



European post-carbon
cities of tomorrow



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DRAWING LESSONS FROM GOOD CITY PRACTICES: PROMOTING POST-CARBON TRANSITIONS

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TABLE OF CONTENTS

SUMMARY	2
1 INTRODUCTION	2
2 ACKNOWLEDGING THE DIVERSITY OF CITIES	2
3 POLICIES AND INITIATIVES	4
3.1 A STRATEGIC APPROACH TO POST-CARBON TRANSITIONS – THINKING ACROSS SECTORS AND TIME HORIZONS	4
3.2 PROMOTING POLICY AND INSTITUTIONAL LEARNING, AND INCREASING THE EVIDENCE BASE	6
3.3 DEMONSTRATION AND VISIBILITY: RAISING ATTENTION AND AWARENESS AMONG URBAN POLICY-MAKERS, CITIZENS AND OTHER STAKEHOLDERS	7
3.4 SECTOR-SPECIFIC POLICY INITIATIVES	7
4 CONCLUSIONS AND POLICY RECOMMENDATIONS FOR MOVING CITIES TOWARDS POST-CARBON FUTURES	8
RECOMMENDATIONS FOR POLICIES TO PROMOTE POST-CARBON TRANSITIONS IN EUROPEAN CITIES	9
REFERENCES	10

LIST OF ABBREVIATIONS

CEMR	Council of European Municipalities and Regions
CO ²	Carbon dioxide
COP 21	21 st Conference of Parties for the UN Climate Convention
EU	European Union
ICLEI	Local Governments for Sustainability
NGO	Non-governmental organisations

SUMMARY

The transfer of good practices among cities in Europe has been an important driver of local climate action since the forerunner cities became active in climate policy in the early 1990s. Although lesson-drawing has taken place since then, particularly by forerunner cities, there are also limitations. The diversity of cities with respect to their size, geographical location, social and economic structures and their position within national governance systems needs to be acknowledged. Still, lessons can be learned in different areas: i) strategic approaches to post-carbon transitions, ii) evidence-based institutional learning, iii) visibility and awareness-raising through demonstration projects, and iv) sector-specific initiatives (for the built environment, transport, waste, urban planning, etc.). Given the diversity of cities and towns in Europe, there is no one-size-fits-all approach. However, certain preconditions are needed: post-carbon transitions require political and administrative leadership, a broad integration of and support for post-carbon objectives and initiatives, and the participation of citizens and stakeholders. In addition to charismatic leaders at a local level, transitions need to be supported by the member states and the EU.

1 INTRODUCTION

The threat of climate change and the importance of reducing emissions of greenhouse gases such as CO₂ are widely acknowledged. Consequently, a new agreement was reached at the 21st Conference of Parties for the UN Climate Convention (COP 21) in Paris, with the objective of holding the global average temperature below 2°C above pre-industrial levels by mitigating global greenhouse gas emissions. Although this is a step in the right direction, the question remains of how the agreement will be shaped in practice to achieve a post-carbon future.

Cities play a major role in reducing carbon emissions. Urban areas are not only the main producers of CO₂ emissions, accounting for approximately three-quarters of total global carbon emissions, but are also key players in initiating and steering a global post-carbon transition. They can act as important places of experimentation, innovation and climate leadership (Andonova et al., 2009; Jensen et al., 2013). The creation of post-

carbon cities will not only reduce the amount of carbon emissions but moreover bring additional benefits at the local level, such as air quality improvements and increased energy security.

Cities learn from each other. It is, however, important to acknowledge that cities learn different things and do so in different ways and at different speeds (Kern et al., 2007; Bulkeley, 2010). Learning and transfer are fundamental to post-carbon transitions but they are also fundamentally dependent on contextual factors. Ultimately, as Meadowcroft (2009) has emphasised, transitions are a very political process, defined by local conflicts as much as learning processes. No matter how they unfold, post-carbon transitions will retain a degree of unpredictability and will produce losers as well as winners.

For achieving these goals, it is crucial to gain a deeper understanding of how carbon emissions can be mitigated. Therefore, POCACITO assembles and evaluates good and best practices in small, mid-sized and big cities to advance the post-carbon vision. In this policy brief, we present the lessons learned from this research for policy-makers and identify the crucial points for developing strategies, policies and measures to promote post-carbon transitions in cities. This document presents a strategic approach towards a post-carbon transformation (Döhler et al., 2014). In doing so, this policy brief suggests grouping cities based on their characteristics as a first step to finding the most suitable solution for each city. Still, it should be noted that this is not a mandatory approach but merely a starting point to develop individual pathways towards post-carbon transitions. Next, the policy brief summarises important aspects that were identified based on the analysis of good practices in European cities that promote post-carbon transitions, concerning i) strategic approaches, ii) institutional learning, and iii) key urban sectors.

2 ACKNOWLEDGING THE DIVERSITY OF CITIES

For finding suitable transition pathways and thus enabling a post-carbon future, it is essential to acknowledge the diversity among cities and to be aware of their various contextual conditions stemming from long-, medium-, and short-term social, cultural, economic and political processes in the past as well as the present. Possible pathways

towards carbon neutrality are considerably shaped by those processes and the resulting urban conditions. Whereas one climate policy may work in a certain context, it can be utterly ineffective in another. Thus, since not every measure can easily be transferred from one city to another, it can be useful to look at the municipal policies of cities that have similar contextual characteristics and learn from their actions. Existing policies can and should be developed in a way that matches the needs of one's own city.

For facilitating the transfer of policy lessons, we suggest matching cities that share core characteristics. We identify the following defining aspects as particularly significant for determining useful pathways to post-carbon transitions: city size, urban diversity and social capital, geographical location and biophysical conditions, national and local governance systems, and the local economy.

The *size of a city* plays a major role in developing a transition pathway. The size of the population and its changes as well as its urban form, i.e. dispersed or densified, old or new, multifunctional or zoned, affect the possibilities of a city to act. For example, congestion and air pollution are closely linked to motorised transport and are usually higher in bigger cities, yet such cities often have a wider range of opportunities for investment in public transport, car sharing, bicycle networks and park-and-ride systems to address the problems.

Cities with larger populations might also be able to develop greater expertise and, for instance, establish energy agencies within their administrations or rely on local energy companies, whereas smaller towns may lack specific skills and often obtain their energy from elsewhere. Developments in city size and the differences between growing and shrinking cities should also be taken into account. The opportunity to push post-carbon urban agendas is further dependent on the urban economy, which is typically in a better situation in growing cities than in shrinking cities. The latter may face significant social and economic challenges on top of the post-carbon ones. Even prospering cities, which have the means to build new energy-efficient buildings and districts, may not succeed in retrofitting existing buildings.

Whereas broadly dispersed cities might face difficulties in developing an efficient public transport system or promoting bike lanes, densely populated areas can take advantage of their density

to build energy-efficient buildings. At the same time, green spaces and parks may be sparse and thus impact on the air quality, health and well-being of urban residents.

Important for the *social capital* of individual cities is the *diversity of residents, cultures and their socio-demographic composition*. Cities are heterogeneous with respect to their character, urban form, their contexts and historical trajectories. Cultural and socio-demographic heterogeneity and the diversity of residents must be considered when setting the agenda for the post-carbon city and in particular for implementing specific measures. Moreover, the cultural and socio-demographic diversity can be used as a stepping stone for developing and promoting novel transition paths, although it is also potentially a challenge for the change towards a post-carbon city. Thus, these factors should be taken into account directly or at least indirectly when developing policies that promote post-carbon futures. While considering pathways to a post-carbon future, social issues should not be forgotten. It is not only technical measures that enable a city to develop, but also the social aspects are a highly valuable good. Equality/equity, the inclusion and participation of citizens help to ensure that policies work and are accepted. Hence, it proves beneficial to look at cities with a similar cultural background to anticipate how citizens may participate in or react to specific measures.

Other factors that should be taken into account are the *geographical location and the biophysical characteristics* of a city. The existence and availability of renewable energy sources, such as wind and water, often helped by the city's proximity to the sea or a high number of sunshine hours, facilitates a smooth transition to a post-carbon future, as does the mobility infrastructure that connects the city with other (local, regional, global) cities and their hinterlands. But closeness to the sea simultaneously increases the threats of rising sea levels, flooding and storms. The probability of natural disasters due to volcanoes and earthquakes or being located on an island can also be game-changing factors. Depending on the climate zone, heating or cooling facilities might be needed and green roofs or urban gardening might be cost-efficient or not economical at all. The same is true for the existence or non-existence of forests or agricultural land in the surrounding areas.

In addition, the *national governance system* defines a city's range of policy actions and determines the ways in which policy-making and governance are carried out. In some countries, such as Sweden, the governance system is highly decentralised and cities can make decisions largely independently within the nationally set framework conditions, whereas in other countries, such as the UK, city planners are more dependent on central decisions. The possibility of taxing the citizens as well as the overall financial situation has a huge impact on a city's scope for action, and is conditioned by national taxation laws and regulations. Thus, city governments cannot always rely on the same voluntary or mandatory regulatory instruments but are limited in their opportunities for action by the distribution of power among government levels, the systems set up to facilitate governing and the national governance system.

The *local economy* of a city accounts for a major part of its finances. It also influences the ways in which a city can become carbon-neutral. The transition depends on the main economic sector of a city, be it heavy industry, services or manufacturing. For example, while a focus on research in greener technologies or on energy efficiency in general facilitates the transition, cities that depend on car manufacturing need to change their economic focus and/or switch to manufacturing climate-neutral cars. The current economic situation strongly affects which path a city can take towards a post-carbon future.

Additionally, the pathway must always be based on the current situation, infrastructure and general urban conditions, including the progress of post-carbon policies that have already been initiated or are being implemented. Cities with high shares of green or blue spaces (or both) potentially have advantages, since they have the infrastructure in place, but it also may become more complicated if basic steps have already been taken. The improvement of a brownfield site, for example, is a relatively easy step, whereas an entirely built-up city is more difficult to transform.

Thus, developing a city's pathway requires a more differentiated understanding of what is possible for cities in varying contexts and at differing stages of their transition. For achieving carbon neutrality, it is useful to first consider the basic conditions of a city, such as size, geographical location, governance system, economy, social capital and diversity, and then compare these with developments in other

cities that share similar preconditions and face similar challenges. Policy-makers can learn from their mistakes as well as from their good or even best practices.

3 POLICIES AND POLICY INITIATIVES

Across the over 200 cities examined in the POCACITO inventory, general lessons for future policies emerge. These lessons feed especially into defining the policy problem, agenda setting, policy formulation, implementation and evaluation. The findings are presented in this section and grouped around i) strategic approaches, ii) policy and institutional learning that increases the evidence base, visibility and awareness, and iii) main sectoral areas. Following this, we outline and specify the key lessons learned.

3.1 A STRATEGIC APPROACH TO POST-CARBON TRANSITIONS – THINKING ACROSS SECTORS AND TIME HORIZONS

To acknowledge, promote and maintain transitionary initiatives and channel these into a general approach requires action in problem definition, agenda setting, policy formulation, decision-making and policy evaluation, aligned with the steps of the policy cycle. Based on the differences among cities, the crucial aspect for developing transitionary actions and initiatives that gain momentum is the presence of local players who manage to pick up the ball and mobilise support, not least in situations that offer the opportunity for actions, such as rebuilding residential areas after flooding. This may result in actions that gradually place transition initiatives on local agendas and open the opportunity for change, like a change of the energy system based on renewable energy. Furthermore, as post-carbon urban economies require paradigmatic changes of urban governance and a redesign of the built environment and urban infrastructure, e.g. transport and energy systems, some cities opt for carbon-neutrality only as part of a medium- and long-term perspective. Carbon-neutrality indicates a flexible approach to the post-carbon transition that can be adapted to changing contexts as the transition progresses. Specifically, carbon-neutrality denotes that the city does not produce more greenhouse gases in the city than it reduces

greenhouse gases in other places and vice versa. Since most cities face challenges from fossil fuel-based transport (via roads or water), this challenge can be mastered by exporting renewable energy that will reduce carbon emissions elsewhere. Adopting a strategic approach to urban transitions promotes post-carbon and carbon-neutral agendas in cities. A strategic approach to post-carbon transitions implies that policy sectors, actors, and time horizons become integrated into an overall and comprehensive process and strategy. The key factors that enable and propel this are presented below.

First, and perhaps most importantly, *leadership* in some cities is overarching and has underpinned the preconditions mentioned above and supported post-carbon transitions. An example from Switzerland is the transition of the energy sector in Martigny. In Denmark, the urban development agenda in Copenhagen has resulted in an overall urban vision and strategy revolving around becoming carbon-neutral by 2025 and reflecting on the development of an increasing number of comparable cities. The city's administration must provide leadership in climate governance and set a good example by, for example, having high environmental standards in its facilities and promoting bicycle commuting among the city's employees. The city's government and administration also play a huge role in reshaping the city's identity towards being green and carbon-neutral and promoting its post-carbon identity externally.

Second, the formulation and effective implementation of *local urban action plans* are core enabling factors at a strategic level, closely linked to leadership and overall vision. Local urban action plans are in many cities based on evidence and influenced also by national sectoral policies, for example on energy or transport issues, and entail setting specific and measurable targets.

Third, along with involving stakeholders and providing leadership, recognition of the *different time horizons for individual policy actions* is crucial, i.e. short-, medium- and long-term objectives must be kept in mind. It is just as important to implement smaller and short-term actions as to develop long-term visions for a city. In addition, mid-term targets should be valued and promoted since these provide a measure for evaluating progress and potential drawbacks towards

achieving the goal of a carbon-reduced or zero-carbon future.

Fourth, cities that formally *organise post-carbon actions and initiatives across policy areas*, which are usually separate from each other, are more likely to embark on the post-carbon transition. The post-carbon objective needs to be coordinated across sectors so that departments cooperate and actions do not impede one another. Thus, the establishment of cross-departmental offices or permanent working groups addressing transition within not only energy but also a range of relevant urban policy areas enhances efforts towards a post-carbon future and includes civic stakeholders, as demonstrated in Essen, or merges financial and environmental administrations, as in Hannover.

Fifth, when cities manage to develop narratives and *link them to adjusted or reformulated urban identities*, the post-carbon transitions may turn into a driving force and become accepted beyond environmental policy and planning. This has been the case in Malmö and Copenhagen, both of which have strived to formulate a narrative that has become central to the post-carbon identity of the city.

Finally, cities that *identify and respond to public actions or publicly voiced concerns* can potentially embed and gain support for transitions across local government agendas, as demonstrated in Germany by the anti-nuclear power movement in Freiburg, and in the UK by the transition town projects in Totnes. Residents and other stakeholders, such as local businesses or NGOs, should be included in the planning as well as the implementation process. The inclusion of citizens and other stakeholders holds the potential for co-sharing ownership, which supports the post-carbon transition through the actions taken by a wide range of social actors, thus enhancing their commitment and engagement. Moreover, these actors can give valuable advice on the measures that might be useful for a particular district or the city in its entirety and which ones would not be accepted, as well as provide the local data necessary for evidence-based transitions if not yet collected systematically at the local level. Residents often have fundamental insights and an understanding of local conditions, e.g. on the optimal location of new infrastructure, such as a new bike or bus lane, and where changes might be unnecessary. Provided with the option of genuine involvement in decision-making, residents are most often motivated to actively contribute their

knowledge and skills to the city's development and suggest valuable ideas to the planning process. The extent of involvement and the steps of the policy cycle in which participation is integrated differ with respect to the context and depend on the city, engaged citizen groups and the measures to be developed and decided. Especially the younger generation possesses a high degree of motivation and creativity, and may offer important new perspectives.

3.2 PROMOTING POLICY AND INSTITUTIONAL LEARNING, AND INCREASING THE EVIDENCE BASE

A second aspect relates to the level of skills, knowledge and capacity of city councils and city administrations. The examination of cities has revealed measures that enhance the knowledge base for developing targeted post-carbon initiatives and introducing approaches to manage fundamental changes. Moreover, in realisation of the scope of changes that are often needed to enable and promote post-carbon transitions, some cities have stressed the importance of developing new institutions, which can continually advance new policies, measures and approaches and which can adapt to changing conditions. The experience of Finnish cities shows that formalised evaluations of visions, strategies and policies may help to develop mid-term objectives and facilitate institutionalised forms of policy and organisational learning.

City partnerships and networks are an important way to institutionalise continual learning and mutual exchange of ideas and knowledge. Formalised collaboration can especially help smaller cities to stimulate policy innovation among urban policy-makers and planners. Networking in collaborative projects can support knowledge sharing and the joint development of ideas and solutions to practical problems. Thus, it is essential to evaluate and further develop the climate actions best suited to enabling a city to reach a tailored post-carbon future.

Some cities also take advantage of learning through urban living labs by using real-life urban experiences to develop and test measures within the framework of particular city policies. Experiments in one or two districts help in evaluating the actual effectiveness of an idea and provide basic knowledge on the costs and benefits

of a measure. Using the city as an urban living lab also offers a way to involve the city's stakeholders in urban development. New technologies, participatory models, infrastructure and general ways of living can be tested under real-life conditions. This has led to novel measures and adjusted urban plans in some cities (e.g. Lisbon), often involving co-benefits for other urban policy areas without higher costs for the city council. Experiments show how people react to changes in their district and test different forms of citizen and stakeholder participation that potentially generate new ideas, for example on urban climate adaptation, as is the case with the Skt. Kjelds Neighbourhood in Copenhagen. Such examples can act as role models for other parts of the city or even be transferred to similar districts in other cities.

In many cities, and closely aligned with the cultivation of capacities for institutional and policy learning, the compilation of comprehensive datasets promotes actions towards post-carbon transitions. Relevant, adequate and accessible data can serve to generate the scientific knowledge base for taking action. Developing city administrations as learning organisations as well as facilitating urban living labs requires research and knowledge production on climate change and post-carbon technologies. It is also crucial to share scientific and practical results among relevant actors, including residents, other stakeholders and decision-makers. Moreover, it is important to recognise that the ongoing sharing of research and information enables an evidence-based approach towards a post-carbon future. This includes not only collection of data but also analytical capacity to innovate and specify approaches to manage the tasks of basic or major changes of the city. In France for example, Nantes has made a continual effort to develop the scientific, analytical and political approaches to changing the city's economic, political, material and social structures. Copenhagen has designed and regularly updated databases that provide information and document the development of different sources of CO₂ emissions, including the city's CO₂ account and its green account for transport. These examples show that updating such databases regularly requires resources and coordinated actions.

3.3 DEMONSTRATION AND VISIBILITY: RAISING ATTENTION AND AWARENESS AMONG URBAN POLICY-MAKERS, CITIZENS AND OTHER STAKEHOLDERS

European cities that have embarked on transition pathways also demonstrate the importance of visibility and shared knowledge and experiences. The cities specifically use two different ways to highlight and share their actions: demonstration projects and participation in national/transnational city networks.

Implemented climate actions should be made visible not only for other cities to learn from them or due to the requirements of national, EU or other international funding, but also for the residents to see the progress towards the carbon-neutrality of their city. Information on what has been done so far and what is planned in the future should be available as part of a transparent process that is open to new ideas. The demonstration of old and new projects, on the one hand, increases and maintains citizens and other stakeholders' motivation to become involved in city development, while on the other hand it stimulates new ideas and policy innovation. Only if urban policy-makers, citizens, and other stakeholders are aware of the need to transition to a carbon-neutral city, may they produce new ideas and improvements, and engage to the degree necessary to initiate and implement the fundamental changes needed to achieve a post-carbon transition.

Demonstration projects play a special role here, because of their high visibility. Through projects that can be visited and for which the impacts can be demonstrated, options that otherwise appear difficult or costly become potential alternatives to existing urban policies. Moreover, demonstration projects develop on an ongoing basis, showing the co-benefits for other aspects of city life, e.g. the recreational value of urban parks, social empowerment from engaging in local carbon-reducing regeneration or better air quality and noise reduction from enhanced conditions for urban cyclists and pedestrians.

3.4 SECTOR-SPECIFIC POLICY INITIATIVES

Cities target specific sectors in the process of changing to post-carbon urban futures. Our

research findings identify five main sectors in which the transition to a post-carbon city is taking place: i) the energy sector, ii) the built environment, iii) the transport sector, iv) waste management, and v) urban planning.

Energy

Not surprisingly, the forerunner cities have identified the urban energy sector as crucial for actions to promote low-carbon cities. Actions within the energy sector cover energy efficiency as well as changes to low or non-carbon-based energy sources. Since one of the biggest sources of CO₂ emissions is energy production from fossil fuels, the transition to renewable energies is essential. Wind, biomass and solar power are all important alternatives to established energy sources. Local power plants and district heating concepts decrease the amount of CO₂ emissions tremendously. In addition, energy productivity and efficiency must be enhanced in order to become carbon-neutral. Diminishing the amount of wasted energy, for example, can be accomplished by making use of the surplus heat from cooling water or upgrading residential lightning and heating/cooling systems. Other examples are local energy-saving technologies that focus on the maximum use of energy, such as utilising shades to reduce heat from sunlight and save household energy production.

Built environment

The urban design of neighbourhoods and overall urban planning of multifunctional cities can foster low-carbon lifestyles and promote more energy-efficient heating and cooling behaviour, low-carbon transport systems and increased use of waste separation systems. Nudging is one method, while the co-location of different functional services of the city can also enhance low-carbon potential. The energy efficiency of the built environment is the key leverage point for reducing urban carbon emissions. Enhanced energy efficiency standards and guidelines for new buildings and the energy-efficient retrofitting of existing buildings are essential. Moreover, cities such as Copenhagen and Venice have focused on encouraging urban stakeholders, including local businesses and residents, to share responsibility for reducing the carbon footprint of the city.

Transport

In most European cities, there is growing recognition of the challenges related to urban transportation, such as motorised car traffic and diesel-powered urban trains. As it leads to high levels of CO₂ emissions – as well as congestion and low urban air quality – which are difficult to control given societal demands for the smooth and increased mobility of people and goods, this area of urban policy is receiving rising attention. The main focus here is a shift towards promoting soft and non-motorised transport, often in combination with multi-modal options whereby the appeal of walking and cycling is increased for different groups of citizens.

Building on experiences from various cities, notably Rotterdam, Amsterdam, Copenhagen, Freiburg and Cambridge, a range of instruments is needed to promote low-carbon transport. Urban design should motivate walking, cycling and the use of urban trains, and reduce the use of cars and lorries. Pedestrian and bike-friendly infrastructure should be built to stimulate non-motorised and multi-modal transport, e.g. which allows bikes on trains and buses, and offers simple and low-priced ticketing systems, thereby reducing motorised traffic and congestion and improving the safety and well-being of users. By encouraging bike and car sharing schemes as well as public transport, people's commuting habits can be changed. Through encouraging the use of walking and cycling for everyday trips and through developing cycling technologies, such as family and cargo-friendly box-bikes or lock-in parking stations to prevent bike thefts, long-established habits have been shown to change towards more low-carbon urban transport systems.

Waste

The increasing amount of waste causes problems, especially in cities. Although waste is a burden, it can also be regarded as a resource and be used for energy production. Nevertheless, the reduction of domestic, commercial and industrial waste is essential. The separation and cutback of waste as well as the use of recyclables should be facilitated and advocated. Urban mining will most likely gain in importance in the future because many natural resources, for example the resources needed to produce smartphones, have become scarce and will need to be reused systematically in the future.

Urban planning

The last leverage point for a post-carbon transition is urban planning, i.e. the planning of buildings, streets, parks and in some cities, riversides and waterfronts. The overall aim should be to avoid urban sprawl and instead foster the compactness and density of a city, for example by reusing brownfield sites. Urban design is especially important because of its cross-sectoral character and ability to foster low-carbon lifestyles. All five sectors – energy, the built environment, transport, waste and urban planning – should be integrated into a multi-actor and multi-perspective approach in order to reach the goal of becoming carbon-neutral.

4 CONCLUSIONS AND POLICY RECOMMENDATIONS FOR MOVING CITIES TOWARDS POST-CARBON FUTURES

In this final section we summarise the policy implications for encouraging cities to develop strategies, policies and measures for post-carbon transitions. One important finding is that there is no one-size-fits-all approach. Local conditions need to be taken into account in seeking to develop post-carbon cities, in particular the size, geographical location, local economy and socio-demographic composition of their populations. Moreover, each city has to take advantage of local strengths and vulnerabilities, i.e. its social, political, economic and biophysical preconditions for action. That said, we can draw lessons for local, national and European policy-makers that may assist post-carbon transitions in cities.

Overall, urban transitions to post-carbon futures are conditioned by *political and administrative leadership* that maintains momentum towards achieving post-carbon objectives and keeps them high on the urban policy agenda. The challenge is how such leadership can be institutionalised and thus be less dependent on specific political alliances and individuals who are identified with post-carbon policies. This is related to *applying a strategic and flexible approach* to achieving the urban transition, which puts a spotlight on *policy, institutional learning*, innovation and general capacity.

For post-carbon agendas to take root and make a difference to the future of cities, policy-makers

need to ensure the *broad integration of and support for post-carbon objectives and initiatives*. Across the different urban policy sectors, post-carbon objectives must be acknowledged, integrated and able to shape how sectoral policies are developed in coordination with, rather than in opposition to, post-carbon agendas. Equally, it is crucial to foster wide ownership of post-carbon futures among social actors, individuals and businesses. Shared ownership may be supported by highlighting exemplary cases of post-carbon measures and by promoting the city as post-carbon in wider regional to international contexts. Such branding may additionally serve to increase awareness beyond local stakeholders and stimulate interest in post-carbon urban issues and policies. The policy integration of post-carbon initiatives may also be supported by including citizens and businesses in all stages of the policy circle, in particular in identification of local challenges, policy development, implementation of actual measures, and through awareness-raising activities. Promotion and support from higher levels of policy-making, including the EU, for the integration of post-carbon objectives across local as well as national policy areas would increase the legitimacy and the urgency of post-carbon objectives.

Related to this, targeted actions, social and technological innovation, and dedicated leadership are important, especially in the areas of energy production and use (including efficiency and renewable energy). These efforts are also crucial with respect to the built environment and short- to long-term urban planning, sustainable urban and regional transport, consumption and waste, green spaces, and engaging with schools and educational institutions. Special attention should be given to fostering synergies and initiatives across the sectors.

The integration of post-carbon issues across policy areas and the importance of inclusive policy-making call for the *participation of local policy-makers and urban stakeholders, including citizens*, in transitions to post-carbon futures. Cities are often challenged when faced with the task of taking difficult and sometimes wicked decisions, while at the same time allowing for inclusive and broad public participation in an increasingly complex and heterogeneous social reality. This dilemma points to the necessity of developing and testing new approaches to participatory practices, adapted to specific urban conditions and balancing the

interests and needs of diverse actors, including those of communities, businesses and future generations.

Moreover, the participation of local stakeholders in local policy-making can run in parallel with partnerships with research institutions and city or business networks that serve as platforms for collecting data at city level and thereby *increase the knowledge base* at the urban level. Many cities experience a lack of adequate or sufficiently disaggregated data as a barrier to developing feasible post-carbon policies, which envisage the future and identify pathways to achieve it. An increased knowledge base can thus promote evidence-based policy-making and policy initiatives.

RECOMMENDATIONS FOR POLICIES TO PROMOTE POST-CARBON TRANSITIONS IN EUROPEAN CITIES

Policy-makers at all levels should recognise cities as important players and include them at all stages of policy-making. The diversity of cities should be acknowledged, in particular their differences with respect to size and location, their economy and society, and the position of local governments within the national governance architecture. City action in energy and climate policy cannot and should not be regarded as a panacea, because local policies need to be coordinated with policy-making at regional, national and EU levels.

First, policy-makers at the *European* level need to solve the problem that Europe is divided when it comes to local energy and climate governance. While most forerunner cities are located in northern Europe, continental Europe and the UK, only a few outstanding examples can be found in southern Europe and in Central and Eastern Europe. While cities in southern Europe (in particular Italy and Spain) have joined the Covenant of Mayors in high numbers, most cities in Central and Eastern Europe have not developed feasible strategies. It is important that these differences are taken into account when strategies and programmes for urban areas are developed by the EU. Furthermore, it is necessary to link different EU initiatives aimed at cities, such as the Urban Agenda and the Covenant of Mayors. The Urban Agenda provides chances to link sectoral policies to strategic approaches, including air pollution, energy poverty, social inclusion and equality. The link between cities and the EU could also be strengthened through a

strategic use of EU Structural Funds to finance energy transitions at the local level. Apart from the cities themselves, which are well represented in the implementation of the Urban Agenda, city networks (such as Eurocities) and city associations (such as ICLEI or the CEMR) play an important role as communication channels between the European Commission and European cities.

Second, local energy and climate change policy heavily depends on *national* support. Mandates and legal provisions (such as building standards) can either support or undermine local climate action. For example, if citizens may have the right to connect to the natural gas grid, as in the Netherlands, but forerunner cities like Amsterdam (and Copenhagen) want to disconnect an increasing number of households from the natural gas grid. Although even forerunner cities depend on national funding schemes, special attention needs to be given to capacity building in medium-sized and small cities and to institutional support for the creation of knowledge and skills at the local level. If national schemes do not exist or are phased out, as in the Netherlands, local energy and climate transitions become difficult and ambitious targets cannot be reached. National policies and schemes should be aligned with the EU's Urban Agenda, the UN Habitat's New Urban Agenda and the UN's Agenda 2030.

Third, the *regional* level has been neglected in the debate around local energy and climate policy, although regional authorities are essential for reaching ambitious goals. This is most obvious in most sectoral policies, for example in transport policy. In addition, the regional level is most often optimal for coordinating climate adaption policy. Even in climate mitigation the regional level needs to coordinate and solve conflicts between forerunner cities and their hinterlands, for instance when forerunner cities want to increase the percentage of electricity from wind energy used in the city but the surrounding municipalities reject the construction of windmills just outside the city borders. Finally, regional authorities, such as regional energy agencies, are crucial for initiating energy and climate transitions in small towns and villages, which need to work closely together at the regional level.

Fourth, it needs to be acknowledged by all actors that forerunner *cities* are rather an exception. Most cities and towns in Europe are at best followers or even laggards. Forerunner cities may become

European leaders when they connect to other forerunner cities and try to influence policy-making at regional, national and European levels. Follower cities can make improvements when they join city networks like Energy Cities and participate in national schemes, like the German *Kommunalrichtlinie* or the Danish Climate Municipalities. Laggards should not be left behind. They can still be reached by regional authorities (e.g. counties) or new institutions (e.g. regional energy agencies). It is important to institutionalise climate and energy policy within city administrations and support different forms of networking, not only between cities but also between local and regional climate managers. Local climate and energy policy also needs to include residents and other stakeholders in local decision-making to develop visions for the future and make them work in the long run.

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PROJECT

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