



Urban Mobility after COVID-19

Long-term strategies for the sustainable mobility transition in European cities

Hannah Abdullah and Eloi Serrano Robles (Eds.)

CIDOB GLOBAL CITIES

BARCELONA
CENTRE FOR
INTERNATIONAL
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Carla Gómez Castellví has a degree in environmental sciences and holds a master's in management of organisations in the knowledge economy. She has a degree in Environmental Sciences and Agricultural Technology. Her experience is mainly focused on quality control and assurance, with more than 6 years of experience in the pharmaceutical industry (Reig Jofré and Sandoz division of Novartis). Currently, she works in process improvement, project management and communication for The Mobility Factory (TMF), a second-tier cooperative whose members are spread around Europe. Together they work towards sustainable mobility and cooperativism by offering technological solutions for eCarsharing.

Annika Degen is Deputy Director at UITP's Europe Department, where she engages with decision-makers concerning the EU's transport policy and strategies. She joined the International Association of Public Transport (UITP) in 2013 as policy expert for road transport, buses, energy and fuels, representing the public transport sector in discussions at the European Union and at the United Nations Economic Commission for Europe (UNECE). In parallel, she manages the European Office of the German Transport Association (Verband Deutscher Verkehrsunternehmen, VDV) in Brussels. Annika has a keen interest in liveable cities and is an advocate for sustainable development. Previous work experiences have included managing pan-European communication projects for a Brussels-based non-governmental organisation (NGO), as well as interning at the European Commission and the European Parliament. She holds a master's degree in European Political and Governance Studies from the College of Europe and a bachelor's degree in European Studies from University of Osnabrück. She has also studied in France, Romania and the United States.

Carles Fàbregas is a civil engineer (Universitat Politècnica de Catalunya, 1984) specialised in regional planning, transport and urbanism. He was a partner and consulting director of *Servicios de Estudios de Transporte, S.A. (7-SET)*, from 1984 to 1997. Between 1996 and 2013 he was Founding Partner, Manager and Director of *Cinesi, SLU*, a transport and mobility consultancy. For 30 years, his professional activity as a consultant has focused mainly on the field of planning, engineering and transport management, including the production of over 500 studies and technical reports for over 200 clients, among them public administrations and private companies. Since 2014, Carles has been General Director of *Transportes Urbanos y Servicios Generales de la Sociedad Anónima Laboral (TUSGSAL)*. Since 2015, he has been Managing Director of *Servicios Generales de Movilidad y Transporte, S.A. (SGMT)*.

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Peter Jones is Professor of Transport and Sustainable Development at the Centre for Transport Studies at University College London. He is a member of the UK Independent Transport Commission, the UK Department for Transport's Science Advisory Council and co-chair of its Joint Analysis Development Panel. He has led over 100 research projects at national and international levels. He was Scientific Co-ordinator for the EU "CREATE" project on changing trends in urban mobility and future city challenges, and "MORE", on optimum design and operation of road-space on urban main roads. He is also a work package lead on the H2020 SUMP-PLUS project, looking at transitions to sustainable urban mobility and at enhanced cross-sector links. He advises the European Commission and a number of major cities and national governments around the world, and was awarded an OBE for services to national transport policy in January 2017.

Jeremy Leach is Chair of London Living Streets, which was formed in August 2016 to speak up for people on foot across London and which is made up of the many local Living Streets groups around the capital. The group campaigns to improve conditions for people who are walking and to reduce the impact of motor traffic in London; it strongly supports the Vision Zero Action Plan to reduce road casualties in London to zero in the longer term. London Living Streets works closely with other active travel groups in London and is a member of the Healthy Streets Scorecard coalition. Jeremy is also the London Co-ordinator for 20's Plenty for Us, which campaigns for a default 20mph limit in built-up areas and is a co-founder of Action Vision Zero (actionvizonzero.org) which supports individuals and groups working to reduce deaths and fatal injuries on our roads to zero across the whole of the UK.

Lukas Reichel is the CEO of The Mobility Factory SCE. A graduate in Electrical Engineering (ETH Zurich), he has over ten years of experience in development and management in railway propulsion systems (ABB Switzerland) and electrical grid flexibility aggregation (Smart Power Pool GmbH), and was co-initiator of the Catalan cooperative for sustainable mobility (Som Mobilitat SCCL).

Eloi Serrano Robles is Director of the Chair for Social Economics at TecnoCampus, Pompeu Fabra University (UPF), and Associate Professor of Business Economics at the UPF. He is also a lecturer in the Department of History and Economic Institutions at the University of Barcelona.

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Caspar Sluiter is Senior Policy Advisor for European Affairs at VNG, the Netherlands Association of Municipalities. He has represented local interests in Brussels and has supported the Dutch delegation to the Committee of the Regions (CoR) since 2009. Before that he worked for the Dutch Ministry of Economic Affairs and Climate on EU policy, with a short stint at the European Commission. His main policy areas are climate and energy policy, mobility, rural development, the internal market (procurement and services), local finances (SGP, semester), subsidiarity and better regulation. As an expert he has worked on the CoR opinion on the EU Sustainable and Smart Mobility Strategy, supporting its rapporteur Robert van Asten, CoR member and Deputy Mayor of The Hague.

Emilia Smeds is a Researcher with the Centre for Transport Studies, University College London (UCL). Her expertise centres on urban governance of infrastructure and sustainability, particularly comparative studies of transitions to sustainable mobility across different cities and countries. Within the H2020 SUMP-PLUS project, Emilia has been leading on the development of practitioner guidance on transition pathways towards carbon-neutral mobility. Emilia's PhD compares municipal government capacity for policy experimentation in Bristol and New York City, tracing the long-term impact of small-scale experiments on urban mobility systems. She has also published on city networks, night-time mobility and mobility justice. Her work has been commissioned and cited by both local and national governments in the UK. Emilia has experience of working in transport planning in Finland and the UK, and as a researcher at Imperial College London.

Margarita Triguero-Mas is an affiliated research scientist with Mariana Arcaya's research group at the Department of Urban Studies and Planning of the Massachusetts Institute of Technology (DUSP-MIT), where she coordinates the research collaboration "Environmental justice, urban planning and public health" (a collaboration with the Barcelona Laboratory for Urban Environmental Justice and sustainability, BCNUEJ). She is also co-coordinator of the research area of "Urban environment, health and equity" at BCNUEJ and leader of the research line "Urban green spaces and environmental health justice" at the Hospital del Mar Medical Research Institute and Autonomous University of Barcelona. She is a social environmental scientist working at the intersection of public health, urban planning and environmental justice and a world expert on the health impacts of urban nature, with a

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Arnau Vilardell has a bachelor's degree in Geography and a master's in Project Management from the University of Girona and conducted postgraduate studies in Geographic Information Systems (GIS) at the Polytechnic University of Catalonia and in Cooperative Management at ESADE. He is co-founder and coordinator of Som Mobilitat. As part of Som Mobilitat's strategic framework, he collaborated in 2018 in setting up the Brussels-based second-tier cooperative The Mobility Factory to develop technology for electric car sharing and in 2021, RedMovilidad, the first state network of car-sharing cooperatives and e-plural space promoting energy communities that use shared electric mobility.

INTRODUCTION

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To deliver on its Green Deal and become climate neutral by 2050, the European Union (EU) must reduce transport-related greenhouse gas (GHG) emissions by 90% (EC, 2019). This is a colossal challenge. Transport is one of the few sectors in which emissions are higher today than in 1990 and despite mitigation efforts they are still rising. Cities are crucial to achieving this ambitious goal, as they account for 40% of total road transport in the EU (EC, 2020). But cities are not just major emitters; local governments and urban stakeholders are also driving the transition to sustainable mobility through urban experimentation and innovation and new multistakeholder partnerships.

The COVID-19 crisis has demonstrated that dramatic changes in urban transport can be achieved if the political will exists. The need to create safe, socially distanced transport and to regain public space for citizens gave a boost to the mobility transition in many European cities. Tactical measures such as new cycling lanes, pedestrian areas and Low Traffic Neighbourhoods were rolled out in record time. However, these have often been temporary or stand-alone initiatives that are not integrated into longer-term transition pathways towards more sustainable urban mobility systems.

The speed of change during the pandemic and the environmental urgency to transition to low-carbon mobility have also meant too little attention has been given to concerns over justice. The European Green Deal (EGD) aspires towards a just transition, and transport and mobility lie at the heart of a socially fair transformation towards a climate-neutral development model – as the “yellow vest” protests in France reminded us. In cities, the pandemic has exacerbated the mobility divide, with disadvantaged neighbourhoods being more affected by disruptions to public transport and often having poor access to the new public spaces made available through tactical urban interventions. To cushion the socioeconomic consequences of the urban mobility transition and prevent further divisions in society, it is vital that public authorities make social equity a transversal criterion of mobility policy.

The EU's updated Sustainable and Smart Mobility Strategy aims to lay the foundations for how the EU transport system can achieve its green and digital transformation.

This volume explores how cities across Europe can develop more robust and socially just long-term mobility plans, enabling them to effectively contribute to the EU's intermediate climate goal of reducing emissions by 55% by 2030 and its 2050 net-zero target. It examines opportunities for accelerating change – from policy reforms to urban interventions, multi-stakeholder partnerships and social economy innovations – as well as barriers to long-term planning and transformation – from public acceptance to political, financial, legal and technical limitations. The volume is divided into three parts.

I. Long-term policy planning for the mobility transition

The first part explores the local, national and European policy landscapes in which long-term urban mobility planning is currently taking shape and highlights the need for a paradigm shift in transport policy that enables it to contribute to a green and just post-pandemic recovery.

Maruxa Cardama provides a panoramic view of the ways urban transport and mobility systems intersect not only with climate action but also public health, social equality and economic prosperity. To address these complex interfaces, she argues, governments must opt for policies and investments that yield the greatest benefits across the various areas by reducing carbon emissions, providing equitable access to mobility and generating employment. Public policies that *avoid*, *shift* and *improve* urban transport – by *avoiding* and *reducing* the need for motorised travel in cities, by *shifting* to more sustainable, less carbon-intensive modes of transport, and by *improving* transport modes through more support for e-mobility – are vital to this more holistic approach.

The following two chapters turn to the EU's policy framework for supporting urban mobility transitions. **Caspar Sluiter** discusses the EU's updated Sustainable and Smart Mobility Strategy, announced in December 2020 as part of the EGD, which aims to lay the foundations for how the EU transport system can achieve its green and digital transformation. While the strategy is in many ways a policy milestone, Sluiter argues that it does not sufficiently engage with the needs of cities and how they can contribute to a carbon-neutral transport system. Drawing on discussions held at the Committee of the Regions and the Council of European Municipalities and Regions in response to the updated strategy, he makes the case that its urban dimension should be more ambitious.

Sustainable Urban Mobility Plans (SUMP) have been a cornerstone of the EU's urban mobility policy over the past decade. First introduced in the Commission's Urban Mobility Package in 2013, they have been crucial to driving the urban mobility transition. But SUMP have a major drawback: they only operate with a five- to ten-year time horizon. This limited timeframe is clearly unfit for formulating urban mobility transition pathways that aim to meet the EU's 2030 and 2050 climate goals. Drawing on insights from the Horizon 2020 CIVITAS SUMP-PLUS project, **Emilia Smeds and Peter Jones** call for a complementary, long-term urban mobility planning approach with a time horizon of 20 to 30 years. They explore various enabling actions that can support such

an approach, including the deployment of intermediate goals, “back-casting”, cross-sectoral coordination and integrated planning across city-regions.

II. Towards less polluted and more liveable cities

Two of the main fronts on which European cities are working to reduce air pollution and congestion are traffic restrictions and interventions in physical urban space. Part two of the volume assesses these efforts and their effectiveness by focusing on some of the measures that are most widely applied across cities to these ends today.

Valeria Bernardo examines quantity-based and price-based policies to reduce the circulation and share of private cars in cities. The most widespread quantity-based measure are Low Emission Zones (LEZs), which are today in place in close to 300 European cities and prevent polluting vehicles from entering city centres. Some pioneer cities like London, Stockholm and Milan have gone a step further and introduced congestion tolls that apply to all vehicles entering the city. Bernardo shows that while both policies are effective in combating pollution, only tolls are effective in reducing congestion.

Since the onset of the COVID-19 crisis, the “15-minute city” model, in which residents live in close proximity to all their daily needs and which give priority to pedestrians and other forms of active transport, has gained much traction. Low Traffic Neighbourhoods (LTNs), such as Barcelona’s Superblocks, are a key ingredient for the “15-minute city”. By introducing barriers on streets, LTNs reduce through traffic and nudge residents to switch to alternative forms of micro-mobility, thereby improving air quality, road safety, liveability and promoting local businesses. Drawing on insights from London, where the number of LTNs expanded rapidly during the COVID-19 lockdowns, **Jeremy Leach** examines the impact of LTNs on traffic flow in cities.

But traffic restrictions and related urban interventions, such as the creation of pedestrian zones and parks, do not only bring benefits. **Margarita Triguero-Mas** shows that environmental interventions geared towards making cities less polluted and more liveable often have unintended social consequences by contributing to gentrification. So-called green or environmental gentrification typically occurs in previously deprived neighbourhoods that experience a cultural transformation and higher property prices following their “greening”. These processes lead to the social exclusion – or worse, displacement – of long-term low-income residents. Triguero-Mas warns that to be truly sustainable, urban mobility planning needs to factor in environmental justice mechanisms that mitigate such impacts.

III. Why public and shared transport matter

Both public transport and shared mobility have been hard-hit by the COVID-19 lockdowns, work-from-home policies and users’ fear of infection. For the sustainable mobility transition in European cities this represents a disconcerting setback, because both transport modes form

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the foundation of any low-carbon and equitable urban mobility system. Part three of the volume examines how the recovery of the two sectors can be better supported by public authorities to unlock their full potential to contribute to a green and just transition in cities.

Annika Degen analyses the three major transformations the public transport sector will have to undergo to meet the EU's 2030 climate target: firstly, operators will need to *decarbonise* their vehicle fleets; secondly, customer interfaces and services need to become fully *digitalised*; and, thirdly, the sector needs to significantly *grow*. Crucially, the investments required for these transformations far exceed current public budgets for the sector. Given these constraints, Degen argues, cities are well-advised to explore alternative revenue sources for updating their public transport services, such as road tolls, as well as EU funds that will be made available as part of the Recovery and Resilience Facility flagship project on sustainable and public transport.

While the pandemic devastated many shared mobility services, it also exposed how shared mobility options – from micro-mobility to car sharing – represent a new mobility paradigm that can make urban transport systems more resilient. Shared mobility can increase access to public transport, enlarge public transport's spatial reach and reduce crowding by acting as a substitute for short trips. Yet, as **Albert Gragera** shows, this will require shared mobility services to be fully integrated with a city's public transport system and included in its long-term mobility planning. Further, the capacity of shared mobility services to accelerate the urban mobility transition will depend on the creation of an enabling environment. This includes a pragmatic and flexible approach to regulation, especially for micromobility, as well as experimentation with new forms of public-private partnership.

IV. The social economy as a driver of the mobility transition: Voices from the mobility sector

As the chapters on public transport and shared mobility suggest, the mobility transition in cities will greatly depend on the commitment of mobility operators to sustainable business models that support carbon-neutral transport and equitable access. Mobility cooperatives and other social economy companies are leading the way in this regard. They provide a business model that prizes the person over capital and combines business efficiency with solidarity, responsibility and social cohesion. The final part of the volume complements the preceding more analytical contributions with the on-the-ground perspective and experience of mobility cooperatives and employee-owned companies.

CIDOB publications do not usually include presentations of practical cases. However, by giving operators the chance to explain their mobility concept under the precepts of the social economy, we hope to illustrate some of the more theoretical and policy-oriented arguments put forth in the volume and connect them with recent economic and technological innovations in the mobility sector.

Following a brief introduction on the relationship between the social economy and mobility services, three types of mobility operators are

presented. They comprise a meaningful sample of organisations committed to urban sustainability in the 21st century because of the ways they develop solutions to various mobility issues, from decarbonising public transport to making clean mobility more accessible and affordable to everyone.

The first case is the employee-owned company Tusgsal, presented by **Carles Fàbregas**, which operates public bus services in the Barcelona metropolitan area and is currently transitioning from a fossil-fuel-powered fleet towards a fully electric one. Beyond this, the organisation is committed to reducing the environmental impact of its facilities and operations, as well as to a democratic and participatory management model.

The second case, Som Mobilitat, introduced by **Arnau Vilardell**, is a car-sharing cooperative that uses fully electric vehicles and was set up by mobility activists in Catalonia to contribute to changing mobility habits in the region. Striking about this cooperative is how the concern to drive the expansion of an inclusive, social and green mobility system that goes beyond merely commercial relationships is an integral part of its operating model.

The final case, The Mobility Factory (TFM), presented by **Carla Gómez Castellví and Lukas Reichel**, is a second-tier mobility cooperative (a cooperative of cooperatives) formed of 13 members from five different European countries. Operating as a platform cooperative, TFM provides its members with the necessary technology to offer shared mobility services. By scaling technological solutions, it advances a new mobility paradigm at European level.

The mobility transition in cities will greatly depend on the commitment of mobility operators to sustainable business models that support carbon-neutral transport and equitable access. Mobility cooperatives and other social economy companies are leading the way in this regard.

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LONG-TERM POLICY PLANNING FOR THE MOBILITY TRANSITION

- CO-CREATING KNOWLEDGE, POLICIES AND COLLABORATIVE ACTION FOR SUSTAINABLE, LOW-CARBON URBAN TRANSPORT

Maruxa Cardama

- THE NEW EU SUSTAINABLE AND SMART MOBILITY STRATEGY: A LOCAL AND REGIONAL PERSPECTIVE

Caspar Sluiter

- DEVELOPING TRANSITION PATHWAYS FOR MOBILITY IN EUROPEAN CITIES – CHALLENGES AND NEW APPROACHES

Emilia Smeds & Peter Jones

Maruxa Cardama

Secretary General, SLOCAT Partnership on Sustainable, Low Carbon

2 020, a year of historic change and disruption, has shown us the extent to which access to transport and mobility in our cities determines access to livelihoods, jobs, essential goods and socio-economic opportunities in general. We have also experienced how the resilience of passenger and freight transport systems is essential in times of global and local shock.

I. Transport systems underpin equitable and sustainable societies

In the wake of the COVID-19 pandemic, we have appreciated living with better air quality and less noise. Movement restrictions have shown us the extent to which our neighbourhood streets and public spaces are essential to community cohesion. With our sudden plunge into a “new normality”, we have learnt the hard way that mobility behavioural change at community and individual levels can happen at a much faster pace than we had thought. We have also seen that governments can affect radical change to public mobility policies and expenditure overnight, if they want to.

But more fundamentally, the pandemic has brought to the surface the interconnected social, economic and environmental issues our societies must urgently address to resolve prevailing equality and climate action challenges. Ambitious, transformative action in transport and mobility paradigms is essential to tackling these interconnected challenges. Sustainable, low-carbon transport is the engine of the global economy and increases equitable access to jobs and other socio-economic opportunities for people of all ages and abilities: it powers a just transition to green jobs in a circular economy; reduces climate impacts, congestion, fuel imports and infrastructure costs; improves air quality and benefits public health; and fosters livelihoods in urban and rural areas within the carrying capacity of Earth’s ecosystems.

The pandemic is putting a magnifying glass on the good, the bad and the ugly of urban transport and mobility systems as they interface with social equality, economic prosperity, climate action and public health.

II. Action was due yesterday. Today is the best second chance we've got

Like in many other areas, the pandemic is putting a magnifying glass on the good, the bad and the ugly of urban transport and mobility systems as they interface with social equality, economic prosperity, climate action and public health. Foundational notions of the sustainable low-carbon transport movement, as well as key principles of sound transport planning and policymaking have become more relevant than ever.

At the same time, the climate crisis has not disappeared with the outbreak of the pandemic. Growing evidence by multilateral and research entities confirms that carbon emissions are returning to normal far quicker than our societies. Transport contributes roughly a quarter of global energy-related greenhouse gas emissions and is therefore a vital part of the solution to the puzzle of a net zero-emission economy. Without urgent intervention, transport emissions are projected to double by 2050, becoming the fastest growing emissions sector, while in a below 2°C scenario, they should decrease by over two-thirds.

It is imperative that the transport sector significantly reduces its emissions. The good news is that the Intergovernmental Panel on Climate Change (IPCC) underlines that a 1.5°C pathway for transport is possible. Yet, for such transformations to occur, mobility and transport systems must be prioritised in policy, regulatory, financing and fiscal frameworks. Further, because mobility is ultimately a story of access to socio-economic opportunities, it is imperative to improve the resilience of transport systems.

III. The Avoid-Shift-Improve transport framework at the centre of an equitable and green socio-economic recovery

The post-pandemic recovery must be one of bold and courageous equity and climate action, and must not derail us from the goal of achieving transport for a 1.5°C planet. To realise the full potential of transport's contribution to recovery, coordinating public policies that *avoid*, *shift* and *improve* transport will be vital.

First, this is about putting emphasis on *avoiding* and *reducing* the need for motorised travel in our cities. The high urban motorisation trends that marked the 20th century worldwide continue to come at high costs in terms of inequality, poor air quality, deaths and injuries in road crashes, carbon emissions, chronic congestion and loss of productivity. Establishing urban transport policy frameworks that disincentivise car use, while making alternative choices affordable, efficient, safe and attractive is vital to improving the quality of life in cities. Second, *avoiding* and *reducing* motorisation also involves *preserving* walking and cycling where it already exists. Third, transit-oriented development, as well as integrated transport demand management have proven to be impactful *avoid* and *reduce* approaches. Finally, sustainable urban transport planning – both for passengers and freight, circular economy approaches (e.g. reduction, re-use and recycling of raw materials along supply chains), and the digitalisation of services (e.g. home deliveries, at-home administrative or care services) are key.

Once measures to *avoid* and *reduce* motorised travel have been rolled out, the next step is to *shift* to more sustainable, less carbon-intensive modes of transport. Since the outbreak of the pandemic, many cities are witnessing the resurgence of the private vehicle due to fears of infection. More than ever, it is essential that we proactively take care of public transport because it is the backbone of any equitable, low-carbon urban mobility system. Allowing public transport systems to collapse would only exacerbate social inequality as well as air pollution and emissions.

Further, efforts to *shift* urban mobility should not neglect so-called informal or paratransit transport services. In many cities, they remain critical to providing access to mobility – especially to those living in the most vulnerable situations, including on the outskirts of cities. Walking and cycling must be given a prominent role in the *shift* stage. While in many Global South contexts it has long been the day-to-day for the majority of the population, a new enthusiasm for walking and cycling has emerged in European cities with the pandemic. Over the past year, many cities worldwide have been thrust into the greatest street experiment since public space was turned over to the private car in the 20th century. Cost-efficient tactical urbanism – including temporary sidewalk extensions and pop-up cycling lanes, for instance – has boomed, with Global South cities often taking the lead. The task ahead is to harness these innovations for long-lasting *shifts* to sustainable low-carbon urban mobility.

Shifting to less emitting modes of transport must also include urban freight. With skyrocketing demand for freight transport (due to e.g. online shopping and home deliveries), ageing populations, highly polluting and disparate freight fleets, cities need to turn towards new solutions where possible. Here, introducing new ways of delivering goods, for example by rail or by using electric tricycles, and working with land use planners to optimise routes, stocking, drop-off and pick-up points will be very important.

Once *avoiding* and *shifting* measures are implemented, the challenge is to *improve* transport modes. This is where electric mobility comes into play. To unleash the true potential of electrification, two things need to occur. On the one hand, policies should combine urban transport electrification with the use of clean renewable energies. In this manner, a profound transformation of national economic systems can be achieved, while creating local employment and technical capacities. On the other hand, electrification must contribute to zero-carbon integrated and inter-modal transport systems. The shift towards electric cars is a positive development. However, it should not come at the expense of support for e-scooters, e-bikes, e-cargo bikes, e-trucks and e-buses, as well as other established modes of public electric transport such as trams and railways. Cities should focus on maximising the *shift* potential of e-mobility in general. For example, electric two-wheelers are offering a very significant contribution to tackling local challenges across access to mobility, congestion, air quality and emissions. It is e-bikes that are already transforming cities, mobility and energy demand across many European countries. Public–private alliances are also important for the shift to e-mobility. Many private sector companies are committing to “Net Zero by 2050” pledges. This represents a great opportunity for enhancing electric road freight, as well as for boosting combined electrified railroad freight services for long distances.

To realise the full potential of transport's contribution to recovery, coordinating public policies that *avoid, shift* and *improve* transport will be vital.

While significant progress has been achieved in the last decade in many cities across Europe, integration and inter-modality in urban mobility remain underdeveloped.

IV. Wanted! Integrated and inter-modal metropolitan transport plans

While significant progress has been achieved in the last decade in many cities across Europe, integration and inter-modality in urban mobility remain underdeveloped. Turning the tide requires further increasing the number of countries and cities with National Urban Mobility Plans (so-called NUMPs) and Sustainable Urban Mobility Plans (SUMPs) that address both passenger and freight transport. It is not a question of a single measure but of packages of integrated and intermodal measures at the metropolitan scale that present mobility as a service to citizens.

The quest for sound planning and policymaking also requires increased political and technical support to locally elected representatives and policymakers. Such support is particularly needed in the use of regulation and participatory planning to, among other things, set local climate targets, establish low-emission zones for both passenger and freight vehicles, and introduce congestion charges and parking policies. These measures are also supported by a majority of European city dwellers. A recent online survey across 15 large European cities in eight countries by Transport & Environment (2021) shows that almost two-thirds of their urban residents are in favour of the idea that after 2030 only emission-free cars should be on sale in Europe.

Further, integrated and inter-modal metropolitan transport planning and policymaking calls for better integration between spatial planning, urban development and transport planning. The renewed and growing interest in proximity-based placemaking (e.g. the “15-minute city” model) offers great momentum to build upon.

V. Reminder: Transport is an induced demand

Urban transport planners and policymakers should not lose sight of the fact that the demand for transport is induced, and that it is shaped by a multiplicity of factors and policies beyond transport. Thus, any urban transport policy needs to be accompanied by enabling measures in areas such as fiscal policy and pricing. Crucially, only a more cross-cutting and holistic transport policy approach can ensure that all transport modes progressively internalise their broader impacts on society – from impacts on climate and air quality to the shared use of public space. Such an approach also requires governments to work, not only with actors on the transport supply side (e.g. public transport operators, logistics companies, shared mobility companies and captive fleet owners) but also with urban stakeholders who can help modulate transport demand (e.g. administrators, real estate agents, and employers managing industrial parks, office buildings, universities and hospitals).

VI. Re-interpreting “value for money” in urban transport investment

Over the past decade, urban and transport planners, cities and civil society have increased awareness about the socio-economic, health and environmental benefits of low-carbon urban transport. Today, however,

adequate investment beyond pilot phases and piecemeal approaches remains at best limited.

As we witness the biggest ever mobilisation of public funds in history, it is vital that some of the Next Generation EU and other recovery funds are channelled towards removing the prevailing barriers to scaling equitable, healthy, green and resilient urban mobility solutions. The choices made today will determine the urban transformations possible over the next decade and whether the EU will be able to meet its 2030 climate target of reducing emissions by 55%. To create a more enabling environment for sustainable, low carbon transport policies they must be framed as expenditure and investment frameworks, sending clear messages on what type of investments will deliver the best value for money. Governments, international financing institutions and financiers must interrogate which urban transport investments will give us the greatest improvement across three impact areas: equitable access to mobility options, employment generation and reduced carbon emissions.

It is vital that some of the Next Generation EU and other recovery funds are channelled towards removing the prevailing barriers to scaling equitable, healthy, green and resilient urban mobility solutions.

VII. Never forget that it is always about people

Rejuvenating urban life in the aftermath of the pandemic will greatly depend on prioritising equitable, healthy, green and resilient mobility solutions that serve the majority and not only car-driving citizens. Key to more equitable solutions will be multi-stakeholder governance processes that place mobility at the centre of social justice and healthier, low-carbon lifestyles; cross-sectoral collaboration between transport, energy, health and land use professionals and municipal departments; IT solutions at the service of open data, transparency and fact-based policymaking; private innovation and public-private partnerships that respond to public urban mobility goals; and localised solutions with community engagement. These and other processes will be critical to enabling the contribution of transport and mobility to a better quality of life for all in our cities.

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On December 9th 2020 the European Commission presented its “Sustainable and Smart Mobility Strategy”, which is central to achieving the climate targets of the European Green Deal (EC, 2020a). Together with an Action Plan of 82 initiatives, the strategy sets the policy agenda for Europe’s transition to a green, smart and affordable transport system that aims to change the way people and goods move across the continent and deliver a 90% reduction in the transport sector’s emissions by 2050. The strategy also lays the foundation for the digital transformation of the EU transport system and stresses the importance of making transport more resilient in order to secure a well-functioning single market in future crises. More generally, the objective is to make all transport modes more sustainable, make sustainable alternatives widely available in a multimodal transport system and put in place the right incentives to drive the transition. To make this vision a reality, ten key areas for action (“flagships”) are laid out, ranging from boosting the uptake of zero-emission vehicles and related infrastructure to achieving seamless, safe and efficient connectivity and enhancing transport safety and security.

One of the strategy’s priority action areas is that of “making interurban and urban mobility more sustainable and healthy” (EC, 2020a: 6). With urban areas being accountable for 40% of Europe’s total road transport CO₂ emissions (EC, 2020b), cities and the regions they form part of have a central role to play in Europe’s mobility transition. This chapter assesses the urban dimension of the new mobility strategy by drawing on discussions held at the Committee of the Regions (CoR) and the Council of European Municipalities and Regions (CEMR) in the process of drafting an opinion on the strategy.¹

I. Towards a holistic urban mobility transition

In cities, mobility is the link between where people live, work and go to school and where businesses provide their products and services. A successful urban mobility transition requires a holistic approach that moves beyond reductions in CO₂ emissions, particulate matter and noise to also address issues around connectivity, accessibility, affordability and traffic

1. The author worked on the CoR opinion as an expert supporting its rapporteur Robert van Asten, CoR member and Deputy Mayor of The Hague. At the time of writing, the opinion is under consideration by the CoR. Adoption is foreseen for June 30th/July 1st 2021. This chapter therefore does not reflect the positions adopted in the final CoR opinion.

The EU Sustainable and Smart Mobility Strategy lays the foundation for the digital transformation of the EU transport system and stresses the importance of making transport more resilient in order to secure a well-functioning single market in future crises.

safety. Ultimately it is about making cities more liveable, healthy and inclusive.

“The mobility transition is not just a question of making transport more sustainable (towards zero-emission vehicles), but also of reducing distances and the amount of travel – where possible – and changing and sharing modes of mobility” (Robert van Asten, Deputy Mayor of The Hague and rapporteur for the CoR’s opinion on the EU Sustainable and Smart Mobility Strategy).

Mobility policy is often embedded in spatial policy. Today, European cities and regions leading the mobility transition aim for service proximity in order to avoid unnecessary travel. The 15-minute city model, which aims for residents to live within a short walk or bike ride of their daily needs, exemplifies this approach. Schools, workplaces and shops should ideally be close to where people live, not just in (inner) cities but also in surrounding areas. Greater workplace proximity improves the access of vulnerable populations to the labour market. Ensuring services are within easy reach reduces rural flight among the young and makes it possible for the elderly to live independently for longer.

An effective urban mobility transition also depends on support for more and new forms of active modes of transport, including shared and micromobility (e.g. scooters or speed pedelecs), as well as the provision of dedicated infrastructure for walking, cycling and public transport. People need affordable and safe public transport connections and reliable and available mobility as a service (MaaS). Crucially, these alternative modes of transport can only be successful if they are accompanied by behavioural changes. Cities and regions are well positioned to provide incentives for citizens and businesses to change their mobility habits and preferences. The COVID-19 crisis, which has brought a sharp increase in teleworking and more flexible working hours, provides an opportunity in this regard.

Finally, an urban mobility transition also requires functional urban areas to be interlinked with the wider networks of connections in which they are embedded. Cities and regions are multimodal mobility hubs within national and international networks, where passengers and freight come together. Both their internal and external connectivity are vital for the economic, social and territorial cohesion of the EU and the integrity of the internal market. Resilient interurban networks are a prerequisite for a well-functioning internal market in future crises.

II. Cities in the EU’s new mobility strategy

Where and how do cities and regions feature in the new EU Sustainable and Smart Mobility Strategy?

Sustainable Urban Mobility Plans (SUMP)

A cornerstone of EU urban mobility policy, Sustainable Urban Mobility Plans (SUMP) are also central to the local and regional contributions to the new mobility strategy. First introduced in 2013, this voluntary

instrument was designed to improve the accessibility of urban areas by providing sustainable mobility and transport “to, through and within” cities and their surrounding (peri-urban) areas (EC, 2013). To be effective, SUMP’s have to be flexible and meet the principles of subsidiarity and proportionality. In some member states they are used together with regional mobility plans that cover regional “daily urban systems”, that is, the urban region and the surrounding areas from which individuals commute. Currently, around 1000 European cities have adopted SUMP’s. Building on the original SUMP guidelines, in recent years the EU has published additional guidance covering a wide range of issues from low-emission zones to cycling and shared mobility (Eltis, 2021).

Cities and regions are well positioned to provide incentives for citizens and businesses to change their mobility habits and preferences.

In the new mobility strategy, the Commission announced that the use of SUMP’s will be extended and made mandatory for cities that are nodes on the Trans-European Transport Network (TEN-T). In light of these changes and as part of the revision of the EU Urban Mobility Package in the autumn of 2021, the SUMP guidelines will be further adjusted. Clearer guidance is still needed on local and regional mobility management to tackle congestion, on improving connectivity with suburban and rural areas, and on interlinkages between mobility and deteriorating local ecosystems. The new policy package will provide the main mechanisms for supporting cities in the improvement and adoption of SUMP’s.

EU financial support for cities

The Commission’s new mobility strategy emphasises that the importance of urban mobility must be reflected in EU policies and more financial support for cities. For the overall functioning of the TEN-T, this would mean that provisions are made for first and last mile solutions in cities, including multimodal mobility hubs, park-and-ride facilities and safe infrastructure for walking and cycling. A first step in this direction could be the proposal by the Climate-Neutral and Smart Cities Mission of the Horizon Europe research and innovation funding programme to support 100 cities in their systemic transformation towards carbon-neutrality by 2030 (EC, 2020c). Mobility measures will no doubt play a large part in these efforts. Another option would be to link the formulation and implementation of SUMP’s with the option of accessing certain EU funding programmes focused on urban and mobility solutions.

“The European Union has to encourage the shift of mobility behaviour with dedicated funding and legislation” (Andreas Wolter, Deputy Mayor of Cologne and Spokesperson for Mobility at the Council of European Municipalities and Regions [CEMR]).

Yet, while this and other EU funding programmes are very welcome, they are not enough to get the majority of European cities on track for meeting the EU’s 2030 and 2050 climate targets in the transport sector. Substantial investments need to be made from the European Structural and Investment Funds (ESIF) and the Recovery and Resilience Facility (RRF), the key instrument at the heart of Next Generation EU.

The Commission also needs to make it easier for cities and regions to access EU funding. The fragmentation of budgets, strict eligibility requirements, low success rates in qualifying for funds and burdensome

The Commission announced that the use of SUMP's will be extended and made mandatory for cities that are nodes on the Trans-European Transport Network (TEN-T).

accountability obligations are all barriers that cities and regions face when trying to apply for EU funds. Simpler procedures, better information and the creation of one-stop shops that provide technical assistance and share expertise tailored to the regional and local scale could improve the chances of subnational administrations and their partners.

That said, not all financial support has to come from EU funding and subsidies. Supporting cities in qualifying for and attracting other public and private investments is equally if not more important. A good example of how this could be done is the InvestEU programme, which offers financial instruments to combine public and private investments in its "sustainable infrastructure" policy window.

Enabling cities to shape the mobility transition

EU legislation in the field of harmonisation, standardisation and interoperability is necessary for a level playing field. Proper exchange and protection of data and high standards for emissions and road safety can only be regulated at EU level. The new mobility strategy provides many useful policy measures to help cities and regions shape the mobility transition, including on standards for zero-emission vehicles and new MaaS concepts. However, if these policies are to be effective, cities and regions' needs and interests need to be central to their design and implementation.

The policy proposals for zero-emission vehicles (CO₂ standards and post-Euro 6/VI standards) must be implemented in a way that enables cities and regions to keep pace with the necessary expansion of renewable energy production, regional and local distribution networks, and fuelling and charging infrastructure. In this regard the new proposals the Commission will make to promote charging infrastructure and hydrogen points are very welcome.² However, it is important that the new standards leave sufficient room for regional and local innovation and are technology-neutral.

Sustainable and smart mobility are two sides of the same coin. Many cities and regions want to implement MaaS concepts to promote door-to-door transport. To that end, it is important that the EU's forthcoming revision of the Directive on Intelligent Transport Systems (ITS)³ includes the introduction of multimodal tickets and integrated information about all possible types or combinations of transport. This directive should also take into account future autonomous vehicles that will fundamentally change the way we travel and make it possible to set up "public transport on demand" in small municipalities in sparsely populated areas.

On a number of points the planned legislation outlined in the new mobility strategy could be more ambitious. For example, cities and regions are trying to limit car and freight traffic through low-emission and zero-emission zones, but lack access to vehicle restriction data⁴ to ensure proper enforcement. To enhance road safety the EU should also adopt legislation on the use of Intelligent Speed Adaptation (ISA) systems in all vehicles and a clear regulatory framework for light electric vehicles such as electric scooters, speed pedelecs and other forms of micromobility.

2. These changes will be made by revising the Alternative Fuels Infrastructure Directive (AFID) expected in July 2021 and the Energy Performance of Buildings Directive (EPBD) expected in December 2021, specifically provisions related to charging infrastructure in the built environment.
3. The ITS directive will be revised in the third quarter of 2021.
4. EUCARIS is an intergovernmental application for a network of national vehicle registration databases. It is currently used for Directive 2015/413 on the exchange of information on road traffic offences.

III. In need of a more joined-up approach

The Commission's new mobility strategy is a valuable and comprehensive initiative for regions and cities. However, to make European mobility more sustainable and smarter by 2030, the implementation of the strategy should take into account cities and regions' needs and their knowledge and experience. Mobility policy and governance cut across all scales of government, from the EU to the national, regional and local. A joined-up approach involving all levels of government is vital to the transition to sustainable mobility. Cities and regions are keen and ready to work with all partners involved to make the mobility transition a success.

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The policy proposals for zero-emission vehicles must be implemented in a way that enables cities and regions to keep pace with the necessary expansion of renewable energy production, regional and local distribution networks, and fuelling and charging infrastructure.

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Meeting the European Union's 2050 climate-neutrality target will require a 90% reduction in transport-related greenhouse gas (GHG) emissions. A large proportion of these reductions will need to come from Europe's city-regions, and urban mobility in Europe will need to change fundamentally as a result. The question for European municipalities is how they can pursue mobility planning that ensures GHG emissions decline at sufficient scale and speed to meet the EU's 2030 and 2050 climate targets.

The European Commission's current policy framework for supporting urban mobility transitions includes the Sustainable Urban Mobility Planning (SUMP) approach as one of its cornerstones, with the SUMP practitioner guidelines currently in their second iteration and EU funding for municipalities likely to become conditional on adherence to these planning principles. Based on our work within the H2020 SUMP-PLUS project, we argue that new long-term planning approaches to developing transition pathways are needed that complement existing SUMP planning focused on a five- to ten-year time horizon (Smeds & Jones, 2020). In this chapter, we make reference to the cities of Barcelona and Stockholm as illustrative examples, based on conversations with representatives of the respective city governments during the webinar "Urban Mobility after COVID-19" hosted by CIDOB in April 2021.

I. Towards a long-term planning approach

Meeting EU climate targets in the mobility sector will be challenging.¹ Since the rise of the local sustainable development agenda in the early 1990s, the transition towards sustainable mobility has been too slow. Across the EU, GHG emissions from the transport sector have not declined at the same pace as emissions from the energy, agriculture, industrial and service sectors. Transport emissions in the EU only started to decrease in 2007, and in 2017 were still 28% higher than in 1990. Road transport is the largest contributor of emissions in urban areas, accounting for 82% of the total. There is no large-scale dataset for GHG

1. This paragraph draws on an earlier, longer chapter by Smeds and Cavoli (2021). References for the statistics and research cited can be found in that chapter.

Long-term planning approaches to developing transition pathways are needed that complement existing Sustainable Urban Mobility Planning (SUMP) focused on a five- to ten-year time horizon.

emissions attributable to urban areas across the EU, but considering the evidence available, we can be quite confident that urban transport emissions are not on track to achieve the 2050 target. It is crucial to acknowledge that mobility transitions have been uneven, both geographically and within cities of different sizes. We know that many large Western European cities have successfully reduced private car use since the early 2000s, but we also know that car use is increasing in other parts of Europe, and our analysis of data from a survey of 336 European municipalities shows that half of those with fewer than 50,000 inhabitants have next to no experience with sustainable mobility planning (Dragutescu et al., 2020).² The capacities and drivers related to sustainable mobility transitions vary a lot. Decarbonisation and context-specificity are thus two crucial aspects that will need to be integrated more strongly into the upcoming revision of the policy framework for urban mobility developed by the European Commission's Directorate-General for Mobility and Transport (DG MOVE) and any future revision of the SUMP concept.

With these challenges in mind, what kind of mobility planning will enable European cities to achieve the 2030 and 2050 climate targets? In the SUMP-PLUS project, we have published guidelines for a long-term planning approach focused on developing transition pathways to carbon-neutral mobility with a time horizon of 20 to 30 years, and with intermediate milestones and implementation strategies (Smeds & Jones, 2020).³ Developing an emissions reduction pathway for urban mobility is a demanding technical exercise that involves aligning EU, national and cities' overall emission reduction targets and introducing local policy measures that complement those being implemented at other levels. Then, long-term targets for urban mobility emissions need to be broken down into intermediate ones. Many larger European cities going through this process at the moment are still figuring out how to do this. Although some specific tools have been developed to support cities in developing emission pathways, like SCATTER in the UK,⁴ only limited best practice has been established.

One problem is that in most cities, strategic mobility planning continues to rely on modelling to forecast travel demand that is based on historic relationships, even though the paradigm of "predict and provide" has long been challenged and is not sustainable. In other words, while cities plan for accommodating projected population and traffic growth, long-term climate goals are not the central focus, in the sense of targets that cannot at any cost be missed.

Within the SUMP-PLUS project we argue for a backcasting approach. Backcasting is an established planning method that has been applied since the early 2000s in London and cities in Sweden and the Netherlands, among other places (Miola, 2008), but has yet to become mainstream. Backcasting focuses on vision-led planning: taking a future vision of the desired city as a starting point and working backwards all the way to the present to identify what needs to be done between today and 2050 at specific points in time in order to achieve that vision. Here, models are used to construct and validate policy packages that will meet key targets. Cities then develop a pathway that includes a clear timeline of policies and milestones linked to emission targets – a narrative and strategy so compelling that the next political administration cannot ignore it and is

2. Drawing on survey data collected as part of the H2020 CIVITAS SUMP-PLUS project.
3. We focus on GHG emissions here, but of course these pathways also need to consider other policy objectives, such as road safety (e.g. through Vision Zero) and social justice – equalising access to public transport, active mobility and public space for different socio-economic, age, gender and ethnic groups.
4. <https://scattercities.com/>

obliged to keep its eyes on long-term goals. During the CIDOB webinar, both Barcelona City Council and the City of Stockholm explained that they already draw on elements of the backcasting approach. It is likely that European cities can learn a great deal from each other in this respect.

While carbon emissions curves are crucial, we also need to set this within a broader long-term vision for the city. The days when urban mobility planning was primarily about techno-economic engineering are long gone; today, mobility planning at its core is about place-making, sustainable lifestyles and the relationship of citizens with streets and mobility services as part of the city's public life. Building political coalitions around new ways of framing mobility policy is crucial. During the CIDOB webinar, Stockholm's Vice Mayor for Transport, Daniel Helldén, underscored that backcasting approaches are more challenging to "sell" to stakeholders, who are used to seeing things from the modernist perspective of "planning for growth", rather than with the planet's absolute limits in mind. New participatory visioning approaches and governance platforms are needed to generate new narratives, as well as partypolitical strategies that can tie sustainable mobility issues into broader progressive policy platforms and win elections.

Backcasting focuses on vision-led planning: taking a future vision of the desired city as a starting point and working backwards all the way to the present to identify what needs to be done between today and 2050.

II. The need for cross-sectoral coordination

A vision for a climate-neutral city that promotes human well-being, offers high-quality public services in line with the European social model and builds sustainable economic prosperity⁵ also needs to consider cross-sectoral coordination in the development of transition pathways. Realising the goal of the Horizon Europe Mission for Climate-Neutral and Smart Cities to support 100 European cities to become climate-neutral by 2030 and many more cities thereafter means that carbon emissions generated in one sector can no longer be "exported" to another – including transport emissions. The need for mobility is largely a "derived demand", in other words, it is generated by decisions made in other sectors, beyond the policy levers of mobility planning (Jones, 2012). For example, building new housing, shopping or educational facilities in locations inaccessible by public transport and active mobility has major carbon-generation consequences.

In order to reduce urban mobility emissions, we thus need cross-sector coordination that goes beyond integrated land use and mobility planning to take into account the mobility consequences of decisions made in different public and private sectors. Within SUMP-PLUS, we have developed an initial framework supporting the identification of such cross-sector linkages (Jones et al., 2021). We are working with Greater Manchester in the UK on the transport implications of how people will access healthcare in the future and how the sector could reduce or shorten trips through more decentralised or digital services, aligning with the UK's decarbonisation plan for its national healthcare system (NHS, 2020). The interrelation between emissions, mobility flows and the tourism sector in Barcelona would be another example that is relevant to the SUMP-PLUS Links approach. To get to net-zero emissions we need planning that considers mobility across public services, consumption and leisure activities – essentially linking spatial concepts like the 15-minute city to decarbonisation pathways across sectors.

5. See the work of UCL's Institute for Global Prosperity on approaches to sustainable place-based prosperity and universal basic services

To reduce urban mobility emissions, we need cross-sector coordination that goes beyond integrated land use and mobility planning to take into account the mobility consequences of decisions made in different public and private sectors.

III. Enabling actions for overcoming barriers

Our guidance on how European municipalities could develop transition pathways includes eight steps (Smeds & Jones, 2020). The step we highlight in this essay is identification of the “enabling actions” that are interdependent with policy milestones: institutional and financial barriers that need to be overcome or new capacities that need to be built to enable the implementation of ever-more ambitious mobility policies. We know that the greatest barriers to sustainable mobility transitions are primarily a lack of financial resources and appropriate business models and issues to do with cross-sector governance and partnerships. But assessing the carbon-intensity of our mobility policy mix is just one key issue. In paying attention to enabling framework conditions, we must also ask what the deadline is for different enabling actions to overcome a specific barrier, in order to facilitate the actual implementation of a policy and the achievement of our intermediate carbon target.

The city-regional context is one crucial dimension. Inward commuting and car-dependency across city-regions are issues for all large European cities. We know that progressive mayors are accelerating sustainable mobility transitions with bold visions and experiments, but big-city mayors cannot “save the world” alone. Integrated planning across functional urban areas remains the fundamental cornerstone of sustainable mobility: to enable us to reach climate neutrality by 2050, innovative actions to strengthen city-regional governance are needed. Achieving the European Green Deal will require increased levels of EU funding support to European cities (Smeds & Cavoli, 2021) and, in many countries, political and fiscal decentralisation to empower municipalities to experiment with mobility policies (Smeds, 2020). In the UK, local governments have started to explicitly list the additional national support and local powers needed to achieve carbon-neutral mobility in their transition pathway policy documents. Such demands to change the framework conditions of planning will become more common over the next ten years, we predict.

IV. Conclusion: balancing long-term planning and short-term experimentation

We have argued that the European Green Deal – and the climate crisis it seeks to address – demands a new approach to long-term mobility planning. We have outlined the SUMP-PLUS method of developing transition pathways to achieve carbon-neutral mobility by 2050 through backcasting and cross-sectoral coordination.

We conclude by acknowledging that long-term planning needs to be complemented by medium-term thinking and actions that can urgently accelerate the implementation of sustainable mobility policies leading up to 2030. Within SUMP-PLUS, we have also developed implementation concepts to kickstart this process through “quick wins”, experimentation and building public political momentum towards milestones for more radical policy change, like larger CO₂-free zones or an end to the sale of particular types of vehicle.⁶ Professor Phil Goodwin, a former transport advisor to the UK government, recently tweeted that every pathway needs a detailed “Gantt chart for decarbonisation”.⁷ A comment on the

6. See the Implementation Strategy concept, in Smeds and Jones (2020).

7. https://twitter.com/Phil_Goodwin99/status/1380784780376150016

tweet read: “we won’t... plan our way to net zero. Interim targets and thinking about dependencies are essential, but so is experimentation and failure along the way”. We agree with both perspectives: careful long-term planning linked to emission curves is crucial, but the recipe for mobility transitions also necessarily involves ensuring that municipalities start “building stuff on the ground” and making concrete progress as soon as possible – while drawing on civil society ideas and private sector business models to enable transformative change.

As everything cannot be foreseen, everything cannot be planned for. During the COVID pandemic, we have seen many cities experimenting with “quick-win” scheme implementation, but there are many lessons to learn about how such experimentation can be made more strategic and integrated with wider plans. We are in a climate emergency, but we need to take a more holistic approach and accelerate transitions in a strategic way that also achieves the other components of cities’ visions. There will be many more shocks and disruptions in the lead-up to 2050, and we need to think about how policymaking can remain agile in the face of them.

Long-term planning needs to be complemented by medium-term thinking and actions that can urgently accelerate the implementation of sustainable mobility policies leading up to 2030.

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TOWARDS LESS POLLUTED AND MORE LIVEABLE CITIES

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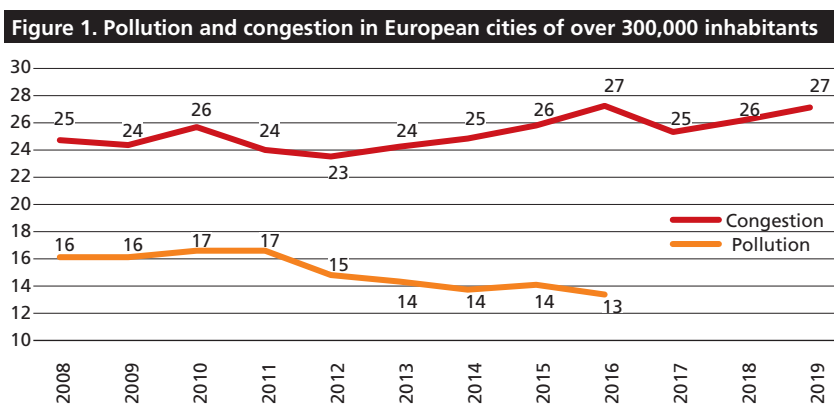
THE EFFECTIVENESS OF LOW-EMISSION ZONES AND URBAN TOLLS IN MITIGATING POLLUTION AND CONGESTION: EVIDENCE FROM THE LITERATURE

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The large share of private car traffic in cities generates severe congestion and pollution. The cost of congestion for European society is estimated to be €270 billion a year (European Court of Auditors, 2020). Further, exposure to pollution, particularly fine particulate matter (PM 2.5) (EEA, 2020), is a major cause of premature death and disease that is responsible for around 400,000 annual premature deaths in the 39 member countries of the European Environment Agency (excluding Turkey). These two negative externalities of private car traffic are related, with car circulation at low speeds impacting the emission of polluting substances (Beaudoin et al., 2015; Parry et al., 2007).

Figure 1 presents the evolution of both externalities for a sample of 130 European cities of over 300,000 inhabitants. The congestion indicator is based on data obtained from the TomTom Traffic Index and shows the additional travel time a vehicle needs to undertake a trip in a certain city as compared to a free-flow situation. The pollution indicator is based on annual estimates of fine particulate matter in suspension with a maximum diameter of $2.5 \mu\text{g}/\text{m}^3$ (PM 2.5), using the method developed by Van Donkelaar et al. (2019).



Source: Bernardo et al., 2021.

The cost of congestion for European society is estimated to be €270 billion a year.

Exposure to pollution, particularly fine particulate matter (PM 2.5), is a major cause of premature death and disease that is responsible for around 400,000 annual premature deaths in the 39 member countries of the European Environment Agency.

On average, the levels of congestion in European cities are very high and increasing over time, with values ranging between 23% and 27% (see Figure 1). With respect to pollution, the data shows PM 2.5 levels decreasing over time, but they are still higher than the 10 µg / m³ threshold established by the World Health Organization (WHO) above which a clear association has been detected between prolonged exposure to PM 2.5 and cardiopulmonary diseases.

This is the context in which city councils across Europe are seeking to transition to more sustainable urban transport. Policies to reduce the share of private cars in urban mobility can be either price-based or quantity-based. The implementation of urban tolls is an example of a price-based measure. It generally involves imposing a congestion charge to enter and leave a city (typically only the city centre). Thus far, only a few cities have implemented such measures, most of them European. Urban tolls are in force in Singapore (since 1975), London (since 2003), Stockholm (since 2007), Milan (since 2008), Gothenburg (since 2013) and Palermo (since 2016). While in Italian cities the congestion charge is combined with a Low-Emission Zone (LEZ), London applies an additional charge to the congestion toll depending on the emission level of the vehicles. Of the quantity-based measures, LEZs are the most widespread implemented in Europe, with more than 280 in place in urban areas. To reduce pollution, LEZs involve banning polluting vehicles from a determined urban area, mainly city centres. However, there is no uniformity in the application of LEZs, and they differ in size and the types of vehicles and emissions thresholds banned.

The research done so far does not seem to consistently demonstrate the effectiveness of congestion tolls and LEZs in targeting both pollution and congestion.

In the literature analysing the impact of urban tolls on congestion, there is consensus that the policy is effective in reducing congestion. For example, studies of London and Stockholm report a reduction in congestion of 20%–30% (Eliasson, 2008; Santos & Fraser, 2006; Börjesson et al., 2012 and 2014), while analyses for Milan and Gothenburg find a reduction of about 10%–15% (Andersson & Nässén, 2016; Gibson & Carnovale, 2015; Rotaris et al., 2010; Percoco, 2013). In a Europe-wide study, Bernardo et al. (2020b) show reductions in congestion after the implementation of tolls of 29% in Gothenburg and 19% in Palermo. Yet, these numbers must be treated with caution. As toll revenues are typically used to improve public transportation, the measured reductions correspond to the direct effect of tolls as well the indirect effect derived from improvements in public transportation.

Fewer studies exist on the effectiveness of tolls in reducing pollution, but all find the measure to be effective for emissions reduction. Gibson and Carnovale (2015) report a fall in pollution of between 6% and 17% in Milan, depending on the pollutant. Simeonova et al. (2019) find a reduction of between 5% and 19% in Stockholm. Moreover, additional benefits of congestion tolls reported in the literature include fewer accidents in the case of London (Green et al., 2016) and improved children's health (especially fewer children suffering from asthma) in the case of Stockholm (Simeonova et al., 2019).

Regarding LEZs, previous studies suggest that they are an effective measure for reducing pollution and improving air quality. Studies of German cities report a reduction ranging from 4% to 13% (Malina & Scheffler, 2015; Morfeld et al., 2014; Wolff, 2014). Other studies present similar results for Amsterdam (Panteliadis et al., 2014), London (Ellison et al., 2013), Rome (Cesaroni et al., 2012) and Madrid (Lebrusan and Toutouh, 2021). However, there is no clear evidence of the effectiveness of LEZs in reducing congestion. The three studies done so far report on average no reduction in congestion after the implementation of an LEZ.

In a panel data study of 130 European urban areas during 2008–2016, Bernardo et al. (2020a) conclude that, on average, LEZs are ineffective in reducing congestion. Moreover, analysing the average effect at city level for the 2008–2019 period, the same authors conclude that there is a high level of heterogeneity in the evolution of congestion in LEZ cities when compared to similar cities that have not implemented an LEZ, with a prevalence of LEZ cities experiencing increased congestion (Bernardo et al., 2020b). Similarly, in a detailed data study of the LEZ implemented in central Madrid from December 2017 to December 2019, Tassinari (2021) finds no effect of the measure on the city's overall level of congestion. The author concludes that while the flow of cars within the restricted area was reduced, this occurred at the expense of increased traffic in the surrounding areas, meaning the effect for the city as a whole ended up being null.

The main lesson from the literature is that while both policies seem to be effective in fighting pollution, only urban tolls seem to effectively reduce congestion. However, at European level an increasing number of cities are creating LEZs while congestion tolls have only been introduced in a few cities.

What is the reason for this policy choice? Fageda et al. (2020) argue that it has to do with public acceptance of LEZs being easier to achieve than of congestion tolls. There appears to be public consensus that, firstly, pollution is a more severe externality and, secondly, that quantity measures are more effective in curbing pollution. The authors suggest that this public consensus is also strongly related to the fact that LEZs only ban a share of vehicles from the designated area (the most polluting ones), which only affects a limited number of commuters (while tolls affect all commuters). The majority of medium and high-income commuters who own newer and less polluting cars continue commuting after the creation of an LEZ in their city. Other reasons for the popularity of quantity measures are that they are more cost-effective to implement, as they are not expected to be accompanied with investments in public transportation. Finally, quantity measures spur the renewal of the car fleet, as older and more polluting cars are replaced by newer and cleaner ones. They are thus in the interests of the vehicle manufacturing industry and often supported by it.

To conclude, there is evidence that congestion tolls are more effective than LEZs in targeting both pollution and congestion. In this sense, even though LEZs are effective in reducing pollution, it would be advisable to consider a combination of both tools to deal with the negative externalities of private vehicles in urban settings.

Policies to reduce the share of private cars in urban mobility can be either price-based or quantity-based.

There is evidence that congestion tolls are more effective than LEZs in targeting both pollution and congestion.

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CHALLENGING THE CAR'S DOMINANCE TO BRING LIFE BACK TO RESIDENTIAL STREETS AND SUPPORT HIGH STREETS AND TOWN CENTRES

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Chair, London Living Streets

All over the world communities are grappling with the impact of motor traffic. For more than 100 years cities, towns and villages across the globe have been in retreat as the imperative to enable journeys by motor vehicle has dominated transport and urban planning. The needs of local people and communities have been subordinated to the convenience of those travelling by private motor vehicle, whether within or through an area. Recently, however, communities have been pushing back. The COVID-19 pandemic brought things to a head, making people aware of the huge difference it can make to life in an urban setting when a fair balance exists between the needs of those who live in a place and those who drive through. Here, we look at examples of this pushback in the United Kingdom and London in particular, where the number of Low Traffic Neighbourhoods (LTNs) has expanded rapidly in the wake of the COVID-19 lockdowns.

I. Traffic growth on neighbourhood streets

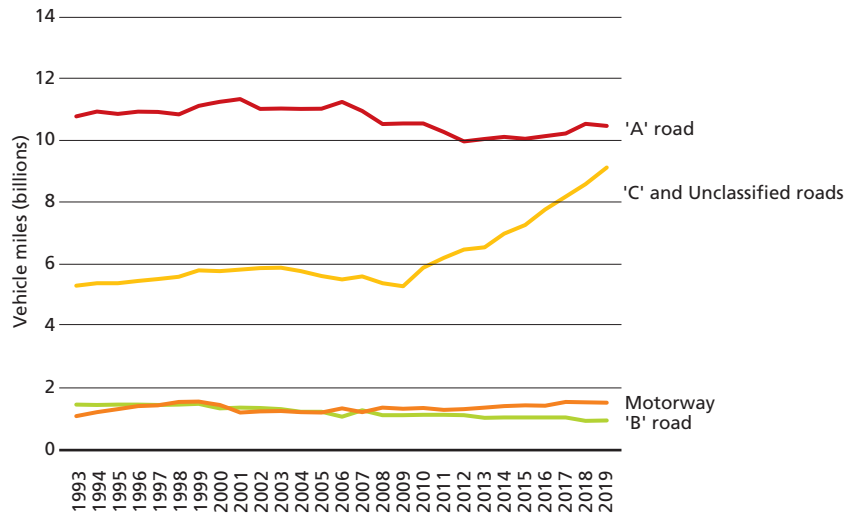
A number of attempts have been made to reduce the impact of traffic in London, most notably the introduction of congestion charging in 2003, which was linked to a huge increase in the quality and frequency of bus-based public transport. The picture in London had been one of generally stable traffic levels across the 1990s and the first decade of this century, but the arrival of satellite navigation technology changed the picture dramatically. As the chart below shows, traffic volumes on neighbourhood streets and residential roads ("C" and "Unclassified") rose dramatically as journeys and routes that were previously only known to professional drivers (e.g. cab drivers) and locals suddenly became accessible to anyone with a satellite navigation system. While traffic volumes remained stable on London's main roads, they jumped by 72% in just ten years on "C" and "Unclassified" roads. By 2019 these roads were carrying almost as much traffic in total as the main "A" roads.

Inevitably, communities were slow to react, as they only gradually became aware that what were once quiet neighbourhood streets were now subject to large volumes of traffic. Increasing the impact of this traffic was the fact

The COVID-19 pandemic brought things to a head, making people aware of the huge difference it can make to life in an urban setting when a fair balance exists between the needs of those who live in a place and those who drive through.

that it was no longer just local people driving around the area. Now it was often people in a hurry seeking to shave seconds off their journey with little or no concern for the impact of speed on the neighbourhoods they passed through.

Annual traffic by road type in London. Traffic in Great Britain from 1993 to 2019 by road type in vehicle miles (billions).



II. The origins of the Low Traffic Neighbourhoods (LTNs)

By 2013 the impact of all this extra traffic was beginning to dawn and communities were starting to respond. LTNs were born out of the Mayor of London's *Vision for Cycling* and the proposals to create three "mini-Hollands" in outer London boroughs.¹ In Waltham Forest, the development of an initial LTN around Walthamstow Village experimented with removing through traffic from the area. The principle behind an LTN is to remove through traffic by introducing barriers (e.g. bollards, planters or camera-enforced closures) while still allowing all vehicles to access any location (even though the journey to them may sometimes be a little less direct). Everyone is still able to reach their home or business by motor vehicle, but it is no longer possible to drive through. Although initially controversial, this programme was implemented successfully through a combination of strong political will, communities seeing huge benefits from the changes and a body of research showing that people were walking and cycling more,² becoming more active and less reliant on their cars. This research also found that overall traffic was not displaced to surrounding main roads or adjacent neighbourhoods.

III. Creating LTNs: the essentials

So, what are the main ingredients of a Low Traffic Neighbourhood? Ideally it should be about 1 km² to ensure the distances to the boundary roads are not too great. Two other key indicators of likely success are the density of the area and levels of car ownership. In densely inhabited areas, distances

1. https://www.london.gov.uk/sites/default/files/cycling_vision_gla_template_final.pdf
 2. <https://doi.org/10.32866/001c.17128>

to local shops and other amenities will tend to be short and therefore easier to walk or cycle. Lower levels of car ownership mean the improvements to the walking and cycling environment that the LTN offers immediately benefit a greater proportion of the local community. Transport for London (TfL) set out the interplay of these different factors well in its June 2020 *Strategic Neighbourhood Analysis*.³

As the first lockdown ended in summer 2020, LTNs were introduced at pace with many of the 33 London boroughs keen to protect the gains that communities had seen due to the huge falls in traffic of the previous three months. Instead of a full consultation process, the LTNs were introduced using emergency traffic orders. While this fast introduction helped many to retain the benefits of a low traffic environment, it left others feeling that they had not been consulted and that these changes were being imposed on them.

Ideally, the process of developing and implementing LTNs would follow that developed in Waltham Forest, which goes something like this. Step one is to identify an appropriate area for a LTN in terms of size and setting the boundary roads. A number of London boroughs have mapped their whole borough in terms of all potential LTNs, and the strategic analysis by TfL breaks up London into an array of potential LTNs. Once we have an idea of the area, the next step is to find out what issues residents, workers and visitors face in relation to travel within that area. Platforms such as Commonplace and Placebuilder from The Future Fox can be useful at this stage, with people able to pop ideas and issues onto an online map. This should of course be supplemented wherever possible with face-to-face engagement with local people. With the information gathered from this we move onto stage three, where initial designs for the LTN can be developed. These can then be tested and improved through engagement and consultation with local people. Once changes have been made to these designs to incorporate feedback, it is time to move on to implementation followed by monitoring and further adjustments based on what does and doesn't work.

IV. The impact of LTNs

What have we learned about the impact of LTNs from those introduced in Waltham Forest since 2015 and those implemented in response to the pandemic? Significant formal research has been undertaken on the Waltham Forest schemes. The impact of the more recent initiatives introduced in 2020 has been made less clear by the fluctuations in traffic volumes that have resulted from lockdowns coupled, especially in London, with the huge fall in public transport usage.

However, it looks like we can say the following with some certainty:⁴

- **People walk and cycle more.** As Waltham Forest's first LTNs were implemented in 2015, there has been time to study them in detail. Residents within an LTN walked 115 minutes more per week and cycled 20 minutes more. More recently, Lambeth found that cycling increased by 51% within the Railton LTN and 32% across the area. Additionally, cycling increased by 65% and 84% on Railton Road and Shakespeare Road, two through roads that are now filtered.

The principle behind an LTN is to remove through traffic by introducing barriers while still allowing all vehicles to access any location.

3. content.tfl.gov.uk/lsp-app-six-b-strategic-neighbourhoods-analysis-v1.pdf

4. The following conclusions and data are drawn from: <https://www.betterstreetsforsouthwark.org.uk/all-about-ltns/#WalkCycleMore>

LTNs reduce traffic volume and car ownership.

- **LTNs reduce traffic volume and car ownership.** Evidence from Hackney and Waltham Forest shows that LTNs reduce car journeys and car ownership. It is not the case that traffic is just displaced: overall traffic falls across the area. There are claims that LTN trials have increased congestion on boundary roads, but both Lambeth and Hackney have released monitoring data on LTNs as part of their COVID-19 transport response showing that LTNs did not increase overall traffic on surrounding main roads. Additional monitoring in Lambeth has shown a 31% decrease in traffic and 23% fewer heavy goods vehicles in and around the Railton LTN. By reducing road capacity for motor vehicles, traffic decreases. This phenomenon, known as “traffic evaporation”, has been seen in many places around the world. Researchers in Waltham Forest also found that car ownership within LTNs dropped 6% after two years – a much larger fall than in areas where other walking and cycling schemes were implemented. Surveys also show evidence of lower car ownership after an LTN is implemented.
- **LTNs improve road safety.** Reducing traffic volume improves road safety within an LTN. Motor traffic on minor roads has been found to involve a higher degree of risk of casualty than on main roads, especially for people walking and cycling. More recently, according to data from TfL, collisions on minor roads have been increasing at a higher rate than on major roads. Waltham Forest saw a 70% reduction in road traffic injury per trip on roads within the LTN for people walking, cycling and in motor vehicles. There was also no negative impact on boundary roads.

V. Don't forget the main roads

Addressing through traffic in neighbourhood streets is however not enough. Huge problems remain with main road traffic that London and other cities need to address. It is estimated that more than a third of driven journeys in London are less than 2km in length,⁵ and a range of measures are needed to begin tackling this main road traffic. To date, a price has never been put on the true cost of driving, especially in cities, particularly the impact that motor vehicles have on air quality, climate changing emissions, community and casualties. It is time for road pricing to be introduced for all driven journeys with the cost of a journey potentially taking into account the emissions of the vehicle, the time of day and the ability to substitute a driven journey with public transport. It is also time for those who own a vehicle to pay a fair price for parking it. Again, some kind of comprehensive emissions-based charging for parking coupled with universal controlled parking zones would be a much-needed start.

VI. A fairer balance for people and motor vehicles

LTNs are not a perfect solution, but they are a key building block for any city which aims to balance the needs of local people with those of people who choose to and have to drive. Unless through traffic is restricted on neighbourhood streets it will not be possible to tackle traffic on the main roads. Ever since they emerged in cities, motor vehicles have pushed people to the margins of urban life. The present debate about whether they should be permitted to use all streets at all times and the introduction of measures to limit through traffic in towns and cities shows that we are finally ready to struggle to regain our place.

5. https://www.london.gov.uk/sites/default/files/health_impact_of_cars_in_london-sept_2015_final.pdf

TRANSITIONING TO SUSTAINABLE URBAN MOBILITY IN A JUST AND EQUITABLE MANNER: HOW TO PREVENT ENVIRONMENTAL GENTRIFICATION AND ENHANCE SOCIAL EQUITY?

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Social conflicts related to gentrification processes are one of the main challenges facing cities around the world. Typically, they affect neighbourhoods that have suffered from historical under-investment and socioeconomic deprivation that later become desirable to medium and high-income groups because of their central location or architectural style. With the influx of capital linked to new medium- and high-income residents, these neighbourhoods are socially, economically, culturally and physically transformed in ways that cater and are more aesthetically attractive to the new residents. The neighbourhoods are equipped with new cultural and environmental amenities (such as new parks and pedestrianised streets or low-traffic neighbourhoods), new (luxury) housing, new forms of commerce and even new healthcare facilities (Cole et al., 2021), which may accompany and trigger gentrification. Historically, the impacts of gentrification have caused much controversy, but recent research overwhelmingly demonstrates that it increases segregation within neighbourhoods (Cole et al., 2021).

I. Environmental gentrification and low-traffic neighbourhoods

The improvement or construction of environmental amenities such as parks or the implementation of environmental interventions such as Low-Traffic Neighbourhoods (LTNs) may contribute to gentrification, a process that has been called environmental or green gentrification (Cole et al., 2021; Triguero-Mas et al., 2021). In this case, the socio-cultural and physical exclusion and displacement linked to rising rents and housing-related costs is often accompanied by underprivileged (long-term) residents perceiving or experiencing a neighbourhood's new amenities and interventions less positively than new residents – they may even view them negatively (Triguero-Mas et al., 2021). Consequently, the advantages of these environmental interventions, such as health benefits for residents, may be undermined, with new types of social injustices created for some and environmental privilege for others. New environmental amenities and interventions may thus not always contribute to just and sustainable neighbourhoods for all.

Today there is evidence from cities around the world demonstrating the linkages between sustainable transport amenities and neighbourhood gentrification.

Today there is evidence from cities around the world demonstrating the linkages between sustainable transport amenities and neighbourhood gentrification. Much of this evidence stems from the United States.¹ A particularly relevant case is the transformation of the Albina District in Portland (Oregon, US), where a cycling lane was constructed on one of the main avenues in 2014, causing heated public debates around racism, gentrification, cycling and classism (Hoffmann, 2016). Albina, which has historically been inhabited by African Americans, has been subject to a long history of racial injustices and institutional racism towards its residents related to redlining policies and postwar infrastructure projects that destroyed key African American landmarks, homes and commercial establishments, including what was considered the heart of the community in Albina and Portland. Following the abandonment and decay of the neighbourhood, its revitalisation began in the 1990s when young white Portlanders started to move in. Housing prices increased and, ultimately, most of the African American community was displaced. Against the backdrop of this history, the remaining African American residents viewed the construction of the cycling lane as a strategy to further gentrify and commodify the neighbourhood, which had already been deeply impacted by other “white upper-class” urban and cultural projects to the detriment of black culture and residents (Hoffmann, 2016).

In the European context, similar cases and dynamics can be found, such as evidence on pedestrianisation interventions being linked to gentrification processes in Brussels, Belgium (Kęblowski et al., 2019); Madrid and Barcelona, Spain (Salvador González, 2019); and Istanbul, Turkey (Özdemir & Selçuk, 2017).

II. How can environmental gentrification be prevented?

With the potential interrelationships between urban environmental interventions and gentrification, urban planners and policymakers face the challenge of promoting the transition towards sustainable mobility while also fighting gentrification. There is no single solution to this problem, but it requires a mix of policy tools that take into account the specific history, sociocultural and political contexts of neighbourhoods and how different neighbourhood characteristics are related and create context-specific dynamics (Oscilowicz et al., 2021). A recent toolkit developed by the Barcelona Laboratory for Urban Environmental Justice and Sustainability (BCNUEJ) in partnership with ICLEI-Local Governments for Sustainability suggests a promising step in this direction. It provides planners and policymakers with 30 anti-displacement and 20 equitable environmental development tools that can help achieve the right balance between tackling gentrification and promoting environmental interventions that may include sustainable urban mobility improvements (Oscilowicz et al., 2021).

For example, in the case of the city of Barcelona, potential key tools for fighting gentrification in areas where sustainable urban mobility interventions have been made could include: property tax support for long-term underprivileged residents in the form of subsidies or through mechanisms of taxing only land value in lieu of property

1. For example, gentrification processes initiated by the rapid transit stations in the San Francisco Bay Area (California), the cycling lane created on Valencia Street in San Francisco's Mission District, as well as examples in Chicago (Illinois), Portland (Oregon), Los Angeles (California), Milwaukee (Wisconsin) and Seattle (Washington).

value; investment incentives in specific areas of high socio-economic need; stronger affordable and social housing requirements for new construction and major housing rehabilitation; restrictions against further tourism development; municipality-controlled redevelopment of large areas with priority given to housing stability; regulation of short-term rental apartments; moratoriums on new businesses and hotels catering to tourists; channelling revenue from luxury property taxes towards affordable and social housing projects; taxes on foreign housing ownership; or taxes on vacant housing units. Moreover, other tools to promote a sustainable and just urban mobility transition could include funding for small-scale neighbourhood transport infrastructure (such as transformation towards LTNs), both permanent and temporary (Oscilowicz et al., 2021), as well as fees for developers that target environmental interventions and amenity funding.

Urban planners and policymakers face the challenge of promoting the transition towards sustainable mobility while also fighting gentrification.

III. What else is needed to transition to sustainable urban mobility in a just and equitable manner?

Apart from preventing environmental gentrification, any interventions, plans and policies that aim to contribute to the transition towards sustainable urban mobility should prioritise justness and equity to ensure a sustainable future for all. To achieve this, there is a need for resident-led city-making and bottom-up policies, also called “procedural justice” (Anguelovski et al., 2020). But participatory processes alone are not enough. It is also important to ensure what Anguelovski et al. (2020) have called “hermeneutical and epistemic and testimonial justice”. This relates to whether all participant groups receive the credibility they deserve; and whether they are provided with the right conditions to reflect on, make sense of and share their distinctive experiences. For example, are childcare services provided so parents can participate? Are facilitation dynamics made available to ensure that conflicting and traditionally invisible experiences can be expressed? Do participatory processes account for the fact that the most vocal residents may not represent the majority (Hoffmann, 2016)?

As well as providing the right methods and conditions for citizens’ participation, there are other things to consider. In the case of cycling lanes or LTNs, policymakers and planners need to ensure that the varying norms of use, behaviours, values, identities, needs and preferences of different population groups (and their members at different life stages such as childhood, parenthood, etc.) are taken into account, as well as how the different groups may be differently impacted (objectively and subjectively) by the interventions, and how historical privilege may affect these factors (Anguelovski et al., 2020). As Barcelona’s LTNs – the so-called superblocs – have demonstrated, the success of such interventions greatly depends on adapting them to the neighbourhood context and the preferences of long-term residents.

Only by working in a context-specific manner that recognises the specific history, needs, interests, intervention impacts and perceived risks for long-term residents can we work towards justice (Anguelovski et al., 2020). Low-Emission Zones (LEZs) and associated congestion charges also illustrate the need for ensuring “distributional justice” (Anguelovski

et al., 2020). While the reduction in traffic and air pollution benefits all citizens' health, LEZ congestion charges tend to discriminate against poorer households. A pricing system that takes into account household incomes could rectify this.

There is a need for resident-led city-making and bottom-up policies, also called "procedural justice".

IV. Conclusions

In their effort to transition towards sustainable mobility city governments and other urban stakeholders need to ensure equity and environmental justice in ways that mitigate potential unwanted impacts from sustainable mobility projects, such as green gentrification. For urban environmental transformations to be publicly accepted, just and beneficial to *all* residents the needs, experiences and perceptions of all socioeconomic groups and generations need to be considered, as well as the specific histories of neighbourhoods. In short, a just and equitable mobility transition goes far beyond transport policy. It must take a systemic approach that weighs up the impacts of environmental interventions and amenities on the varying lived realities and contexts of a city's residents.

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WHY PUBLIC AND SHARED TRANSPORT MATTER

- BUILDING BACK EUROPEAN PUBLIC TRANSPORT
AFTER COVID-19

Annika Degen

- HOW CAN SHARED MOBILITY CONTRIBUTE TO THE
POST-PANDEMIC URBAN MOBILITY TRANSITION?

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The COVID-19 pandemic has had a major impact on the European public transport sector. In the years leading up to 2020, passenger numbers had constantly grown. The European Green Deal (EGD) further highlighted questions around daily mobility and stressed the importance of safe and efficient public transport systems for the transition to clean and sustainable mobility. Then, the COVID-19 lockdowns led to a sudden and sharp decline of public transport passenger numbers (down as much as 90% during the first wave) and enormous farebox revenue losses throughout 2020 and 2021. Yet, the pandemic has also demonstrated the vital role of public transport systems for accessing work and essential services. Across European cities, despite low passenger numbers public transport companies, often backed by local authorities, continued to operate at a next-to-normal level to provide mobility to those who rely on them.

The pandemic's economic impact on the public transport sector went beyond lost fare revenue, which was further aggravated by the need to impose capacity limits to ensure physical distancing. More frequent cleaning and disinfection, the supply of essential protective gear to staff and passengers, and the need to set up new processes and IT tools to manage passenger flows and avoid crowds have all added to the running costs of public transport companies. Several EU member states have established rescue packages to help the sector through the crisis, but often these have only eased part of the financial pressure and only for a limited time.

With lockdown measures lifted in many parts of Europe in spring 2021, ridership levels have slowly increased again. However, they have not yet returned to pre-pandemic levels. The calls by some politicians and authorities for people to avoid public transport during the pandemic has discouraged its use. It will likely take years to fully regain the trust of passengers, despite the evidence that the risk of catching COVID-19 on public transport is very low when the measures recommended by the health authorities are implemented, including the wearing of masks, disinfection of surfaces and good ventilation and air renewal (UITP, 2021). Unlike places with a much higher probability of infection – including offices, schools and universities,

health centres, cultural events, bars and other places where people gather to eat, drink and socialise for an extended period of time – the general behaviour of passengers (who interact and talk little and are forbidden to eat on board) limits the spread of droplets.

The European Green Deal highlights questions around daily mobility and stresses the importance of safe and efficient public transport systems for the transition to clean and sustainable mobility.

I. The role of public transport in a green and just recovery

As vaccinations are rolled out across Europe, countries are striving to overcome the economic crisis while at the same time advancing on the implementation of global agendas like the Paris Agreement on Climate Change, the 2030 Agenda for Sustainable Development and the New Urban Agenda. To reduce greenhouse gas emissions from transport, the “avoid-shift-improve” principle remains valid and can guide government action at all levels. Cities play an important role through their management of daily mobility. Besides walking and cycling, which need to be further encouraged, public transport offers multiple environmental, social and economic benefits that can form the basis of fairer and healthier cities. Efficient local mobility systems with public transport as their backbone offer inclusive and affordable services that are accessible to anyone, independently of social standing. They also offer health benefits and encourage an active lifestyle by reducing congestion, road accidents, greenhouse gas (GHG) emissions, pollutant emissions and noise. Every kilometre travelled on public transport saves 95 grams of GHG emissions and 19 grams of NOx compared to motorised private transport (VDV, 2019).

Public transport also acts a strong lever of local economic recovery and growth by connecting businesses, people and communities to economic and social opportunities. The sector provides millions of decent local jobs at various levels of qualification, and is often amongst the largest employers in a city. The investments public transport companies and authorities make mostly benefit businesses and SMEs (small and medium-sized enterprises) within the region and positively impact the local economy. It has been demonstrated that every euro invested in public transport creates a benefit in the wider economy of over five times the initial investment (UITP, 2018). A shift to sustainable public transport thus not only brings cities and regions environmental and social benefits but also economic ones.

The EGD has initiated a fundamental transformation of many sectors, including transport. The European Commission’s Sustainable and Smart Mobility Strategy published in 2020 (see Sluiter in this volume) provides support to the energy and digital transition in transport. However, it also recognises that technological innovation alone will not be sufficient to reach the EGD objectives in the transport sector. A modal shift towards cleaner forms of transport, especially active mobility and public transport, is also needed. With 40% of road transport happening in cities, there is much potential to reduce transport emissions by addressing daily mobility and commuting habits at the local level. The Commission’s plan to support 100 European cities in their transformation towards climate-neutrality by 2030 is testimony to the leading role cities will play in Europe’s green transformation and investments in public transport will have a large role to play in this process.

II. The public transport transformations needed to meet the EU's 2030 climate target

The EU's new 2030 climate target proposes to raise the bloc's ambition on reducing GHG emissions to at least 55% below 1990 levels. The expansion and transformation of the European public transport sector, which aims to become net climate neutral by 2050 at the latest, will be vital to making this vision a reality. The public transport sector is therefore facing the triple challenge of *decarbonisation*, *digitalisation* and *growth*.

Decarbonisation will require public transport authorities and operators to progressively replace their conventional bus fleets with clean and zero-emission buses. It also requires the setting up of corresponding charging or refuelling infrastructure at depots and in maintenance shops, the upgrading of workshops to enable technicians to access and repair electric vehicle components and the re- and upskilling of staff. Further developing urban rail systems (metro, tram, etc.) will also be necessary to increase the share of zero-emission public transport.

Digitalisation brings with it both advantages and necessary readjustments for the public transport sector. Advantages lie for example in predictive maintenance and data-based optimisation of internal processes, such as energy management. Others include better customer information based on real-time data and paperless ticketing. However, digitalisation also requires public transport companies and authorities to invest in new IT tools, infrastructure and skills, including in staff with more diversified profiles, and it has brought new competition in the form of multinational companies offering platform services. Public transport companies will have to develop data strategies and decide whether they set up their own digital customer interfaces or participate in a third-party MaaS (Mobility as a Service) platform. If such a MaaS platform is managed by a public authority, this can enhance trust between the various mobility providers and platform developers, help establish fair rules and safeguard the overall promotion of sustainable mobility.

The third and biggest challenge is to significantly *grow* the public transport offer to attract new passengers and enlarge the capacity in public transport networks within a relatively short period of time. Following the overall mobility reduction and shift towards individualised mobility during the COVID-19 pandemic, the first step must be to regain the trust of passengers. Local authorities will have a central role to play in this process, and many European cities that have set themselves ambitious climate targets are already encouraging the return to and use of public transport and active and shared mobility options as part of their broader climate and sustainability plans.

Further, and more concretely, a greater public transport offer will require more public transport vehicles (buses, trams, metros), increased frequency of services and a both denser and wider network of services. The overall mobility offer in cities, especially for the first and last mile, can be improved by better integrating public transport systems with sharing services and micro-mobility – physically at multimodal stations and digitally on MaaS platforms. More remote regions that are currently poorly served by collective transport need

Efficient local mobility systems with public transport as their backbone offer inclusive and affordable services that are accessible to anyone, independently of social standing.

The public transport sector is facing the triple challenge of decarbonisation, digitalisation and growth.

to be better connected, for example by designing a personalised and demand-responsive transport offer in areas where mass transit does not have a business case.

Each of these three transformations will require huge investments that exceed the limited support for public transport by public authorities. Unless member states have specialised funding schemes in place, public transport providers will have to focus either on expansion (based on current technologies), decarbonisation or digitalisation. Without additional funding, it will be impossible to progress on all three fronts within the short timespan that is politically (and environmentally) required. Given these conditions, it is vital for cities to assess the resilience of their public transport funding, taking into account impending needs and developments and if necessary generate new revenue streams, for example through applying the “user and polluter pays” principles. Distance-based road tolls may not be popular with residents, but they can help cities prepare for a future where fully autonomous vehicles (AVs) roam the streets, unlimited by either electricity prices or labour cost. Toll systems could put a cap on future AV mobility and reduce congestion, while generating revenue streams that can be used to advance collective and clean mobility options.

Funding from the EU may provide additional support for cities. In particular, the Recovery and Resilience Facility (RFF) flagship project on sustainable and public transport (“Recharge and Refuel”) may provide opportunities for local authorities (European Commission, 2020). The EU could further support the urban public transport sector by approving new and extended national support schemes developed in response to the COVID-19 crisis. In the upcoming years, the sector needs an enabling regulatory framework that offers possibilities for it to grow, provide cost-efficient services, decarbonise and digitalise. EU funding schemes for public transport vehicles and infrastructure should be continued and if possible increased. It is also important that the particular needs and perspective of public transport are considered in any European transport initiative, including on alternative fuels infrastructure, autonomous vehicles, MaaS and mobility data policies. The new Urban Mobility Package that will be adopted in September 2021 will present a good opportunity for the EU to further engage cities in the Green Deal agenda. With campaigns and positive communication, the EU can also use its soft power and the Climate Pact¹ to encourage citizens to re-discover public transport.

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HOW CAN SHARED MOBILITY CONTRIBUTE TO THE POST-PANDEMIC URBAN MOBILITY TRANSITION?

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The severe economic impacts of the COVID-19 pandemic and the social distancing measures introduced to tackle it have caused the mass adoption of telecommuting. The result was an unprecedented reduction of mobility and temporary improvements in air quality in major urban areas. But the pandemic also widened the mobility divide between social groups. Disadvantaged neighbourhoods and low-income communities where people are more reliant on public transport and often have low-skilled jobs that are not compatible with remote work have been severely impacted and faced major travel disruptions. With lockdowns, people were forced to meet their needs in their neighbourhoods, highlighting differences in quality of life between high and low amenity areas. One of the few positive aspects of this development was the forced reduction of travel distances, which triggered a burst in the use of active and shared mobility that is better suited to such shorter trip ranges. The post-pandemic normality is expected to present serious challenges to the urban mobility transition. In this chapter, I explore the likely mid- to long-term effects on the mobility sector and why shared mobility might be key to achieving a positive outcome.

I. The post-pandemic city and its mobility challenges

The COVID-19 pandemic has shown that it is impossible to disentangle mobility, environmental and equality issues when we think about cities. We now better recognise that city layouts are a complex combination of housing, job and transportation markets and that their interactions will determine whether the measures passed in European cities in response to the health crisis and its socioeconomic impacts will be effective in the long term.

COVID-19 heavily increased the negative externalities associated with urban agglomerations and population density (EIT, 2021). The perceived larger risk of infection and generally stricter social distancing measures have limited chances to exploit agglomeration economies and have prevented citizens from enjoying urban amenities. These trends have introduced a shift in the balance of the push and pull forces that shape city layouts, affecting the

The pandemic widened the mobility divide between social groups.

trade-offs that households and firms make when choosing their location. The broad adoption of telecommuting, while lower now than during the lockdowns, makes part of this shift permanent and acts as a land-use change facilitator. Such changes have ripple effects that translate into altered mobility flows and mobility mode choices.

Early evidence suggests that telecommuting will trigger residential moves towards suburban locations, where housing prices per square metre are lower and household can still enjoy high levels of amenities (Su & Liu, 2020). The fear is that the relocation effect (increased travel distance) will outweigh the substitution effect (number of trips foregone), potentially leading to higher car usage and greater environmental damage. Further, the evidence potentially points towards the concentration of firms in central locations increasing, as they seek to exploit agglomeration economies by taking advantage of space-efficiency gains from the reduced number of on-site workers. Combined, these two trends could further increase commuting distances, private car usage and pressure on cities trying to reclaim public space from cars. To limit these knock-on effects, it will be crucial to ensure that telecommuting-induced relocation does not occur in car-dependent scenarios.

Lockdowns and fear of infection have led to major reductions in public transport ridership. The institutionalisation of this fear in public discourse – despite mixed evidence on the relationship between public transport use and risk of infection – has certainly not helped. It adds to the already worrying situation in which capacity restrictions to ensure social distancing and low occupancy rates eliminate public transport's competitive advantage and greatly diminish its congestion relief effect (see Degen in this volume). Social distancing restrictions pose a threat to the financial sustainability of public transport by undermining the core economic efficiency justifications for public transport spending, especially at a time when public budgets are already aggravated by the economic crisis.

Part of this modal shift has been funnelled into individual mobility options, with a positive rise in cycling figures and a worrying increase in the appeal of cars (EIT, 2021). However, while bike sales have skyrocketed since the pandemic, car sales have not. Rather than being a cause for celebration, this should worry city officials. At current car ownership levels, even a small increase in usage can cause much harm. Many cities are seeing air pollution returning to pre-pandemic levels even though the economy has far from recovered, putting the sustainability goals reached in past decades at risk. To avoid the increase in the appeal of cars also translating into higher ownership rates, travel demand management initiatives and financial constraints ought to be applied in cities, such as low emission zones and congestion charges (see Bernardo in this volume) or market-oriented paid parking initiatives where drivers bear the full cost of parking.

II. Shared mobility solutions

Shared mobility options, from shared micromobility to car sharing, can provide solutions to some of the key challenges of the urban mobility transition in the aftermath of the COVID-19 crisis.

If well-integrated with public transport systems, shared micromobility, such as bike and scooter sharing, can increase accessibility to public transport and replace some trips, thereby curbing crowding on public transport and the perceived associated health risks. Moreover, micromobility options can enlarge public transport's spatial reach, allowing it to offer a competitive alternative to car travel to a larger pool of riders. Better integration between public transport and shared micromobility options offers a unique opportunity to accelerate the rollout of Mobility as a Service (MaaS), fostering the much-needed increase in the flexibility of transport systems, as the pandemic has once again highlighted.

Car sharing services are another effective tool for enlarging transport users' mobility options and offering residents of transport-deficient areas a true alternative to car ownership. However, big car-sharing operators face challenges to make ends meet even in the most densely populated areas. The cases of Zipcar in Barcelona, Autolib in Paris and Car2Go in Copenhagen have shown that even large user numbers are not enough to ensure profitability. Smaller car sharing cooperatives with less focus on profitability, more socially oriented business models and a stronger community base and engagement often seem to do better at adapting to less densely populated areas. This is especially relevant in the current context of the rise in telecommuting and the trend towards residential relocation to more suburban areas, where more flexible travel options need to be deployed to truly compete with the increased appeal of cars.

Shared mobility options, from shared micromobility to car sharing, can provide solutions to some of the key challenges of the urban mobility transition.

III. Creating an enabling environment for shared mobility services

The degree to which shared mobility will be able to contribute to the sustainable mobility transition in the post-COVID city will greatly depend on the regulations imposed by cities and other levels of government. This is particularly true for shared micromobility. Cities need to carefully consider how they regulate shared micromobility options and manage their coexistence with other modes of mobility in public space in a fair manner. The regulatory frameworks municipal governments impose – such as fees, limited fleet size, and parking or outright bans – can either make or break the initiatives that try to establish themselves in a city. To support evidence-based local decision-making and regulation, more analysis and data is needed on the actual impact of these services. Currently, the science lags behind the new services continually being launched.¹

A level playing field also needs to be established for the plethora of subsidies and incentives for car ownership and usage. The first step in this regard should be to rethink government support for the car manufacturing industry in the post-COVID economic recovery in a way that makes it both productive and beneficial for achieving sustainability goals. We need to start thinking about trip-based subsidies instead of capacity-based ones, and allocate them to the trips that generate the highest social return (i.e. by reducing externalities or inequality), including those involving shared mobility options.

The introduction of new travel demand management regulations and the funnelling of price-based alternatives (like congestion charging or

1. It is relevant to highlight that commendable efforts are being made by some cities to support the evaluation of the impact of shared mobility services, like those participating in the MOBI-MIX Interreg project (<https://www.interreg2seas.eu/en/MOBI-MIX>).

The degree to which shared mobility will be able to contribute to the sustainable mobility transition in the post-COVID city will greatly depend on the regulations imposed by cities and other levels of government.

paid parking) into mobility sector adaptation is also necessary. These new revenue streams can offer much-needed support to transport system investments, especially public transport. As the International Association of Public Transport (UITP) has argued, there is a need to take actions to: mitigate the financial risks public transport faces due to ridership shortfalls; allow it to more dynamically adapt to changing situations; and help public transport face the challenges of digitalisation and the disruptions of new mobility solutions by supporting it with more flexible and scalable modes (UITP, 2020). Shared mobility options can act as a support tool to complement the much-needed optimisation of transport networks and loosen the pressure on already tight budgets at a fraction of the cost of standard investment solutions.

Further, a thorough analysis is needed of new forms of public-private partnership that can help with the integration between shared mobility and public transport. This could be done by analysing the use of subsidies to incentivise transport operators to adhere to public-private schemes and explore user-oriented subsidies that favour new business models and the participation of start-ups to cover unserved needs (POLIS, 2019).

The structural changes brought on by the COVID-19 pandemic have amply exposed the dysfunctionalities of the urban mobility marketplace and planning, as well as the need for cities to plan for future disruptions linked to digitalisation and automation. We need more resilient urban mobility systems that can adapt more easily to crises and change. Shared mobility offers a good starting point. To fully enable the development and flexible integration of shared mobility options into existing urban transport systems, cities must include these options in their long-term mobility strategies and broader sustainability agendas.

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THE SOCIAL ECONOMY AS A DRIVER OF THE MOBILITY TRANSITION: VOICES FROM THE MOBILITY SECTOR

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PROLOGUE: SOCIAL ECONOMY COMPANIES AND THE TRANSFORMATION OF URBAN MOBILITY

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The “social economy” is formed of private organisations that people create in the attempt to address their own social demands, substantive problems and social aspirations (Chaves and Monzón, 2018). Social Economy Europe considers that, beyond a legal structure, social economy entities share the following characteristics: primacy of people and social goals over capital; democratic control by members (except in foundations); most surpluses reinvested to support sustainable development goals or services of interest to members or more generally; voluntary and open membership; defending and applying the principles of solidarity and responsibility; and autonomous management and independence from public authorities (Social Economy Europe, 2021). In fact, the organisations that make up the social economy have diverse legal structures, ranging from cooperatives and employee-owned companies to mutual societies, foundations and associations. The common thread is that they are all private endeavours with legal personality that are free and voluntary in nature, have democratic decision-making processes and are created by civil society to meet and resolve the needs of specific individuals or groups rather than to repay the investments of capitalist partners.

Social economy organisations (here we will focus on cooperatives and employee-owned companies) start from the principle of management by impact, in other words, there must be an intersection between the interests of the members of the organisation and the general interest. As such, cooperatives and employee-owned companies are businesses in which the execution of their activity must further the common good. They are organisations in which economic benefits are subordinate to impact. That is not to say that these types of companies do not want to make money, but that they consider it a means, rather than an end. This is an element of the utmost importance: the design of their production function is based on making a contribution to the community rather than maximising the appropriation of surpluses.

Mobility studies and plans do not only explore the development of systems to minimise the time and costs of transporting people and goods; they also analyse their contribution to social development, to the rational

use of scarce goods (like energy and urban space) and their environmental impact. An essentially monetarist vision would see the operator's role as basically oriented towards maximising profits and returns. And while regulators undoubtedly play a crucial role in setting operating standards, social economy companies are important actors in the transformation of urban mobility. Because of the way they conceive of their activity, cooperatives and employee-owned companies can play a role in areas such as accessibility and territorial integration and cohesion. This is particularly important for achieving a design that prioritises collective benefit.

For the purposes of this volume, it is worthwhile including the perspectives of several cooperatives and employee-owned companies operating in the free market as representatives of a segment of mobility operators that are essential to the development of a new urban mobility paradigm.

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I. 1985 - a new social economy company is created

In 1985, the 117 staff of TUSA (Transports Urbans, SA) formed a new transport entity owned in equal parts by the workers, transforming it into a social economy company in the form of a *Societat Anònima Laboral* (an employee-owned limited company). Today, Tusgsal's offer has been diversified through the companies of the DIREXIS group and provides regular, occasional and school transport, along with mobility consultancy. The DIREXIS group aims to serve society by providing inclusive, safe and environmentally friendly mobility based on ethical values and a commitment to social responsibility.

Tusgsal's main activity is the provision of regular transport in two concessions awarded by the Barcelona Metropolitan Area (AMB). The daytime bus network consists of 31 lines covering the areas of Barcelonès Nord, Montgat, Tiana, Montcada and Reixac and Barcelona, providing urban and interurban services and the night bus network, which involves running 14 night bus lines in Barcelona and its metropolitan area. Tusgsal has a staff of 950 people and provides services to 42,500,000 passengers through a network that extends across more than 14 million kilometres and has 327 vehicles in service.

II. Values, SDGs and sustainable development

Throughout its evolution, Tusgsal has maintained its values and remained true to its origins, consolidating itself as an ethical, democratic, inclusive, participatory, efficient and socially transformative company. These are all characteristic features of social economy companies, a way of understanding economic activity whose essence is closely aligned with sustainable development and its global objectives, as reflected in the United Nations' 2030 Agenda and Sustainable Development Goals (SDGs). In this context, the social economy represents a real alternative to the "conventional economy", a different economic and social model whose tenets seek the common good and which represent a competitive factor of great value for Tusgsal.

The social economy represents a real alternative to the “conventional economy”, a different economic and social model whose tenets seek the common good.

As a social economy company, Tusgsal seeks to provide an example of how an organisation can grow and position itself among the leaders in its sector through democratic, participatory and solidarity-based management and a commitment to its social and environmental context, ensuring it meets the needs of all people and groups with legitimate interests in the organisation, while providing the best working conditions for everyone who forms part of it, all within a sustainable development model.

Sustainability is a paradigm for thinking about a future in which environmental, social, labour, economic, ethical and governmental considerations are balanced in the search for a better quality of life around the world. In the urban transport sector, there is a growing need to contribute to more sustainable mobility to ensure that citizens can move in an efficient, clean, socially inclusive, healthy, economical way, with the lowest possible energy consumption. This model of sustainable mobility replaces an already obsolete transport model that is excessively oriented towards economic interests and individualism, overly dependent on the private car, and has become synonymous with rising costs, harming the environment, barriers to universal access to basic needs, negative health effects and lost time on any journey due to excessive traffic.

III. Public transport and sustainable mobility within a management system

Public transport is an indisputable cornerstone of the promotion of sustainable mobility. Looking beyond the conception of cities as physical spaces of economic development, society increasingly demands that they be imagined, structured and managed as genuine spaces of human coexistence in which the transport model enables everyone, without exclusion, to meet their needs in terms of access to education, work, health, culture and leisure, and in which the needs of future generations are also guaranteed.

Tusgsal's business strategy explicitly commits to sustainable mobility. This is closely linked to the organisation's *raison d'être*, as the management of public and social transport infrastructures is fundamental to citizens' quality of life. Tusgsal's management model clearly demonstrates the dedication to this approach. It has been strengthened by a range of standards, such as UNE-EN ISO 9001: 2015 (quality management systems), UNE-ISO 39001: 2013 (road traffic safety management), UNE-EN 13816: 2003 (public passenger transport), ISO 45001: 2018 (occupational health and safety), the SIGOS Healthy Organisation Management System, IQNet SR 10: 2015 (social responsibility management systems) and, specifically in terms of the environment, UNE-EN ISO 14001: 2015 (environmental management systems), UNE-EN ISO 50001: 2018 (energy management systems) and the Government of Catalonia's Emblem of Guarantee of Environmental Quality.

IV. Putting the commitment to environmental sustainability into practice

Tusgsal sees environmental management as both a fundamental part of the concept of social responsibility and directly related to the social economy. Its business activity has a major impact on the environment

and its commitment is reflected in various vectors of action, such as the growth of a sustainable fleet, training and the management of facilities, consumption and waste. As every measure is developed within the certified system, Tusgsal is able to set improvement targets to reduce the environmental impacts of its activity and advance its commitment to sustainability through specific action plans. What follows are some of the actions Tusgsal takes to realise its commitment to the environment and sustainability as a social economy company.

Sustainable fleet

Over the last decade Tusgsal has incorporated cleaner technology vehicles to reduce pollution in the municipalities it serves. The introduction of these units has taken place in three phases, starting in 2011 with hybrid units and expanding each year to 2021, when it has 130 hybrid and 12 electric units.

The first phase was characterised by experimentation and study of the operation of units that combine diesel systems with electrical energy. All are series hybrid vehicles with ultracapacitors as energy storage systems. The emissions from 100% diesel vehicles were reduced by around 25%.

In the second phase, the technology was much more developed and fully electric vehicles came into play. These reduce greenhouse gas emissions by 100%, while hybrid units contribute to a reduction of close to 35%. Notable in this period were the series hybrid and parallel hybrid (characterised by the existence of gearboxes) combinations, with a range of energy storage systems (lithium batteries or ultracapacitors).

The third phase consisted of incorporating hybrid vehicles of the two types mentioned above. As yet, no real data on emissions reductions are available, but they are estimated to be close to 30%.

Training

The incorporation of vehicles with new forms of technology is complemented by the involvement of the people who work with them. Tusgsal devotes efforts and resources to ensuring that these people have the knowledge needed to meet the requirements of their activity and offer the best possible service to the public.

Specifically, training is provided in safe and efficient driving, idle control, automatic fuel consumption monitoring systems, service planning based on maximising the use of the sustainable fleet, study of the operation of types of vehicles by line (pilot tests of a consumption study) and managing the load of electric vehicles, among others.

Facilities

Fixed physical infrastructure is a potential source of waste generation and high consumption. As such, on its premises Tusgsal takes action on issues such as renewable energy consumption, the installation of

In the urban transport sector, there is a growing need to contribute to more sustainable mobility to ensure that citizens can move in an efficient, clean, socially inclusive, healthy, economical way, with the lowest possible energy consumption.

Sustainable mobility replaces an already obsolete transport model that is excessively oriented towards economic interests and individualism.

LED technology in all facilities, monitoring and analysis of the water from the offices, changing rooms and washing tunnel, reducing water consumption, especially in the washing tunnel – by installing purification mechanisms in the washing train itself and water pressure control valves – and the installation of recharging points for technical assistance vehicles (100% electric).

At both office and workshop level (particularly the latter), the following actions (among others) have been promoted with the intention of reducing the waste generated each year:

- Medium- and long-term waste minimisation plans drafted by the environmental sustainability department and workshop.
- Provision of tools and technology (CMMS to monitor the maintenance and spare parts for the workshop, license plate reader on the washing train, application of reports on tasks and vehicle cleaning incidents, etc.)
- Training of facility maintenance personnel, particularly in proper waste segregation.
- Training workshop staff to improve awareness about relevant polluting materials (batteries, engine lubricants, oil filters, etc.).

Business travel plans

In its improvements for staff, Tusgsal also provides a number of tools to encourage their commitment to environmental sustainability, some of which are:

- Awareness workshops on the use of sustainable means of transport (public transport, hybrid or gas cars, etc.);
- Subsidies for purchasing electric bicycles and electric scooters to assist all those wishing to travel by these means of transport;
- Purchase of company electric bicycles for travel between facilities.

As a social economy company, Tusgsal is fully aware of its role as a driver of change in a society that demands commitment and responsibility from both governments and companies. That is why it explicitly dedicates resources and efforts to the development of inclusive, safe and environmentally friendly mobility, with the firm goal of contributing to improving the lives of people and their environment.

SOM MOBILITAT: THE COOPERATIVE WHOSE SERVICES ARE INCREASING SUSTAINABLE MOBILITY

Arnau Vilardell

Founder and Coordinator, Som Mobilitat

In 2016, a group of mobility activists in Catalonia set themselves the task of changing their mobility habits to contribute to minimising environmental impact and lowering CO₂ emissions. The first challenge was to dismantle the current mobility model. This model has led us to a dead end in terms of congestion and investment in infrastructure, pollution and human health, the use of public space and the quality of life in our neighbourhoods and municipalities, and CO₂ emissions. The second challenge was to create a model on which our entire value proposition would hinge.

Travel by foot, by bicycle or by public transport whenever you can. If you must use a vehicle make sure it is electric, uses 100% renewable energy and is shared.

With this clear idea in mind, a cooperative of consumers and users was set up with the goal of shifting the mobility model from one based on the private combustion vehicle to one that is more sustainable and respectful of the environment and people's health. This legal entity combined the desire to create a sustainable cooperative model within the tradition of consumer cooperativism in order to promote collective empowerment and build communities with shared electric mobility services that reach all of Catalonia's neighbourhoods and municipalities. By combining mobility communities under a single technological umbrella, a regional car sharing network is being built collectively.

I. Catalonia's first electric car sharing cooperative

Som Mobilitat's innovative approach has made it a unique project in Catalonia. The cooperative is currently formed of over 2,200 individual members, 200 companies and organisations that travel using the cooperative's vehicles, and around 20 municipalities that participate as promoters of the project in their area.

By combining mobility communities under a single technological umbrella, a regional car sharing network is being built collectively.

To give form to this diverse set of users it was essential to make a clear commitment to develop technology that is flexible enough to respond to each community's needs. This flexibility is then given order by the collective will to work on a single mobility model, a unified tariff and vehicle access policy for all communities. Three crucial pillars of the strategy for building the car sharing network stand out.

II. Communities: car parks that combine various mobility needs

The Som Mobilitat communities are made up of individuals, companies and public administrations and incorporate different types of electric vehicle (cars, vans, motorcycles, bicycles and/or cargo vehicles), depending on the needs of each community. The communities are created around a car park and function as an interconnected node in the cooperative's shared electric mobility network. These communities are mainly located within neighbourhoods and close to public transport stations whenever possible in order to facilitate intermodality.

To meet the most possible mobility needs with the smallest number of vehicles, the participation system is designed to be open to everyone. Hence, from the start the project has added mobility to the region. Driven by the individual cooperative members, the extra mobility made it possible to activate a community. It seems counterintuitive, but the cooperative's aim is not to create new forms of mobility but rather to replace existing ones by aggregating them into a community. What is most interesting about this aggregation process is that not only can it meet a person's mobility needs, it can also help to reduce them. Remember: *Travel by foot, by bicycle or by public transport whenever you can. If you must use a vehicle make sure it is electric, uses 100% renewable energy and is shared.*

The whole ecosystem has a very simple governance model: *One person (or entity or city council) = One vote.* A summary of the historical legacy of the consumer cooperative movement might be that participation generates a sense of belonging, that belonging boosts communities and that joining communities together makes visible a different model of building collective infrastructure.

The vocabulary used around a collective project like Som Mobilitat, such as governance, empowerment, participation and open and shared knowledge, reinforces the wider collective strategy to be everywhere and reach everyone looking to change their mobility. When the consumers are the owners of the cooperative and are responsible for much of its communication strategy, the collective discourse and message has the potential to mould itself to reach both a quantum engineer and a person with little formal education. The magic is that the members speak from personal experience about their participation in the cooperative and their use of the vehicles.

This strength of the project makes it easier for members from the same neighbourhoods and municipalities to organise themselves and set up a shared electric mobility community that responds to their mobility needs.

III. A platform project: technology as a support tool

This ecosystem is based on a major technological undertaking by Som Mobilitat that guarantees consumers:

- a car-sharing platform (web/app) that enables reservations to be made (searching the map and/or selecting the date and time), changes to be managed, battery charge levels to be checked, keyless locking and unlocking of vehicles and contact with the support service.
- a platform designed to be able to group workers together, satisfying mobility needs with a single vehicle and offering the possibility of a single organisation reserving vehicles in specific time slots and days (leaving them available for other members in the unreserved time slots).

To meet the most possible mobility needs with the smallest number of vehicles, the participation system is designed to be open to everyone.

One defining element from the cooperative world underpins this whole technological project: intercooperation. In 2018, in collaboration with the Flemish cooperative Partago, The Mobility Factory was set up, a second-tier cooperative based in Brussels, the host location for all our electric vehicle sharing technology. Currently, 13 cooperatives from Spain, Belgium, Germany, the Netherlands and the United Kingdom share ownership, governance and technology, which makes continuous improvement processes viable and guarantees sustainability and maintenance.

Further, in 2020, Som Mobilitat began working with Som Energia, a renewable energy producer and supplier, and Som Connexió, a telephony services provider, to begin sharing ERP (enterprise resource planning) developments – an internal management system that accompanies the app and which contains many of the cooperative's internal management processes. This may seem like a minor thing, but cooperatives, like companies, have many management processes in common. Sharing their development to make faster progress in the automation and digitalisation of the cooperative's operations has great potential.

IV. Self-financing to guarantee the project's independence

Funding remains one of the Som Mobilitat project's major challenges. To address it, all the crowdfunding options offered by the people and partner entities involved in the project have been explored. In recent years, participatory securities have been issued (to boost the technological project and the purchase of electric vehicles, giving an economic return on investment after five years), campaigns have been promoted for members to contribute to the share capital over the long term (to strengthen the cooperative and the projects it promotes, with an economic return of 3%), and mechanisms have been created with a collaborative rationale to speed up the financing of vehicles in the region, specifically the collaborative financing map. On the map, individual and institutional members can show their interest in a vehicle in a particular location and commit to making a financial contribution. By combining all the financial contributions promised in a location

a new electric vehicle sharing service can be set up. Thanks to this tool, residents of several municipalities in Catalonia have been able to purchase a number of electric cars that can be used by all members of the cooperative.

THE MOBILITY FACTORY: A EUROPEAN COOPERATIVE PROVIDING E-CAR SHARING SERVICES TO CITIZENS

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The climate emergency requires a comprehensive response at all levels. Collectively, public administrations and the different political strata must be pressed to encourage proposals to tackle it. These proposals must be integrated with towns and cities, where we have to rethink certain habits and decisions, such as our consumption model, the energy we use and how we move within the territory. The impact of the latter means it needs particular emphasis: a new mobility model is needed.

The concentration of CO₂ in the atmosphere has risen by 47% since 1790.¹ The climate consequences of this excessive increase are hard to predict, but their scale will undoubtedly depend on when we stop using fossil fuels (IPCC, 2014). With transport currently accounting for around a third of all CO₂ emissions, these unpredictable consequences are a key factor in understanding the importance of a new mobility model. The excessive use of internal combustion engine vehicles does not only lead to global warming, it also causes the emission of other polluting particles, such as NO₂, PM₁₀ and PM_{2.5}, that cause serious health problems in people, including increased mortality (Landrigan, 2017) and adverse effects on children's development (Salvi, 2007).

The ways we as a society approach this change can (and should) be diverse. Sustainable mobility cooperatives are a model that offers solutions to this problem by introducing the shared electric car that wherever possible is charged with electricity from renewable energy sources. The Mobility Factory (TMF) is a European cooperative that connects with local cooperatives to provide technological support and promote intercooperation between them. These contributions must enable European cities and towns to move towards a mobility model that is sustainable and based on citizen democracy.

This chapter is divided into four sections addressing what citizen empowerment platform cooperatives offer, how TMF is evolving and how it responds to the concept of sustainable urban mobility.

1. <https://www.esrl.noaa.gov/gmd/ccgg/trends/>

Sustainable mobility cooperatives are a model that offers solutions by introducing the shared electric car that wherever possible is charged with electricity from renewable energy sources.

I. Citizen empowerment to change the urban mobility model

Urban mobility and, in particular, its management are going through a period of profound change. The new platform cooperativism models contribute to making sustainable mobility possible in towns and cities. TMF represents a technological platform cooperativism model that influences urban mobility management by, for example:

- Encouraging citizen participation through local cooperatives, ensuring citizens are those who define and decide mobility needs. In the case of TMF, which is made up of local cooperatives, citizens' voices will shape the evolution of the platform and the new features to be developed in the software.
- Meanwhile, cooperatives are becoming more technologically empowered. All the knowledge shared via intercooperation is in their hands, and therefore in the hands of the citizens. The same applies to the personal and mobility data generated through technology platforms, which have great value and therefore great potential.

Platform cooperativism offers sustainable urban mobility solutions, and its models can be replicated in different cities. TMF is a flexible platform that takes the different mobility needs of each territory into account. Its work to improve mobility has a digital component that grants users facility and convenience when interacting with the platform. Finally, as our work is rooted in the cooperative world, synergies are generated with other actors in the field – European technological partners moving in the same direction and working on urban and sustainable mobility.

II. TMF as an example of technological platform cooperativism

Evolution of TMF

The Mobility Factory is a second-tier European cooperative. In other words, its members are other European cooperatives. TMF works in a platform cooperative environment and offers member cooperatives the technology needed to run their electric car sharing services.

The concern and motivation of two cooperatives – Som Mobilitat (SM), which is based in Catalonia, and Partago cv from Belgium – led to TMF's creation in 2018. Partago and SM worked together to develop a technological tool. Both were members of the REScoop.eu mobility network, the European federation of renewable energy cooperatives. REScoop.eu currently has around 2,000 cooperatives signed up, with over 1 million citizens forming part of the energy transition.

In 2018, eight cooperatives joined the TMF project and it has now grown to encompass 13 members in five different countries: Belgium, the Netherlands, Germany, Spain and the United Kingdom. The cooperatives account for around 200 shared electric cars, and the TMF application has approximately 2,200 users.

The three principles that define TMF are:

- **Sustainable mobility:** TMF works to achieve mobility that is sustainable and respectful of citizens and the environment. That is why we work with shared vehicles and use renewable energy. Contracts for supplying this energy are made with cooperatives in the Rescoop.eu network.

Interest is growing among the different cooperatives in sharing not only cars, but also bicycles. TMF will work to introduce this functionality to its app and make it extendable to all interested cooperatives.

- **Cooperativism:** TMF was created with the aim of working in a democratic, transparent and collaborative environment. To achieve this, the values and principles of the International Cooperative Alliance (ICA) are followed and adapted to a software platform context. In order to support the citizen-led energy transformation TMF also asks that all member cooperatives join the Rescoop.eu network.
- **Technological solutions for e-car sharing services:** Technology is TMF's focal point. As such, it may be defined as a technological cooperative that works to continuously develop and improve a platform that offers:
 - Technological solutions for cooperatives to establish electric car sharing services;
 - Solutions for end users to participate in the service via the app and all its features.

Urban mobility and, in particular, its management are going through a period of profound change. The new platform cooperativism models contribute to making sustainable mobility possible in towns and cities.

The ecosystem shaped by TMF

TMF takes the form of an ecosystem in which each cooperative is an ecological niche. Each niche contains all the necessary elements to carry out its activity, but at the same time collaborates and networks with the other niches that make up the TMF ecosystem.

TMF seeks to provide the necessary technology, which can then be adapted to all the scenarios the cooperatives present. The following information is always borne in mind:

- The cooperatives are **co-owners of the software** and **jointly decide** what needs to be developed. As such, they have real influence over the software, but not complete control.
- This is what allows the members to **cooperate with each other and share knowledge and experiences**. For example, on business plans, pricing modules, growth strategies, and so on. Not only do they share technology, they cooperate with each other and share experience and knowledge – in short, they exchange good practices. All of this know-how is a very important asset for the TMF ecosystem.

However, in practice, the 13 cooperatives working with TMF face very different realities. All work in e-car sharing, but their distinguishing features vary.

Platform cooperativism offers sustainable urban mobility solutions, and its models can be replicated in different cities.

- There are **large cooperatives** like Partago cv, which operates in over ten municipalities in Flanders, and **very small cooperatives** like Nadder Community Energy in Tisbury in rural England, which has two cars and solar panels distributed across farms and schools.
- The starting points for each TMF member cooperative also vary greatly. Some were created to work directly towards **sustainable mobility** via an e-car sharing service, while others grew out of local energy transition initiatives to later become sustainable mobility cooperatives that incorporated electric vehicles.

This diversity is possible because the platform is built in collaboration and by using democratic and fair means to reach agreement on the range of interests and needs.

In this sense, it should be noted that the app has various modules and features, all of which are customisable. This allows each cooperative to make use of the modules that best suit its needs and interests.

Governance and organisation

TMF provides various spaces for debate and communication with cooperatives.

- Internally, in line with its statutes, an annual assembly is held in which a representative of each cooperative participates. Each representative has one vote, regardless of their cooperative's number of cars, members, activities or other differential features.
- TMF also provides **a common discussion space for cooperatives** through Basecamp, an everyday tool used to debate, select and jointly evaluate all aspects of the platform.
- It should be noted that the **cooperatives are completely independent** and make their own decisions on their fleet, brand, pricing model, financing and insurance, and that they own their data.
- Finally, at a more external level and, following one of the ICA principles, TMF forms alliances with other European cooperatives. For example, for enterprise resource planning (ERP) the open source software Odoo is used, while a technology cooperative, Coopdevs, helps in its implementation. An alliance has also been built with REScoop.eu, which has an extensive European network constructed around the energy transition.

III. Conclusions and future challenges

The road ahead for TMF and other similar cooperatives remains strewn with challenges. To bring new collaborators to the platform, it is necessary to keep innovating by offering improvements to the platform that favour its management by the cooperatives, without neglecting everyday needs.

Establishing good communication to address cultural differences and ensure attention is given to the interests of all members equally has always been the backbone of TMF's platform cooperativism. So has always respecting the diversity brought by each cooperative. To do this, common meeting spaces must be maintained, where everyone can make their point and where all voices are heard.

TMF also has technological challenges to face. Working on features like "roaming" between cooperatives is one example. This presents us with a new scenario in the European context by introducing obstacles that go beyond the technical, such as the differences between countries in terms of legislation, regulation, insurance and so on, and the fact that to make roaming viable a large fleet of vehicles would be needed.

TMF's road ahead is not defined – the member cooperatives will set its course. But it will continue to seek to bring more cooperatives and groups of organised citizens who want to make the change towards sustainable mobility and take a step towards the energy transition to its European project. The idea is to grow slowly, but solidly.

The cooperatives are co-owners of the software and jointly decide what needs to be developed.

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To deliver on its Green Deal and become climate neutral by 2050, the European Union must reduce transport-related greenhouse gas emissions by 90%. This is a colossal challenge. Transport is one of the few sectors in which emissions are higher today than in 1990 and despite mitigation efforts they are still rising. Cities are crucial to achieving this ambitious goal, as they account for 40% of total road transport in the EU. But cities are not just major emitters; local governments and urban stakeholders are also driving the transition to sustainable mobility through urban experimentation and innovation and new multistakeholder partnerships.

The COVID-19 crisis has demonstrated that dramatic changes in urban transport can be achieved if the political will exists. The need to create safe, socially distanced transport and to recover public space for citizens gave a boost to the mobility transition in many European cities. However, the tactical measures rolled out have often been temporary or stand-alone initiatives that are not integrated into longer-term mobility transition pathways. What is more, the speed of change during the pandemic and the environmental urgency to transition to low-carbon mobility have meant too little attention has been given to concerns over justice.

This volume explores how cities across Europe can develop more robust and socially just long-term mobility plans, enabling them to effectively contribute to the EU's intermediate climate goal of reducing emissions by 55% by 2030 and its 2050 net-zero target. It examines both opportunities for accelerating change – from policy reforms to urban interventions, multi-stakeholder partnerships and social economy innovations – as well as barriers to long-term planning and transformation – from public acceptance to political, financial, legal and technical limitations.