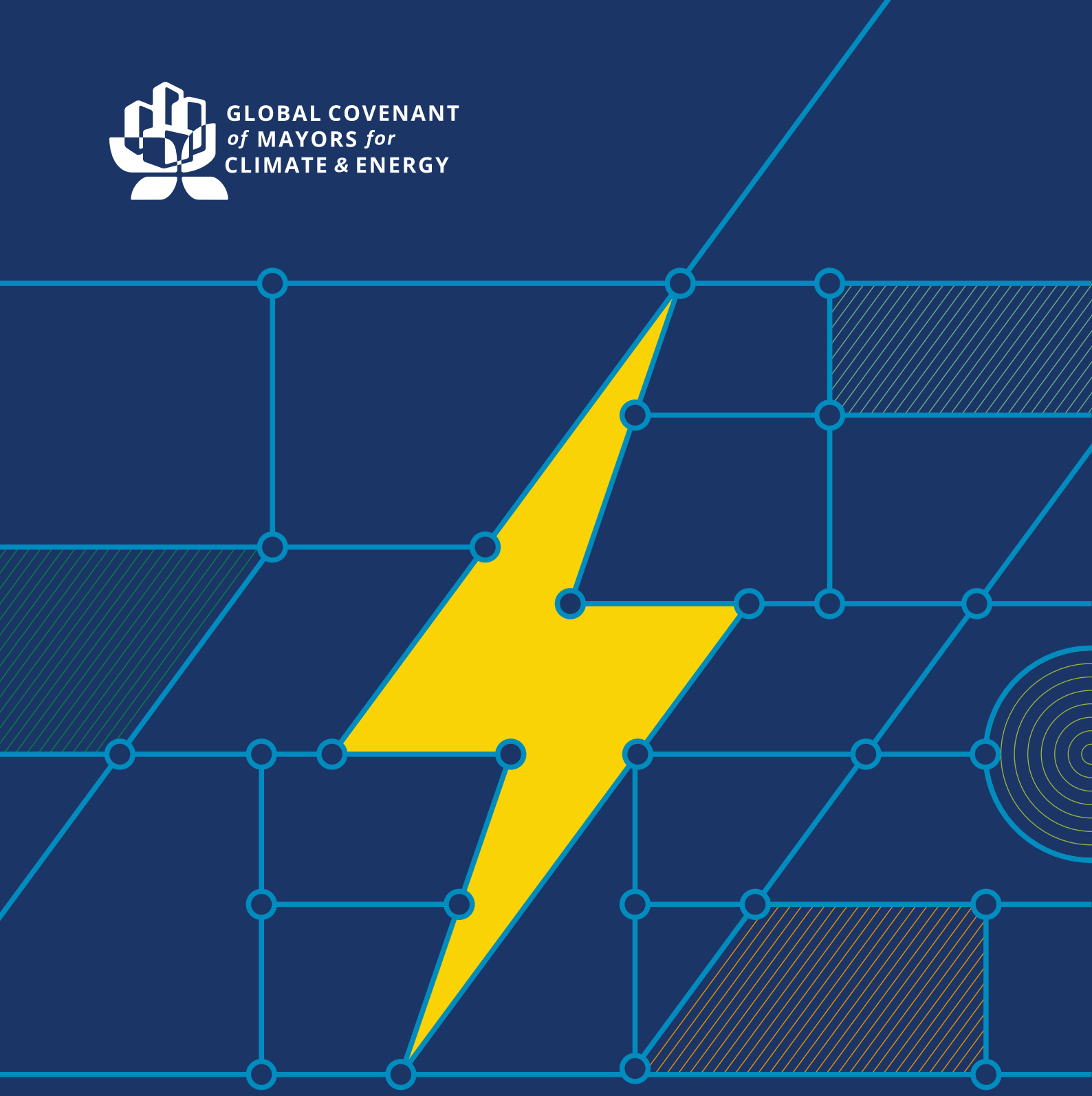
GLOBAL COVENANT of MAYORS for CLIMATE & ENERGY



UNLOCKING URBAN ENERGY ACCESS AND POVERTY

Research Report

Contents

GLOBAL COVENANT of MAYORS for CLIMATE & ENERGY

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Executive Summary

To complement the Global Covenant of Mayors' (GCoM) addition of the Energy Access and Poverty Pillar (EAPP) to its Common Reporting Framework (CRF) in 2022, this report synthesises research into the barriers local governments face in facilitating energy access and addressing energy poverty. The objectives of the research focused on understanding the role of local governments in improving urban energy access and reducing energy poverty.

This research conducted by Arup consisted of a global literature review and a survey of GCoM signatories. Interviews were also conducted with stakeholders of an energy access project in Cape Town, South Africa; for a Sub-Saharan case study of how a vision of energy access was realised via a localised project.

Key findings include:

- Understanding energy poverty—or lack of energy access—as **a form of deprivation** in individuals', households' and communities' **lived experiences** provides both context and qualitative data for local governments to **effectively target and shape** their **policy, infrastructural, technological, and socioeconomic interventions**.

- Local governments are **well-placed** to improve energy access and alleviate energy poverty due to their **ownership of the collection, analysis, and communication of data,** and **proximity to local contexts, narratives and lived experiences**.

- Local governments also face **barriers** in facilitating energy access, which are seen in the **financing** of solutions, **institutional capacity and structure** to deliver, navigating **policy landscapes, engagement and collaboration** with other stakeholders, the availability of **data** and **physical and human context**, and lack of **political leadership**.

- Local governments tend to have **limited powers** in influencing the urban assets and functions around energy services. However, the **distribution of powers amongst different levels of government, utilities and wider stakeholders vary significantly** across national contexts—characterising these differences enables an understanding of opportunities available to local governments to take action.

- Based on their available capacity and powers, local governments can use three approaches to address their barriers to energy access: identifying and evaluating **short-** *and* **long-term outcomes; efficient, effective,** *and* **equitable** capacity allocation; and maximising their available powers via **collaborative case-making**.

- There are many possible levers for local governments to deploy in realising energy access solutions, via **policies & regulation, stakeholder collaboration, internal capacity building & data collection, investment & securing finance**, and **city-led programmes**.

Framed around the data, experiences and actions of local governments from the literature and survey responses, the report narrative functions as a walkthrough for local governments in their contextual exploration of energy access and poverty:

- What energy access—and energy poverty—mean for their communities, households, and citizens;
- What are the critical themes of energy access and poverty in their city, and what barriers to they face in facilitating energy access or addressing energy poverty;
- How do the city powers they possess—or lack—influence how energy access solutions are realised within their political economies; and
- What approaches and levers are appropriate and effective for their cities' context and available powers towards enabling the implementation of energy access solutions.

These findings based on lived experiences of poverty and systemic barriers are contextual and temporal snapshots of energy access and poverty in cities. A key next step is regionally or thematically focused research, to further understand the political economies that local governments and their citizens work and live within.

1. Introduction

1.1 Overview and research aims

The Global Covenant of Mayors (GCoM) launched the Energy Access and Poverty Pillar (EAPP) of its Common Reporting Framework (CRF) in 2022, emphasising its critical role in the sustainability of cities and local governments. Under the EAPP, signatories aim to enact and monitor their progress against the UN Sustainable Development Goal (SDG) 7 to ensure access to affordable, reliable, sustainable and modern energy for all.[1] This is captured in the EAPP's indicators and targets around local governments' progress within the boundaries of their jurisdiction across three key energy access attributes: secure, sustainable and affordable energy (defined in Table 1 at the end of this section).

Whilst local governments are well-aware of the urgency, importance and benefits of addressing energy access and poverty, they often face significant and complex barriers that limit their ability to take action. Local governments also operate within diverse multi-level governance structures with differing degrees of influence over critical urban infrastructure and functions that support good energy access within urban communities. The energy markets, regulatory frameworks and governance landscapes that local governments operate within are often shaped by higher levels of government with limited influence from local government. This landscape shapes the opportunities and levers available to local governments to progress action on energy access and poverty.

Within this context, the core aims of this research are to:

1. Explore the role of local governments in improving urban energy access and alleviating energy poverty.
2. Develop a more detailed understanding of the barriers local governments face in making progress on energy access and poverty.
3. Understand how different powers configurations between local, regional and national government influence the opportunities available.
4. Identify a range of levers cities are employing to improve energy access and reduce energy poverty, and how these levers are shaped by the barriers and power structures they operate in.

Exploring local governments' barriers and powers uncover the complexity they work within, as a starting point to map potential ways forward. Exposing such barriers can help to identify opportunities to innovate solutions; within their administrations or by collaborating with relevant community, private sector, regional and national stakeholders. This research seeks to better understand the spaces for collaboration amongst different levels of government—including local, regional and national—as well as utilities and other relevant stakeholders, in order to strengthen the collective approach to improve energy access and alleviate energy poverty. Where data was available, the research considered a diversity of perspectives and provides a global snapshot. However, it is important to consider that energy poverty expresses itself most visibly in local communities and energy access is progressed in unique political economies and contexts.

[1] Global Covenant of Mayors (2022). Energy Access and Poverty Pillar (EAPP) Annex Common Reporting Framework.

1.2 Approach

The research aims outlined above were explored through the following data collection approaches. Information obtained from the literature review and survey have been integrated to generate consolidated insights and findings throughout the report.

- A literature review of global advocacy, case studies and academic research on energy access and energy poverty
- An online survey and data analysis of 74 GCoM signatories on their barriers, local government powers and initiatives in improving energy access and alleviating energy poverty
- Case study deep dive into energy access and energy poverty issues within Cape Town, supported by stakeholder interviews [Section 4]

This report therefore starts by exploring the role of local governments in advancing energy access and addressing energy poverty in cities. It then reflects on the areas of energy access in which local governments face barriers, and how these barriers are presented. Next, the governance and power structures that shape local governments' ability to influence the urban assets that relate to energy access and energy poverty are explored, including the relationship between multiple levels of government and the private sector. Finally, useful approaches for energy access planning and governance are presented; mapping the levers currently being used by local governments to overcome barriers and mainstream energy access solutions.

1.3 A note on 'lived experiences' of energy poverty and limited energy access

Since its introduction in 2019, the CRF has provided guidance and vocabulary for data, action and advocacy in global city climate action. It has also demonstrated the multi-disciplinary approach and impacts of climate action. Whilst aspects of EAPP are closely related to other parts of the CRF (for example on Renewable Energy Sources), the focus on energy poverty—or lack of energy access—is somewhat unique in its approach. Other indicators capture a city's context via its socioeconomic activity, adaptation capacity, political economy, and policy mechanisms—for the purposes of understanding where targeted action has produced maximum impact and co-benefits. In contrast, energy poverty is a direct expression of deprivation in a city's every-day life. It is at once context *and* impact experienced by individuals, households, and communities.

This research aims to complement the existing indicators within the EAPP by exploring energy access and energy poverty with the lens of lived experience. It seeks relatable expressions and experiences of energy poverty, that are contextual yet allow patterns to be found and addressed.[2] Introducing a focus on lived experience allows us to question what structures could improve energy access—or address energy poverty—and enable people's access to their city's economic, social, and cultural opportunities.[3]

This adds contextual nuance to the EAPP's indicators and targets, while unpacking the lived meanings of the data. From a systemic perspective, households and individuals' interactions with energy supply and billing systems point to the infrastructural, technological and policy solutions that local governments can implement or advocate for.[4] At the community level, lived experiences of energy poverty's consequences provide qualitative data for local governments to tailor projects and socioeconomic support.[5]

[2] McIntosh, I. and Wright, S. (2019). Exploring what the notion of 'lived experience' offers for social policy analysis.
[3] Heredia, M.G. et al. (2022). Mainstreaming a gender perspective into the study of energy poverty in the city of Madrid.
[4] Filippidou, F. et al. (2019). Mapping energy poverty in the EU: policies, metrics and data.
[5] Heredia et al., Mainstreaming a gender perspective into the study of energy poverty in the city of Madrid.

	Secure Energy	Sustainable Energy	Affordable Energy
Definition	Energy is accessible and/ or reliable—enabling access to economic, social and cultural engagement	Energy is generated from renewable and non-pollutive resources—avoiding negative health, social and gender consequences	Energy is affordable and/or building stock is energy efficient to maximise value of expenditure—enabling energy applications for economic, social and cultural opportunities
EAPP CRF targets[7]	• Increase average duration of available electricity • Increase % of population or households with electricity access • Improve annual average energy consumption per capita, without affecting the level and quality of use	• Increase installed renewables capacity • Increase total renewable energy generation • Increase renewable energy consumption • Transition source mix of energy for heating & cooling, and cooking	• Reduce % of population or households that face energy poverty • Increase building energy efficiency
Example of lived experience	While 86% of urban Myanmese households are grid-connected, service quality is often worse than rural connections due to the overwhelming demand for energy in urban areas, which out-strips grid capacity. Grid connections are often supplemented by batteries to cope with voltage fluctuations during monsoon season.[8]	Sustainable energy transition is not usually an immediate and single-step transition; households in Mozambique and Togo without electricity access rely on multiple energy sources, including biomass, for different applications and to provide redundancy in supply.[9]	Understanding in Central and Eastern Europe is complex, because poverty indicators are relative to national and international benchmarking, while self-assessments such as 'ability to keep one's home warm' are individually subjective.[10]
Consequence of energy poverty	Community, small and medium enterprises, and local government operations are impacted by lack of reliable energy services (Jordanian survey respondent)	Low air quality due to pollutant by-products of thermal power plants (Ukrainian survey respondent)	Disproportionate impact on households unable to participate in energy efficiency or clean energy programmes, as level of electrification and energy prices increase (USA survey respondent)

Table 1 Relevant definitions, means of data collection and contextual information about energy access and energy poverty[6]

[6] The research process uncovered a great diversity of definitions for both energy access and energy poverty; across academic research, white papers and local/ national government policy, and case studies from implemented community projects. Each definition was slightly different from the other, and it was necessary to unpack and articulate the specific context in which the definition had been produced, shaped by a local political economy, circumstances of energy procurement, generation, and distribution, and urban energy context. In subsequent analyses, therefore, exploring the definition of energy access and energy poverty considered the political and socioeconomic narratives that are produced and reinforced by its vocabulary and phrasing.

[7] GCoM. Energy Access and Poverty Pillar (EAPP) Annex Common Reporting Framework.

[8] Aung, T. et al. (2022). City living but still energy poor: Household energy transitions under rapid urbanization in Myanmar.

[9] Mahumane, G. and Mulder, P. (2022). Urbanization of energy poverty? The case of Mozambique.

[10] Karpinska, L. and Śmiech, S. (2020). Invisible energy poverty? Analysing housing costs in Central and Eastern Europe.

2. The role of local governments

Given the very local experience and consequences of energy access and energy poverty, it is a pressing concern for local governments. This research has explored why local governments are important to addressing these issues, the challenges they face, and the opportunities they have to act within their powers and capabilities.

2.1 Why local governments are central to improving energy access

Ownership of the collection, analysis, and communication of data

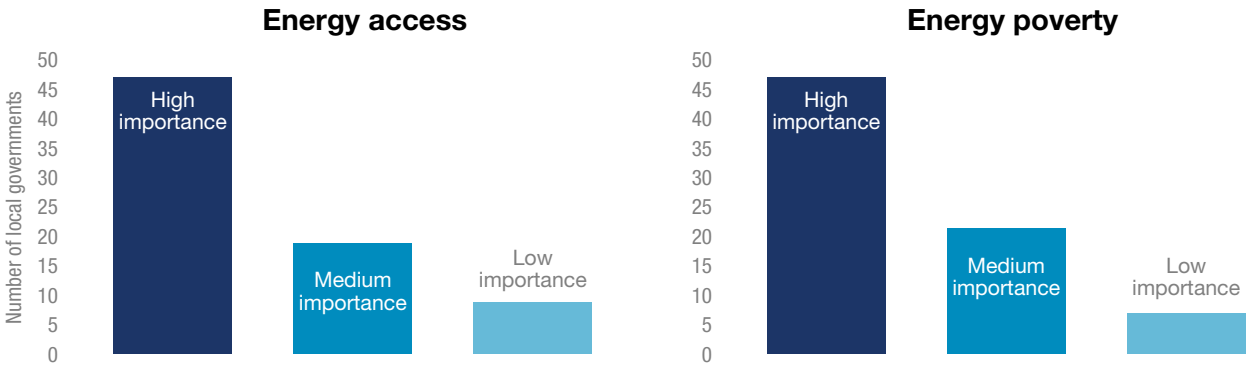

Figure 1 Survey respondents' self-identification of the extent to which energy access and energy poverty are priorities for their cities

Over 40 local government respondents (Figure 1) out of 74 identified that energy access and energy poverty are of high importance in their city's priorities. Many local governments have ownership of the collection, analysis and reporting of different forms of local socioeconomic data. This is an area of both accountability and opportunity: how can data be aggregated and communicated in sensitive and constructive ways? How can data collection involve the local community more directly in sharing their lived experiences?[11] How can data be used to coordinate local stakeholders on solutions for energy access and energy poverty, and advocate for policy and programmes with regional and national governments?[12]

As with many other forms of deprivation, much of the literature points out that a fundamental challenge in addressing energy poverty and improving energy access is the lack of a cohesive vocabulary across socioeconomic, meteorological, cultural, and other contexts. Without this to describe lived experiences of energy poverty, it is often lost in the mix of wider political discourse;[13] despite being flagged as high priority for local governments. In many policies, frameworks, and white papers, improving energy access is framed as a co-benefit of wider emissions reduction or climate adaptation actions. This also—as with many other forms of deprivation—does not expose structural and systemic causes of insecure, unsustainable, and unaffordable energy. In some political economies, ignoring inequitable structures can produce narratives that individuals are solely responsible for their lack of energy access.[14] The way data is used and framed in local governments' analysis and communications therefore has great influence: in how energy poverty and the communities experiencing it are perceived, discussed, and supported.

[11] Sheridan, D. et al. (2020). Voicing the urban poor: experience from an energy justice program for and by slum dwellers.
[12] Sareen, S. et al. (2020). European energy poverty metrics: Scales, prospects and limits.
[13] Bouzarovski, S. and Petrova, S. (2015). A global perspective on domestic energy deprivation: Overcoming the energy poverty–fuel poverty binary.
[14] Simcock, N., Frankowski, J. and Bouzarovski, S. (2021). Rendered invisible: Institutional misrecognition and the reproduction of energy poverty.

Proximity to local contexts, narratives and lived experiences

Much of the literature highlighted how energy poverty is a form of deprivation that expresses itself in specific local ways.[15] Local climate conditions dictate the type of energy application needed; for example where people prioritise heating in cool climates and cooling in hot climates, and alter their provision based on thermal comfort requirements in their home, heavily influenced by affordability.[16] In Busan, South Korea, type of housing stock—particularly older detached houses for low-income households—was a major factor in needing more energy for heating.[17]

In addition, sociocultural identities and wider economic contexts intensify the experiences and consequences of energy poverty. In Sydney, Australia, elderly people coping with healthcare and food costs choose not to cool their homes; resulting in overlapping stressors of thermal discomfort, food insecurity, and social isolation of not being able to provide a hospitable environment for visitors.[18]

Lebanese survey respondents highlighted how the nation's financial crisis and currency devaluation not only causes the national grid energy supply to be rationed to 2-4 hours per day, but also exacerbates households' ability to afford alternative fuels to supplement their needs. Without sustainable and low-carbon alternatives, increased reliance on liquid or gas fuels at home also results in negative air quality and health consequences. One Lebanese local government also shared that the unavailability of sustainable and low-carbon energy impacts local agriculture, water quality and biodiversity. This gives us the sense of the multidimensional consequences of energy poverty in people's every-day lives, and conversely the opportunities in facilitating energy access.

Local governments have the greatest proximity and access to such communities, households, and individuals, especially compared to regional and national governments working across large geographical areas. In their operations and services, local governments understand how people interact with energy suppliers, infrastructure, and tariffs. They can uncover local expressions of energy poverty that is produced by individuals' socioeconomic and cultural identities, contexts, and challenges.

Responding to local needs and priorities

Both these factors mean that local governments are well-placed to be both innovative and effective in designing energy access solutions. The combination of local governments' vision with contextual data has great potential for targeted interventions that address real-life challenges. It is also an opportunity to co-produce knowledge, technical skills, and benefits for a diversity of city stakeholders.[19] Finally, it balances the ownership of action—instead of the responsibility solely on local governments' policies and infrastructure or individual energy consumption choices.

Zhytomyr City Council, Ukraine, runs programmes to improve centralised heating technology, co-finance energy efficiency upgrades for homes, and provides training for neighbourhood leaders. This demonstrates the combination of city infrastructure and consumer-level interventions to make energy access more affordable.

[15] Zhou, K., Wang, Y. and Hussain, J. (2022). Energy poverty assessment in the Belt and Road Initiative countries: based on entropy weight-TOPSIS approach.
[16] Thomson, H. et al. (2022). Understanding, recognizing, and sharing energy poverty knowledge and gaps in Latin America and the Caribbean – because conocer es resolver.
[17] Kim, H., Kwon, Y. and Choi, Y. (2022). Determinants of Electricity Consumption of Energy-Vulnerable Group Using Ensemble Gradient-Boosting Algorithm.
[18] Porto Valente, C., Morris, A. and Wilkinson, S.J. (2022). Energy poverty, housing and health: the lived experience of older low-income Australians.
[19] Heredia et al., 'Mainstreaming a gender perspective into the study of energy poverty in the city of Madrid'.

2.2 The limitations and challenges of local governments

Despite being very aware of and committed to facilitating energy access and addressing energy poverty, many local governments come up against specific barriers in their planning and implementation. Mapping and analysing their barriers enable us to understand how and why local governments' planning—and the efficacy of their efforts—might be limited.

In the survey, respondents were asked whether various energy themes were relevant to their city's energy access and energy poverty challenges (Figure 2). This gave us an overall view of local governments' focus areas.

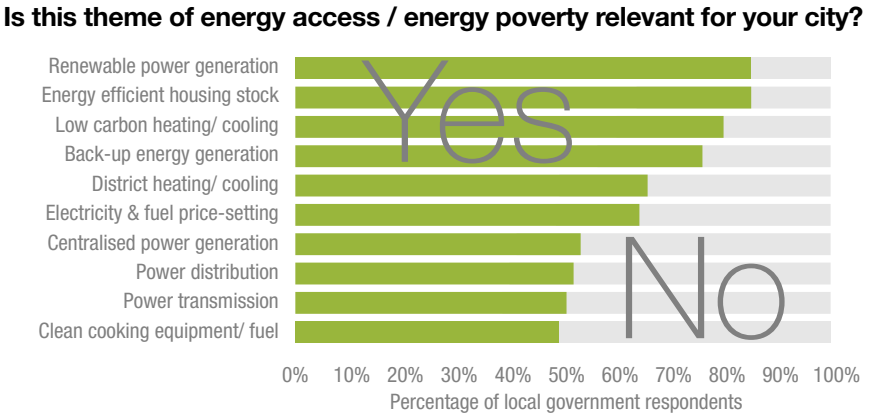

Figure 2 Is this theme of energy access / energy poverty relevant to your city?

The most relevant themes across all survey respondents were:

- Renewable power generation
- Energy efficient housing stock
- Low-carbon heating/cooling
- Back-up energy generation

Respondents then indicated the relevant barrier(s) that they experience in progressing each theme of energy access, as tallied in Figures 3 and 4.

Across the board, lack of *financing* was the most common barrier. In the aspects of facilitating energy access that most respondents considered relevant, many local governments faced barriers (Figure 3) in their *institutional capacity and structure*, navigating sectoral *policy landscapes*, and *engagement and collaboration* with other stakeholders. This could be in the direct availability of stakeholder resources and networks to coordinate action,[20,21] complex policy mechanisms to navigate in realising solutions,[22,23] and lack of strong case-making to prioritise energy access programmes.[24]

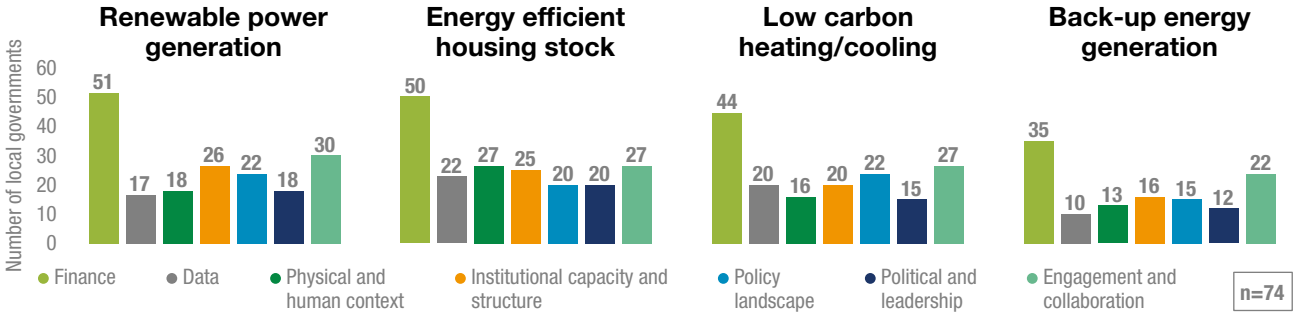

Figure 3 Barriers named by respondents as most significant for key energy access themes

[20] Global Covenant of Mayors (2021). Understanding Data and Tools to Accelerate City Climate Action: A Decision-Making and Tools Project White Paper.
[21] UK100 (2021). The powers local authorities need to deliver on climate.
[22] GCoM, Understanding Data and Tools to Accelerate City Climate Action: A Decision-Making and Tools Project White Paper.
[23] Anuga, S.W. and Njenga, N. (2022). Why does an African interpretation of energy poverty matter? A note for Sub-Saharan (SSA) energy policy actors.
[24] GCoM, Understanding Data and Tools to Accelerate City Climate Action: A Decision-Making and Tools Project White Paper.

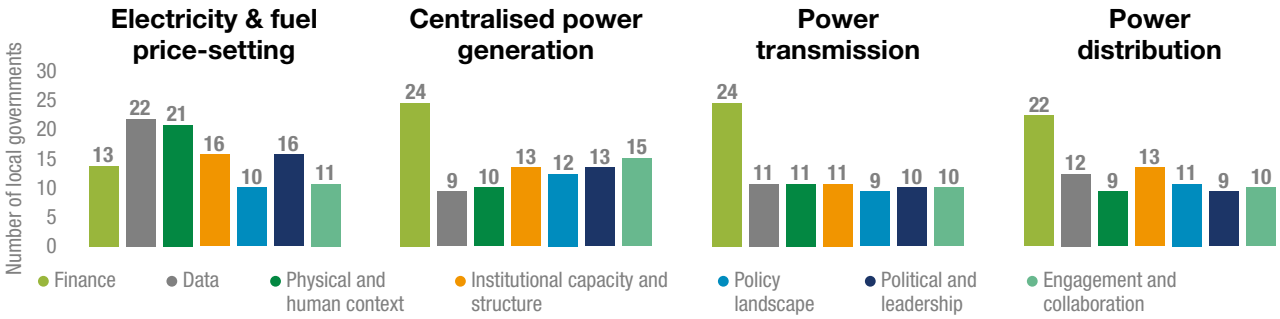

Figure 4 Barriers named by respondents as most significant to other notable energy access themes

Notably, some of the lower ranking themes around central energy assets and functions presented interesting barriers profiles (Figure 4). In price-setting for electricity and fuel, respondents highlighted different challenges in *data* and *physical and human context*. This indicated that—while *institutional capacity* and *political leadership* are still important—quantitative and qualitative information is crucial for tariffs to be grounded and responsive to lived experiences of city communities.[25] Comparing the profiles for power generation, transmission, and distribution also gave an understanding of the respective focuses needed to address the relevant infrastructure and stakeholders. Centralised power generation showed challenges in coordinating coordinated action with national government bodies and utilities on improving generation capacity and transition of generation sources to renewables.[26] On the other hand, barriers around institutional capacity and data quality to facilitate targeted and efficient grid connection were cited more often in power transmission and distribution.[27]

These barrier categories and the analyses were useful to collate and group the challenges that local governments' experience. They are however a momentary snapshot of a subset of local governments, to kick-off the necessary conversation. For example, the lack of 'relevance' indicated by local governments of energy generation, transmission, distribution, and pricing prompts a deeper question. Given how critical these themes are in promoting secure and affordable energy access, are the 'not relevant' responses informed by local governments' relative disempowerment in these areas? It prompts a deeper reflection for themes that are often the domain of higher levels of government.

To further analyse and address these barriers, we need to differentiate in what ways they are overt and tangible experiences of political gatekeeping, and implicit narratives of what is—and is not—possible. One approach to this is unpacking the powers local governments possess or lack in the various aspects of facilitating energy access. This gives us a sense of the very real boundaries in local governments' efforts in their energy access policy and programmes.

[25] Olawuyi, D.S. (2020). Energy Poverty in the Middle East and North African (MENA) Region: Divergent Tales and Future Prospects.
[26] Coalition for Urban Transitions (2021). ZERO CARBON CITIES BY 2050: Mitigation potential by sector and level of government in six key countries.
[27] Palermo, V. et al. (2022). The Covenant of Mayors in Sub-Saharan Africa: in depth analysis of sustainable energy access and climate action plans.

2.3 Local government powers in relation to improving energy access and alleviating energy poverty

The extent of local government powers over the urban assets and functions that are important to support good energy access and alleviate energy poverty vary strongly by national context and across asset type. The powers section of the online survey sought to develop an understanding of the varying ability of local governments to influence these urban assets and functions—to better understand the opportunities available to enact change. Local government influence was explored through the lens of their 'powers' under the dimensions identified in Table 2, building on previous work on city powers to drive climate action.[28,29]

Power dimension	Description
Set vision & policy	The ability to establish the overall vision, goals, strategies, and policies relating to the asset
Own/operate	The ownership or responsibility to operate the asset
Set regulation	The responsibility for establishing regulation to govern assets and pricing
Enforce regulation	The responsibility for enforcing regulation that governs assets and pricing
Control budget	The ability to control or establish the budget for the asset

Table 2 Local government power definitions

2.3.1 Local government power signatures

Respondents reported on who holds responsibility for each asset relating to energy access listed in Appendix A (e.g. local renewable power generation, power distribution network, energy efficient housing stock etc.), choosing all that apply between 'local government', 'regional or metropolitan government', 'national government', 'private sector' and 'other'.

Figure 5 summarises the most common power 'signatures' across all assets, ranked by frequency, where scores of '0' signify that the local government has no influence for a given dimension of power for the asset, '1' indicates that the local government has shared powers with another entity, and '2' indicates that the local government holds sole powers. Note that in these figures, 'n' refers to the number of instances respondents identified the power signature across all assets, where the total number of responses across assets = 785. These six power signatures together represent approximately 70% of all 785 responses across the 14 assets and functions listed in Appendix A (Table 2). The remaining 30% of responses were distributed across a further 28 distinct power signatures, each reported 15 times or fewer across assets (with 17 of these power signatures being reported 5 times or fewer). These power signatures largely reflect different combinations of 'shared powers' and 'no powers' across power dimensions. This indicates that for most types of assets relating to energy access and energy poverty, the respondent local governments feel they have relatively little influence in general, compared with other key stakeholders such as national government.

[28] C40 Cities and Arup (2015). Powering Climate Action Cities as Global Changemakers.
[29] C40 Cities (2022). Powering inclusive climate action in cities.

Where they do hold influence, it is more likely to be constrained to the ability to set vision and policy for that asset, instead of the more direct forms of influence such as ownership and operational, regulatory, or budgetary powers. The notable exception here is the 25 instances where local governments identified a sole ability to influence assets across all five dimensions of power; these responses were from local governments located in Middle East & North Africa and Eastern Europe & Central Asia (see Figure 8).

The most common power signature by a significant margin is 'No powers' (Figure 5, A), representing 46% of all recorded power signatures across assets, the case in which respondents identified all dimensions of power reside fully within the control of non-local government entities. Beyond this, respondents most often report shared or sole powers in setting vision and policy. This is either identified as the only dimension of power in which local government holds influence (in the case of B) and D)), with the addition of power to enforce regulation in F). The third and fifth most common powers signatures indicate uniform powers across all dimensions (reflecting uniformly shared powers in the case of C) and sole powers in E)). Note that responses related to tariff and pricing responses have not been included, as they only relate to regulation related power dimensions and therefore do not have full power signatures.

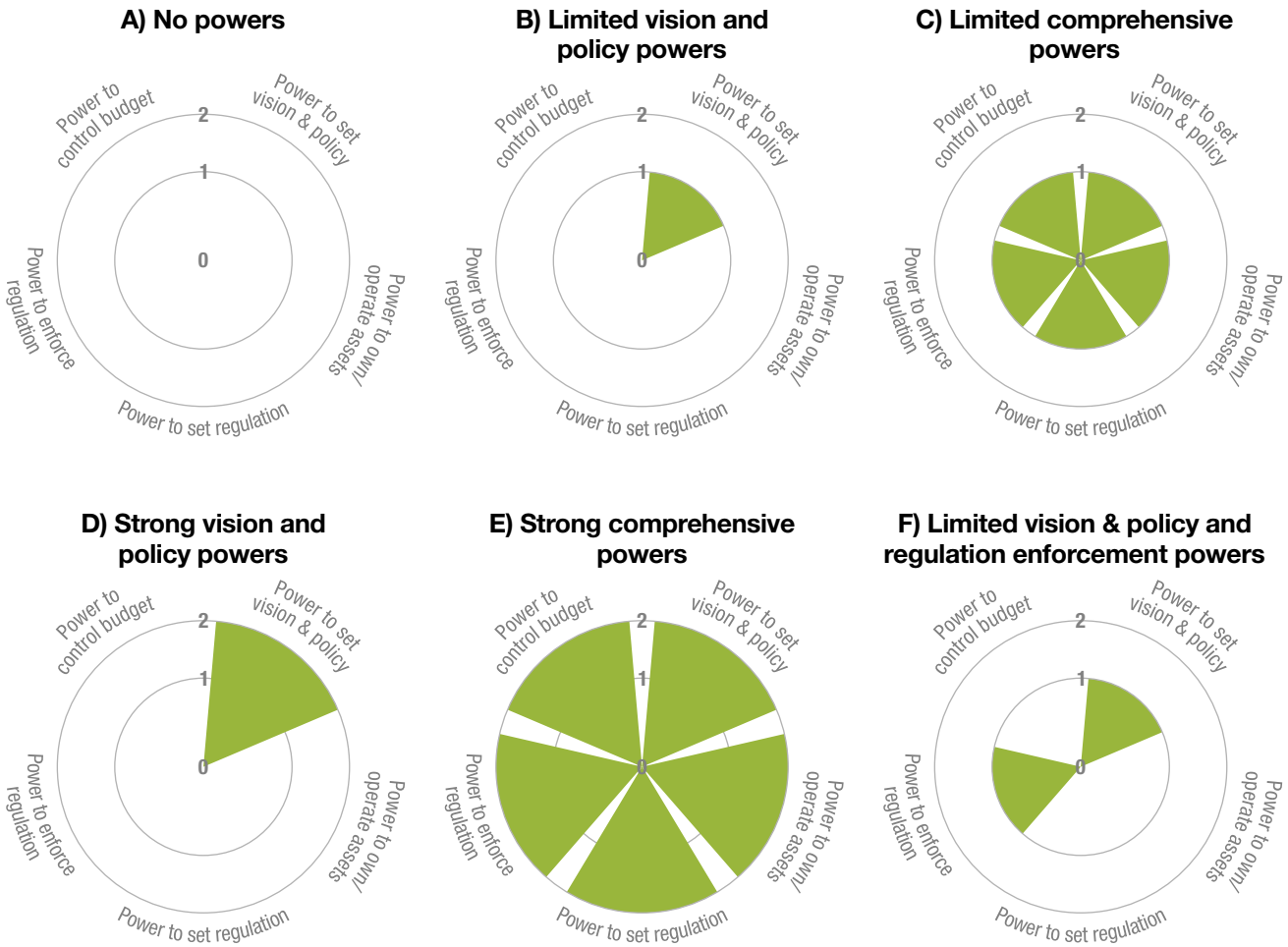

Figure 5 Most prevalent power signatures across all survey responses. Scores of '0' signify that the local government has no influence for a given dimension of power for the asset, '1' indicates that the local government has shared powers with another entity, and '2' indicates that the local government holds sole powers. The total number of responses across assets = 785

Figure 6 summarises the number of times each of the above power signatures was reported, highlighting that the majority of responses indicate that the local government state they hold no powers over the assets and functions relating to energy access and energy poverty.

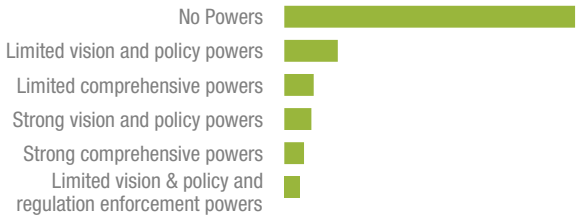

Figure 6 Summary of response frequency for most frequently reported power signatures

Figure 7 shows a breakdown of each of the above six common power signatures by the asset types they are recorded for. Respondents most frequently report the 'No powers' signature for power transmission, centralised power generation and power distribution assets (Figure 7 A)). Looking at the assets for which local government report the strongest powers (i.e. sole powers across all dimensions in Figure 7 E)), these most commonly relate to renewable energy generation, low carbon heating and cooling assets, and back-up energy generation.

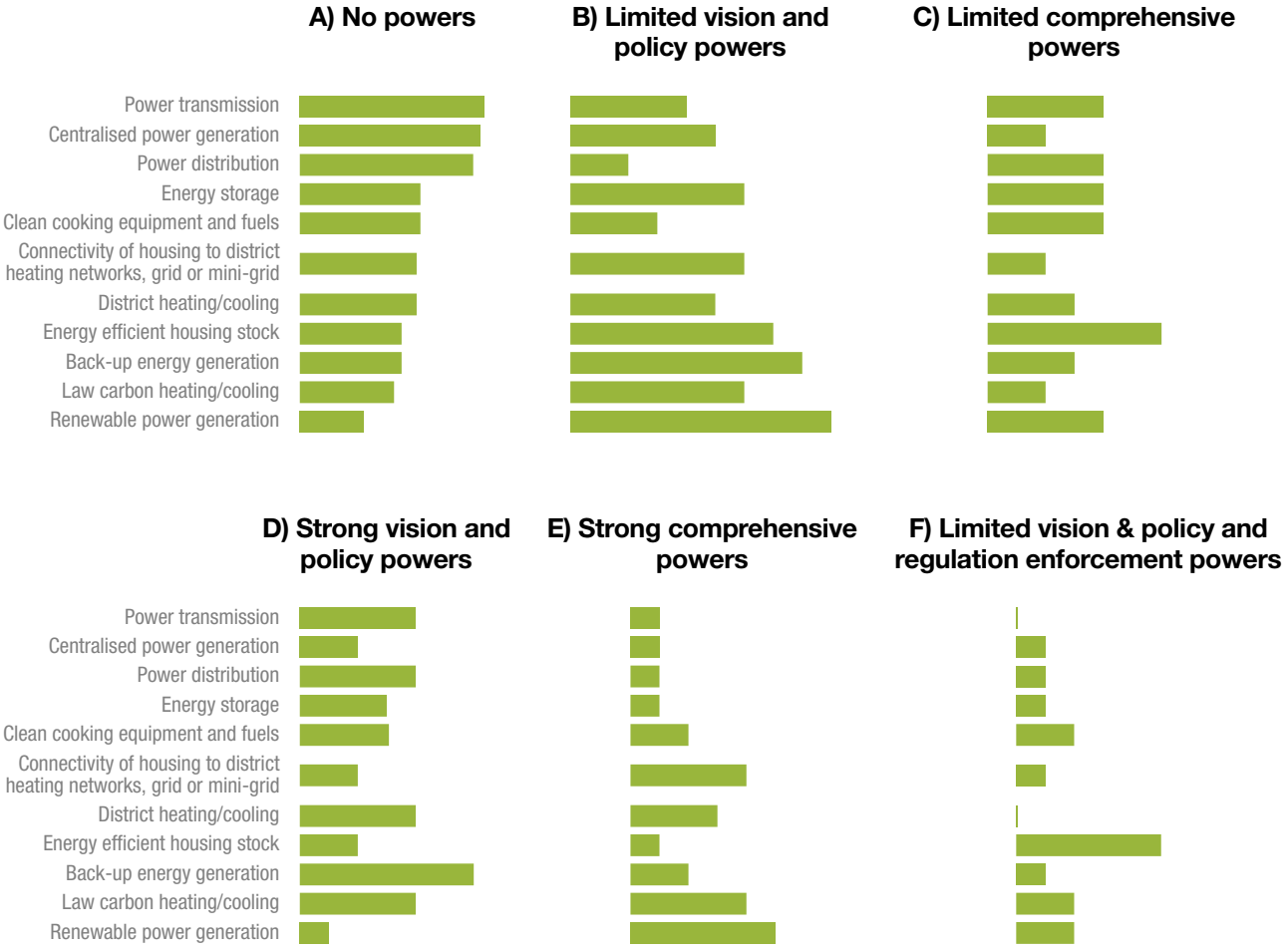

Figure 7 Breakdown of power signatures by asset type

Figure 8 provides an indication of how these power signatures vary by region, where values have been normalised against regional response rate, and response rates for each region are given in brackets within the legend. Note that responses reflect the perception of the local government respondents' influence over the assets and functions that relate closely to energy access and energy poverty.

Responses with strong comprehensive powers across assets are split between the Middle East & North Africa region and the Eastern Europe & Central Asia region. Regional shares across other power signatures indicate a more varied picture, though Sub Saharan Africa, Latin America & the Caribbean and Oceania in particular appear to record responses amongst the weaker power signatures.

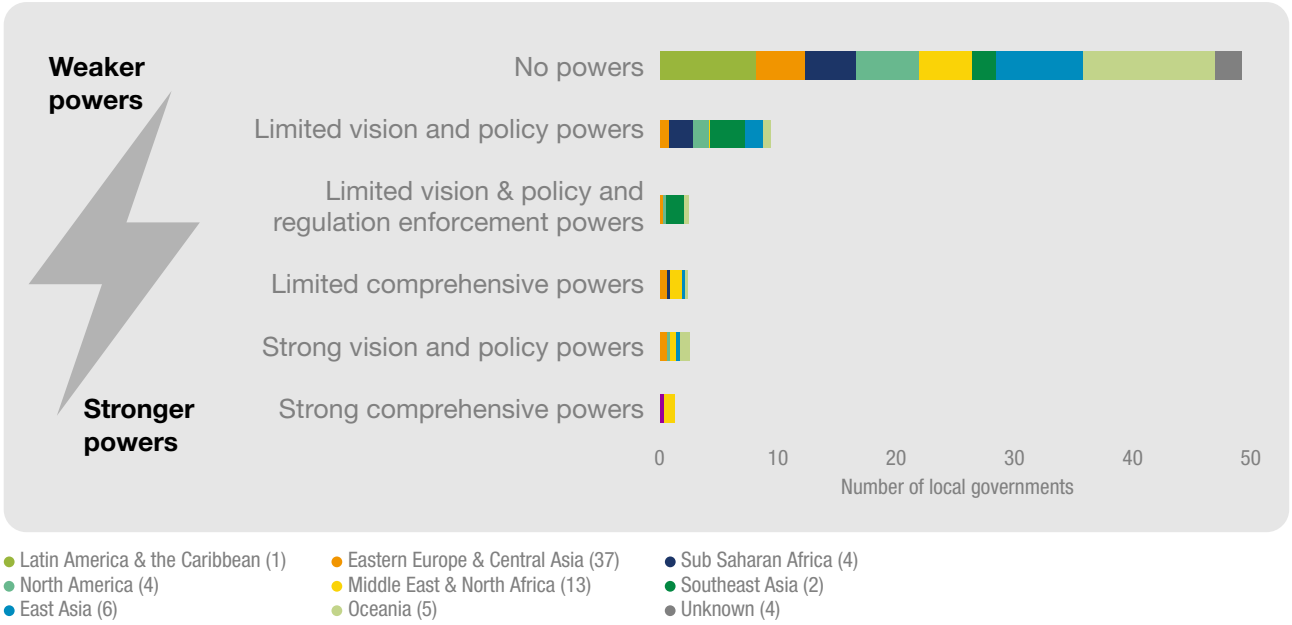

Figure 8 Indicative breakdown of power signatures by region. Note that values have been normalised against the number of responses per region to offset disparity in geographical response rates.

The vast majority of respondents and the urban communities they represent identified different power signatures for different asset types, for example demonstrating regulatory powers for certain asset types and not others. However, for a selection of urban communities, respondents reported consistent power signatures across all asset types, indicating that these signatures generally reflect the local government's powers across assets relating to energy access and energy poverty. Considering the six power signatures identified in Figure 7, 22 cities reported 'No powers' A) across all assets[30], 2 cities reported 'Limited comprehensive powers' C) across all asset types[31], and 1 city reported 'Strong comprehensive powers' E) across all asset types[32]. The remaining power signatures 'Limited vision and policy powers' B), 'Strong vision and policy powers' D) and 'Limited vision & policy and regulation enforcement powers' F) were not reported across all asset types for any respondent urban community.

[30] Zdolbuniv City Council (Ukraine), Konotop City council (Ukraine), Slavutytska City Council (Ukraine), Zhytomyr City Council (Ukraine), Korosten city council (Ukraine), Mingachevir Municipality (Azerbaijan), Nizami rayon municipality of Ganja city (Azerbaijan), Mayor's Office Mun. Ceadir-Lunga (Moldova), Cimislia City Hall (Moldova), Local administration of Ijevan community Tavush region (Armenia), Stepanavan Municipality (Armenia), Kazbegi Municipality (Georgia), Kimotsuki Town, Kagoshima Prefecture (Japan), Esteban Echeverria (Argentina), Union of Eastern Baalbek Municipalities (Lebanon), Bishmizzine municipality (Lebanon), Municipality of Zarqa (Jordan), City of Chicago (USA), City of Melbourne (Australia), Mairie de Cocody (Ivory Coast)

[31] Novobuzky City Municipality (Russia), unknown (State of Palestine)

[32] Municipality of Menjez (Lebanon)

2.3.2 Share of powers across government and private sector

Figure 9 provides a broader look at the government and private sector entities reported to hold power, for those assets identified by respondents as being particularly critical in their efforts to address energy access and energy poverty (see Section 2.2).

Across these assets—which reflect trends across other assets more widely—national governments are reported to hold particularly strong regulatory powers and budgetary powers, whereas local governments self-identify as influencing vision and policy to a greater extent. The private sector is reported to hold stronger own/operate powers—particularly in the case of local renewable power generation—and vision and policy powers than regulatory powers, however this appears to vary by asset type. The influence of regional and metropolitan level government appears mixed, though with apparent stronger influence over back-up energy generation than other asset types.

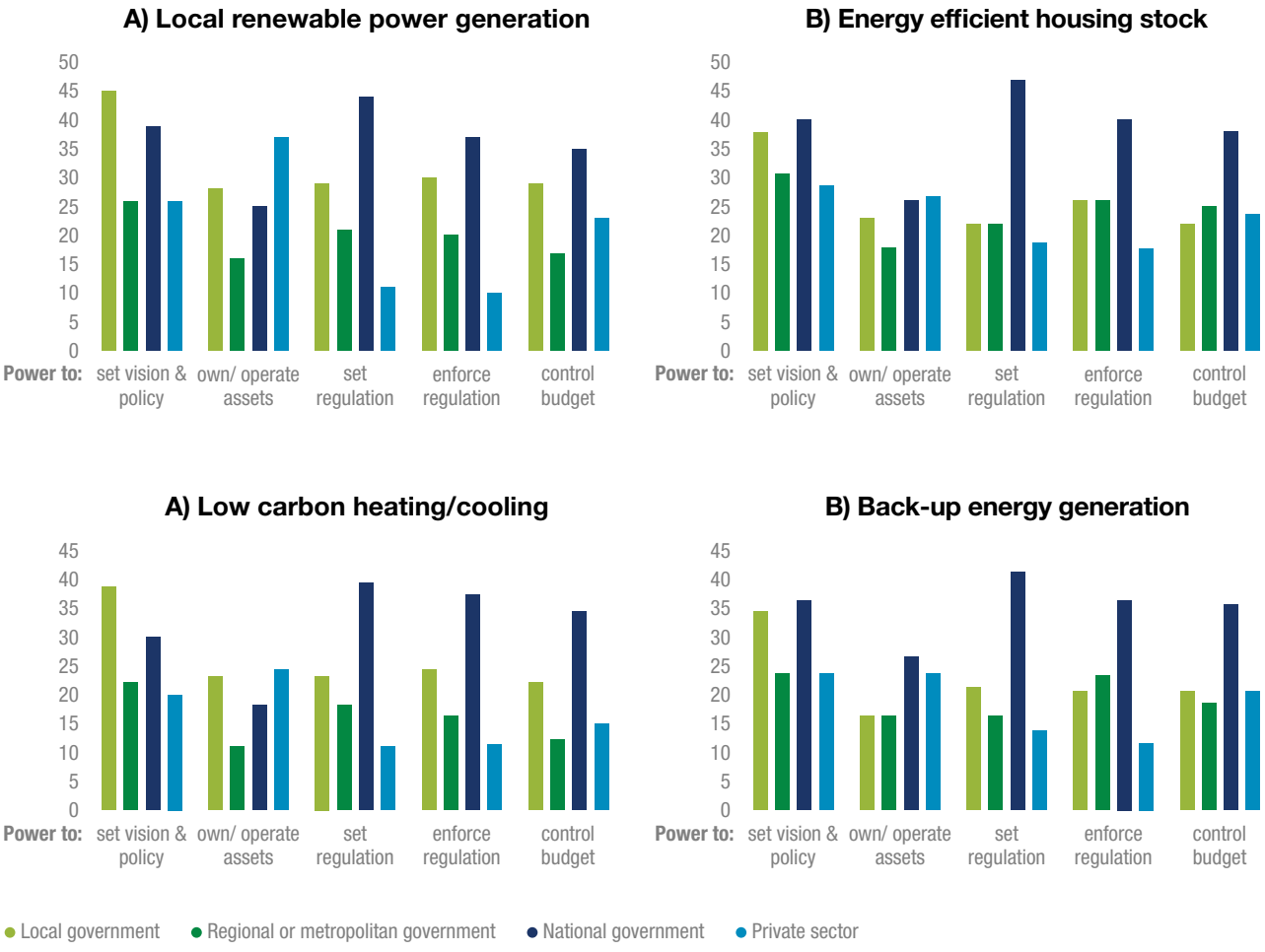

Figure 9 Breakdown of local and higher tier government and private sector powers, for the assets identified as most critical for energy access (see Section 2.2). Values indicate the number of times each entity was reported to hold power over the given asset across all survey responses.

Online survey responses from urban communities within Middle East & North Africa (MENA, n=13) and Eastern Europe & Central Asia (EECA, n=37) were numerate enough to allow a regional breakdown of powers for those assets identified as posing particularly significant barriers to energy access, which can be found in Appendix B. Remaining regions all had 6 or fewer responses.

3. Local government levers

3.1 The approaches for overcoming barriers to energy access

Mapping the city climate action journey against energy access and poverty action levers

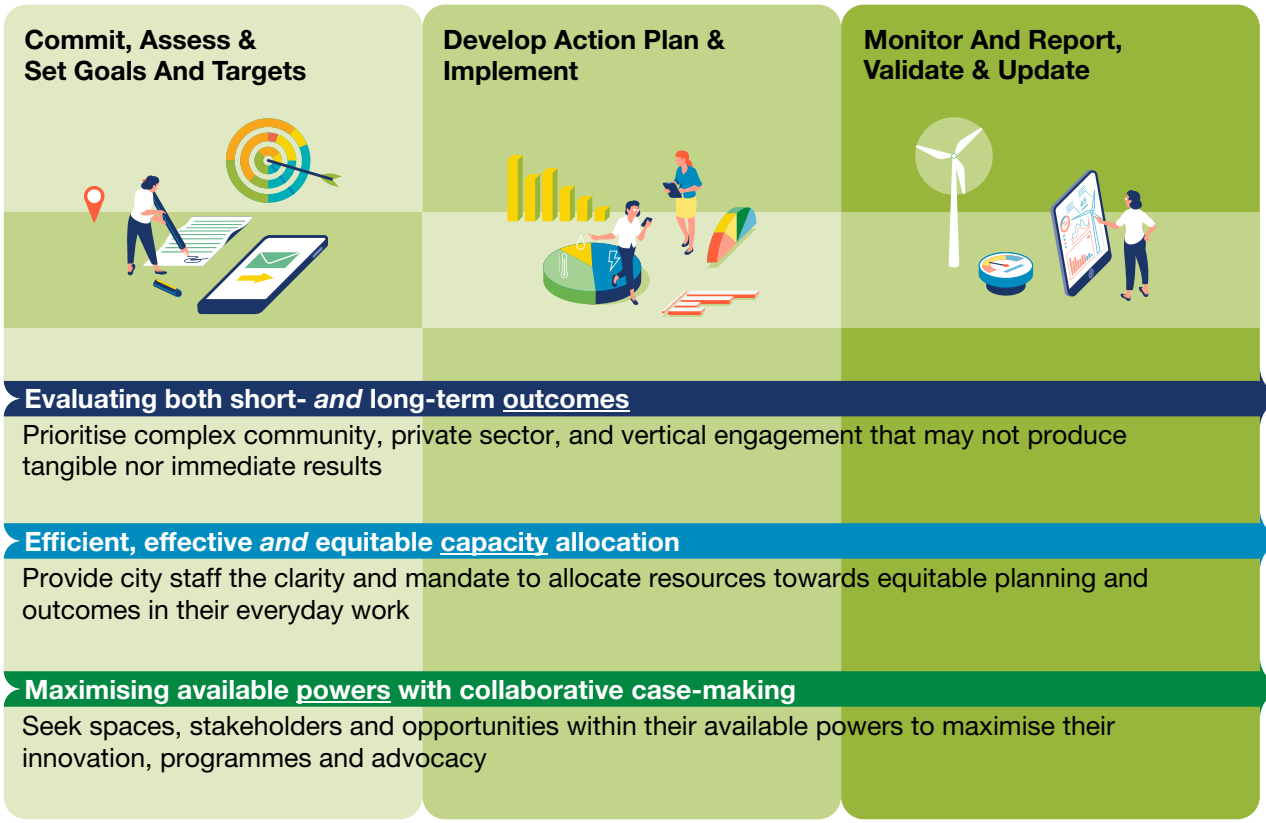

Figure 10 Approaches to overcome barriers to energy access, mapped against extent of mainstreaming these approaches in local governments' City Journeys a mechanisms outcomes

Analysis of both the role of local governments, the barriers they face, and the powers that they possess, share, and lack has pinpointed a few areas where they can focus their efforts. Local governments can use three approaches to address their barriers to energy access (Figure 9). These approaches can be iteratively and increasingly mainstreamed in governance, policies and programmes, and reporting; from doing initial status appraisals, to embedding in vision, goals, and targets, and ultimately energy access actions and outcomes in communities. The approaches also overlap and reinforce each other—serving not only communities' increased energy access, but also other local government priorities in sustainability, social equity, and beyond.

Evaluating short- *and* long-term outcomes

This first shift is in extending the time horizon for the evaluation of policies and programmes to facilitate energy access. Many local government visions and programme KPIs are relatively short term; pegged to leadership turnover or project financing cycles. While this is a necessary bureaucratic feature for a local government's administration and operations, this could sometimes lead to a focus on short-term outcomes. The complex community, private sector, and vertical engagement to understand and address energy poverty may not produce tangible nor immediate results, making it difficult to justify and prioritise.

Giving space for longer-term outcomes and impacts of any policy, programme or enabling action would allow local governments to move from one-size-fits-all solutions to innovative and contextual ones. Progressively building this into the local governments' vision, operations and programmatic KPIs, and the implementation of policy and projects would empower them to build a strong methodology for engagement and design for effective solutions "emerging from and required by a specific context."[33]

Efficient, effective, *and* equitable capacity allocation

The second paradigm shift reinforces the first, by creating ways for local governments to vision and resource their solutions to improve energy access via justifiable and transparent processes.[34] Local governments have administrative processes to ensure their human and financial resource allocation is efficient and effective, but many do not factor in the considerations and potential benefits of energy access and other social equity themes. This not only needs to be written into local governments' vision statements but mainstreamed in all aspects of their operations—so that city staff have the clarity and mandate to make equitable planning and outcomes part of their everyday work.

Incorporating methodology for determining how resource allocation addresses energy poverty and other forms of deprivation[35] would allow local governments to dedicate resources to long-term actions with less-tangible interim results. In the planning and implementation of policy and programmes, monitoring the efficiency, effectiveness and equity outcomes of action would support review and update processes with any interim progress, technical solution, or data updates.[36]

[33] Sheridan et al., Voicing the urban poor: experience from an energy justice program for and by slum dwellers.
[34] Olawuyi, Energy Poverty in the Middle East and North African (MENA) Region: Divergent Tales and Future Prospects.
[35] SEforALL (2022). The Role of End-User Subsidies in Closing the Affordability Gap.
[36] SEforALL (2022). Chilling Prospects 2022: Lessons learned from developing the India Cooling Action Plan.

Maximising available powers with collaborative case-making

The third shift is the most outward-looking, where local governments can seek spaces and opportunities within the powers available to them and relevant stakeholders to maximise their ability to innovate, implement and advocate for communities' energy access. Many local governments are familiar with aligning with or piggybacking existing policies and political priorities at the regional or national levels; [37] this is often effective but relies on the national political circumstances. Instead, reinforcing a creative and collaborative energy in local governments' vision, operations and delivered outcomes will help city staff make the most of available powers and policy mechanisms.

The new question for local governments to ask is how stakeholders with diverse yet relevant interests can be brought together to amplify the powers and voices of each.[38] Community-led data collection will build a quantitative and qualitative evidence-base: enabling incisive advocacy based on lived experiences while developing local energy access leadership.[39] Co-creation of programmes across local government bodies, the private sector, and community organisations also develop "context-based and need-specific energy solutions".[40] Sharing lessons-learnt and best practices on regional and global platforms will also allow local governments to identify transferable solutions or actions for their own energy poverty and energy access contexts.[41]

As seen in both the barriers and powers analyses, it is necessary to acknowledge that many aspects of realising energy access solutions are owned by national and regional government actors. Some local governments may experience a lack—or an active restriction—of national energy access ambition due to internal and external factors that are not transparent to citizens. It is however still important to align and piggyback policy and financing opportunities, build collaborative networks with private sector, academia and international organisations to inform national policy and programmes, and building data, analyses and advocacy across multiple local governments for effective case-making.

3.2 Levers

The approaches can be concretely demonstrated in the types of levers that local governments use to address energy poverty and advance energy access. The levers were organised in the following categories to structure the collation of literature, writing of survey questions, and synthesis in this report: *policies & regulation, stakeholder collaboration, internal capacity building & data collection, investment & securing finance,* and *city-led programmes*.

Local governments may use the above typology as a starting point to understand where they are in their energy access paradigm shift. They can then refer to the listed levers as potential actions to contextualise for application to their citizens' lived experiences and political economy of stakeholders—towards addressing the barriers to energy access that they encounter in their every-day. Each lever has been tagged in alignment to the three approaches, according to the categories and definitions in Table 3 below. This a general reference and is not a fixed indicator of applicability to local governments' contexts.

[37] ibid.
[38] ibid.
[39] Sheridan et al., Voicing the urban poor: experience from an energy justice program for and by slum dwellers.
[40] Ambole, A. et al. (2021). A Review of Energy Communities in Sub-Saharan Africa as a Transition Pathway to Energy Democracy.
[41] Olawuyi, Energy Poverty in the Middle East and North African (MENA) Region: Divergent Tales and Future Prospects.

The time horizon for which levers outcomes will be more visible and tangible	The level of demand on local government capacity and resources	Local government powers configuration that the lever will apply to and maximise
→ **Short-term** 1-3 years	● ○ ○ **Easy-win** Feasible with existing resources	ϟ ϟ ϟ **Sole powers** Local governments have sole authority
⟶ **Medium-term** 3-10 years	● ● ○ **Collaborative action** Includes engagement with internal & local stakeholders	ϟ ϟ ϟ **Shared powers** Local governments have sole or shared authority
⟶ **Long-term** More than 10 years	● ● ● **Extensive coordination** Includes engagement with regional & national actors	ϟ ϟ ϟ **Limited powers** Local governments have shared or no authority

Table 3 List and definitions of lever tags

3.2.1 Policies & regulation

Levers in this category are focused on establishing policies and regulation to enable local government interventions, private sector innovation, and community stakeholder development:

→ **Short-term horizon**
● ● ○ **Collaborative action**
ϟ ϟ ϟ **Shared powers**

Energy and climate action master planning
Masterplanning around energy access, community development and climate mitigation and adaptation to document and implement action design.

→ **Short-term horizon**
● ● ○ **Collaborative action**
ϟ ϟ ϟ **Sole powers**

Analyse climate risks and adaptive capacity
Mapping critical energy generation, transmission, and distribution infrastructure to form or update regulatory frameworks—in response to intensifying climate hazards and other global risks.

⟶ **Medium-term horizon**
● ● ○ **Collaborative action**
ϟ ϟ ϟ **Shared powers**

Establish legal and regulatory frameworks for financing and implementation of interventions
Within available local government powers provide legal and regulatory frameworks for private sector participation and investment: providing clear processes on how they can be involved in local technological and infrastructural interventions.

→ **Short-term horizon**
● ○ ○ **Easy-win**
ϟ ϟ ϟ **Shared powers**

Policy and programme design that speaks to lived experiences
To support case-making, facilitating energy access can also be framed in terms of socioeconomic benefits— e.g. improved air quality, health and educational outcomes, gender equity, household participation in economy, and more.

LOCAL GOVERNMENT IN ACTION

Bethlehem Municipality, Palestine
The municipality has drafted their 2030 Energy Plan which includes regulations in housing policies for more efficient energy consumption and renewable energy projects.
Taken from the survey and data analysis conducted for this report.

3.2.2 Stakeholder collaboration

Local government actions to engage with communities, the private sector, as well as other tiers and branches of government towards data collection and implementing energy access solutions:

→
Short-term horizon
● ○ ○
Easy-win
ϟ ϟ ϟ
Limited powers

Community-led data collection programmes
Facilitate the collation and documentation of both quantitative and qualitative data of lived experiences, led by local leaders and residents.

→
Short-term horizon
● ● ○
Collaborative action
ϟ ϟ ϟ
Sole powers

Co-design solutions with local communities that speak to specific contexts and needs
Embed analytical and stakeholder engagement steps in the policy and programme design processes to ensure they are informed by and apply to specific lived experiences in communities and households.

⟶
Medium-term horizon
● ● ○
Collaborative action
ϟ ϟ ϟ
Sole powers

Engage with private sector and academia
Tap into private sector and academic know-how to design technical solutions, and implement projects, and provide community training opportunities.

⟶
Long-term horizon
● ● ●
Extensive coordination
ϟ ϟ ϟ
Shared powers

Transparent and documented processes
Ensure clear documentation and public communication of policy, regulation, and programme design to encourage local education and ownership of interventions and outcomes.

⟶
Medium-term horizon
● ● ●
Extensive coordination
ϟ ϟ ϟ
Limited powers

Engage with national and regional energy access actors
Connect with national and regional bodies and energy supplier to advocate for infrastructural, legislative, or financial solutions.

→
Short-term horizon
● ● ○
Collaborative action
ϟ ϟ ϟ
Limited powers

Coordinate stakeholders and data for national engagement
Connecting and facilitating local and regional stakeholders to make a concerted case for implementing national actions.

LOCAL GOVERNMENT IN ACTION

Tweed Shire Council, New South Wales, Australia
Promotes smart housing design, energy efficient fixtures and behaviour, and renewable power generation through community workshops, events, and online resources.
Taken from the survey and data analysis conducted for this report.

3.2.3 Internal capacity building & data collection

Levers to increase the technical and resource capacities of local governments, as well as establishing clear monitoring, evaluation and reporting—to make the case for local intervention and national government advocacy:

→
Short-term horizon
● ● ○
Collaborative action
ϟ ϟ ϟ
Shared powers

Central working group for energy access
Create and mandate a single coordinating municipal entity to lead ownership, coordination and buy-in of local government departments, relevant regional and national political actors, and relevant private sector and community stakeholders.

→
Short-term horizon
● ○ ○
Easy-win
ϟ ϟ ϟ
Limited powers

Joining regional and international platforms
Participate in regional and international platforms on energy access to discuss common challenges; enabling opportunities to share best practices, develop common solutions, and form advocacy coalitions.

→
Short-term horizon
● ● ○
Collaborative action
ϟ ϟ ϟ
Shared powers

Data-collection networks and infrastructure
Build networks between local government departments and relevant external agencies or private sector partners to collate datasets on energy poverty and energy access—e.g. in energy supply downtime, building energy efficiency, household energy expenditure, and more. This should be supported by a central data repository for energy access towards further analysis and case-making for policies, programmes, and vertical integration.

⟶
Medium-term horizon
● ● ○
Collaborative action
ϟ ϟ ϟ
Limited powers

Data analysis and case-making
Curate evidence-base that provides coherent and systemic methodology to legitimise energy access solutions for policy and financing case-making—pinpointing infrastructural gaps in transmission and distribution, quantitative and qualitative data on household energy consumption, addressing uneven negative consequences of energy poverty, and promoting equitable energy access benefits in the community.

⟶
Medium-term horizon
● ○ ○
Easy-win
ϟ ϟ ϟ
Sole powers

Monitoring, evaluation and reporting (MER) frameworks to support planning
Establish cost- and resource-effective strategies within strategic, policy and programme planning to monitor and evaluate energy access circumstances and the efficacy of interventions. Framework should also specify review and update process based on new information available or progress made.

⟶
Long-term horizon
● ○ ○
Easy-win
ϟ ϟ ϟ
Shared powers

Building local technical knowledge and capacity
Provide opportunities for staff to exchange technical knowledge with other local governments, as well as private and academic stakeholders. Where possible, involvement in cross-departmental data analysis and masterplanning provides further opportunities for multi-disciplinary and co-designed interventions.

LOCAL GOVERNMENT IN ACTION

Konotop City Council, Ukraine
Promoted energy management systems for buildings and established local monitoring of energy and fuel consumption.
Taken from the survey and data analysis conducted for this report.

3.2.4 Investment & securing finance

Actions to secure local, national, and international funding for solutions in implementing energy access policies and programmes:

Medium-term horizon
● ○ ○
Easy-win
ϟ ϟ ϟ
Sole powers

Financing energy access programmes
Provide grants for, subsidise, or fund interventions—e.g. in residential electrification and energy efficiency retrofits, distributed renewable energy generation, tariff subsidies for low-income households. Co-financing schemes can also be used to encourage ownership and education.

Medium-term horizon
● ● ○
Collaborative action
ϟ ϟ ϟ
Sole powers

Analyses and innovation of funding models
Explore innovative finance models to improve cost-parity of solutions and attract large-scale investors, especially in clean energy and district heating/cooling solutions.

Short-term horizon
● ● ○
Collaborative action
ϟ ϟ ϟ
Sole powers

Energy performance contracting (EPC)
Contract an Energy Service Company (ESCO) to deliver energy efficiency retrofits with committed reduction targets; where the intervention costs are paid off via the energy savings made.

Long-term horizon
● ● ○
Collaborative action
ϟ ϟ ϟ
Sole powers

Engage with potential funders
Engage with local, regional, and international funders to support and finance local interventions and levers, in both hardware and soft data infrastructure.

LOCAL GOVERNMENT IN ACTION

Kimotsuki Town, Kagoshima Prefecture, Japan
Provided subsidies for residential installations of solar power generation, energy storage, fuel cell, and net zero energy home (ZEH) systems.
Taken from the survey and data analysis conducted for this report.

3.2.5 Programmes led by local governments

When energy access solutions do not have cost or administrative effectiveness for large-scale programmes and diverse infrastructure and assets, local governments can directly undertake programmes and projects. These are opportunities for pilot demonstrations and local capacity building—financed by direct government provision and grants, or co-financing models with households:

⟶ **Medium-term horizon** ● ● ○ **Collaborative action** ϟ ϟ ϟ **Shared powers**	**Energy data infrastructure and audit analysis** Install smart metering to monitor energy consumption of residential or social housing buildings; process data for energy audits to target energy efficiency interventions.
⟶ **Medium-term horizon** ● ○ ○ **Easy-win** ϟ ϟ ϟ **Limited powers**	**Local community training** Conduct training with local community leaders and residents to raise awareness of energy efficiency solutions to ensure expenditure is maximised in improving living conditions and thermal comfort.
→ **Short-term horizon** ● ● ○ **Collaborative action** ϟ ϟ ϟ **Shared powers**	**Energy efficiency retrofits** Retrofits to increase energy efficiency of fittings and technology, improve thermal insulation and convert cooking and heating appliances to low carbon alternatives. Local governments can target social housing and other assets under their management.
→ **Short-term horizon** ● ● ○ **Collaborative action** ϟ ϟ ϟ **Limited powers**	**Distributed renewable energy generation** Install rooftop or micro solar PV systems to offset or subsidise energy consumption. Local governments can target social housing, administrative buildings, and other assets under their management.
→ **Short-term horizon** ● ○ ○ **Easy-win** ϟ ϟ ϟ **Sole powers**	**Financial support for households to improve energy affordability** Make energy more affordable by direct reviews of energy and fuel pricing, bill subsidies, or easing the overall financial burden of households via other support such as rent ceilings and employment opportunities.
⟶ **Long-term horizon** ● ○ ○ **Easy-win** ϟ ϟ ϟ **Shared powers**	**Municipal energy procurement** As individual—or a group of—local government(s) sign power purchase agreements with energy providers with secure supply uptimes as well as renewable generation sources.

LOCAL GOVERNMENT IN ACTION

Municipality of Spitak, Lori Province, Armenia
Partnered with UNDP Armenia, local stakeholders and financial institutions to improve the thermal insulation of residential buildings, as part of the EU-funded Covenant of Mayors – Demonstration Projects (CoM-DeP) project.
Taken from the survey and data analysis conducted for this report.

4. Enabling energy access: a Cape Town case study

Cape Town is a port city of 4.6 million residents, located on South Africa's southwest coast. The majority of the city's residents are connected to licensed electricity suppliers—with at least 70,000 informal households without direct grid connection, and more accessing as informal 'backyarders'.[42] The city faces complex energy-related challenges, including a highly nationalised, regulated and largely coal-fired energy supply system, rapid urbanisation and a growing share of low-income households, rolling planned blackouts ('load-shedding') due to supply capacity challenges, declining financing from the National Equitable Share Grant due to macro-economic change, and geographical and land-use constraints that limit grid extension to certain areas occupied by informal settlements. Low-income households—both in areas that are connected and not connected to the grid—remain largely in a position of energy poverty, and even higher income households face a lack of supply security with frequent load-shedding.

The City of Cape Town has a 100% electrification policy, aiming to provide access to energy services for all residents in the city. In 2017, the City set up a dedicated Low-income Energy Services (LINES) as part of their Sustainable Energy Markets Department, with the aim of driving innovation in facilitating the provision of 'best possible' energy services to low-income communities in a sustainable manner. The city has not defined 'energy access', but currently understands 'energy poverty' in its urban context to be:

- Lacking access to grid electricity which consequently precludes access to any form of subsidised energy services;
- The inability to pay for sufficient, sustainable, and less-pollutive energy to meet consumption needs, regardless of the formality of connection to grid electricity.

The following sections provide an overview of key initiatives being undertaken by the municipality and other key stakeholders in Cape Town to alleviate energy poverty and improve energy access, offering some practical examples of some of the levers identified in Section 3.2 of this report. A set of learnings from the Cape Town experience are also identified, that may be useful for other urban communities in SSA seeking to address common energy access challenges. Whilst the focus remains on City-led action, we also highlight other innovative initiatives being led by wider stakeholders to improve energy access in Cape Town, notably the UMBANE project, a partnership between academia, the private sector and community organisations.

This case study has been informed by interviews held during April and May 2023 with key stakeholders involved in efforts to improve energy access and alleviate energy poverty in Cape Town. This included two City of Cape Town representatives working in the sustainable energy markets team and the energy directorate, a decentralised renewable energy technology provider operating in Cape Town (Zonke Energy) and academics at the University of Cape Town and University of Exeter working on energy access in informal settlements (the UMBANE project).

[42] City of Cape Town (2020). Integrated Development Plan. > Available here

4.1 Cape Town's energy access and poverty context

Grid-connected population

In Cape Town there are two distribution networks, where 25% of grid-connected households are supplied by a distribution network operated by Eskom, the state-owned national utility, and the remaining 75% by the City's own distribution network operated by the municipality.[43] The City of Cape Town has little influence over the policies and infrastructure associated with the Eskom network, and therefore the policy interventions relating to renewable energy procurement and tariff subsidisation benefit residents within the City distribution area only. Eskom owns and operates most power generation assets in South Africa, with a limited but growing share from private sector developers known as Independent Power Producers (IPPs) in South Africa.

Load-shedding, planned power cuts to curb demand in response to supply constraints, currently occur almost daily for up to 10 hours per day across South Africa, significantly impacting all city residents by cutting traffic lights, power supply to households, businesses, schools and hospitals, cutting off electricity for all those without back-up generators. Cape Town's mayor, Geordin Hill-Lewis, describes load-shedding as the "biggest handbrake on the economy at the moment and is what is keeping so many people in poverty and out of work".[44] In February 2023 South Africa's president declared a national state of disaster, identifying blackouts as an existential threat to the country's economy and social fabric (this state of disaster and the regulations developed as a result, have since been abolished).[45]

The City provides an energy services social package to low-income households consisting of subsidised grid connections, the lifeline tariff,[46] and Free Basic Energy (FBE) allocations. In the Eskom distribution areas, a subsidised 'homelight' 20Ampere electricity tariff is available to any household whose supply is limited to a maximum of 20 Amperes. Nonetheless, evidence suggests that these policies are not sufficient to relieve energy poverty, and therefore many low-income households are resorting to an 'energy stacking' approach to supplement their FBE allocation, with other energy sources such as paraffin and candles to meet their needs. This poses significant health risks due to poor air quality, child poisoning and shack fires. 31% of residents connected to the City distribution network are on a subsidised tariff package (2020).

[43] Cape Town Green Map. > Available here
[44] ESI Africa (2022). Powerful electricity declarations unfolding in South Africa. > Available here
[45] Aljazeera (2023). South Africa's Ramaphosa declares 'state of disaster' on power. > Available here
[46] City of Cape Town (2020). Residential Electricity Tariffs. > Available here

Population without grid-connection

Under national policy and planning guidelines dwellings that have been illegally constructed on private or unstable land—or in areas that have been banned from development—cannot be connected to the electricity grid.[47] In Cape Town, this leaves an estimated 10,000 informal households that are deemed impossible to connect to the grid, due to their location on land that is reserved for infrastructure expansion, situated within marshland or a national park, legally disputed, or otherwise deemed unsuitable or unsafe for development in some other way.[48] There is no near-term plan to connect these households to the electricity grid. An additional estimated 23,000 households across the city are on a waiting list to receive grid connection, which do not currently have access to grid electricity or an energy subsidy.

Households in informal settlements not connected to grid electricity typically rely on illegal and unsafe grid connections, charcoal, paraffin and diesel generators to meet their energy needs (cooking, heating, lighting and cooling). Fossil-fuel energy sources are burned inside and nearby poorly ventilated shacks, which can pose significant health risks and cause dangerous shack fires. Illegal connections can also cause fatal electrocutions. There is a growing number of informal households in the city, linked in part to increasing migration and urbanisation.

In addition to larger settlements, there are also what is known in the city as ‘backyarders’; informal housing located on the same residential property as a main dwelling. These households typically rely on accessing services through connecting to the main dwelling on the property, and therefore do not receive energy subsidies reflecting their usage, and also can experience abuses of landlord power such as price markups and threatened supply.

[47] City of Cape Town (2014). Residential Electricity Reticulation – (Policy Number 23531). > Available here
[48] City of Cape Town (2021). The City Of Cape Town’s Pathway To Alleviate Energy Poverty. > Available here

The UMBANE project

The UMBANE project—the 'electricity' project in the Xhosa—is a partnership between academia, private sector and community organisations seeking to improve access to sustainable, less-pollutive and reliable energy in Qandu-Qandu, an informal settlement of 3,500 households in Cape Town. The project is led by the academic partners at the University of Exeter and the University of Cape Town, working closely with solar mini-grid solution provider Zonke Energy, the Thrie Energy Collective sustainable consulting agency, and Story Room, a business and entrepreneurship incubation and acceleration firm. The project has received grant funding through UKRI and other sources. Insights from interviews with Zonke Energy and Academic partners of the UMBANE project are included here and throughout this case study.

Figure 11 Photographs of installed solar PV towers and appliances in Qandu-Qandu, courtesy of the UMBANE project.

The Qandu-Qandu settlement is not connected to the electricity grid, and residents most commonly access energy services through illegal connections or burning paraffin, wood and plastic. The project is working to implement solar mini-grids featuring solar PV towers with 40m 24 Vdc cables, responding to the space constraints posed by high density development. So far 11 solar towers have been installed in the settlement, with plans to continue scaling.

Some key examples of innovation within the project include:

- **Collection to understand community energy needs:** The early project phases involved extensive community surveying and data collection to understand the energy needs within the communities in Qandu-Qandu. This led to a focus on refrigeration, enabling longer-term storage of perishable food, medicines, a higher quality of life and wellbeing, and reducing the need for community members (usually women) to walk long distances to source food.
- **Working with community leaders:** Zonke Energy also work extensively with community leaders to understand preferred locations for new solar towers based on energy needs, finding that issues of theft and vandalism can be allayed by positioning towers within gardens of respected community leaders.
- **Facilitating female entrepreneurship:** The project has involved an entrepreneurship training and mentoring programme, in order to help women to run businesses that utilise refrigeration and generate income that allows them to afford energy services. 20 local businesses were kick-started through this programme.
- **Navigating the policy environment:** Zonke Energy's business model has been designed to be independent from subsidy reliance, instead drawing on small investments and grant funding to top up subsidised customer tariffs. The organisation also circumnavigates national regulations that prevent non-state entities from selling power directly to customers, by selling energy as a service (i.e. charging customers for energy services per day rather than per kWh).

Zonke Energy identified a stronger policy framework and subsidy scheme as being vital to their long-term financial sustainability and ability to scale. More information on the project is available here.

4.2 Cape Town's levers

This section showcases the key levers the City of Cape Town is applying in their context to address energy access and energy poverty, and maps them against those identified in Section 3.2 of this report. Please note that there are multiple other relevant initiatives ongoing to address energy access, and therefore those presented within this case study are not exhaustive.

Time horizon for delivery, level of local capacity and degree of local government power required are indicated for each lever. Note that these are high-level qualitative indicators applied to each lever type in general, rather than a reflection of the associated specific initiative in Cape Town.

Renewable energy procurement

Establish legal and regulatory frameworks to implement interventions with private sector participation

→
Medium-term horizon

●●○
Collaborative action

ϟϟϟ
Shared powers

The City of Cape Town have been campaigning to change procurement rules to enable them to procure renewable energy directly from suppliers, improving energy security for grid-connected city residents. In 2019 the City took national government to court to challenge the exclusive rights of Eskom (the state-owned utility) to procure electricity for resale.[49] The case was put on pause, however in October 2020 an amendment to the Electricity Regulation Act (2006) was published allowing municipalities to procure electricity from private sector energy developers.

Following this change, the City of Cape Town have launched a tender to procure 300 MW of renewable power from IPPs, to reduce the city's reliance on Eskom and provide some alleviation of load-shedding, improving access to a more affordable, reliable and sustainable energy supply. The procurement is currently at evaluation stage and the City plans to start procuring from IPPs in summer 2023. The City has also launched a second tender process for dispatchable projects (e.g. renewable supply with storage) to further address load-shedding.

[49] C40 Cities (2019). Cities100: Cape Town is spearheading South Africa's shift towards a decentralised, renewable energy supply. > Available here

Small Scale Embedded Generation (SSEG) scheme

Establish legal and regulatory frameworks to implement interventions with private sector participation

⟶
Medium-term horizon
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Collaborative action
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Shared powers

The City also has a 'Small Scale Embedded Generation' scheme, allowing individuals and businesses who produce electricity to feed excess electricity into the grid and offset their energy consumption, only paying the equivalent of their net consumption in bills each month. Whilst it would currently be legal to remunerate small scale generators for exported electricity under the new IPP procurement rules, the City would still need to comply with an onerous procurement process to demonstrate fairness and competition in line with the 2003 Municipal Finance Management Act, which would be administratively prohibitive if applied to all small-scale generators across the city. The City's efforts to apply to the Minister of Finance for exemption have so far been unsuccessful, however they are continuing to lobby national government.

The City hopes that in procuring power directly from IPPs, it will gradually create a competitive energy market that will reduce the price of electricity for residents.

Free Basic Alternative Energy policy (under development)

Policy and programme design that speaks to lived experiences that deliver socioeconomic benefits

→
Short-term horizon
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Easy-win
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Limited powers

The City of Cape Town are exploring a 'Free Basic Alternative Energy' policy package aiming to increase provision of energy services in informal settlements through decentralised renewable energy. Households would be allocated energy service 'coupons', which they could use to purchase from a range of alternative energy services, including for example electricity produced by solar minigrids, LPG for cooking, a solar home kit etc. This would enable individuals and households the flexibility to benefit from energy services that are most desired, and available in their area. In addition, the City has limited the subsidy to only LPG and solar power—unlike other South African municipalities—to avoid consequences such as indoor pollution and shack fires due to use of candles or paraffin. This City policy is currently under development, and the policy will be available after council approval.

City of Cape Town Low-income Energy Services (LINES) unit

Central working group for energy access to lead ownership, coordination, and stakeholder engagement

→
Short-term horizon
● ● ○
Collaborative action
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Shared powers

In 2017 the City of Cape Town set up a Low-income Energy Services (LINES) unit dedicated to improving access to energy services amongst low-income communities in a sustainable manner (now the energy poverty alleviation team is part of the Sustainable Energy Facilitation unit). In addition to developing policies and programmes to directly improve energy access, this unit also focuses on internal capacity building around energy access and poverty, for example convening City departments to share knowledge and data on energy poverty, and formulate a consistent and coordinated communication strategy. The unit also helps to strengthen the case for taking action to alleviate energy poverty, for example through undertaking analysis on the cost of inaction (due to shack fires and health consequences), and providing dedicated staff to identify and respond to funding or partnership opportunities.

Municipal Energy Resilience (MER) Initiative

Joining regional and international platforms to share best practices, develop solutions, and form advocacy coalitions

→
Short-term horizon
● ○ ○
Easy-win
ϟ ϟ ϟ
Limited powers

Following the amendments to the Electricity Regulations Act in 2020 that allowed municipalities to procure electricity directly from IPPs, the Municipal Energy Resilience (MER) Initiative was set up to provide a platform for knowledge sharing, capacity building and mutual support amongst municipalities on the implementation of renewable energy projects in the Western Cape province, aiming to increase energy and economic resilience. The City of Cape Town was a founding partner for the initiative and has been using the platform as an opportunity to share learnings on increasing energy resilience, such as navigating procurement regulation, writing and evaluating tenders, and understanding technical requirements.

Cross-cutting learnings and localised insights for local governments

A number of learnings were identified by interviewed stakeholders that may be transferable for other local governments working on energy access and energy poverty presented below:

- Help people to access the **energy services they say they want** as a priority, as these are likely to deliver the greatest benefits. This involves **working closely with individual communities** to gather data on energy needs, and designing policy that embeds **flexibility into its design**.

- Identify and create **opportunities to share knowledge** amongst other local governments and energy-related stakeholders at different stages of the journey, for example sharing insights on renewable energy tendering, grid capacity assessment methodologies, how to engage with communities around energy access and poverty, available funding, and engaging with other tiers of devolved governance. Knowledge sharing could occur in formalised structures such as **working groups**, though could also take the form of **finding opportunities to hold informal conversations** with other local authorities facing similar challenges.

- If local capacity and resources allow it, the appointment of a **dedicated role** within local government with the aim of addressing energy poverty and energy access can offer important opportunities to improve data collection, design strategies and policies, coordinate across relevant departments and apply for funding.

- **Defining the terms 'energy access' and 'energy poverty'** is challenging and can be highly context specific. The City of Cape Town currently does not have agreed definitions for these terms, but understand that energy poverty in the city can be classified as not having access to grid electricity (the highest level of energy service offered) and therefore also not having access to any form of subsidised energy services, as well as the inability to pay for sufficient safe and clean energy to meet your needs throughout the month, even if the household is connected to grid electricity. More work is currently being undertaken to better understand challenges around energy access, which includes collecting energy use data in informal settlements that are not directly connected to the grid and applying for funding applications to test solutions.

- **Engage creatively with private sector and community activities**, seeking ways to mutually benefit efforts to improve energy access; for example partnering with community organisations for engagement activities, finding opportunities to share data and knowledge (e.g. willingness-to-pay, energy demand profiles, technical site-specific information), and offering support for projects like UMBANE despite a constrained policy environment.

5. Conclusion

Local governments recognise the urgent challenge to alleviate energy poverty and improve energy access. They are also well-placed to do so in their proximity to lived experiences, role in consolidating data, and position to convene relevant stakeholders. The journey of this research has highlighted the immense challenge and opportunity for local governments in addressing energy poverty and facilitating energy access. It complements the new EAPP pillar of the Global Covenant of Mayors' CRF by starting from a framing of energy poverty as a phenomenon that is lived. Local experiences of being deprived of secure, sustainable, and affordable energy access—and its consequences—gives us a direct insight to where local governments can target their interventions.

Based on the literature review and survey responses, we have understood that financing action is the most significant challenge. However, it is also important to note the need to expand their institutional capacity, find ways to navigate the relevant political economies, and increase stakeholder collaboration. It is also critical to highlight the implication of disempowerment on addressing energy access related to central assets around energy generation, transmission, distribution, and pricing.

The survey results also highlight local governments' lack of exclusive powers in many aspects of energy access governance and action. However, their relative powers in vision-setting and proximity to local community, governmental and private stakeholders can be viewed as an opportunity to gather available information, voices, and pathways to increased energy access.

This can be done via shift in approaches to mainstream equitable energy access, around:

1. Evaluating short- *and* long-term outcomes,
2. Efficient, effective, *and* equitable capacity allocation, and
3. Maximising available powers with collaborative case-making.

These approaches will allow local governments to increasingly apply bespoke levers identified in the literature review and survey responses, related to policies and regulation, stakeholder collaboration, local government capacity building and data collection, investment and securing finance, and locally-led programmes.

In summary, the findings across the barriers to, powers in, and levers for energy access provides a relatable vocabulary for local governments to:

- Notice, articulate, and expose the overt barriers, political gatekeeping, or disempowerment they may experience in facilitating energy access,
- Pinpoint effective steps forward based on a local government's combination of barriers experienced and powers available,
- Support case-making and co-design with community, private sector, and other governmental bodies, and
- Discuss common challenges and transferable levers with local government peers at regional and international scales.

The exploration of local governments' unique sets of barriers and available powers is that other elements of the CRF also require grounding in climate equity and local lived experiences. Planning for climate action should include inclusive stakeholder engagement for coordinated action, mapping socioeconomic inequalities to analyse climate hazards and risks, and considering socioeconomic trade-offs when designing high-impact emissions reduction strategies.

Due to the contextual and temporal nature of lived experiences of poverty and systemic barriers to energy access, this qualitative research is but a snapshot from available literature and survey respondents. Further research—with specific regional, sociocultural, and economic focus—is needed to understand the influences of the national, regional, and international political economies that local governments work within.

Appendix A

Survey Methodology Note

Overview of approach

The survey was developed to build an understanding of the actions that local governments can take to improve energy access and alleviate energy poverty. The survey forms part of a wider energy access and poverty (EAP) research project conducted by the GCoM Secretariat in partnership with Arup.

This survey was designed to take approximately 20 minutes to complete, and was distributed using JISC Online Surveys platform.

The survey is split into 4 parts:

Part 1 captures contextual information on communities and local governments and the extent to which energy access represents a priority

Part 2 explores how critical assets and functions currently limit energy access and the underlying barriers that make it difficult for local governments to take action

Part 3 develops an understanding of the extent and form of local government powers to influence the assets and functions that relate to good energy access, in order to better understand their opportunities to enact change

Part 4 obtains information on actions and initiatives the local government is already taking including their implementation status and effectiveness if known

Assets and functions

A number of questions relate to a list of assets and function that relate to local governments' efforts to address energy access and energy poverty, for example first seeking to understand which assets are perceived to be most critical, how barriers influence the ability of local government to take action, and the powers that local governments hold to influence these assets and functions. The assets and functions that were the subject of these questions are presented in Table 5.

Category	Asset or function
Energy generation	Local renewable power generation Local low carbon heating and/or cooling Clean cooking equipment and fuels Back-up energy generation Centralised power generation (outside city boundary)
Energy transmission and distribution	Power transmission network Power distribution network District heating and/or cooling network Energy storage
Building stock	Energy efficient housing stock Connectivity of housing to district heating networks, grid or mini-grid
Tariffs and pricing	Tariff and pricing regulation for electricity Tariff and pricing regulation for fuel Tariff and pricing regulation for heating/cooling

Table 5 Assets and functions within survey

Underlying barriers

Definitions for local government barriers included within the survey are provided below.

Engagement and collaboration: Lack of effective engagement and collaboration with communities, private sector and other important stakeholders such as higher-tier government.

Policy landscape: Policies and regulations create barriers to market entry or do not create a supportive policy environment for improved energy access, for example limiting the ability of small-scale energy projects to establish economically viable schemes.

Political and leadership: Challenges related to prevailing political ideologies or priorities, governance typologies, or the strength of leadership from key actors.

Institutional capacity and structure: Challenges relating to limited capacity to provide services such as policy and business support to develop and manage schemes to improve energy access, as well as barriers created by the distribution/devolution of relevant powers amongst international, national and sub-national levels of government.

Data: Challenges that relate to a local government's ability to access information and acquire knowledge required to take effective decisions.

Finance: Barriers relating to accessing funding and financing from public, private and IFI sources for the development and deployment of schemes to improve energy access.

Physical and human context: Challenges that relate to a city or community's geographical location and demographic characteristics that can affect the viability of schemes to improve energy access, including historical land use planning.

'Limiting factor' refers to physical, technological and economic conditions that limit a city or community's ability to achieve good energy access or alleviate energy poverty.

Appendix B

Regional comparison of powers for select assets

Online survey responses from urban communities within Middle East & North Africa (MENA, n=13) and Eastern Europe & Central Asia (EECA, n=37) were numerate enough to allow a regional breakdown of powers for those assets identified as posing particularly significant barriers to energy access. Remaining regions all had 6 or fewer responses.

The subsequent graphs highlight differences in the entities reported to hold powers in these two regions, for 'Local renewable power generation', 'Low carbon heating/cooling', 'Energy efficient housing' and 'Back-up energy generation' assets.

Local renewable power generation

Responses from the MENA region indicated a more significant role for the private sector across vision and policy, and ownership/operation powers than those from the EECA region in the context of local renewable power generation, whereas EECA reported a key role for national government in vision and policy setting. In general, the MENA region respondents identified a stronger role for local government relating to regulatory setting and enforcement powers and budgetary control.

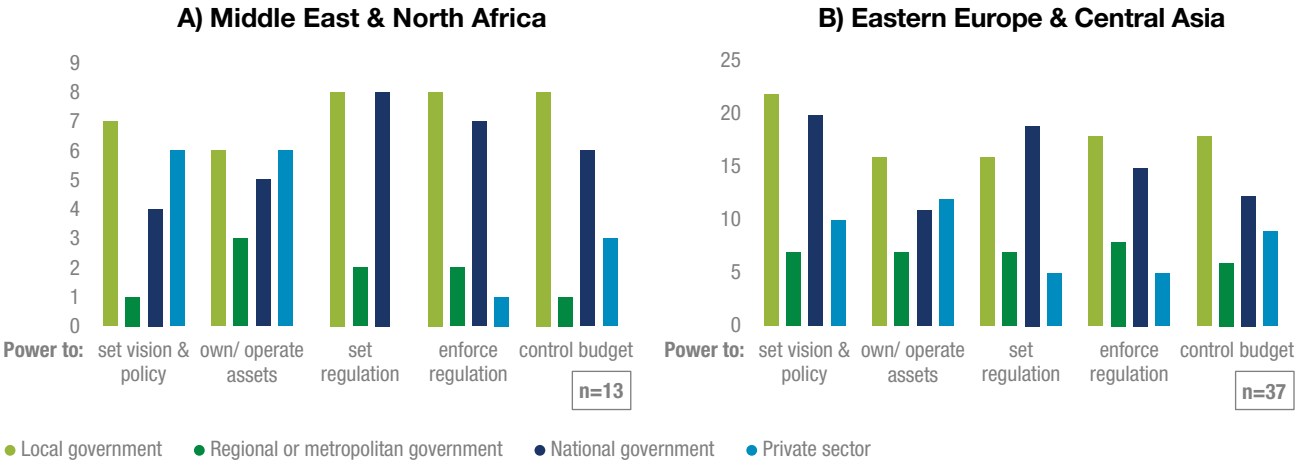

Figure 12 Regional breakdown of local and higher tier government and private sector powers for 'Local renewable power generation'

Low carbon heating/cooling

In general, respondents within EECA report a stronger ability for local government to influence low carbon heating/cooling assets than MENA responses, particularly relating to vision and policy setting powers and budgetary powers. MENA respondents reported a stronger regulatory role for national government, and in general stronger regional government powers.

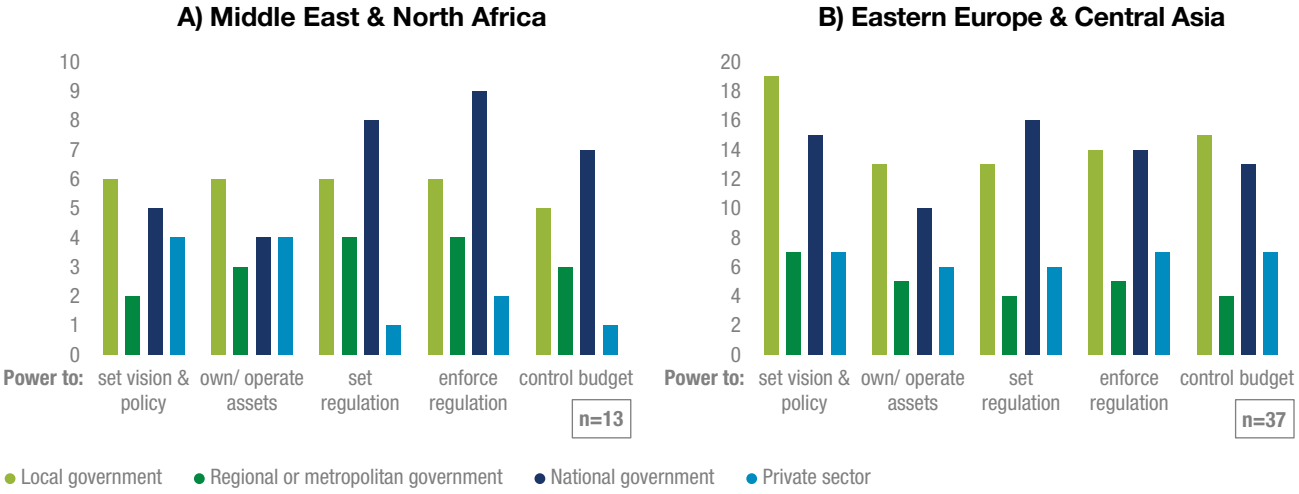

Figure 13 Regional breakdown of local and higher tier government and private sector powers for 'Low carbon heating/cooling'

Energy efficient housing stock

MENA respondents indicate that local government is the entity with the most influence over vision and policy setting, whereas the other power dimensions are dominated by national government (save budgetary which appears to be shared predominantly between local and national government). The private sector is reported to have a much stronger role in energy efficient housing stock within EECA responses across power dimensions, though local government plays a strong role in vision and policy setting.

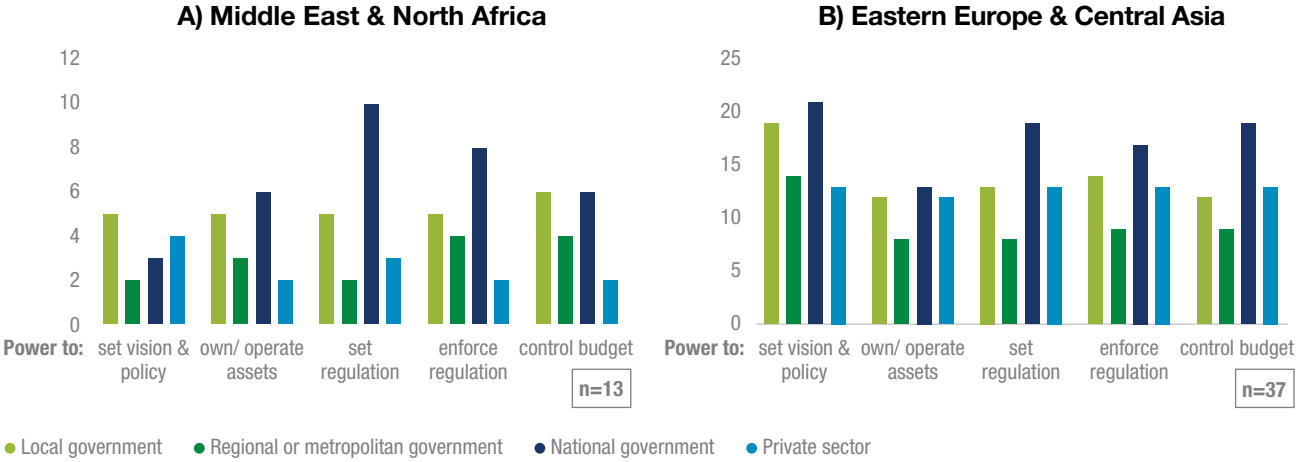

Figure 14 Regional breakdown of local and higher tier government and private sector powers for 'Energy efficient housing stock'

Back-up energy generation

EECA respondents report a stronger role for local government in vision and policy setting for back-up energy generation assets than MENA respondents, however the remaining power dimensions are broadly comparable across regions in terms of local government influence. EECA responses identify a key role for national government in budgetary control of back-up energy generation assets.

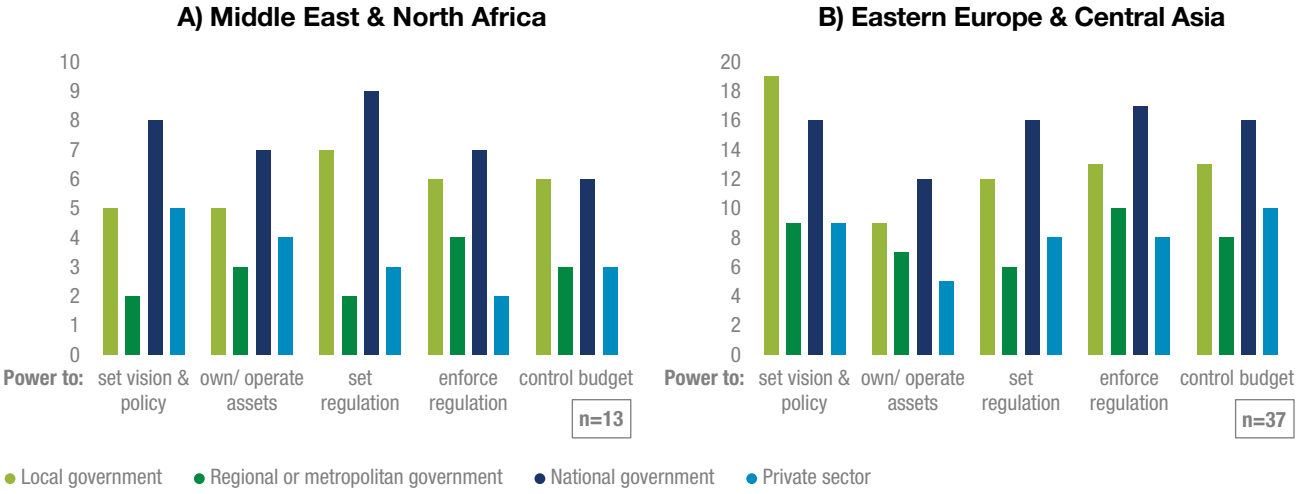

Figure 15 Regional breakdown of local and higher tier government and private sector powers for 'Back-up energy generation'

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Karishma Asarpota (ICLEI World Secretariat)
Emmanuel Michael Biririza (UN-Habitat)
Tabare Curras (WWF Cities)
Peter Haems (GCoM Secretariat)
Benjamin Jance IV (GCoM Secretariat)
Miguel Morcillo (Covenant of Mayors - Europe)
Alejandro Nocete (GCoM Secretariat)
Laura Parry (CDP)
Marco Pittalis (Joint Research Centre), Co-chair
Valentina Palermo (Joint Research Centre), Co-chair
Lea Ranalder (UN-Habitat)
Rohit Sen (ICLEI World Secretariat)
Irene Skoula (C40 Cities)

GCoM Energy Access and Poverty Pillar Subcommittee Members

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Covenant of Mayors for Climate & Energy EUROPE
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ICLEI Local Governments for Sustainability
The Joint Research Centre – the European Commission's science and knowledge service
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GLOBAL COVENANT of MAYORS for CLIMATE & ENERGY UNITED STATES

GLOBAL COVENANT *of* MAYORS *for* CLIMATE & ENERGY

www.globalcovenantofmayors.org
info@globalcovenantofmayors.org

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