for water-related and heat-related high-risk hazards, storm-, wind-, and wildfire-related hazards receive significantly less planning attention, indicating a misalignment between assessed climate risk and planned adaptation response.

Figure 45. Proportion of signatories reporting a "high risk" hazard also reporting at least a matching action



In blue: number of reported high-risk hazards covered in action plans.

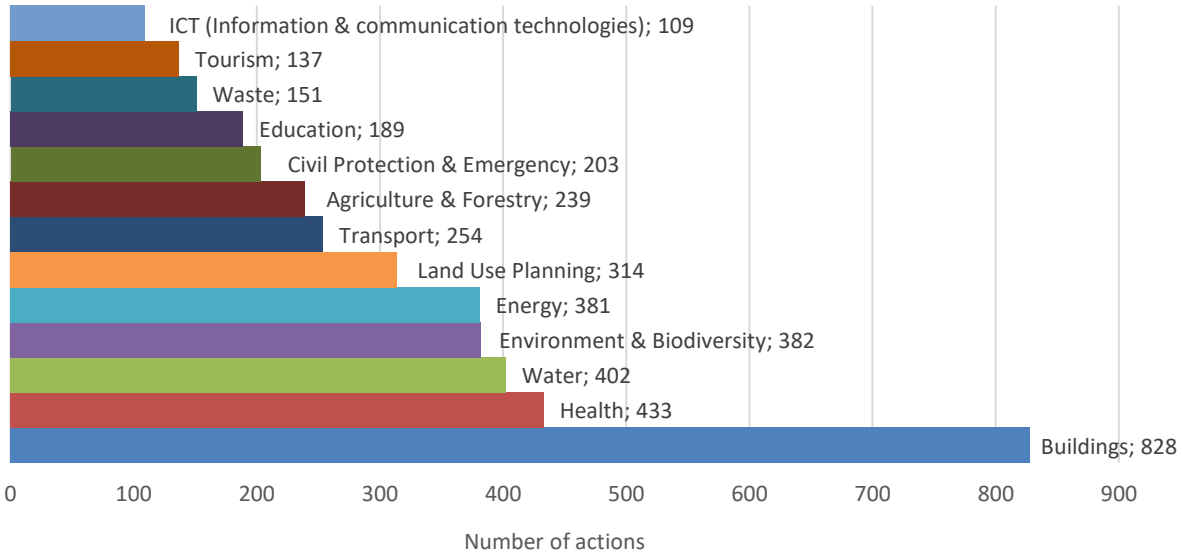
In red: number of reported high-risk hazards not yet addressed in submitted action plans. Hazards are ordered by the number of signatories reporting them as high risk in their RVAs.

Source: JRC elaboration

4.4.2. Actions by vulnerable sector

According to the data shown in Figure 46, the most targeted sector by adaptation actions is buildings, with 828 planned measures, significantly exceeding all other domains. Health follows with 433 actions, while water (403 actions), environment & biodiversity (403) and energy (381) also receive substantial attention, indicating that signatories prioritise strengthening essential public services and critical infrastructure. Mid-range levels of adaptation efforts are observed in land use planning (314 actions), transport (254) and agriculture & forestry (239). By contrast, civil protection & emergency (203), education (189 actions), waste (155) and tourism (144) are addressed less frequently. The least targeted sector is ICT (Information & Communication Technologies), with only 109 actions, suggesting that digital systems remain underrepresented in current adaptation planning.

Figure 46. Adaptation actions and most targeted vulnerable sectors



Source: JRC elaboration

Box 6. Landslide protective structures in Ozurgeti (Georgia)

Signatory: Ozurgeti | Country: Georgia | Population: 62 500 | Adhesion: 2017

Capturing and draining sources, filling and compacting landslide cracks, and arrangement of retaining walls are essential measures. In areas where agricultural fields are no longer viable, phytomelioration (bioengineering) are planned to be implemented. This involves cultivating plantations with deep root systems and terracing slopes. Phytomelioration is also used to alter the topography of landslide-prone terrain. Supporting structures should be strengthened in areas where landslides threaten highways or house construction on unstable slopes, using gabions or flat stones to reinforce riverbanks prone to erosive washing.

Climate hazard(s) addressed:

- Mass movement

Affected sectors:

- Buildings

- Transport

- Energy

Box 7. Monitoring of the spread of pathogens and viruses in Rivne (Ukraine)

Signatory: Rivne | Country: Ukraine | Population: 250 205 | Adhesion: 2021

Rivne action plan includes the monitoring of the spread of pathogens and viruses and the readiness of medical institutions to the increase in the number of diseases associated with climate change. Objectives are:

- improving the surveillance system and developing protection measures in case of new pathogens or viruses in humans, stray animals, and trees.

- establish coordination with the Department of Ecology and Natural Resources to monitor and observe the spread of invasive species that may affect the health of residents.

- conducting an audit of the readiness of healthcare infrastructure.

- develop protocols for responding to an increase in relevant morbidity rates, with a focus on the potential increase in cardiovascular disease during periods of extreme heat.

The monitoring should be accompanied by the development of information materials and recommendations on preventive measures for the population.

Climate hazard(s) addressed:

- Extreme heat

Affected sectors:

- Health

Box 8. Protect buildings from extreme weather events in Spitak (Armenia)

Signatory: Spitak | Country: Armenia | Population: 39 912 | Adhesion: 2021

The SECAP of the Municipality of Spitak includes a key adaptation action aimed at inventorying and repairing building roofs vulnerable to extreme weather events, carrying out necessary preventive repair and restoration work and significantly reducing the probability of damage to buildings and infrastructure.

This activity envisages inspection of roofs of community buildings and public housing complexes, inventory of roofs vulnerable to heavy precipitation, hail and strong winds, repair of damaged and/or vulnerable roofs, replacement of roofing, reinforcement of supporting structures, replacement of worn-out timber, modernisation of the drainage system.

Climate hazard(s) addressed:

- Heavy precipitation

- Storms

Affected sectors:

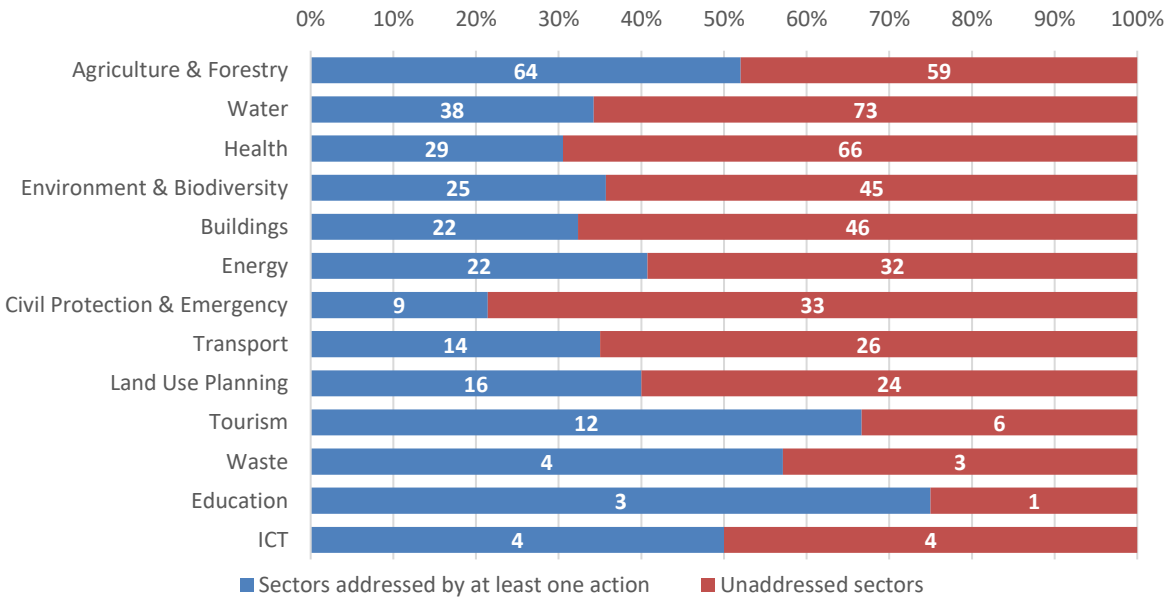
- Buildings

Looking at the sectors reported in RVA, it is possible to analyse how many of them are targeted by planned actions. Figure 47 shows the proportion of signatories reporting a "high-vulnerable sector" that is also addressed by at least one adaptation action. The bars represent the number of vulnerable sectors identified in RVAs, distinguishing those already linked to at least one adaptation measure (blue) from those not yet addressed (red).

- Overall, among all vulnerable sectors reported in RVAs (680), only 39 % (262) are addressed by at least one adaptation action.
- Among the most reported sectors, high alignment between vulnerability and planned actions is shown in agriculture & forestry with 52 % addressed cases (64 out of 123) , energy with 41 % (22 out of 54), and environment & biodiversity with 36 % (25 out of 70).
- Other sectors such as land use planning (40 %), transport (35 %), and buildings (36 %) also demonstrate strong integration between assessment and planned measures.
- Although the highest number of cases addressed, education (75 % of cases addressed), tourism (67 %), waste (57 %) and ICT (Information & Communication Technologies, 50 %) appear less prioritised in number of actions, indicating remaining implementation gaps in institutional and digital resilience sectors.

These findings suggest that local authorities tend to prioritise adaptation in sectors where actions are more tangible and within municipal control — such as buildings, water management, and agriculture — while more cross-cutting or non-physical sectors receive fewer directly linked adaptation interventions.

Figure 47. Proportion of signatories reporting a vulnerable/impacted sector also reporting at least a matching action



In blue: number of reported high-vulnerable sectors covered in action plans.

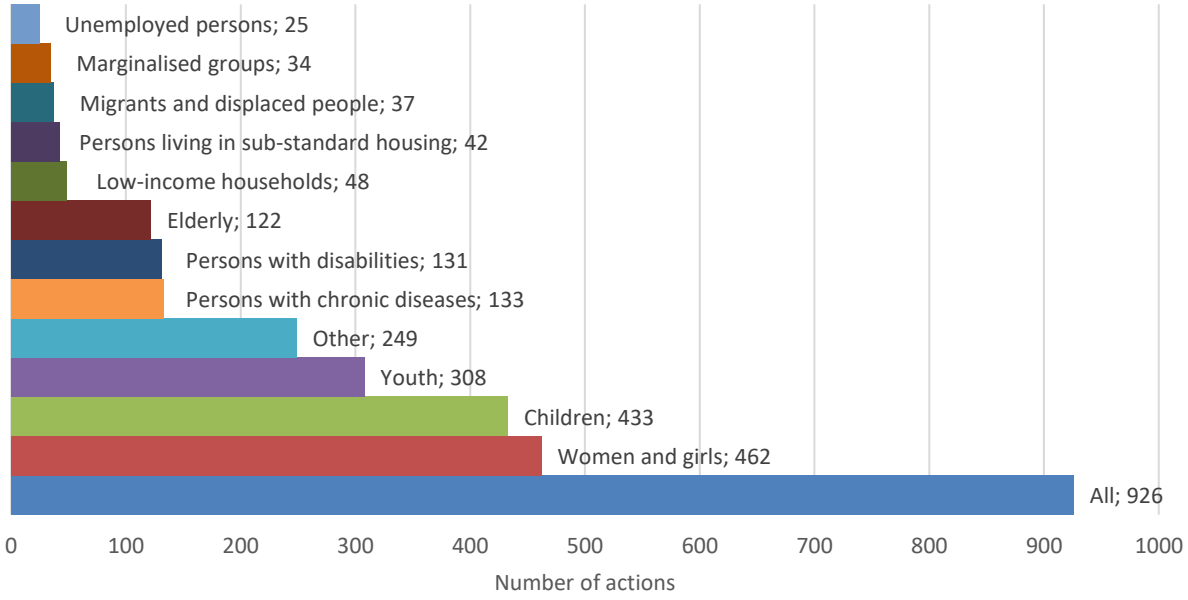
In red: number of reported high-vulnerable sectors not yet addressed in submitted action plans. Sectors are ordered by the number of signatories reporting them as high vulnerable in their RVAs.

Source: JRC elaboration

4.4.3. Actions by vulnerable groups

Looking at vulnerable categories, the most frequently targeted vulnerable population groups are women and girls (462 actions) and children (433 actions) (Figure 48). A substantial number of planned measures also address youth (308 actions), followed by interventions targeting persons with chronic diseases (146) indicating that signatories prioritise groups with sensitivity to climate impacts and reduced adaptive capacity. Some attention is given to and persons with disabilities (133), elderly people (122 actions), low-income households (48), persons living in sub-standard housing (42), and migrants and displaced people (37). In contrast, marginalised groups (35 actions) and unemployed persons (25 actions) are the least addressed, suggesting that socially excluded and economically vulnerable groups can remain underrepresented in current adaptation planning.

Figure 48. Adaptation actions and most targeted vulnerable population groups



Source: JRC elaboration

Based on the matching analysis between reported vulnerable groups in RVAs and the adaptation measures included in the action plans (Figure 49), only a limited portion of identified vulnerabilities is currently addressed by adaptation actions. Considering all the categories of vulnerable population groups reported in RVAs, only 13 % of cases are addressed by at least one adaptation action, while the remaining 87 % are unaddressed.

The highest numbers of alignment are observed for unemployed persons with 30% of matched cases (9 out of 29), persons with disabilities (25%, 26 out of 102), marginalised groups (25%, 6 out of 24), children (21%, 18 out of 85) and migrants and displaced people (21 %, 5 out of 24).

In contrast, several vulnerable groups remain severely under-supported:

- Persons living in sub-standard housing have only 12 matched actions and 139 unmatched cases.
- Elderly people and low-income households show respectively only 20 occurrences matched by at least one action compared to 127 unmatched cases.

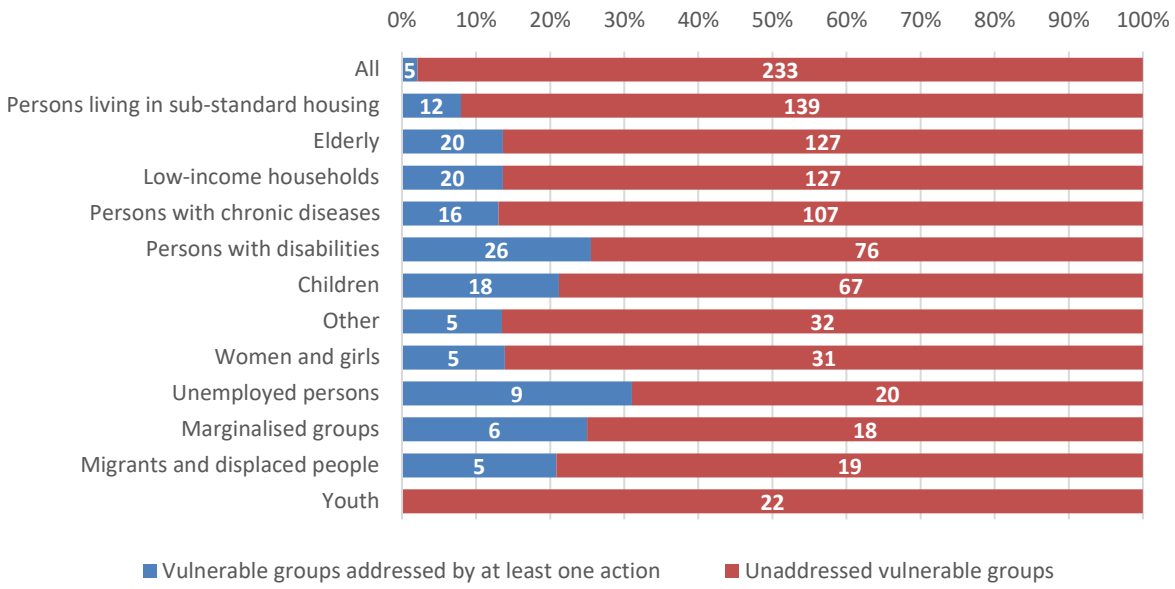
— Persons with chronic diseases show 16 matched cases vs. 107 unmatched cases.

— Women and girls show 5 matched cases vs. 31 unaddressed occurrences.

These figures reveal that socially excluded or mobility-constrained groups receive very little attention in adaptation action planning despite being regularly identified as vulnerable in the RVAs.

Overall, the analysis highlights a substantial implementation gap: although cities systematically identify a wide range of vulnerable population groups, only a limited proportion of these vulnerabilities is translated into concrete adaptation measures. This underlines the need for stronger integration of social equity considerations into local adaptation planning.

Figure 49. Proportion of population groups reported as vulnerable in RVA also reported in at least a matching action



In blue: number of reported vulnerable groups covered in action plans.

In red: number of reported vulnerable groups not yet addressed in submitted action plans. Groups are ordered by the number of signatories reporting them as vulnerable in their RVAs.

Source: JRC elaboration

4.4.4. Adaptation gap and potential misalignment among RVA and actions

As noted in the previous sections, there is a slight misalignment in the hazards and sectors reported in different sections of the SECAP (goals, RVA, and actions). In particular, important differences concern high-risk hazards and vulnerable sectors as reported in RVAs and in the actions:

— While droughts & water scarcity is the most reported high-risk climate hazard in RVA, it is not among the top three addressed hazards in the action plans.

— Extreme cold is the second addressed hazard in adaptation actions although it is one of the least reported high-risk climate hazards in RVAs.

— While agriculture & forestry is the most reported vulnerable sector in RVAs, it is the eighth most addressed sector in adaptation actions.

— On the contrary, water supply & sanitation is not among the most vulnerable sectors in RVAs, but it is the third targeted sector by adaptation actions.

This can be linked to difficulties in developing actions in sectors in which signatories have limited jurisdictional competence. For example, in some CoM East signatories, agriculture and forestry are managed and regulated at the regional or national level, leaving little room for actions to local authorities. The same applies to health.

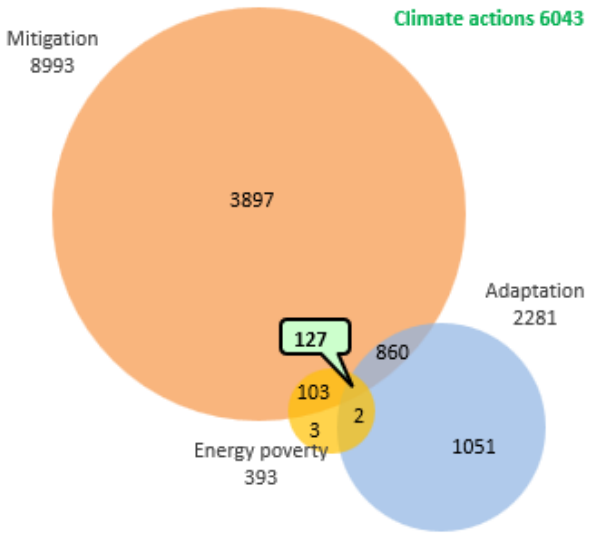
On the contrary, land use planning and education, including public awareness campaigns, represent sectors where local authorities generally have stronger competencies and a higher degree of control, enabling them to design and implement targeted measures more effectively.

4.5. Integrated actions

Within the CoM East reporting, signatories reported a total of 6 043 climate actions. Mitigation remains the dominant focus with 3 897 actions that include only the mitigation component, while 1 051 actions address only adaptation, and 3 actions focus on energy poverty only (Figure 50).

When reporting on the actions, signatories can identify if a planned measure target more than one pillar, demonstrating an integrative approach of some actions proposed. A relevant share of measures shows integrated planning approaches: 860 actions address both mitigation and adaptation, 106 simultaneously address mitigation and energy poverty, and 2 combine adaptation and energy poverty. In addition, 127 cross-cutting actions address all three dimensions (mitigation, adaptation and energy poverty).

Figure 50. Actions and their share among the three pillars of the CoM East initiative



Source: JRC elaboration

5. Conclusion

This report analyses data of SECAPs submitted by 1st January 2025 and related to the Covenant of Mayors in Eastern Partnership countries (CoM East), namely Armenia, Azerbaijan, Georgia, Republic of Moldova and Ukraine. The initiative counts 540 committed cities, covering a total population of 31 million inhabitants. The majority of the CoM East signatories (81 %) are small- and medium-sized towns with a population of less than 50 000 inhabitants. However, more than a half of the CoM East population (54 %, corresponding to over 17 million inhabitants) live in large urban centres.

Figures analysed show that the initiative continues raising interest and is increasing its territorial coverage among local authorities; with 56 % of CoM East signatories with a 2030 commitment.

From the mitigation pillar's results, commitments from signatories' that have a 2030 emission reduction objective are on average in line or slightly higher than the minimum required: the majority of signatories set a mitigation target in the range between 30 and 35 %, followed by a smaller share, whose targets are in the range of 36-45 % and supported by a small but growing number of signatories aiming at achieving an emission reduction of 80%. Signatories' emissions inventories highlight the high contribution to emissions of residential buildings and transport sectors and a strong reliance on fossil fuels. With an aggregated share of 82 %, the building sector as a whole represents the dominant source of emissions within local inventories.

The adaptation pillar of CoM East shows that local authorities put in place growing efforts to tackle climate change impacts and become more resilient. Overall, out of 165 signatories that submitted a SECAP with 2030 commitments, 58 % reported at least an adaptation goal, demonstrating that while progress has been made, the integration of adaptation planning is still challenging. Looking at the assessment of risks and vulnerabilities, droughts & water scarcity emerge as the climate hazard posing higher risk, followed by extreme heat and heavy precipitations. The sectors most vulnerable to climate hazards are agriculture & forestry, followed closely by buildings.

Only a 20 % of signatories with an action plan has submitted a monitoring report, and the majority of them still has not included a complete monitoring emission inventory. This shows the need to reinforce the monitoring and progress review phase and an overall need to further support signatories to transition from planning to regular, structured SECAP implementation and reporting.

Focusing on the action planning, the mitigation actions analysed shows that despite the majority of actions refers to municipal buildings, the largest contribution to emission reduction is expected in the residential buildings sector. In the stationary energy sector, most actions refer to energy efficiency (partial and complex modernisation of buildings and efficient electrical appliances and indoor lighting) and to awareness raising. In the transport sector, most of the planned actions concern transport modernisation including electrical vehicles, transport infrastructure and road network optimization, and modal shift, such as implementation of bicycle facilities. Waste and non-energy sectors show a potential for improvement and diversification of actions.

Adaptation actions vary following the local specificities. The climate hazard most frequently addressed in adaptation measures is extreme heat, followed by extreme cold and heavy precipitation. Droughts & water scarcity, and floods & sea level rise also represent major adaptation priorities. Emerging attempts of integrating mitigation, adaptation and energy poverty actions were pursued by signatories, highlighting their up-to-date and cross cutting approach in dealing with the climate challenge.

Overall CoM East signatories are showing high commitments towards low carbon and resilient transition. Given the evolution of the initiative and its timeframe, the mitigation pillar appears more

robust, but progress has been made also in regard to climate change adaptation. Some further improvements, such as the need to formulate specific and measurable adaptation goals as well as to establish clear links between hazards, vulnerabilities and actions would enable the completion of information. Further integrated actions tackling mitigation, adaptation and energy poverty are needed in order to have a better understanding of the avoidance of maladaptation and of undesired consequences undermining equity and justice considerations in the action plans. SECAPs submissions and new signatories are expected, thereby allowing increased information on all three pillars, balancing the distribution across the signatories and countries. In this regard, the requirements and reporting framework on the third pillar on energy access and poverty, which became mandatory in 2025 will allow to further enlarge the scope of CoM East signatories' actions and increase their capacity building.

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List of abbreviations and definitions

Abbreviations	Definitions
BEI	Baseline emission inventory
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
DG ENEST	European Commission's Directorate-General for Enlargement and the Eastern Neighbourhood
EC	European Commission
EU	European Union
GCoM	Global Covenant of Mayors for Climate and Energy
GHG	Greenhouse gas
JRC	Joint Research Centre
MEI	Monitoring emission inventory
MR	Monitoring Report
Mt	Million tonnes
MWh	Megawatt Hour
NDC	Nationally Determined Contribution
RVA	Risk and Vulnerability Assessment
SEAP	Sustainable Energy Action Plan
SECAP	Sustainable Energy and Climate Action Plan

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