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Decarbonizing European Cities: How to Speed Up and Build Synergies?

Center for Energy
& Climate

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Abstract

Cities are on the front line for enabling governments to meet their commitments under the Paris Agreement. Although cities occupy only 2% of the earth's surface, they are home to between 50 and 60% of the world's population (70% by 2050 according to the United Nations), account for two-thirds of the world's energy consumption and emit 80% of CO_2. As an example, the CO_2 emissions of the city of Berlin are equal to those of Croatia, Jordan or the Dominican Republic. New York's total annual CO_2 emissions are roughly equivalent to those of Bangladesh. Yet their central role not only for adaptation, but also mitigation, has been recognized lately.

Cities need to step up their collective ambition, driving systemic change on the ground. They must therefore position themselves on an ambitious trajectory of emissions reduction (or peaking) to achieve carbon neutrality and climate resilience by 2050 at the latest. To this end, it is absolutely crucial for them to have precise methodological tools and adequate skills to put credible strategies in place.

Although cities have been working towards carbon neutrality for a number of years, in particular through the cooperation and partnership networks of mayors they have chosen to join, the path remains largely uncharted. This is amply demonstrated by the diversity of the paths chosen, the approaches adopted and the tools used. This path is made more difficult by the inherent limit of the nature of cities, namely the territorial limits of their action: this is the whole question of indirect greenhouse gas (GHG) emissions, i.e. those induced by the needs of urban dwellers but not emitted directly in the city. This is a crucial issue when it comes to mobility, which is a major lever for achieving carbon neutrality, but which requires a completely new public policy approach in the absence of convincing results in this area. When looking at the carbon neutrality of a city, the geographical dimension is added to the temporal dimension. C40 identifies two types of approach: the sector-based approach and the consumption-based approach. The sector-based approach takes into account Scope 1 emissions only, i.e. what is directly emitted within the city's geographical perimeter, while the consumption-based approach takes into account emissions for which the city is "responsible", i.e. emissions linked to everything consumed within the city's territory. In fact, the vast majority of the cities only take into account the waste component of indirect emissions, which corresponds to a so-called BASIC level in the accounting standards recommended by the C40.

Against the backdrop of an ongoing resolute effort to decarbonize electricity supplies, European cities should focus not so much on energy

production but rather on the most important levers for action: energy efficiency and mobility. Two fundamental lessons can be drawn from the experience of mobility policies implemented in European cities over the last three decades.

First, one-off measures, which are often the focus of communication and territorial marketing, do not work. The right scale of public action is key. In this respect, there is an urgent need for the cycling policies that are being copied one after the other by the major Western cities to be put back into perspective as part of broader mobility policies. While they are useful for public health, their impact on modal shift is more than limited. Territorial marketing cannot take the place of climate policy.

The second lesson to be learned from these experiences concerns the issue of partnerships between stakeholders: urban decarbonization policies require transformative rather than incremental approaches, combining transport, housing and human activities (leisure, work). As a result, they require long-term partnership approaches in order to secure the political and social acceptance of the citizens concerned. In the case of mobility, the typical example is the relationship between the city center and the suburbs. With the exception of Vienna in Austria, which has been affected to a lesser extent by its century-old public housing policy, the majority of European households live on the outskirts, or even the very outskirts, of towns and cities. In France, CO_2 emissions from city-center road mobility now account for just 2% of individual road mobility emissions, compared with 78% for journeys between the different strata of urban areas (the remaining 20% are from rural areas). The work of decarbonizing mobility has already been carried out in urban centers: this is not where attention and investment should be focused, contrary to public communication by elected representatives and the media, which is obsessed with mobility in the urban hypercenter. Investment in public transport, both rail and road, needs to be massively and urgently redirected towards the suburbs. This is a complex process because it involves sophisticated governance between public players, since the mobility patterns of city dwellers straddle territorial institutional logics. Yet it is the choice of scope that will determine the success of carbon-neutral city strategies.

Innovation is also crucial to enable a more efficient allocation of the financial resources devoted to decarbonizing cities. In this respect, European cities would benefit from taking global action to accelerate the decarbonization of cities in the southern hemisphere. For example, the very high cost of energy efficiency policies in buildings, particularly energy renovation, – from a financial, social and even political standpoint – for limited climatic results raises questions about the relevance of Eurocentric urban strategies when it is in the southern hemisphere that the urban revolution of the 21st century is taking place.

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Introduction

> "We don't yet know what a totally carbon-neutral city would look like"[1].

This observation may come as a surprise given that a large number of cities on every continent have embarked on this path, most of them by 2050, and some well before that date, such as Vancouver (2020!) and Oslo (2035).

In fact, the preamble to the Paris Agreement recognizes the important role played by local authorities in the fight against climate change. Although cities occupy only 2% of the earth's surface, they are home to between 50 and 60% of the world's population (70% by 2050 according to the United Nations), account for two-thirds of the world's energy consumption and emit 80% of CO_2. With most of the world's population and emissions concentrated in cities, they are on the front line, having to take swift action to curb the trend and prepare for possible warming scenarios that could destabilize their operations.

To play this role, cities need to step up their collective ambition, driving systemic change on the ground. They must therefore position themselves on an ambitious trajectory of emissions reduction (or peaking) to achieve carbon neutrality and climate resilience by 2050 at the latest. To this end, it is absolutely crucial that cities have precise methodological tools and adequate skills to implement credible strategies aimed at achieving carbon neutrality. This is the subject of the first part of this report.

Although cities have been working towards carbon neutrality for a number of years, in particular through the major cooperation and partnership networks they have chosen to join, the path remains largely uncharted. This is amply demonstrated by the diversity of the paths chosen, the approaches adopted and the tools used, all of which are discussed in the second section.

This path is made more difficult by the inherent limit to the nature of cities, namely the territorial limits of their action: this is the whole question of indirect greenhouse gas emissions, i.e. those induced by the needs of urban dwellers but not emitted directly in the city. Thus, the issue of the relevant perimeter for action is closely intertwined with that of the most effective levers, a question that will determine the acceleration of the role of

1. L. Tozer and N. Klenk, "Discourses of Carbon Neutrality and Imaginaries of Urban Futures", *Energy Research & Social Science*, Vol. 35, 2018, p. 174-181.

European cities in achieving the objectives of carbon neutrality, in Europe and beyond: this is the subject of the third part of this report.

The role of towns and cities in reducing CO_2 emissions: complex methodological issues

The late recognition of the urban scale in the fight against climate change

It's an oft-repeated fact: in a world that is urbanizing at breakneck speed, cities, where massive CO_2 emissions are generated by buildings and mobility, are going to play an increasingly crucial role in climate change. Just think: the CO_2 emissions of the city of Berlin are equal to those of Croatia, Jordan or the Dominican Republic. New York's total annual CO_2 emissions are roughly equivalent to those of Bangladesh. London's emissions are almost equal to… those of Ireland.

Paradoxically, however, the involvement and understanding of cities in climate change on an international scale came late. It is only recently that they have been recognized as key players in the fight against climate change. Although cities have strong interactions with climate change[2], they have long been marginalized in international forums for decision-making (COP) and reflection (IPCC) on climate change. With regard to the United Nations conferences on climate change (commonly known as "COP"-Conference of the Parties), it is only since COP21 and the Paris Agreement (2015) that cities have been recognized as having a role in dealing with climate change. However, even though they mobilized strongly in parallel with the meeting of heads of state and government, Article 7 designates them not as actors in mitigation, but as one of the actors driving adaptation to climate change. Similarly, the IPCC reports take relatively little interest in cities as actors in both climate change and the fight against climate change. They are generally seen as areas where the risks associated with the consequences of climate change are increasing. However, at its 43th session in 2016, the IPCC decided to include a special report on climate change and cities in the 7th analysis cycle, which will finally be published in 2022.

2. The World Bank refers to an "urgent agenda" when it comes to the relationship between cities and climate change (see "Cities and Climate Change: Responding to an Urgent Agenda", World Bank, 2011. *The Urban Development Series* is edited by Daniel Hoornweg).

Early actions using standardized methodological tools

However, cities have not waited to take up the issue, supported in parallel by research aimed at gaining a better understanding of the link between cities and the climate, and by the creation of major transnational urban networks.

Since the early 2000s, cities and towns across the world have been putting the climate issue on their agendas. The first initiatives to reduce emissions, the first climate plans and the first action guides appeared in 2002 in Helsinki[3], in 2009 in Copenhagen –in the context of COP 15, which failed, mainly because non-state actors (cities and businesses) were not involved in the negotiations–, in 2011 in Rio de Janeiro (*Municipal Law of Climate Change and Sustainable Development*), Seattle[4], Vancouver (*Greenest City Action Plan*), in 2013 in Minneapolis[5], in 2015 in Portland (*2015 Climate Action Plan*). The signing of the Paris Agreement in 2015 obviously gave a boost to these initiatives, and we can cite the rise of this type of plan in 2016 in Adelaide (*Carbon Neutral Adelaide Action Plan 2016-2021*), Boulder[6], Oslo (*Climate and Energy Strategy*), Washington DC (*Climate Ready DC*).

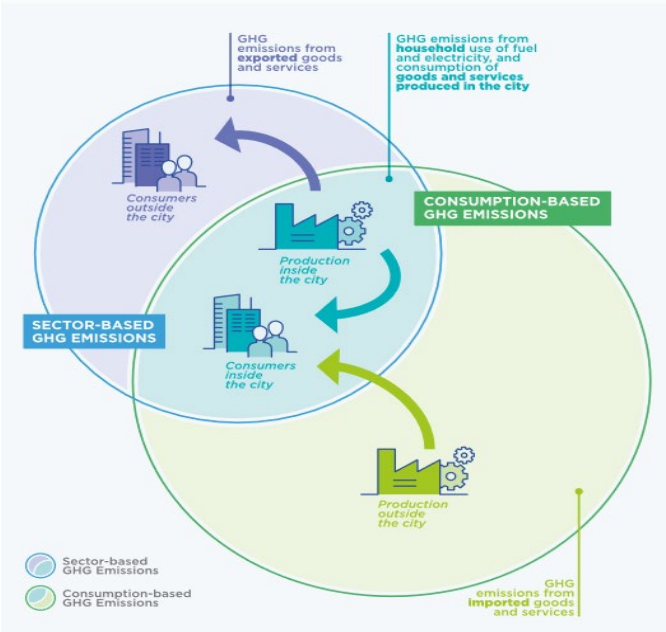
At the same time, because they are not fully integrated into the international dynamic of negotiations and research, cities are organizing themselves into networks to successfully combat climate change, creating a *soft power* that challenges the *hard power* of traditional diplomatic channels. These networks now play an important role; in the twenty years between 1995 and 2015, their number has doubled. The C40, the International Council for Local Environmental Initiatives, the *Carbon Neutral Cities Alliance* (CNCA), the Covenant of Mayors, Energy Cities and the 2050 Pathways Platform, to name but a few. These networks have their own histories, objectives and developments. What they have in common, however, is that they enable cities to define common climate objectives that are often more ambitious than national or international targets, and to exchange ideas within a formal framework to achieve them. To do this, they have developed protocols that provide cities with standard methodological tools. This standardization is essential: in terms of climate action, detailed knowledge of its emissions is an essential first step for a city. The need for comparability with others in order to measure progress and performance is

3. Helsinki first set its objectives for greenhouse gas emissions in a sustainable development program in 2002.
4. Seattle adopted the goal to become carbon neutral by 2050.
5. This city adopted the Commercial Benchmarking Ordinance, allowing building owners and the city to track energy and water usage to determine opportunities for improvement.
6. In December 2016, Boulder City Council formally adopted goals to guide Boulder's climate action efforts.

the second reason why the main city networks have developed common methods for GHG inventories.

When looking at the carbon neutrality of a city, the geographical dimension is added to the temporal dimension. What emissions need to be taken into account in the carbon footprint? C40 identifies two types of approach: the sector-based approach and the consumption-based approach. The sector-based approach takes into account Scope 1 emissions only, i.e. what is directly emitted within the city's geographical perimeter, while the consumption-based approach takes into account emissions for which the city is "responsible", i.e. emissions linked to everything consumed within the city's territory.

Figure 1: Intersection of consumption-based and sector-based GHG emissions of C40 cities

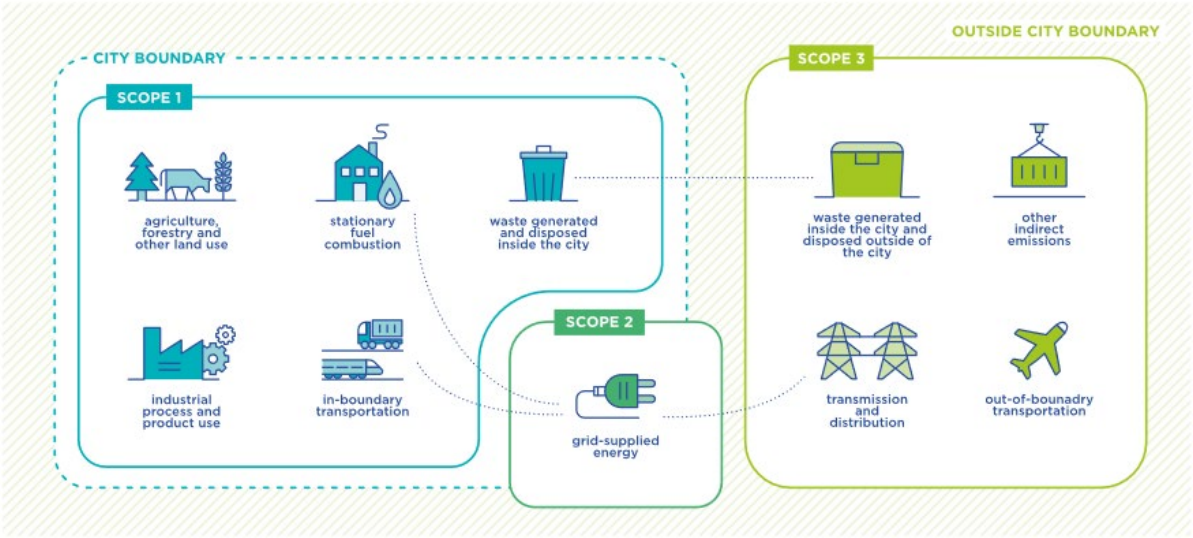


Source: "Consumption-Based GHG Emissions of C40 Cities", C40, March 2018.

Thus, depending on the type of city under consideration (consumption-based or production-based), the choice of one approach or another can lead to a significant underestimation of the emissions for which the city in question is responsible. The C40 concludes: "Cities in these regions, and other cities that have high consumption-based GHG emissions, are recommended to use consumption-based GHG inventories alongside their sector-based GHG inventories, or incorporate key supply chains into the latter. This would encourage more holistic GHG emissions assessments; enable decision-makers to consider a wider range of opportunities to reduce global GHG emissions; and provide an additional perspective with which to

engage other stakeholders in climate action[7]". It is therefore the consumption-based approach that is currently favoured, as it allows us to work in terms of the urban carbon footprint and to introduce policies based on life-cycle analysis. It should be noted, however, that the distinction between producing and consuming cities is useful when it comes to working on the relationships between cities and mapping carbon flows, as we shall see later.

Figure 2: Sources and boundaries of GHG emissions of C40 cities



Source: "Consumption-Based GHG Emissions of C40 Cities", C40, March 2018[8].

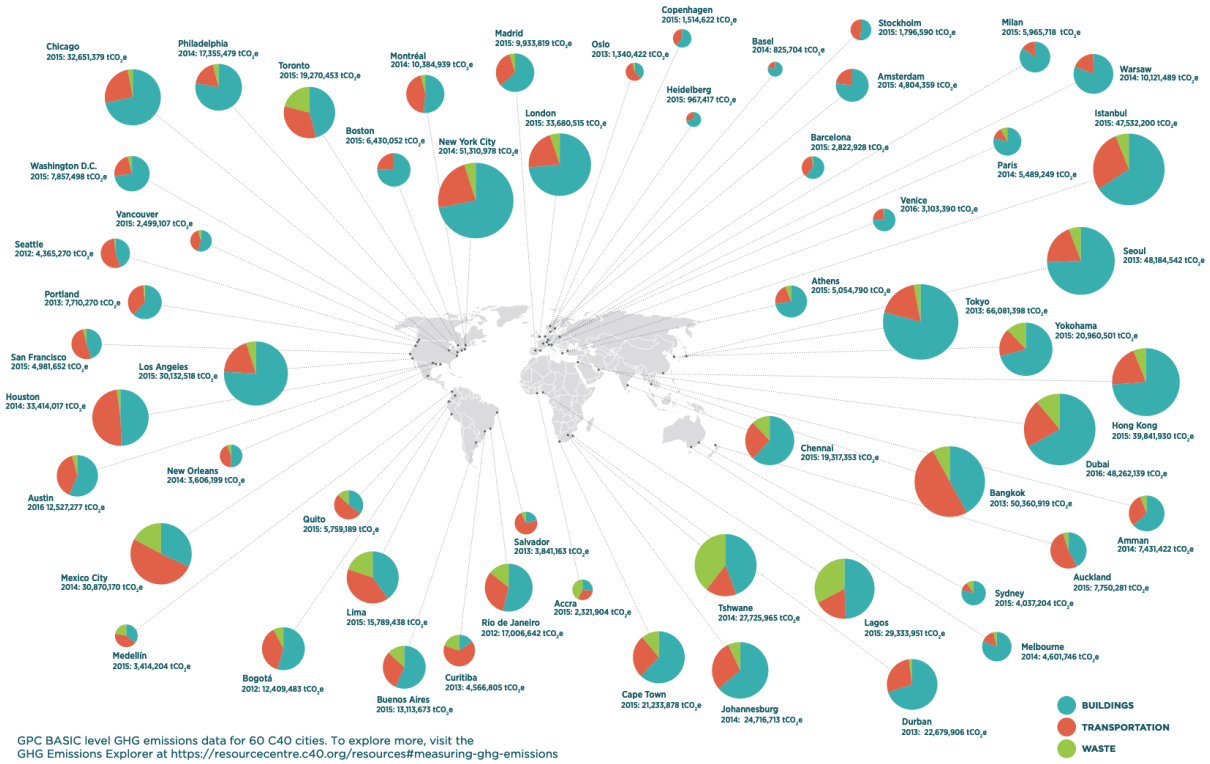
In fact, the vast majority of the cities studied only take into account the waste component of indirect emissions, which corresponds to a so-called BASIC level in the accounting standards recommended by the C40[9]. This can be explained by the complexity of calculating or estimating indirect emissions, or by the complexity of the boundaries of responsibility between the various players, which is particularly acute in the field of mobility. This is a paradox, given that indirect emissions represent a massive or even majority share of emissions. This is all the more true when Scope 2 emissions are very low, due to a very low-carbon energy mix at national level, as illustrated by the example of Oslo, where the 61% of GHG emissions in 2013 came from the transport sector, 19% from waste and 17% from buildings, so that in electrifying public transport a huge step forward can be achieved.

Conversely, the share of so-called stationary emissions, which relate in particular to the heating of buildings, tends to be overweighted. The

7. "Consumption-Based GHG Emissions of C40 Cities", C40, March 2018, available at: C40knowledgehub.org.
8. *Ibid*.
9. Cities have the option of taking transport into account as part of the BASIC + level, but few do.

following C40 map illustrates these different biases and shows that comparisons between cities are sometimes not very relevant, even though the tool was designed to facilitate such comparisons.

Figure 3: Basic level GHG data for 60 C40 cities



GPC BASIC level GHG emissions data for 60 C40 cities. To explore more, visit the GHG Emissions Explorer at https://resourcecentre.c40.org/resources#measuring-ghg-emissions

Source: "GHG Emissions Explorer", C40.

The conditions for effective urban climate action: taking account of the diversity of urban typologies

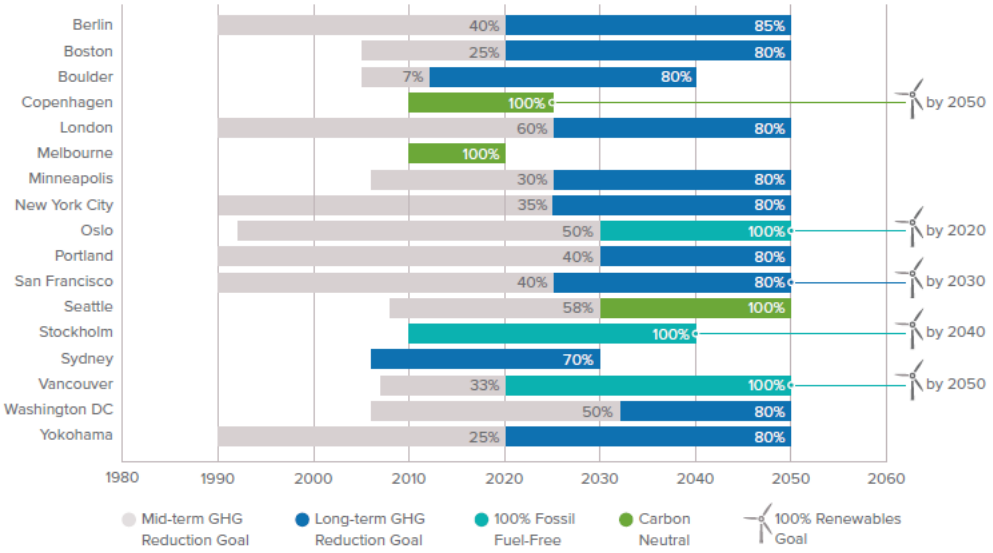
Different timetables and courses of action

Most cities have committed to reducing their GHG emissions within their borders by at least 80% by 2050, in line with the scientific consensus. Beyond this overall strategy, like businesses, the climate action plans of most cities focus on intermediate targets with relatively shorter time horizons, such as 2020 or 2030, accompanied by progressive reduction targets of 20 to 30%.

While the road to decarbonization is sown with uncertainties, in the case of cities there is an additional uncertainty, namely the impact of decisions taken by other levels of governance, in particular the state. The diversity of strategies also reflects the level and coherence of interactions between state strategy and urban strategy.

The typical case is that of the evolution of the energy mix. Not all cities are starting from the same point. For example, the electricity supplies of Oslo, Paris and Stockholm are almost 100% carbon-neutral, thanks to a mix based on hydroelectricity, nuclear power and wind power, whereas most cities have a high percentage of their electricity supply generated from coal and gas. Interactions between national state level and city level can also shape urban strategies. Melbourne's target of 100% renewable energy is based on the assumption that a carbon price will change Australia's energy mix, which is currently 79% fossil-fuel based (56% coal, 21% gas and 2% oil). This is not the case today. As a result, urban strategies vary both in terms of their timetable and their means of action, as shown in the table below, which sets out the strategies adopted in the wake of the Paris Agreement by the most climate-savvy cities in Europe and across the Atlantic, members of the CNCA.

Figure 4: CNCA Cities' Long-Term and Interim GHG Reduction Targets



Source: CNCA[10].

The table is also striking for the diversity of terminology used. In their public communications, some cities choose to emphasize the objective of eliminating fossil fuels, while others focus on a totally renewable energy mix. This is clearly a form of territorial marketing, a tool that is an integral part of cities' attractiveness strategies: these formulas are more inspiring, easier to understand and more "visual" than objectives expressed in terms of emissions reductions. However, this diversity of terminology also reflects very different ambitions and means of achieving them. Some cities have adopted this objective as being limited to electricity, while others envisage it for all fuel sources. In the case of Stockholm, for example, the "100% fossil fuel free" objective refers both to a national objective that aims to rely on nuclear power and renewables and to an urban objective that, within the city limits, aims to substitute clean energy sources for all the fossil fuels used: coal-based boilers for district heating production; fuel oil for building heating boilers, district heating, industry and shipping; natural gas for heating boilers, cookers and vehicles; oil for road vehicles; diesel for road vehicles, machinery construction, and shipping; aviation fuel; and fossil fuel-based plastic in waste supplied to heating plants.

10. "Framework for Long-Term Deep Reduction Planning", CNCA, 2018, p. 3, available at: https://carbonneutralcities.org.

Climate strategies, a reflection of urban forms and activities

The fact that not all cities have the same distance to cover to achieve the goal of carbon neutrality is also due to their specific characteristics, linked in particular to their urban form and the nature of the activities they host. Recent research[11] has produced a typology of cities according to the extent of their impact on the climate. An international team of researchers[12] has examined the emissions of 13,000 towns and cities with the aim of creating a coherent model for assessing the carbon footprint of towns and cities on a global scale, to demonstrate the importance of the role of local government in reducing greenhouse gas emissions. The findings of this model, known as the *Gridded Global Model of Carbon Footprints*, are highly instructive in that they enable to qualify the blanket assertion that cities are the main sources of greenhouse gas emissions, a statement that is of little use in devising action plans.

The first lesson to be learned from this study is that, while it confirms that cities are major emitters, it also shows that urban emissions are doubly concentrated. Firstly, in more than 50% of the 187 countries studied, the three largest urban areas account for more than a quarter of the national carbon footprint. This figure is confirmed by country-specific studies. For example, half of Australia's carbon footprint depends on five cities in the country[13]. Secondly, the one hundred most carbon-intensive urban areas account for 18% of the world's carbon footprint, for 11% of the planet's population. The profile of these 100 cities is that of dense, high-income cities. However, this does not rule out the fact that less dense or low-density areas may also concentrate a high proportion of emissions. For example, affluent suburbs and rural areas can have a higher carbon footprint than cities: the richest 5% of non-urban residents generate 32% of the total national footprint in the United States. Underlying this is the question of urban form, in this case, in the American example, a form built around and by the private car, combined with high levels of consumption of goods and services.

These lessons are invaluable in helping to focus public action on priority areas: metropoles, particularly in North America and Europe, and affluent suburbs where there is an overreliance on cars.

11. D. Moran *et al.*, "Carbon Footprint of 13,000 cities", Environmental Research Letters, 2018.
12. It brings together researchers from the Norwegian University of Science and Technology in Trondheim, the Faculty of Economics and Law at Shinshu University in Japan, the Department of Economic History at Lund University in Sweden and the School of Forestry and Environmental Studies at Yale University in the United States.
13. G. Chen, T. Wiedmann, M. Hadjikakou and H. Rowley, "City Carbon Footprint Networks", *Energies*, Vol. 9, No. 8, 2016, p. 602.

This observation is reinforced by the second lesson to be learned from this study: indirect emissions (scope 3) can add massively to a city's carbon footprint, i.e. by a factor of two to three, particularly for densely populated cities with a high standard of living. To put it another way, in order to assess and take action on a city's carbon footprint, it is vital to consider all the incoming and outgoing flows, i.e. upstream and downstream of the city's activities. Like countries, cities are the source of significant emissions outside their boundaries, particularly through the links they maintain with other areas via trade or tourism, for example.

Looking at the case of Australia, not only does half of Australia's carbon footprint depend on five of the country's cities, but between 43% and 71% of the carbon footprint of these cities is linked to emissions contained in imports[14]. In this respect, not all cities are in the same boat. Unsurprisingly, high-income cities are particularly affected by the weight of indirect emissions, which is much higher than that of direct emissions. This is hardly surprising given that, as Pierre Veltz points out, we are now living in a "metropolitan economic regime [...] [because] of the deep affinity between the metropolitan context and the new economic forms of the early 21st century, transformed by globalization, digital technology and the rise of services"[15].

In terms of public action, this lesson leads us to distance ourselves somewhat from current methodological protocols, which leave out a large part of scope 3. On the contrary, it seems appropriate to recognize the major role of scope 3 in order to better understand how inter-city carbon flows are mapped in a globalized world. With regard to EU cities in particular, this observation prompts us, for example, to examine the strategic project of derisking the EU's economic and trade relations with China from not only a state angle but also an urban one. The purchasing and public procurement policies of Europe's metropolises and major cities are now largely structured by rules designed to encourage only price-based competition, which gives China a *de facto* advantage, particularly in the field of low-carbon technologies. Is this compatible with urban carbon neutrality strategies? The carbon border adjustment mechanism is likely to correct this bias, but will it be both sufficient and compatible with cities' decarbonization timetables? A mix of price-based and lifecycle analysis-based competition rules would enable cities to redesign their procurement policies, provided a huge investment in training: in most cases, lifecycle analysis is not well known in the public service.

14. *Ibid*.
15. P. Veltz, 2014, interview available at: www.aurba.org.

Accelerating the decarbonization of European cities, or how to move from an incremental approach to a transformational one

Accelerating the decarbonization of European cities: what are the priority levers for action?

While European cities are undoubtedly among the highest emitters according to the typology presented above, they are already very committed to decarbonizing their activities. The results of their action demonstrate, incidentally, that it is perfectly possible to decouple GHG emissions, economic growth and population growth. This decorrelation is particularly impressive in demographically dynamic cities such as London and Copenhagen.

At the same time, as explained above, they are at different stages of decarbonization which, more than differences in ambition, reflect the weight of the national energy mix. This is only logical, given that the system over which cities have the least direct control is precisely their energy supply. And this applies even to the most powerful cities, as shown by an assessment carried out by the C40 in 2015[16].

Rather than focusing on energy production, which will have a limited impact, it is in the interests of European cities to concentrate on the most important levers for action, in line with the principle of subsidiarity: energy efficiency and mobility. In the European context, the issue of waste treatment and recovery is already very well covered by regulations and public and private players.

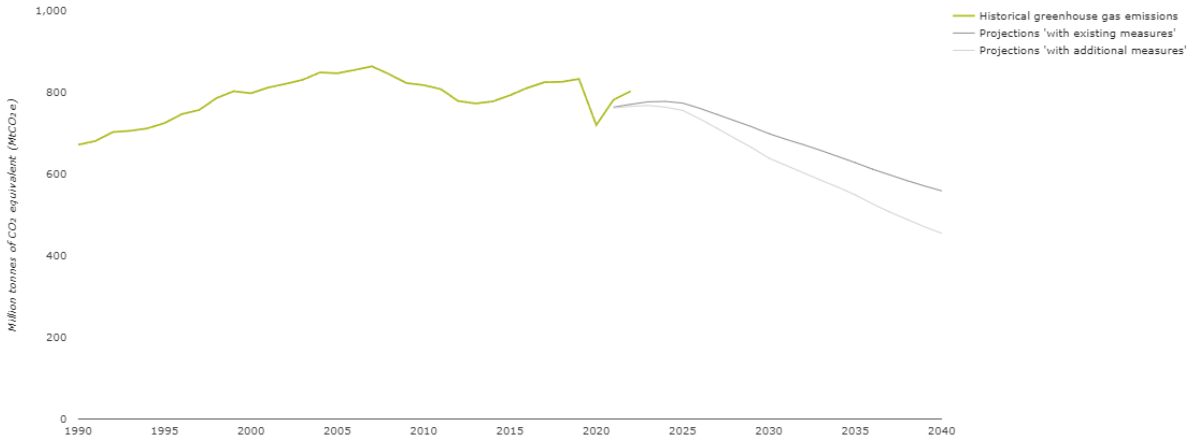
As far as energy efficiency is concerned, the downward trend is already underway in Europe, even if the most recent figures show a sharp deceleration in this decline, as illustrated by Enerdata's briefing[17] which

16. "Powering Climate Action", C40, June 2015, p. 16.
17. "Why is Energy Efficiency of Households Slowing Down at EU Level?", *Analyst brief*, Enerdata, December 2021, p. 2.

describes the trend in energy consumption per dwelling, adapted to the average EU climate, from 2000 to 2019 in the various Member States. Average energy consumption in the EU was 1.3 toe/capita in 2019. There are wide disparities between countries, even after adjustment for the same climate, ranging from 0.5 toe/capita in Malta to 2.3 toe/capita in Luxembourg. Unit consumption has been falling in most countries since 2000 (-1.0%/year at EU level). In the EU27, the downward trend in energy consumption per dwelling slows after 2014 (-1.3%/year for 2000-2014 and -0.2%/year for 2014-2019). It remains to be seen to what extent the energy crises of the past years has reversed this trend as households have been affected by higher energy prices.

The situation is quite different, however, when it comes to mobility. National projections drawn up by the European Environment Agency suggest that, even with the measures currently planned in the Member States, emissions from national transport will not fall below their 1990 level until 2032. Emissions from international transport (air and sea) are expected to continue to rise.

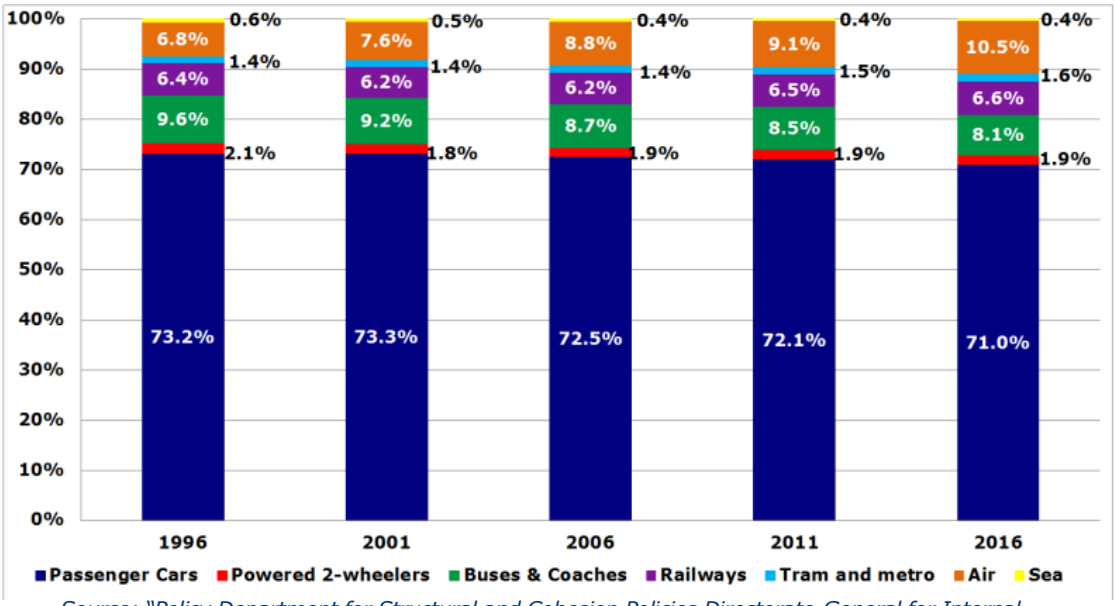
Figure 5: Greenhouse gas emission from the transport sector in the EU, 1990-2040



Source: "Greenhouse Gas Emissions from Transport in Europe", European Energy Agency, October 24, 2023, available at: www.eea.europa.eu.

This situation is largely due to the remarkable stability of the modal share of the private car, the overwhelming source of transport-related emissions, for more than thirty years in the EU.

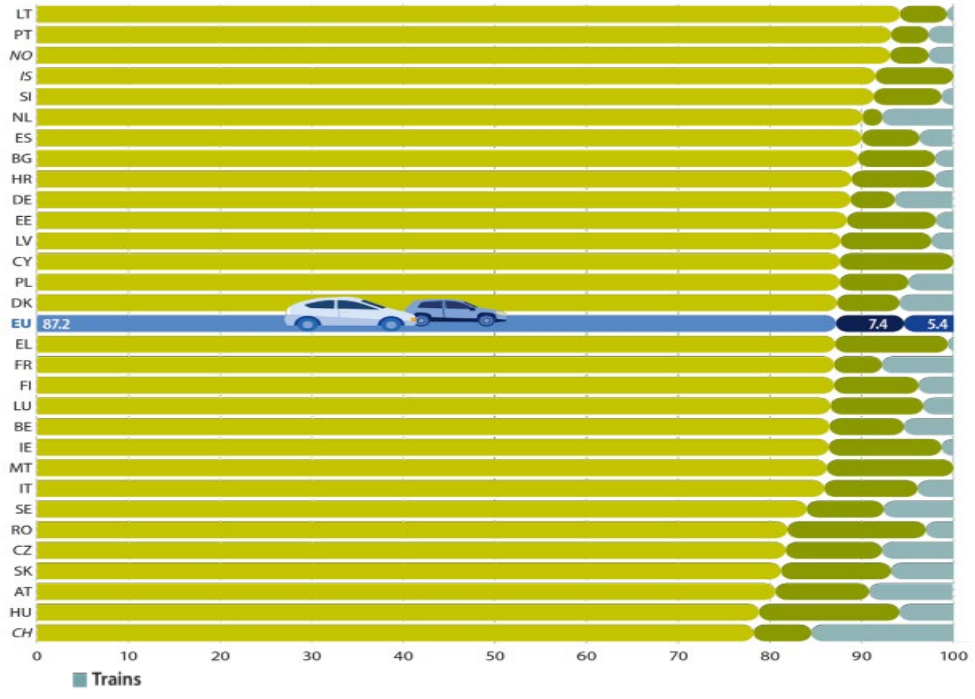
Figure 6: Evolution of modal share for passenger transport in the EU, 1996-2016 (based on passengers/km)



Source: "Policy Department for Structural and Cohesion Policies Directorate-General for Internal Policies, Research for TRAN Committee - Modal shift in European transport: a way forward", November 2018, p. 34, available at: www.europarl.europa.eu.

An analysis of the figures by country reveals results that are largely counter-intuitive but highly instructive, as shown by this table devoted to land mobility, showing the modal share of cars, buses and trains in each Member State in 2022.

Figure 7: Modal split of inland passenger transport in the EU, % based on passenger per km in 2020



Source: "Key Figures on European Transport", Eurostat, 2022, p. 13, available at: https://ec.europa.eu.

The figures for the Netherlands, for example, may come as a surprise: a country where everyone imagines urban mobility centered on cycling, the modal share of the private car is higher than the European average, which stands at 89%. Similarly, in France, even after large investments in rail transport over the last thirty years, the car's share remains stable and emissions linked to individual cars mobility still account for 16% of the country's emissions. How can this be explained and, in particular, what role can urban policies play in this? To answer this question, we need to look at the reasons for the failure of public policies in recent decades to encourage modal shift.

The explanation given by transport economists has to do with the misunderstanding that public decision-makers and public opinion have of mobility policies. The work of the French economist Yves Crozet[18] shows very clearly that massive investment in alternative infrastructure to road mobility –cycling, rail– does not lead to substitution between modes but to addition. For example, public players think that investing in cycle lanes will reduce road traffic, but what actually happens is that motorists will still use their cars, but may add cycle journeys to their daily trips. Building an efficient high-speed rail line (with frequent and reliable journeys) between two major cities will mean that motorists will no longer make the journey by car, or that air passengers will prefer to take the train. As Yves Crozet explains, "transport is a doubly open world. The plurality and complementarity of modes of transport on the one hand, and rising incomes on the other, lead to a principle of addition". For substitution to work, we need to develop an efficient, reliable range of alternative services that correlate with people's lifestyles, particularly the geography of housing and employment, while at the same time reducing the attractiveness of the private car. These conditions call for climate neutrality policies in European cities to be looked at from a new angle, going beyond the question of the level of investment required to increase supply: that of the right scale of urban action.

18. For example, see the webinar organized by Jean Coldefy, chairman of the Union routière française think tank, on "Le rapport modale de la voiture vers le vélo et les transports en commun : mythes et réalités", November 10, 2023, featuring Yves Crozet, professor emeritus at Sciences Po Lyon, Laboratoire aménagement économie transports, available at : www.unionroutiere.fr. The following quotes from Yves Crozet are taken from this webinar.

Accelerating the decarbonization of Europe's cities: the scale of action and partnership approaches are crucial to the acceptance of carbon-neutral policies

Two fundamental lessons can be drawn from the experience of mobility policies implemented in European cities over the last three decades.

First of all, one-off measures, which are often the focus of communication and territorial marketing, do not work. The right scale of public action is key. In this respect, there is an urgent need for the cycling policies that are being copied one after the other by the major Western cities to be put back into perspective as part of broader mobility policies. While they are useful for public health, their impact on modal shift is more than limited, as we have seen. Territorial marketing cannot take the place of climate policy.

Consequently, the second lesson to be learned from these experiences concerns the issue of partnerships between stakeholders: urban decarbonization policies require transformative rather than incremental approaches, combining transport, housing and human activities (leisure, work). As a result, they require long-term partnership approaches in order to secure the political and social acceptance of the citizens concerned. In the case of mobility, the typical example is the relationship between the city center and the suburbs. With the exception of Vienna in Austria, which has been affected to a lesser extent by its century-old public housing policy, the majority of European households live on the outskirts, or even the very outskirts, of towns and cities. In France, according to the economist Jean Coldefy[19], CO_2 emissions from city-center road mobility now account for just 2% of individual road mobility emissions, compared with 78% for journeys between the different strata of urban areas (the remaining 20% are from rural areas). The work of decarbonizing mobility has already been carried out in urban centers: this is not where attention and investment should be focused, contrary to public communication by elected representatives and the media, which is obsessed with mobility in the urban hypercenter. Investment in public transport, both rail and road, needs to be massively and urgently redirected towards the suburbs. This is a complex process because it involves sophisticated governance between public players, since the mobility patterns of city dwellers straddle territorial institutional logics. Yet it is the choice of scope that will determine the success of carbon-neutral city strategies.

19. J. Coldefy, *Mobilités: changement de modèle*, Orthez: Publishroom, 2022.

Accelerating the decarbonization of cities in emerging economies: how can European cities contribute to climate justice

The question of the scope of action is therefore at the heart of the effectiveness of the carbon neutrality strategy: this is true on the scale of the urban era, but also on a global scale. In a world that is becoming massively urbanized, where it matters little where the greenhouse gas molecule is emitted, what role can European cities play? Faced with growing demands for climate justice, European cities, like the States of the northern hemisphere, must do their bit. In particular, while there are already many channels for cooperation between cities *via* the major networks mentioned above, as well as *via* twinning and decentralized development cooperation initiatives, the climate issue could give new impetus to the methods of cooperation.

With this in mind, the City of Paris announced an interesting initiative within the C40: "With its Climate Plan, Paris is committed to initiating a new working group within the C40 in 2018, with the aim of working on the framework for the development of carbon offsetting mechanisms on the basis of Article 6 of the Paris Agreement, with a view to creating ITMOs (Internationally Transferred Mitigation Outcomes, i.e. carbon offsetting units) to be shared between cities". This group dedicated to carbon offsetting will enable the City of Paris to develop an offsetting approach on an international scale by strengthening its cooperation agreements for low-carbon development and climate solidarity. By taking part in this initiative, the cities will provide the C40 with a shared definition of carbon neutrality and will work together to put in place a simple methodology for verifying and monitoring offsetting for cities in response to the blockage of national certification and the current lack of methodology[20]. To date, however, ITMOs remain the prerogative of the states alone, the only semi-exception being Singapore[21], which is acting in this area more as a state than as a city-state.

This lack of climate innovation by European cities is all the more regrettable given that such initiatives could facilitate the currently complex management of the political and social acceptance of climate measures taken in the European context. In this respect, the measures taken in the area of energy efficiency in buildings deserve to be examined from a cost-benefit analysis perspective. While converging studies carried out in several

20. "Defining Carbon Neutrality for Cities and Managing Residual Emissions", C40, April 2019.
21. See S. Kerschner, I. York and W. Grazebrook, "Emerging Fundamentals in Climate Mitigation Through ITMO Transactions Under Paris Agreement Article 6.2", White&Case, March 8, 2023, available at: www.whitecase.com.

European countries and the United States show the extremely high financial cost of these measures for a modest climate benefit due to the rebound effect, would it not be preferable, first to target first and foremost low-income households in Europe, second to redirect this expenditure towards cities in the southern hemisphere where, due to the much lower cost of abating a tonne of CO_2, the overall climate benefit would be much greater? To put it differently, energy efficiency spendings in buildings should be weighed in with social justice in European cities, with climate justice in cities in the southern hemisphere.

Such a Copernican change would facilitate sustainable urbanization in the South, limit the increase in the cost of housing in the North in a context of rising interest rates, and facilitate the social acceptance of climate measures by a European public that is beginning to be won over by a certain climate fatigue. At least two Nobel Prize winners in economics have expressed their views in this vein, including Jean Tirole and Esther Duflo[22] during a lecture at the Collège de France. According to the former, "The introduction of unquantified environmental standards or the choice of energy sources by public authorities often leads to a lack of coherence that substantially increases the cost of reducing polluting emissions". Governments sometimes spend up to €1,000 per tonne of carbon avoided (as is the case in Germany, a country with little sunshine, with the installation of first-generation photovoltaic systems), whereas other emissions could be reduced at a cost of €10 per tonne. A policy that a large majority of observers describe as respectful of the environment, but which is not really: for the same cost, emissions could have been reduced by 100 tonnes instead of just one![23] As for Esther Duflo, referring to the work published in 2018 by Michael Greenstone on the country's largest residential energy efficiency program –Weatherization Assistance Program–, carried out on a sample of around 30,000 households in Michigan, she points out that "The results suggest that the initial investment costs are around twice as high as the actual energy savings. What's more, the savings projected by the model are more than three times higher than the actual savings". The poverty expert concludes: "Thermal renovation is not the magic solution that will save the planet. These policies can be implemented, but they are very costly and do not produce spectacular results. Nor are they part of the 'win-win' approach we hear so much about, i.e. the idea that if we invest today, we can continue to live the same way tomorrow".

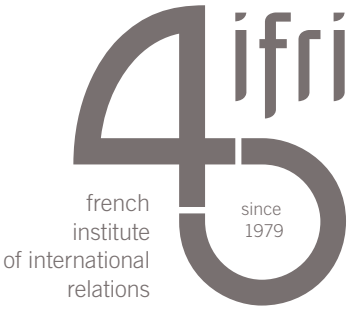
22. "Environnement, climat et énergie", Collège de France, January 27, 2023, available at: www.college-de-france.fr.
23. J. Tirole, *Économie du bien commun*, Paris: Presses universitaires de France, 2016, p. 277-278.

Conclusion

These words from Esther Duflo resonate particularly well in the context of European cities, which, whatever the rankings, are among the champions of quality of life. So, whatever the path chosen to achieve carbon neutrality, the ambitions of cities in this area cannot be conceived in isolation from a broader objective that can be summed up in one word: well-being. No matter how sustainable, green or carbon-neutral a city may be, it cannot be just that, and quality of life is as much a part of Europe's urban character as its built heritage.

This is why none of the pioneering cities in terms of climate change are dissociating their ambitions in this area from their more global urban project. None of these cities intends to abandon its ambitions in terms of attractiveness and growth. The way in which Copenhagen intends to achieve carbon neutrality by 2025 is enlightening in this respect: "When you invest in sustainability, the returns are measured in much more than just environmental terms. Building cycling infrastructure, for example, leads to higher levels of use, which in turn leads to better health and lower CO_2 emissions. Investing in sustainability also has financial benefits. Cleaning up the water in our port has improved the marine environment and has also benefited businesses, tourism and property prices. And an integrated public transport system not only reduces congestion, but also saves us billions of euros, enabling the city to remain efficient and competitive"[24]. Making the city an attractive place to do business and live, stimulating local businesses, economic development and job creation opportunities, reducing costs for consumers/households and businesses, improving public health, improving the quality of the environment, increasing "energy security" and reducing exposure to rising energy prices - in the end, it's all about improving the liveability of the city. The co-benefits of a *successful* decarbonization strategy are major for cities.

24. "Copenhagen Solutions for Sustainable Cities", City of Copenhagen, January 2014, p. 4.



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