Comparative Analysis of Emission and Adaptation Reporting Across 30 Cities

Insights from the LOCALISED project

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Policy Brief

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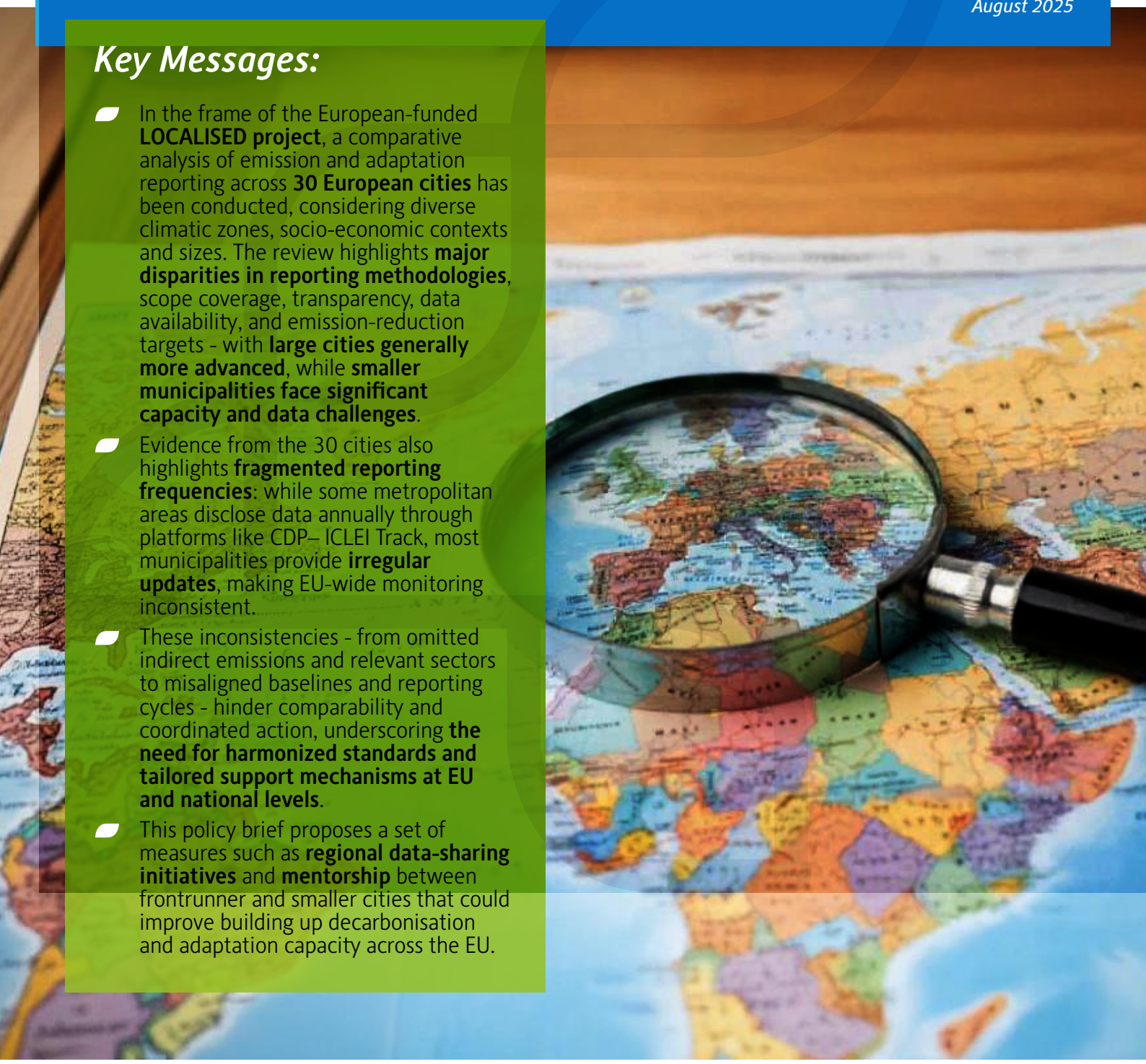
Key Messages:

- In the frame of the European-funded **LOCALISED project**, a comparative analysis of emission and adaptation reporting across **30 European cities** has been conducted, considering diverse climatic zones, socio-economic contexts and sizes. The review highlights **major disparities in reporting methodologies**, scope coverage, transparency, data availability, and emission-reduction targets - with **large cities generally more advanced**, while **smaller municipalities face significant capacity and data challenges**.
- Evidence from the 30 cities also highlights **fragmented reporting frequencies**: while some metropolitan areas disclose data annually through platforms like CDP– ICLEI Track, most municipalities provide **irregular updates**, making EU-wide monitoring inconsistent.
- These inconsistencies - from omitted indirect emissions and relevant sectors to misaligned baselines and reporting cycles - hinder comparability and coordinated action, underscoring **the need for harmonized standards and tailored support mechanisms at EU and national levels**.
- This policy brief proposes a set of measures such as **regional data-sharing initiatives** and **mentorship** between frontrunner and smaller cities that could improve building up decarbonisation and adaptation capacity across the EU.



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LOCALISED project overview

The Horizon 2020 Project LOCALISED disaggregated national decarbonisation plans, consistent with Europe's net- zero target, to NUTS3 (regional) and LAU (local) levels across the EU (Patil et al., 2024). It provides regions and municipalities with various climate action measure sets optimised for investment costs, emission reduction, climate vulnerability and social impacts, made accessible and customisable through the *Climate Action Strategiser* web application. Previously, this was possible only with great effort and detail for individual regions.

To achieve the LOCALISED targets, the project uses a mixture of disaggregated national plans, regional statistics, and a newly developed model approach. For this purpose, LOCALISED utilises a large measure database to calculate an optimal regional response to reach its national decarbonisation pathway. As a secondary goal, the project seeks to estimate the measures necessary to adapt to climate change effects on a local level, based on impacts of climate change. An important part of LOCALISED is adapting to stakeholder needs. The project engages with the specific requirements of local actors through continuous exchanges with pilot cities and local administrations. In parallel, it conducts broader analyses, such as the "30 European cities" study mentioned in this policy brief, to identify gaps in existing reporting practices and address them in the project developed tools.

Background

Cities face multiple challenges in decarbonisation and adaptation planning. The first issue highlighted by the comparative analysis of 30 European cities (Figure 1) is methodological fragmentation: **cities apply different accounting frameworks and sectoral boundaries**, which leads to inconsistent emission figures, even within the same administration plans over time.

These limitations feed into **broader transparency and accessibility concerns**: while large metropolitan areas such as Vienna (AT) or Barcelona (ES) maintain open data portals and publish detailed methodological notes, smaller cities frequently provide only qualitative information. Another challenge is the **misalignment of reporting initiatives and frequencies**: many Covenant of Mayors signatory cities do not comply with the Covenant of Mayors' monitoring cycles, and in general, decarbonisation reporting often depends on external funding and is highly influenced by the political orientation and government periods.

Finally, there is a **clear inequality in planning resources across cities and regions**, with larger urban centres able to deploy advanced modelling tools and align with EU Missions, while smaller municipalities lack the capacity to do so.

Figure 1: *Map representing the 30 analysed cities within the LOCALISED study*

Comparative Findings Across Key Dimensions

Inconsistent methodologies

Most of the analysed cities follow the Covenant of Mayors recommendations to prepare their emission reduction and climate adaptation plans. They provide a structured, internationally recognized framework to plan, implement, and monitor climate and energy actions (Covenant of Mayors – Europe, 2020). However, several cities apply alternative methodologies to better align with national initiatives or local conditions. For example, Barcelona (ES) adjusts its calculations and emission factors to fit the "Spanish Cities for the 2030 Neutrality Mission" (European Commission, 2022). Likewise, Valencia (ES) and Milano (IT) estimate private transport emissions using mobility surveys that measure kilometres travelled within the city limits, rather than relying on the number of registered vehicles as recommended in the Sustainable Energy and Climate Action Plan (SECAP) guidelines. This alternative approach results in approximately 50 percent lower reported emissions for private transport.

Differences in accounting approaches are largely influenced by city resources, **data availability, and national frameworks**. The city of Potsdam (DE), for example, applies Germany's standardized municipal greenhouse gas (GHG) accounting framework known as BISKO (Bilanzierungssystematik für kommunale Treibhausgasemissionen). Unlike the conventional territorial method, which attributes emissions to heat and electricity producers even when that energy is

consumed outside city boundaries, BISKO uses a final energy-based territorial balance (Klimaschutzplaner/BISKO, 2021). **This "polluter-pays" approach can lead to differences of up to 20 percent in reported emissions when comparing the SECAP recommended methodology**, and the German standardized one.

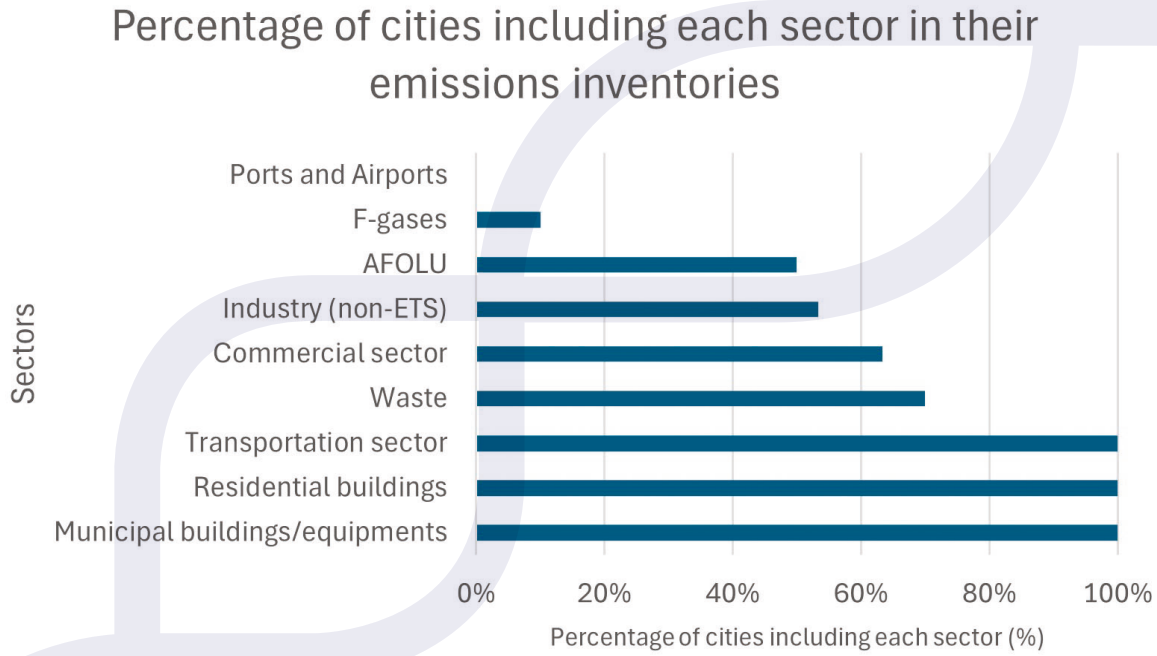

Figure 2: *Percentage of cities including each sector in their emissions inventory*

Sectoral coverage also varies considerably among cities. EU Energy Trading System (ETS) emissions are excluded from all the plans analyzed as these sectors remain under national responsibility according to the European Effort Sharing Regulation (European Parliament & Council, 2023). As visible in Figure 2, two-thirds of the cities omit some of the other sectors. For example, Agriculture, Forestry and Other Land Uses (AFOLU) are excluded in more than ten cities of the sample. Industrial Processes and Product Use (IPPU) - or Industrial Processes alone - are also frequently omitted. Port emissions are generally excluded, as seen in all analysed coastal municipalities. Similarly, airport emissions are typically left out, as they fall outside the local administration's responsibility. Fluorinated gases (F-gases) are rarely included; among the thirty cities analyzed, only Ljubljana (SI), Vienna (AU) and Tampere (EE) partially report them.

Energy mix choices represent another source of divergence. Some cities rely on national energy mixes whereas others use local ones. Mediterranean cities often apply a hybrid approach that combines both local and national factors, reflecting the integration of solar energy and seasonal electricity imports in their emission inventories. Larger cities tend to use more advanced tools and integrate sector-specific models, frequently revising their assumptions to remain consistent with European Union or national frameworks. Consequently, baseline adjustments are also common as more accurate data becomes available, as seen in the Potsdam (DE), Warsaw (PL), Valencia (ES), and Milano (IT) cases.

Unaligned Reporting Frequencies

Most cities do not fully comply with Covenant of Mayors monitoring requirements. As seen in Figure 3, **only one-third of the administrations report carbon inventories annually**. Larger cities such as Barcelona (ES), Milan (IT) or Ljubljana (SI) have shifted toward annual reporting to initiatives like the Carbon Disclosure Project (CDP, 2023), often maintaining overlapping plans for mobility, energy, housing, and climate neutrality. In contrast, smaller municipalities update inventories irregularly-sometimes with gaps of a decade-and rely on external funding to sustain reporting. Nordic and continental cities stand out for more regular updates, supported by national climate reporting schemes that institutionalize monitoring cycles.

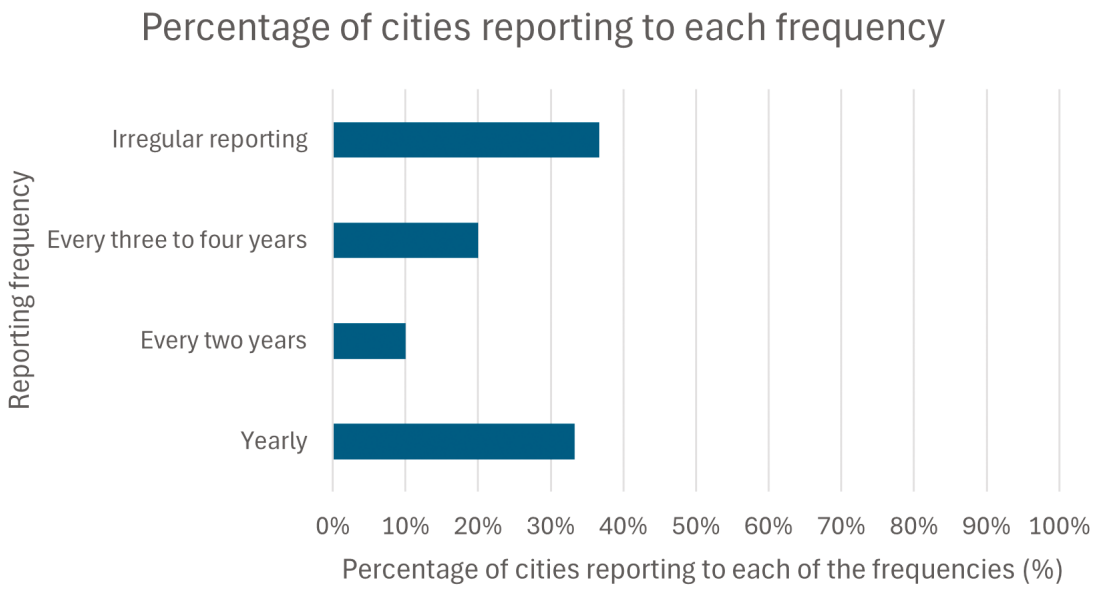

Figure 3: *Reporting frequency for the 30 analysed cities*

Incomplete Emission Scopes

Emission scopes are categories defined by the Greenhouse Gas Protocol (World Resources Institute & WBCSD, 2004) to standardize greenhouse gas reporting. Scope 1 includes direct emissions from sources within the city boundaries, Scope 2 covers indirect emissions from the generation of purchased electricity, heat, or steam used in the city, and Scope 3 accounts for other indirect emissions occurring outside the city boundaries due to activities within the city.

Most municipal plans cover only Scope 1 from direct fuel combustion in buildings and vehicles, and Scope 2 emissions from purchased electricity or heat used in the city. Scope 3 is not considered, except for waste or wastewater processed outside city boundaries which has been considered for a few municipalities.

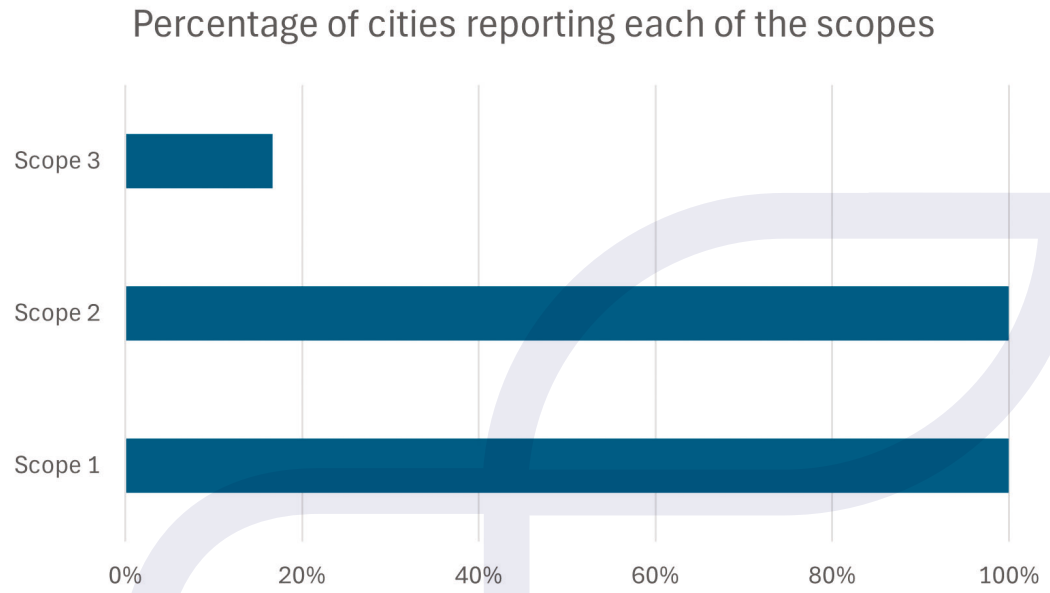

Figure 4: *Percentage of cities reporting each of the emission Scopes*

Recommendations

To ensure that future climate adaptation reporting among European cities is more consistent, comparable and actionable, several coordinated measures could be implemented (see Figure 5).
At a local level, **automating data updates** would further improve reporting. Manual updates every few years lead to delays and inconsistencies, as seen in Burgas (BG) and Patras (EL).

Linking municipal energy and transport data with national statistics through automated pipelines could allow annual updates with little extra effort. Vienna's (AU) climate dashboard, which already integrates live data from utilities and mobility systems, is a good example. **Synchronising local reporting cycles** with national greenhouse gas inventories and climate plans would also avoid mismatches.

Warsaw's (PL) need to adjust its baseline whenever Poland updates its electricity grid factors shows how important it is to coordinate timelines with national energy and climate plans. **Training programs for small and medium sized cities** are equally important, since places like Gabrovo (BG), Prešov (SK) and Utena (LT) often depend on external consultants.

EU backed courses in data collection, scenario modelling and risk assessment, complemented by mentorship from more advanced cities like Barcelona (ES) or Milano (IT), could help close this gap, particularly between pioneer and smaller cities in similar climate zones. In the same line, **mentorship schemes** between frontrunner cities and smaller peers could further boost capacity: Barcelona's experience with urban heat adaptation and sustainable mobility could guide cities like Surbo (IT) or Patras (EL) facing similar challenges.

Improved data repositories are also needed, as medium to small municipalities such as Larnaca (CY), Szombathely (HU) or Cesena (IT) lack historical data and rely on estimates, while cities like Potsdam (DE) keep valuable datasets internally. An EU or national platform to store and share emissions and adaptation indicators could give all cities access to consistent information.

At a higher administrative level, some measures could be fostered, such as **harmonising frameworks and baselines** across Europe to make results easier to compare while still allowing local flexibility. **Shared technical offices** at regional level could also help. Regions with similar hazards, like heatwaves in the Mediterranean or floods in Central Europe, often duplicate analytical work. Finally, **dedicated EU funding** is essential for both regular updates and training.

While many cities access LIFE or Horizon funds for individual studies, consistent financing for long-term monitoring remains scarce. Utena's (LT) adaptation work under the ClimAdaptLT programme funded by Norwegian grants shows how targeted resources can accelerate the planning and reporting progress (ClimAdaptLT, 2020).

Figure 5: *Solutions towards a consistent EU climate reporting*

Sources and References

The recommendations collected in this Policy Brief are greatly the outcome of a systematic evaluation of around 350 local mitigation and adaptation plans and related documents coming from the 30 analyzed European cities (see Figure 1): Athens, Barcelona, Boden, Bucharest, Burgas, Cartagena, Cascais, Cesena, Enschede, Gabrovo, Larnaca, Les Sables-d'Olonne, Liepaja, Ljubljana, Lörrach, Milan, Nice, Patras, Potsdam, Prešov, Skanderborg, Sopot, Surbo, Szombathely, Tampere, Utena, Valencia, Vienna, Warsaw, Zagreb.

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