

# 5

## A Checklist for Public Action to scale up building decarbonisation

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This chapter first discusses the vital role of national governments in promoting a whole-of-government and multilevel governance approach to decarbonising buildings and creating the enabling environments for subnational actors to unlock their potential. Then, it proposes a checklist for both national and subnational governments to scale up building decarbonisation in cities and regions. The checklist aims to support the key roles of subnational governments in planning, leadership and engagement to promote building decarbonisation, and provides recommendations for national governments to set a common policy framework across cities and regions. It also provides relevant policy examples from leading cities, regions and countries.

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## The key role of national governments in setting the enabling environment

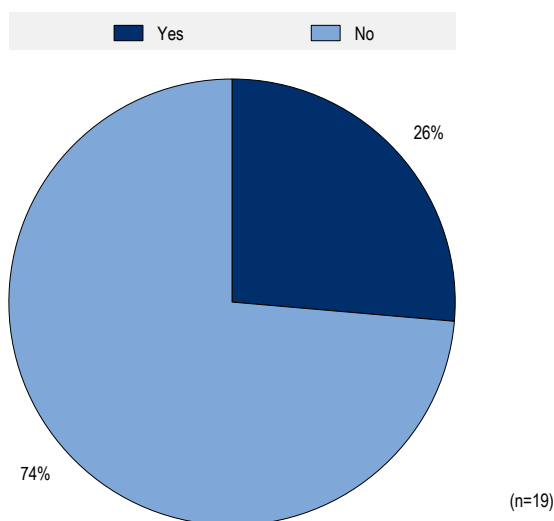
National governments can play a vital role in promoting a whole-of-government and multilevel governance approach to decarbonising buildings. They also create the enabling environments for subnational actors to unlock their potential and scale up action in this field. This includes factoring local considerations into national policies, encouraging local innovation and supporting subnational governments in building capacity. In addition, national governments can help develop a subnational database and indicators, to allow subnational governments to assess progress in reaching their own targets, and to compare how they are doing in comparison with peer cities and regions domestically and globally.

Energy efficiency in buildings involves multiple policy areas, such as housing and building policy, energy policy and environmental policy. Horizontal and vertical policy alignment and co-ordination is essential to provide a coherent long-term vision and support to cities and regions. Three ministries in Japan, the Ministry of Land, Infrastructure, Transport and Tourism, the Ministry of Economy, Trade and Industry and the Ministry of the Environment, have developed a roadmap on policies to promote decarbonisation in housing and buildings, from energy efficiency, renewable energy use and carbon storage, spelling out the roles of relevant ministries (MLIT, 2021<sup>[11]</sup>). Before discussing the national governments' role, it is important to map out the line or sectoral ministries responsible for energy efficiency in buildings. As reported in the OECD survey, these competences lie mostly in the "Ministry of Energy or equivalent" (41%), "Ministry of the Environment or equivalent" (35%), "Ministry of Housing and Urban Development or equivalent" (24%) or in some cases, more than two ministries (29%).

Without an effective and appropriate national regulatory framework for existing buildings, cities and regions may not have the resources or authority to keep up with the targets called for in national plans or strategies. About a third of cities and regions that responded to the survey reported challenges in vertical co-ordination on energy efficiency in buildings across subnational and national governments in their countries. National policy can sometimes diverge from its implementation in a local context, both in terms of levels of ambition and the priorities of policy measures to be taken.

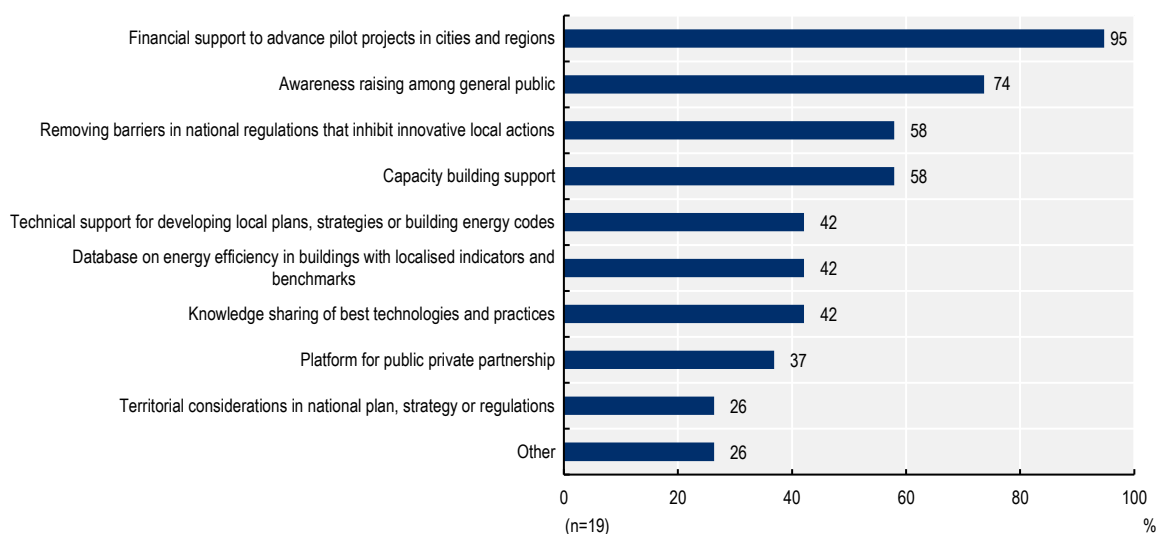
As for the support they received from national governments, 74% of the cities and regions surveyed considered it to be inadequate (Figure 5.1). Asked to specify the type of support they needed, 95% cited "Financial support to advanced projects" and 74% "Awareness raising in general public". Most cities and regions have started their own projects or initiatives and are now facing budget constraints and a lack of motivation among property owners as they try to expand these programmes. "Removing barriers in national regulations that inhibit innovative local actions" and "Capacity building support" is also cited as a priority for 58% of respondents (Figure 5.2). In response to these challenges, national governments could promote dialogue with subnational governments and actors, and identify and adjust regulations that prevent new solutions at the local level. National governments can also develop databases to build capacity and provide information that cities and regions can use to conduct localised analysis and planning. This can also contribute to raising awareness, providing more convincing evidence of the benefits of energy efficiency investment in buildings. The survey also asked how much cities and regions utilise funding from multilateral development banks, supranational or other international donors. While European cities and regions tend to make moderate use of supranational or international donors, most cities and regions do not receive funding from international sources.

**Figure 5.1. Share of cities and regions that receive enough support from national governments**



Source: OECD Survey on Decarbonising Buildings in Cities and Regions.

**Figure 5.2. Type of national government support cities and regions require**



Source: OECD Survey on Decarbonising Buildings in Cities and Regions.

## A Checklist for Public Action to decarbonise buildings in cities and regions

Cities and regions have a holistic role to play, sharing responsibility with national governments and the private sector in the decarbonisation of buildings. National governments play a vital role in setting the basic framework that enables stakeholders in both private and public sectors to decarbonise buildings, leveraging their legislative authority and access to the best available technical and financial resources in a country. Their role includes developing common policy tools and frameworks in cities and regions; enhancing multilevel policy co-ordination; and providing guidance and support to cities and regions. This provides indispensable framework conditions for cities and regions to promote building decarbonisation.

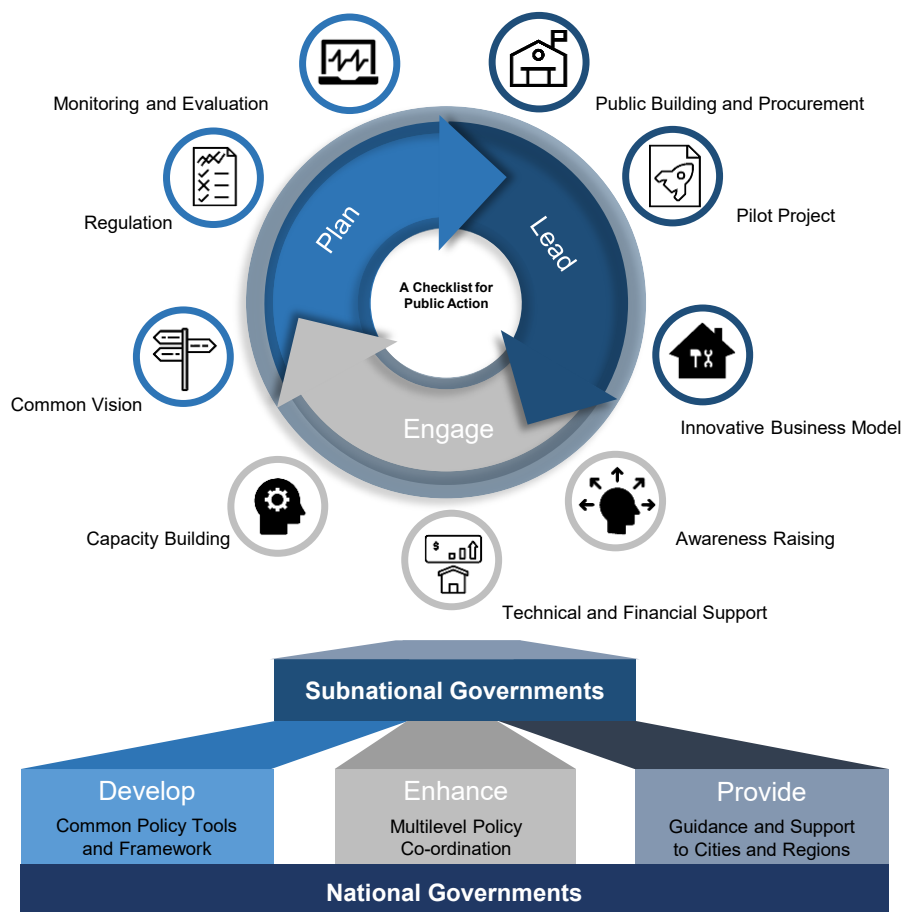
As noted in Chapter 3, cities and regions can play a major role in four policy areas: regulations; financing; planning and co-ordination; and engagement of local actors. These policy measures do not work on their own and need to be closely co-ordinated to produce the intended goals and synergies. A single policy, such as mandatory building energy codes or a subsidy for energy efficiency renovations, cannot create enough momentum for the transition to low-carbon building stock. The policy measures need to be mutually intertwined and strengthen each other, if carefully designed. Cities and regions thus need to develop a comprehensive policy package and consider how their policy measures can create synergy. They can use public building projects to raise public awareness, engage local businesses and make a business case for private financing. Engaging construction and relevant industries in the planning process may help introduce ambitious but appropriate regulations that local industries can actively prepare for. Meanwhile, providing a long-term vision, in particular of public investment, may offer a basis for a more stable market with a view to retaining and expanding skilled labour in the relevant sectors.

Cities and regions need to identify key challenges, as well as local resources available, and create locally tailored strategies to address bottlenecks in effective and efficient ways, making the best use of limited local resources. As noted in Chapter 4, key barriers to upscaling subnational policy actions include: insufficient budget and resources; lack of incentives to secure the commitment of property owners; lack of an effective monitoring and evaluation framework; and a shortage of skilled labour and insufficient support for small- and medium-sized enterprises (SMEs). They can engage a variety of stakeholders, including not only citizens and local businesses but housing and building owners. They can also include construction and supporting industries to promote the transition to the low-carbon building stock as a whole. Subnational governments need to chart a clear vision, to lead by example and to design and apply appropriate governance mechanisms.

The OECD Checklist for Public Action builds on key findings from the report and the underlying survey, insights from policy dialogues with key stakeholders, and a stock-taking of existing guidance to decarbonise buildings for national government, which has paved the way for complementary place-based recommendations. It provides guidance for cities and regions to accelerate and manage the transition to a low-carbon building society in cities and regions. It also offers national governments assistance in setting up a common framework that creates the enabling environments in cities and regions. It builds on three national policy recommendations; and nine subnational policy recommendations, grouped into three pillars that correspond to the key roles of cities and regions: 1) plan; 2) lead; and 3) engage (Figure 5.3):

- **Plan:** Cities and regions can chart a way forward in the transition to low-carbon building stock by: creating a common vision for a broad array of stakeholders; devising effective local regulatory frameworks for building decarbonisation and co-ordinating them with national policy; and introducing an effective scheme for monitoring and evaluating policy progress.
- **Lead:** Cities and regions can lead by example to scale up building decarbonisation by: leveraging public building procurement for broader objectives; promoting pilot projects and innovative business models; and incentivising and co-ordinating renovation needs to create economies of scale.
- **Engage:** Cities and regions can enlist a broad array of stakeholders, citizens and local businesses to take action, by: raising awareness among citizens and local businesses; providing support for low-income households and SMEs; and building capacity in subnational governments and local industries.

**Figure 5.3. A Checklist for Public Action to Decarbonise Buildings in Cities and Regions**



## National governments can provide a common framework across cities and regions

### *Develop common policy tools and framework across cities and regions*

Some policy levers, in particular the regulatory framework, rely principally on national governments. Although cities and regions are in charge of developing their own building codes or introducing restrictions through ordinances in some countries, basic regulations need to be designed by national governments, since construction activities span different subnational jurisdictions. From a business perspective, full compliance with a variety of building regulations in cities and regions is a major investment. From a public perspective, a small city or a remote region does not have the power to influence the private market. Furthermore, developing new regulations to address challenges that may arise, such as reducing embodied carbon, calls for a significant amount of technical resources that a single city or region cannot take on alone. National governments should thus provide, at a minimum, the basic regulatory framework and common measurement indicators reflecting the latest scientific and technical knowledge. France, for example, has introduced regulations for new construction that require a life-cycle carbon assessment, including the carbon emissions generated during both the construction and the demolition of buildings (Ministry of the Ecological Transition, 2021<sup>[2]</sup>). In Finland in 2017, the Ministry of the Environment published a roadmap for decarbonised construction intended to be adopted by the mid-2020s for the life-cycle carbon footprint of buildings. The first assessment method in construction projects was introduced in the autumn

of 2019, and Finland is now moving towards legislative adoption of life-cycle assessment in its construction industry (EC, 2020<sup>[3]</sup>).

Another important role of national governments is to ensure that energy prices reflect the real social and environmental costs, through carbon pricing or other mechanisms. Setting the right price incentives is important, because the low prices of fossil fuels compared to clean energy sources deter both individuals and businesses from investing in energy efficiency and clean energy in buildings. In 2021, Germany launched carbon-pricing schemes in the form of national Emissions Trading System (ETS) for heating and transport fuels (International Carbon Action Partnership, 2021<sup>[4]</sup>). The national government also needs to develop a common framework for measuring and certifying buildings' energy performance in cities and regions. For example, all European Union (EU) member countries promote energy performance certification schemes at the national level based on the Energy Performance of Buildings Directive (EPBD) (BPIE, 2014<sup>[5]</sup>; EC, n.d.<sup>[6]</sup>). This is particularly relevant, as more than half of the cities and regions surveyed report data gaps that make it difficult to compare their policy conditions and outcomes with peer cities and regions. National governments can disclose subnational breakdowns of national statistical data so that cities and regions can compare not only energy and carbon outcomes, but also relevant factors policy makers must consider, such as housing affordability and energy poverty. In addition, they can facilitate the use of common measurement indicators among cities and regions to evaluate regional and local conditions.

Most cities and regions surveyed (74%) also expect support from national governments in raising public awareness of the issue. This is also a policy area national governments can promote effectively, by collecting information on the benefits of building decarbonisation from pilot funding programmes and platforms for multilevel dialogues, and disclosing the data for cities, regions and private organisations. This can help make the case for further investment in decarbonising buildings. In Japan, for example, the national government supported experimental projects to collect health-related data before and after energy efficiency retrofits, enlisting experts in both architecture and medical science, and then subsequently sharing the evidence on health benefits from those retrofits with the relevant constituencies (MLIT, 2019<sup>[7]</sup>).

### ***Enhance multilevel policy co-ordination***

There are substantial needs at local scale for national support on funding and technical expertise. However, energy efficiency policies in buildings usually involve several ministries and agencies at the national level. If cities and regions are to acquire the necessary sustained support from national governments, co-ordination among relevant ministries and agencies and across levels of government is needed. In addition, policy coherence across levels of government is required, to provide the right incentives for building owners and investors. One of the first steps is to create a multilevel platform to share subnational policy practices and developments in national policy, to discuss issues around policy implementation and to align policies related to building decarbonisation. Updated national policy developments are beneficial for cities and regions to draw additional resources, while the information on the obstacles at local scale help national governments identify the potential need for policy reform at the national level.

National authorities can also facilitate plans and strategies at the subnational level, and incorporate policy reform and support for cities and regions in national plans and strategies. The government of the Netherlands worked with more than 100 parties to reach the Dutch Climate Agreement in 2019, clarifying the roles and responsibilities of each level of government. Municipalities were designated as responsible for planning and co-ordination, regions for spatial planning and regional co-operation, and the national government for financial support to local authorities, information and knowledge sharing and regulation (Government of the Netherlands, 2019<sup>[8]</sup>).

## ***Provide guidance and support for cities and regions***

Nearly all the cities surveyed expect national governments to provide financial resources for advanced projects. A lack of budgetary resources is the greatest obstacle to enhancing energy efficiency in buildings that cities and regions face, together with the lack of financial incentives for property owners. To explore effective ways to decarbonise buildings and replicate successful cases on a broader scale, national governments could consider financial support to advanced pilot projects and promote the lessons of these pilot cases. In the Dutch case mentioned above, the national government promotes a Programme for Natural-gas-free neighbourhoods from 2018 to 2028 that provides an average of EUR 4 million in funding for district-based projects. These involve a variety of techniques, financial schemes and approaches to engage residents and to pass on the experiences learned from pilot projects (IEA, 2020<sup>[9]</sup>). National governments can also widely share cost-effective technologies and policy solutions as well as green financing schemes, to encourage efficient subnational public investment. Green recovery packages are another possible funding source for subnational projects. SME greening measures can also broaden the base of the decarbonisation of buildings (OECD, 2021<sup>[10]</sup>).

Cities and regions also noted that a lack of human resources and technical expertise is a major obstacle to building decarbonisation. In particular, a lack of technical expertise and human resources in core functions such as plan making, code enforcement and public building contracting may prevent smooth and effective policy implementation, even if green recovery packages can help to address some subnational financial needs. National governments can monitor and identify pressing human resources and capacity needs in dialogue with cities and regions and provide technical support and capacity-building opportunities for local authorities, to enhance their implementation capacity. Both Ireland and the United Kingdom (UK) have provided guidance documents on ESCOs (energy service companies) contracting in public building procurement, so that public authorities know how to promote energy efficiency measures in public buildings with an ESCO business model (Boza-Kiss, Bertoldi and Economidou, 2014<sup>[11]</sup>). In Finland, the national government has set up a competence centre for green public procurement, which supports municipalities on low-carbon construction projects (Ministry of Economic Affairs and Employment of Finland, n.d.<sup>[12]</sup>).

The lack of resources in local industries is a key obstacle for cities and regions. Many countries report that labour shortages must be addressed in scaling up green investment. Cities and regions can collaborate with local industries, identify local skills needs and provide training for the local workforce, but national governments can also help expand the skilled labour base, including in remote communities, by offering training programmes in co-operation with nationwide business associations and expert organisations. Natural Resources Canada, for example, collaborates with training organisations on online training for a new workforce in the energy efficiency sector and an energy advisor recruitment training campaign to support retrofitting, while focusing on increasing equity and representation of Indigenous communities (Natural Resources Canada, 2020<sup>[13]</sup>). In line with this effort, Canada launched the Canada Greener Homes Grant initiative in May 2021 to provide up to CAD 5 000 for homeowners to renovate their homes. As of January 2022, more than 180 000 home owners applied for this initiative, which called for even more demand for energy advisors. In this initiative, Natural Resources Canada creates a nationwide certification framework for energy advisors, who evaluate both pre-retrofit and post-retrofit energy performance of homes, informs on the courses provided by training organisations, and provides financial support to certain provinces to increase skilled labour. It promised CAD 903 000 investment for the province of Manitoba, which includes training up to an additional 2 000 energy advisors and recruiting 90 energy advisors (Natural Resources Canada, 2022<sup>[14]</sup>). Meanwhile, promoting new technologies and cost-efficient production methods for energy efficiency renovations can also help cities and regions tackle building decarbonisation with a limited amount of skilled labour, in cost-effective ways.

## Subnational governments can help realise building decarbonisation in cities and regions

### *Plan and chart a way forward*

#### *Create a common vision for a broad array of stakeholders*

Although most cities and regions (86%) have their own plans and strategies for energy efficiency in buildings, some do not. Decarbonisation of buildings requires local policy considerations, such as climatic conditions, building stock characteristics, housing affordability, energy poverty, preparedness of local industries and district-scale energy infrastructure. Cities and regions need to factor in these local elements and provide a long-term, common vision for a broad array of key stakeholders, including property owners (e.g. homeowners, landlords, housing authorities, large firms with own buildings, rental office owners, real estate firms) and service providers (e.g. architects, construction firms, energy companies, energy advisors, financial institutions, manufacturers of building materials and equipment). To accelerate decarbonisation of the overall building stock, the plans and strategies need to include long-term goals and targets, roles and responsibilities of key stakeholders, and a roadmap towards the goals with concrete interim steps. Buildings are owned by a variety of entities, including private households and SMEs, which is quite different from infrastructure such as roads and bridges, which are owned mainly by public authorities. The plans and strategies need to be supported by a comprehensive set of policy packages with not only policy measures for public buildings but a mix of regulations and incentives for the whole building stock. The city of Vancouver has developed a Zero Emissions Building Plan that lays out specific strategies for different types of buildings with a comprehensive set of regulations and incentives, including greenhouse gas intensity limits, tax reduction, expedited permitting and partial relaxation of zoning regulations (City of Vancouver, 2016<sup>[15]</sup>).

#### *Devise effective regulatory frameworks for building decarbonisation*

- **Introduce or strengthen the enforcement of building energy codes:** Building energy codes have not been established in most cities and regions across the globe. When they have, only 70% are mandatory, and too few require zero-energy targets. Considering the extremely low rate of new construction, the first step for cities and regions is to put in place mandatory building energy codes for new construction, where such codes are not set up, and strengthen code enforcement at the design and construction stages. Without effective code enforcement in both design and construction, strict building energy codes alone cannot ensure the energy performance of buildings.
- **Develop a long-term vision for stricter regulations:** Large cities in high-income countries with greater human and financial resources should apply strict standards to new buildings (e.g. zero energy building level). In applying ambitious new standards, cities and regions should develop a long-term vision and ensure clarity for the construction and its supporting industries to prepare for stricter regulations, while paying attention to ensuring housing affordability, especially for low- and middle-income households. The Province of British Columbia has engaged key industry stakeholders and successfully introduced net-zero energy standards, by developing a shared long-term roadmap and interim targets, so that industries can prepare for its ambitious level of requirements (Box 3.1). For small municipalities that are not big enough to influence the private market, it is suggested that cities as a group or a region co-ordinate to create common zero-energy building standards.
- **Explore effective regulations for existing buildings:** While very few cities and regions seem to apply building energy codes to all buildings, some have started to introduce other types of regulatory measures for existing buildings, including mandatory certification of building energy performance, mandatory reporting of energy consumption or carbon emissions and mandatory



emissions caps. Cities should further explore effective regulations for existing buildings, starting from public housing and buildings as well as large commercial buildings. The policy options that cities and regions can explore include requiring a certain level of energy efficiency for existing buildings by a certain deadline, based on energy performance certification, restricting the renting and sale of buildings below a certain energy performance and introducing mandatory energy reporting systems. In particular, mandatory energy reporting can help create the baseline on energy consumption for similar types of buildings against which property managers can compare their own energy consumption and examine energy efficiency measures. This will also lay the groundwork for more stringent regulations such as carbon emissions caps for existing buildings. The city of San Francisco has introduced an energy benchmarking ordinance requiring annual benchmarking and disclosure of energy performance of commercial buildings and multifamily housing. It resulted in a 10% reduction of energy use in four years (SFWPS, n.d.<sup>[16]</sup>). Cities and regions also need to consider offering financial support to alleviate the impact of regulations, particularly to vulnerable households and SMEs.

### *Introduce effective monitoring and evaluation for policy outcomes*

- **Assess local policy environments using available local data:** As noted in Chapter 2, policy environments differ across cities and regions depending on climatic conditions, the characteristics of building stock (e.g. size, type, tenure, age, energy performance), construction activities (e.g. the rate of new construction and renovation), energy and carbon emissions outcomes, and socio-economic conditions (e.g. housing affordability, energy poverty). However, these data are not always available at subnational level for policy making and comparable across cities and regions. Cities and regions need to compile the local data and indicators available to assess local policy environments and trends and expand datasets, by obtaining subnational breakdown of national data and exploring local data collection on key indicators.
- **Develop outcome-based indicators to track the outcomes of policy against subnational targets:** Monitoring and evaluation is needed to explore effective policy measures, and to identify areas where more public support is needed. Current subnational practices typically have ambitious long-term targets and short-term individual programme outputs (e.g. the number of renovated housing units in a subsidy programme, or the energy performance of buildings in a newly developed low-carbon district). To evaluate their policy outcomes against their targets in energy or carbon emissions reduction, cities and regions need to know how much the energy performance of buildings has improved and how much energy consumption or carbon emissions have been reduced as a result of the improvements, not only for buildings involved in subnational programmes, but also for the overall building stock. Tracking the energy performance and energy consumption of private buildings is challenging without comprehensive regulations for systematically collecting such data. Cities and regions need first to track energy performance and energy consumption in buildings with the local data available. Monitoring schemes, such as mandatory energy performance certification at the point of sale or rent or mandatory energy reporting systems, can help evaluate progress in private properties.

### **Lead by example**

#### *Leverage public buildings and procurement for broader objectives*

- **Apply stricter energy efficiency requirements to public buildings:** Subnational governments own a large number of public buildings, including government offices, public schools and public housing. Given the difficulty of motivating individual property owners, prioritising energy efficiency improvements in public properties can jump-start progress in building decarbonisation. Given limited public budgets, the priority should be public buildings. Most cities and regions (95%) that

responded to the OECD survey already promote energy efficiency measures for public buildings. Cities and regions should first consider applying higher levels of energy efficiency requirements, such as zero-energy buildings, to their public buildings.

- **Use public building projects to promote broader energy efficiency investment:** Cities and regions can use public building projects (e.g. energy efficiency renovations, installing smart meters, new construction) as an opportunity to explore and test new technology (e.g. digitalised energy management, new building materials) and business models (e.g. ESCOs) and to give local businesses a chance to test and improve the knowledge and skills acquired in real projects. Energy savings and health benefits should be monitored before and after renovation, to make the business case for private investment and to incentivise the public. Cities and regions can work with private companies, as in the *Energiesprong* programme (Box 3.2) and Knauf Energy Solutions in Belgium (Knauf Insulation, 2021<sup>[17]</sup>).
- **Adjust public building procurement processes to consider the benefits over the building life cycle:** Public building procurement processes need to be adjusted so cities and regions can select contractors based on the value created over a building's life cycle. The criteria used in public procurement often focus on the costs upfront, which discourages the introduction of innovative technologies and business models.

#### *Promote pilot projects*

- **Promote pilot projects:** More than half of the cities and regions surveyed (57%) promote pilot and demonstration projects. These are needed to experiment with new technologies and solutions, to examine possible options and results for building decarbonisation, to showcase the benefits to a wider audience and to raise public awareness of building decarbonisation. Cities and regions can identify development opportunities in the context of urban regeneration and actively co-ordinate pilot projects such as low-carbon district developments or mass renovation programmes. As in the case of public building projects, cities and regions can negotiate with developers or building owners to track energy outcomes and produce compelling evidence.
- **Leverage green finance to boost energy efficiency investment in buildings:** Limited funds are the greatest obstacle to enhancing energy efficiency in buildings faced by cities and regions, together with the lack of financial incentives for property owners. Cities and regions should take advantage of green finance to fill the financing gap in subnational budgets to fund building decarbonisation programmes. The Metropole of Lille in France, for example, included energy efficient renovation investment in its EUR 66 million recovery plan (OECD, 2020<sup>[18]</sup>) Multilateral development banks such as the European Investment Bank and the Council of Europe Development Bank offer cities and regions loans to invest in energy renovations (EIB, 2021<sup>[19]</sup>). Cities and regions can also consider issuing green bonds for building renovations, as in the United States (U.S. Department of Energy, n.d.<sup>[20]</sup>)

#### *Encourage innovative business models*

To secure social and political buy-in for energy efficiency measures among key stakeholders, they must be convenient, reasonable and meaningful. Some businesses try to realise this by introducing innovative business models, such as financing upfront costs by future energy savings (e.g. ESCO), reducing the cost and time of energy efficiency renovations by using prefabricated walls and roofs, providing clear evidence of the energy-saving benefits by introducing a real-time energy-tracking system, and developing high-performance building materials. Cities and regions should consider encouraging and promoting such innovative business models, using public building procurement and pilot projects and creating a platform for property owners and businesses, including entrepreneurs and SMEs. To take advantage of economies of scale and cut costs, some renovations should be bundled. Energy efficiency renovations also reduce

district energy needs, where district heating is installed. Beyond public buildings, cities and regions can consider facilitating renovations at a district or neighbourhood level, invite private investment and reduce production costs. Dutch municipalities, for example, are responsible for planning and co-ordinating the transition to natural-gas-free neighbourhoods, with financial support from the national government (PAW, n.d.<sup>[21]</sup>).

## **Engage all stakeholders**

### *Raise awareness among citizens and local businesses*

Nearly 60% of the cities and regions surveyed consider broader engagement of citizens and the private sector and greater awareness raising as among their key priorities. They are close to citizens and local businesses and well-placed to raise awareness among them. They can also promote advisory services for general households. The Brussels Capital Region in Belgium provides citizens with technical assistance services on renovating condominiums and co-operating with the private sector (Cicmanova, Eisermann and Maraquin, 2020<sup>[22]</sup>). Another option available is to compile evidence on the status and benefits of building decarbonisation from public buildings, pilot projects and other resources and inform citizens about them. Paris, for example, provides a digital map with basic building data such as area, construction periods and energy performance, to facilitate building renovations (APUR, 2021<sup>[23]</sup>).

### *Provide technical and financial support for low-income households and SMEs*

- **Offer technical and financial support to low-income households:** Energy poverty is a pressing issue in many countries. In addition, 89% of cities and regions surveyed view reduced energy bills for low-income households as a primary benefit of energy efficiency in buildings. Upfront investment in energy efficiency measures may increase housing costs for these low-income families, however. Due to historically poor investment in the built environment of low-income neighbourhoods, they are especially susceptible to heat island effects. Energy efficiency renovations will also improve housing conditions and residents' health and well-being. Cities and regions need to incentivise technical and financial support for improving the energy efficiency of low-income housing, as does British Columbia, which provides free energy-saving equipment installation for low-income households (CleanBC, 2022<sup>[24]</sup>).
- **Provide technical and financial support to SMEs:** Governments often provide broad technical and financial support to households in energy efficiency measures. Although SMEs account for 30% to 60% of energy consumption in the business sector and have limited technical and financial resources, they are not usually targeted for such greening measures. Cities and regions can provide technical assistance on energy management, including small adjustment on equipment and appliance management as well as financing (e.g. loans and loan guarantees) to energy efficiency renovations by building owners that rent space for SMEs. Italy's Emilia Romagna region, for example, offers SMEs energy diagnosis support (Emilia Romagna STARTUP, n.d.<sup>[25]</sup>).

### *Build capacity in subnational governments and local industry*

- **Promote capacity building in subnational governments:** Cities and regions cited insufficient human resources and technical expertise as a major obstacle to building decarbonisation. Lack of technical expertise and human resources for such core functions as plan making, code enforcement and public building contracting can hold back policy implementation. Cities and regions should take advantage of local resources such as universities and research institutes and collaborate with local businesses to address the lack of technical expertise. They can also optimise the available opportunities provided by national authorities and expert associations.

- **Facilitate skills development of the local workforce:** Chapter 4 identified the lack of resources in local industries as a key obstacle faced by cities and regions. Many countries note that labour shortages must be addressed to scale up green investment. Cities and regions can work with local industries, identify local skills needs and provide training for the local workforce. They can also collaborate with private companies and entrepreneurs to test cost-efficient methods of energy efficiency renovations (e.g. prefabricated walls and roofs that reduce costs and construction time) to address shortages of skilled labour.

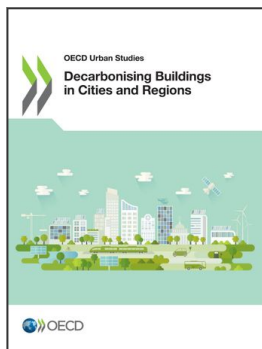
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