



Urban Mobility



Urban Mobility Next #1: Accelerating long-lasting change

EIT Urban Mobility

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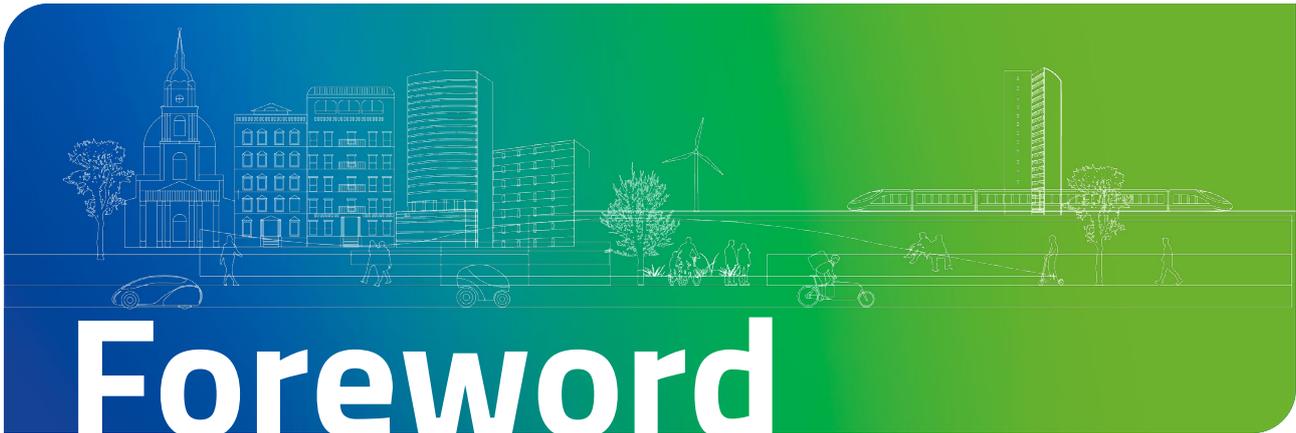
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Dr. Maria Tsavachidis
CEO of EIT Urban
Mobility

Launching the *Urban Mobility Next* Series

At EIT Urban Mobility, we believe in changing urban mobility systems to allow people and goods to move quickly, comfortably, safely, and cleanly, while being affordable. At the same time, we enable cities to reclaim public space from cars and make cities better places for people to live, work and play. We drive change by connecting more than 200 organisations across cities, industry, research, and academia and deliver impact in projects on sustainable placemaking and urban mobility.

Today, I am pleased to launch the *Urban Mobility Next* series, a range of publications in which EIT Urban Mobility will share insights from piloting mobility solutions to inspire positive change across cities. With this series, we want to foster knowledge sharing to contribute to the transition to more liveable urban spaces, sustainable urban growth and eco efficient transport.

The *Urban Mobility Next* series will provide practitioners with exclusive content on cutting edge urban mobility issues, find-

ings and lessons learned from our projects and partner network. Our readers will gain insights into data and recommendations from innovation leaders who are spearheading behaviour and technology change in urban mobility. The most relevant pilot outcomes will be shared early on with the community to accelerate mutual learning and scale successful urban mobility strategies that shape liveable spaces and climate friendly mobility.

In 2020, EIT Urban Mobility went through a structured process to identify the transformations needed and the opportunities to shape people-centred urban mobility concepts. The first report in our series sums up the main findings and gives some insights from projects we have been supporting in 2020. It also shares our strategic objectives and lays out the steps we will take to meet them. Bringing together experts from industry, cities, research, and education, we facilitate local transformations, and inspire their replication to accelerate the sustainable mobility transition.

1. Introduction

1.1 Context

With the European Green Deal presented in December 2019ⁱ aiming to make Europe the first climate-neutral continent by mid-century and the proposal to strengthen the EU's climate ambition to achieve a 55% reduction in greenhouse gas (GHG) emissions by 2030 compared with 1990 levels, the European Commission has clearly made decarbonisation a top priority. This goal is significant for cities, which currently account for around 70% of these emissions worldwide, while generating about 80% of all economic growth.ⁱⁱ As part of this European Green Deal, the European Commission published its vision to make transportation fit for a climate-neutral society by 2050, aiming at a 90% reduction in GHG emissions related to transport by 2050 compared with 1990 levels.

To deliver the required emission reduction at scale and the transition to more sustainable, more silent, and less polluted cities, significant transformations of our mobility systems are needed, especially as urban mobility accounts for 40% of all CO₂ emissions from road transport and up to 70% of other pollutants from transport.ⁱⁱⁱ

Building more liveable urban spaces takes a coherent approach to mobility change, acknowledging the key role of innovation and the central place of citizens and stakeholders in the transition. In the middle of the Covid-19 pandemic, this is proving even more challenging as sanitary, environmental, and socio-economic factors are putting a strain on cities' resilience: a recent joint survey by the Organisation for Economic Co-operation and Development (OECD) and the European Committee of the Regions finds that more than half of local and regional administrations expect a "large decrease" in tax revenues, while facing higher expenditures in fields such as health, social services, and support to small and medium-sized enterprises (SMEs).^{iv}

In a context that calls for rapid local action to face numerous and diverse global challenges, fruitful collaboration to lead ambitious urban mobility change is needed more than ever. Too often, impactful innovative solutions do not make it beyond pilot stage, or mobility transformations remain circumscribed to a district. To overcome such hurdles, it is crucial to accelerate knowledge and experience sharing between all actors and shapers of the urban mobility ecosystem, both direct and indirect ones. Such exchange should not only be limited to successes and failures, but should also provide solutions to stakeholders, decision-makers, and city officials facing common challenges. The *Urban Mobility Next* series will be one of the enablers of such long-lasting change through cooperation and best practice sharing across the urban mobility community.

1.2 Methodology and structure

The first edition of the *Urban Mobility Next* series is based on the insights and experience of EIT Urban Mobility partners, a network of Europe's leading companies, research and education institutions, and cities. The partnership covers the complete value chain from vehicle and traffic technologies to urban planning, data services, energy, retail, financial services, and engineering. The current paper explores pathways for the urban mobility transition, including the main bottlenecks that need to be addressed and opportunities that can be seized. Areas of mobility transformation are illustrated by specific projects supported by EIT Urban Mobility that contribute to the sustainable urban mobility transition through real-world transformation and best practice sharing.

Partners' input was collected during a series of workshops conducted by Trivector Traffic, using a back-casting approach to identify the best strategies that can lead our societies to cleaner, safer, and more inclusive mobility. Overall, 85 participants from 54 organisations – including 19 from cities, 17 from industry, 12 from research, and 23 from academia – took part in these workshops, representing the whole urban mobility innovation ecosystem. Participants brought experience and expertise from local governments, metropolitan regions, citizens and local associations, civil society, academia, and the private sector. The integration of these inputs, consolidated in the present paper, provides valuable insights and pan-European perspectives on the sector's main transformations.



Based on the workshop findings, strategic objectives were defined as a set of actions that EIT Urban Mobility will deploy to achieve its three societal impact goals: mitigation of climate change, improved quality of life in cities, and job creation and strengthening city economics. Strategic objectives are designed to have a significant impact on mobility improvements in cities in Europe and beyond.

In line with the key learnings from our partnership, this first edition of the *Urban Mobility Next* series is built around the structural determinants of mobility transformations (part 2), and the objective of shaping liveable urban spaces (part 3), a long-term goal for EIT Urban Mobility. The concluding section (part 4) puts in perspective the strategic objectives and the contribution of the *Urban Mobility Next* series.

2. Structural determinants of mobility transformations

Structural determinants are key enablers of mobility transformations. This part explores improvement pathways in areas relating to planning processes, infrastructure deployment, stakeholder interactions, and the piloting of innovative solutions.

2.1 Planning, policy, and decision-making

Policy environments are instrumental in enabling and shaping future mobility innovations. From providing long-term planning certainty to ensuring comprehensive approaches to mobility across socio-economic and environmental dimensions, policies and regulations are steering transformation processes.

In parallel, support for and experiments with new solutions through dedicated innovation schemes and pilot projects, as well as common standards to enable their replication, are crucial areas in which some existing barriers to mobility change can be removed.

2.1.1 Political support to mobility innovations

Political support and leadership constitute important enabling factors for innovation and lay the foundation for change towards more sustainable urban mobility. This was already shown in the 1970s in Amsterdam, where strong political and social support for cycling led to the steady roll-out of bike infrastructure and paved the way for remarkable growth in cycle use.^v

More generally, long-term commitments and vision, and even sometimes “courage to fail” in some projects or trials, are important features driving innovative transformation forward. In this process, planning certainty and a stable, supportive policy environment are important pre-conditions for the uptake of new mobility solutions. Coherence of mobility plans over time – which is facilitated by the adoption of the Sustainable Urban Mobility Planning process^{vi} – helps to deliver these, thus creating clear strategies including detailed implementation roadmaps. Such long-term plans allow the building up of the urban mobility capabilities needed to deliver lasting impact, beyond isolated initiatives.

Mobility solutions also need to be accompanied by adequate demand-side policy measures to unleash market deployment, requiring a consistent approach at local, regional, national, and European level. In this way, decision-makers can help to steer consumer behaviours towards more sustainable mobility options. For instance, along with the roll-out of shared mobility solutions in cities, incentivising the uptake of mobility allowances instead of company cars among employees, as was done by Belgium in 2019 with the introduction of the mobility budget,^{vii} can maximise the adoption of these innovations.

The combination of such demand-side measures with supply-side support for the development of new solutions is part of a holistic and systemic approach towards change implementation in urban mobility. Synergies between public and private organisations should be encouraged more frequently, leading to more transparent processes such as co-creation, combining local with more global perspectives. An integrated approach to mobility innovations, like those developed by the OECD to navigate digital transformations,^{viii} will facilitate innovation uptake and roll-out. This needs to be complemented by an agile administration and by lean procedures to facilitate the approval and deployment of urban mobility innovations, granting permits and exceptions through regulatory sandboxes where relevant. Likewise, clear communication and coordination with stakeholders and citizens are of utmost importance in building the necessary consensus and delivering successful and scalable pilots leading to real-world transformations.



Prof. Dr. Amnon Frenkel, Technion Israel Institute of Technology

"The future of our urban mobility systems depends on numerous framework conditions that are city-specific and serve as the building blocks of what we define here as the Transportation Innovation Ecosystem (TIE) of a city. However, many cities do not have a thorough understanding of their TIE, which reduces the ability of cities to promote policies that aim to improve mobility. The TIE project suggests uncovering the underlying dynamics of innovation, in the context of a place ecosystem, and providing a set of suggestions for policy recommendations tailored to improve mobility systems in the city."

2.1.2 Coherent regulation and common standards

Regulations provide clarity to all stakeholders regarding requirements and expectations from public authorities and communities when it comes to innovative mobility solutions. At European level, a common approach to issues that are central to innovation, such as data rights, access, and sharing, should be ensured to improve the scalability of tested solutions, along with proper implementation of EU legislation throughout the Member States. Under the next multi-annual financial framework, the European Commission will accelerate digitalisation through the Digital Europe Programme, which will cover cybersecurity and artificial intelligence aspects relevant to the transport sector and urban mobility. This could, for instance, facilitate the EU-wide roll-out of safer and more sustainable mobility solutions such as autonomous vehicles and Mobility as a Service (MaaS) applications.

Policies and Regulations required for enabling the MaaS concept (PRO-MaaS)

Today, the challenges in achieving MaaS are not only technical, but technical and regulatory. Therefore, PRO-MaaS provides recommendations on implementing strategic roadmaps for MaaS based on expert workshops and thorough analysis of international best practice and lessons learned. Stakeholders involved in urban mobility policy – such as cities and public transport authorities – need to plan MaaS deployment in a concerted and forward-looking manner. In this way, innovations associated with this transition can be steered to ensure more societally desirable outcomes, viable business models, and a dynamically evolving mobility ecosystem.

PRO-MaaS offers tools for policy-makers to set future mobility strategies and governance models incorporating MaaS. The accumulated knowledge from studies, European projects, and pilots will feed into a decision support system helping European cities to deploy new MaaS offerings.



Further information: <https://promaas-eitum.eu/>

EIT Urban Mobility partners involved: Barcelona City Council, Aalto University, Achmea Risk Insurance, Altran Technologies, Altran Lab, City of Hamburg, UPC Technology Centre, City of Amsterdam, Forum Virium Helsinki, Technical University of Munich, Technical University of Catalonia, University College London, ZONE Cluster Ltd, Barcelona Metropolitan Area, ERTICO-ITS Europe, MaaS Global Oy.

Harmonised rules on data availability and access are urgently needed to streamline interactions between mobility providers and cities, thus offering new services to citizens. In this regard, open shared standards can help to streamline requirements for data production, access, and exchange in line with the privacy requirements defined in the EU General Data Protection Regulation.

Similarly, the streamlining and optimisation of procurement rules and procedures at EU level, which is accelerated through e-procurement platforms, constitutes another path to bringing innovation closer to markets and cities. Likewise, pre-commercial procurement (PCP) and public procurement of innovative solutions (PPI) provide suitable frameworks to roll out innovative solutions in cities. For example, PPI provides a large enough demand to incentivise industry to invest in wide commercialisation, bringing innovative solutions to the market with the quality and price needed for mass deployment.

Overall, smart and responsive regulation can act as a major enabler of innovation in the urban mobility context. In particular, the coherence of procurement rules and procedures is an important pre-condition for scaling innovative solutions, as these constitute vital components of successful transformation pathways in cities.

2.2 Infrastructure adaptation in an increasingly digital world

Infrastructure and innovation are deeply interconnected and have been identified in the UN Sustainable Development Goals as the backbone of the roll-out of new solutions in real-world environments.^x It is important to distinguish between the physical infrastructure and the digital one related to communication technologies and data.

2.2.1 Physical infrastructure

Pilot deployment of innovative urban mobility solutions relies to a large extent on already existing infrastructure. Hence, fostering innovation ecosystems within cities also supports small-scale transformations during pilot deployment, potentially leading to larger change once scaled up.

The growing electrification of transport is a good example of the need to match infrastructure deployment with technological change. Sales of electric vehicles (EVs) accounted for 2.5% of global passenger vehicle sales in 2019 and are expected to grow to 32% of market share by 2030, according to recent estimates by Deloitte.^x To cater for this growth, the European Commission estimates that at least 2.8 million publicly accessible EV charging points will be needed by 2030, a 14-fold increase on 2020 levels.^{xi} The revision of the Alternative Fuel Infrastructure Directive, expected in 2021, will help to fill this gap.

With regard to the renewal of public transportation fleets, the European Commission has set up dedicated Clean Bus Europe Platform to support local authorities in transitioning public transport services to clean bus fleets.^{xii} Part of the support provided relates to the necessary infrastructure upgrades for electric buses, as more experience and research is needed to determine the most efficient route patterns for electric bus services.

Improve public transport electrification to fight against climate change (e-Ultimate)

The e-Ultimate project (starting in 2021) has developed a decision support tool (DST) that designs the optimal charging system for electric buses tailored to each specific city. The tool quantifies the impact of the electric service on transit agencies and other stakeholders. Data gathered from the bus operations in six cities characterises the real performance and operating costs of different charging schemes.

The DST considers the need to ensure that electricity supply requirements are met. It includes operation and capital costs (vehicles and facilities) to run the service, battery life, user travel times, and public space consumption. The DST also considers the future evolution of chemistries, costs, and electric scheme performances. It identifies the charging technology in the market that best suits a city's mobility requirements.

EIT Urban Mobility partners involved: Barcelona City Council, Czech Technical University in Prague, City of Milan, AMAT, UPC Technology Centre, Technical University of Catalonia, ZONE Cluster Ltd, Electrobus Europe, Barcelona Metropolitan Area, IDIADA, University of Lisbon, Politecnico di Milano, City of Zalaegerszeg, Municipality of Děčín, Barcelona Regional, TMB-Bus, Almadesign, TUSGSAL, Carris, Lisbon City Council, Ferrocarrils Generalitat Catalunya

Likewise, innovations in the field of logistics benefit from already available infrastructure such as freight depots on cities' outskirts. Such logistics nodes can serve as an anchor or starting point for the deployment of city pilots aimed at optimising last-mile deliveries. The same goes for cycle logistic trials, which require well-developed cycling networks as an important pre-condition for producing optimal results.

2.2.2 Digital infrastructure

Complementary to physical infrastructure, digital infrastructure has been identified as an important current barrier for mobility transformations. Digital infrastructure will be crucial for the operations of the estimated 350 million connected cars worldwide by 2023,^{xiii} and will enable a seamless user experience with on-demand mobility services.

To support cities in their digital transformation, urban digital infrastructures need to be upgraded. Closer alignment between the EU and national levels on policies and mechanisms to support urban infrastructure upgrades would facilitate change implementation. As identified by the European Commission, despite the tremendous improvements in terms of simplification and mainstreaming, there is still effort to be deployed to further simplify the landscape of instruments and of funding schemes for research & innovation at EU level and to further tighten the national and EU levels. To a certain extent, the new framework programme Horizon Europe has been designed with a view to reinforcing innovation ecosystems, promoting synergies between the various instruments (such as between the European Institute of Innovation & Technology and the European Innovation Council), and further delivering on societal challenges with the creation of missions, notably one on climate-neutral and smart cities. Beyond Horizon Europe as such,

adopting a user-centric approach should be the guiding principle to facilitate synergies between R&I funding schemes and other relevant schemes (including the European Regional Development Fund, the Just Transition Fund, the Connecting Europe Facility, and InvestEU).

One area in which infrastructure technology readiness plays a crucial role is vehicle automation, where the roll-out of communication technologies such as 5G constitutes a necessary milestone for enabling communication between vehicles and their immediate environment. Such infrastructure upgrades would allow new mobility applications thanks to seamless interconnections of vehicles and services with the internet of things (IoT).

Further innovations in the digital infrastructure include setting up and running the IoT systems, and public databases that allow cities' digital twins to be modelled. Based on real-time data, these simulations allow cities to monitor traffic, environmental conditions, and energy consumption, and to develop digital scenarios, thus supporting decision-making processes. Experiments with digital twins are multiplying in Europe, with, for instance, a recent government-backed cross-city project starting in the cities of Hamburg, Leipzig, and Munich.^{xiv}

2.3 Citizen and stakeholder engagement

For innovation to fulfil its societal objectives and create added value for stakeholders and communities, it is critical to engage with and consult all affected citizens and stakeholders.

2.3.1 Decision-making processes and consensus

An important process for delivering impactful innovations in the field of urban mobility is to first identify what problems need solving, according to the stakeholders and citizens affected. Using democratic and inclusive processes, it is possible to enhance citizens' information levels and build the necessary capacity to spark a quality debate, leading to informed discussions between all parties. EIT Urban Mobility citizen engagement calls conducted in 2020 aim to fulfil this objective by creating implementation guidance and setting up a citizen engagement platform. This is a key step in shifting to a user-oriented approach, developing solutions around citizens' needs and aspirations.

Furthermore, dedicated tools for stakeholder and citizen consultations are effective in providing a stage for exchange of views and the representation of interests. For instance, the Multi-Actor Multi-Criteria Analysis (MAMCA) stakeholder engagement model developed by Vrije Universiteit Brussel offers a platform for ensuring engagement and representation of stakeholders at all stages of complex decision-making processes.^{xv}



Philippe Lebeau, Vrije Universiteit Brussel MOBI research group

"The Multi-Actor Multi-Criteria Analysis (MAMCA) tool supports decision-makers in navigating complex consultation processes across various stakeholder networks. Thanks to its platform, the MAMCA software allows stakeholders to arrive at a comprehensive and coordinated vision of solutions."

In parallel to dedicated engagement platforms, living labs serve as catalysts for co-creation processes and place citizens (or any other kind of end-user) at the centre of innovation, offering more inclusive ways to involve stakeholders through first-hand trial activities, with the opportunity to provide real-time feedback. Such active creation through user-centred and open-innovation ecosystems opens new avenues for communities and stakeholders to shape their mobility environment. Living labs are levers for change and enablers of the deployment of more sustainable transport systems by helping to address some of the barriers facing cities, for example encouraging political acceptance and support for novel solutions as a driver for innovation; promoting public acceptance of new technologies; fostering improved relationships between stakeholders; identifying viable business models; and stimulating innovation uptake. The Copenhagen Street Lab,^{xvi} the city's testbed for smart city solutions, and the Amsterdam Marineterrein,^{xvii} which provides a real-world test area for innovations such as self-driving vehicles, offer strong illustrations of the deployment of new solutions in urban areas.

2.3.2 Communication and nudging

In addition to direct engagement with citizens and stakeholders, communication with city inhabitants and nudging to steer behaviours are critical in increasing the success of sustainable mobility experiments.

Improving communication with citizens and local businesses through timely and personalised content leads to more public acceptance and greater stakeholder support. In this regard, innovators need to achieve the right tone in communicating on specific initiatives while being as inclusive as possible, reaching out beyond the sole product's customer or user bases. Recently, mobility innovations aimed at managing the impact of Covid-19 on cities showed the effectiveness of communicating a sense of urgency with citizens and stakeholders to gain sufficient media attention and traction. This was the case, for instance, with the rapid roll-out of pop-up bike lanes across cities worldwide, from Bogota to Berlin, which were quickly understood to safeguard sustainable mobility during the pandemic.^{xviii}

The deployment of small-scale pilots should be facilitated as these are tools to spark dialogue among citizens about wider change. Such initiatives put issues and possible solutions in perspective, bringing innovations closer to citizens. This also induces a different nudging style: while the right incentives to make unsustainable behaviours more costly are needed to steer mobility choices, incremental and inclusive experiments accelerating behaviour change are important building blocks for innovative transitions. Against this background, some well-defined and scoped exemptions in regulations are needed to create an enabling framework allowing mobility innovations to be tested. Such exemptions allowed, for instance, electric ride-pooling provider CleverShuttle in Germany to provide and test its services in Berlin over a four-year period.^{xix}

The current transition in urban mobility, along with the generation-triggered change in value attribution and mobility choices, opens new opportunities to accelerate the adoption of more sustainable mobility options, away from car ownership towards shared, on-demand alternatives.

2.4 From pilot to scale

The difficulty for innovators in scaling their solutions beyond the pilot stage is a common bottleneck that is slowing down change in urban mobility. To overcome this, there is a need to improve pilot design while facilitating access to funds and accelerating business model adaptation.

2.4.1 Improving pilot design

Improving pilot design for mobility experiments in cities is one of the missions of EIT Urban Mobility, through the integration of stakeholders from academia, research, industry, and cities. In this regard, multi-stakeholder workshops that aim to solve specific urban mobility issues are important tools to support cooperation and identify the right solution providers, leading to increased overall project quality. Such activities are conducted by EIT Urban Mobility across the partnership through physical or online events that encourage idea exchange and value creation.

In addition to better matchmaking, expertise in the preparation of pilots needs to be optimised, along with the use of adapted strategies in the form of roadmaps or change management plans to achieve a pilot's goal and embed its objectives from the outset. Facilitating best practice exchange and benchmarking activities is also important in enabling projects to learn from each other's experience and in turning ideas into real-world experiments, while avoiding duplication of effort.

Continuous data collection and monitoring during the pilot phase turn out to be valuable components for gathering insights from real-world, small-scale experiments. Likewise, pilot evaluation plays an important role in drawing lessons from urban mobility experiments and provides

precious take-aways for any future similar initiatives. EIT Urban Mobility contributes to pilot design improvement by supporting the development of pilots, including strategic guides for project implementation, with experimental designs and roadmaps for success.

2.4.2 Delivering sustainable impact

Well-designed pilots create new solutions for real-world mobility issues. However, these must scale beyond project stage if they are to bring substantial, systemic change to the wider mobility landscape, transforming short-term success into long-term impact. This challenge is being tackled within EIT Urban Mobility through platforms and automated tools that encourage replication of the most scalable innovations to accelerate change.

Successful innovation pilots can result in start-up creation as another driver of change in an increasingly complex, multi-faceted urban mobility context. Because start-ups are the fastest vehicle for adapting business models to new stakeholders' behaviours and expectations, EIT Urban Mobility is focusing efforts on fostering business creation: using its unique network, it connects start-ups with the right partners across cities, industry, research, and investors. EIT Urban Mobility's support to start-ups also includes training, networking, and funding for early business creation.



Andrew Heneghan, Sales Manager
Laplandar

"The EIT Urban Mobility Accelerator programme has provided a great boost for us! We've engaged across boundaries with motivated mobility start-ups and have been given the opportunity to present our products to municipal governments and major companies. It's fantastic for our network!"

Access to the right funding solutions is an important enabler for innovators to test and roll out new products and services. This is being addressed to some extent at EU level by the European Innovation Council (EIC), which provides grant support along with blended finance to facilitate the scaling-up of innovative companies.^{xx} Looking ahead, instruments such as the recovery and resilience facility (RRF), and the recovery plans in general should focus on innovation as the engine of productivity and of competitiveness. For the recovery to be green, digital, and resilient, funds need to focus on enabling close-to-market solutions to scale and boost sustainable urban mobility.



INTERVIEW WITH

Alexander Schmidt CEO, BABLE & Former Interim Director, Factory

What are the missing links currently slowing down the urban mobility transition in Europe?

In Europe, we probably have the most sustainable modern transport systems of any continent globally thanks to highly ambitious targets, like the 2050 zero-emission goal for the transport sector.

When we talk about cities, a lot of competencies to influence mobility are scattered between them, the regional authorities, or national governments. This means the market is fragmented, and it is harder for solutions to scale.

One other issue is that mobility is localized, as cities create, manage, and shape their own public transport systems. This localized approach has many advantages when it comes to service provision – but a significant disadvantage when it comes to realizing economies of scale. But at the same time all cities have the same targets such as improving liveability, transport safety, and efficiency. Still, while we want to scale solutions and create economies of scale, every city needs specific local solution. Here we need to marry local and global dimensions.

Not all solutions are achieving the example of e-scooters that can scale very fast because not dependent at all on city funding. Other solutions depend on it to scale, which makes the process more painful. Also, those solutions might not actually fit the cities' needs and focus.

There needs to be an acceleration in matching cities' mobility needs to adequate solutions from companies and scaling them. This is where the EIT Urban Mobility partnership and unique ability for pilot-testing stands out.

What (structural) transformations are needed to accelerate deployment from pilot to scale?

Public Private Partnerships is what we need to make sure that the public interest is pursued, and products delivered are efficient and of high quality. In this regard, the 2014 procurement directive is a move in the right direction. Now tools are available where companies can be involved in the drafting of procurement specification before public procurement calls are published, so they can provide input.

With these new processes we can create an alignment on targets between public and private sectors. But these possibilities are currently underexploited and should be used by more cities.

Another current bottleneck is that cities do not always have capacity and technical know-how to engage with all new solution providers. On the other hand, solution providers often do not have the understanding of the complexity of city-systems and correspondingly offer their services not maximizing commercial instead of overall values. Combining the best of both worlds is still going to require a lot of efforts and changes on both the public and private sides.

How does the Factory help businesses and start-ups to scale?

Currently, too many successful pilots fail to make it to product stage. At the factory we ease this process. The ambition is to help those mobility projects that are creating products to successfully go from pilot to scale.

Unfortunately, we see way too often projects where things get tested once, where they succeed and there are learnings, but no replication as the project and associated funding come to an end. We try to smoothen this and to help that jump from public funding to standing in the market autonomously.

What roles do tools and knowledge exchange play in the transition?

In the end, every city and urban mobility system takes its own path. We cannot support on all steps of project roll out, but we can provide targeted help and recommendations.

When starting to implement completely new projects and ideas, it can feel like you are just gliding on a slippery slope. Tools and the information we provide are some points that give you grips, giving examples from similar experience. For **UMAM** can help a city identify gaps, our best practice collection helps cities learn from each other or **MAMCA** can facilitate stakeholder engagement on innovative mobility solutions.

There is still however quite a lot of work to be done and the Factory is not doing it by itself – so if anyone has ideas, join our partnership.

3. Shaping liveable urban spaces

Current mobility trends and new collaboration methods offer opportunities to shape more liveable urban spaces and to drive a lasting change in urban mobility for people and goods.

3.1 Collaboration drives mobility innovation

Collaboration between public and private actors, under many different set-ups, is key to the success and uptake of mobility innovations among citizens, insofar as fruitful partnerships over time lead to more coherent urban mobility concepts, beyond political cycles.

3.1.1 Collaboration between public and private entities

Stable public institutions' goals, especially at local level, can be a driving force for mobility transformations. Thriving mobility innovations need support beyond political cycles, along with a regulatory framework that is open to mobility innovation while pursuing public interest objectives. Initiatives such as the Horizon 2020 GECKO project,^{xxi} which develops recommendations for a regulatory framework for new mobility in Europe, contribute to fruitful collaboration between public and private stakeholders.

Improved collaboration between private and public entities can also create innovative answers to societal challenges. For instance, such opportunities can emerge from restructured public spaces, which have gained traction during the Covid-19 pandemic, as illustrated by the Furnish project.

Fast Urban Responses for New Inclusive Spaces and Habitat (Furnish)

Reacting to the Covid-19 pandemic, the Furnish project puts into practice the principles of "tactical urbanism" to expand public space and improve its quality for the benefit of pedestrians and cyclists.

Considering the wide implications for public space, mobility, and quality of life, the project adopts an open design and manufacturing approach in which makers throughout Europe produce elements to demarcate, furnish, and enliven the public spaces (re-)created during the pandemic. The Furnish project selected teams throughout Europe to

digitally fabricate and deploy urban elements that expand areas for pedestrians and leisure activities. Examples of their creations are accessible online (see here and here). Ultimately, Furnish creates more public spaces and strengthens local digital manufacturing capabilities. It also contributes to the creation of an open-source repository of knowledge related to urban planning, mobility, social behaviour, temporary space design, and urban elements, which can be replicated anywhere in the world.



More information: <https://furnish.tech/>

EIT Urban Mobility partners involved: City of Milan, AMAT, UPC Technology Centre, Technical University of Catalonia, Institute for Advanced Architecture of Catalonia, Elisava Barcelona School of Design and Engineering

New business models can be fostered through PPPs to encourage innovations across silos, creating new, more comprehensive, sustainable business logics. Transport electrification is a prime example of relevant synergies leading to efficiency gains for both the electricity network and vehicles. Similarly, with the popularity of on-demand (micro) mobility services in cities, new building developments benefit from a larger offer in connectivity options, which can be considered and planned for right from the start.

3.1.2 Innovation deployment and pilot planning

With the right balance between planning certainty and flexibility, PPPs can facilitate the testing and uptake of new mobility concepts by transitioning more rapidly from test phase to proven concept. Beyond traditional PPP, more innovative forms of engagement can lead to the development of new solutions for urban mobility issues. For instance, hackathons offer suitable options for involving a variety of experts from diverse backgrounds, sharing different perspectives and solutions on specific issues. In 2019, EIT Urban Mobility supported hackathons on a variety of topics, from electric charging infrastructure to cycling and year-round mobility solutions. Thanks to their open nature, hackathons maximise the available innovation potential by leveraging the power of the community to analyse and exploit data. Their success, however, relies on the quality and amount of available data, as well as on effective communications with stakeholders and citizens. Similarly, innovation competitions can accelerate the deployment of new solutions, while being closer to regular public procurements with short implementation timelines and with service provision criteria.



Juho Kostiainen
City of Helsinki

"Innovation competitions for identified challenges can produce ideas and solutions with innovative and unexpected approaches. Testing promising ideas in the urban environment with real users helps validate and demonstrate their potential. Agile pilots can provide valuable learnings and insights about novel solutions and new ways of doing things."

Planning design, including pilot area selection, greatly impacts project implementation. Decentralised solutions such as living labs and controlled scenarios can accelerate innovation deployment and lead to rapid delivery of first insights, providing a basis for further decision-making. The right pilot area is also important in terms of the test environment it provides, as conflicts with or lack of existing infrastructure can occur during pilots, for instance in the case of autonomous vehicle tests or even while experimenting with active mobility solutions.

Beyond controlled deployment in safe environments, city-wide implementation of innovations requires more holistic planning, with common goals enabling scalability through adequate infrastructure and services. To drive mobility transformations, closer alignment and coordination on parallel initiatives across the public and private sectors is required, while identifying and creating synergies between complementary solutions.

3.2 Placemaking – citizens at the heart of the transformation

The pandemic has brought already existing concepts of placemaking to the centre of decision-makers' and the public's attention. Increasingly, inhabitants are being given the opportunity to co-create and redefine the places they live in.

3.2.1 Creating value, locally

The pandemic has stressed the importance of quality of life in cities and has encouraged citizens to take advantage of neighbourhood life and to consume differently, focusing spending on essentials while cutting back on other categories.^{xxii}

In parallel, according to a May 2020 survey by PWC, 28% of Europeans living in urban areas used online shopping as the main channel for buying groceries, a 10% increase on pre-pandemic levels.^{xxiii} This trend puts pressure on local businesses, despite support from local and regional administrations, which is vital for fostering vibrant communities, as is maintaining essential services such as schools, medical centres, and cultural offerings.^{xxiv}

In Europe, cities such as Barcelona (Superblocks), Milan (Strade Aperte), and Paris (15-Minute City concept) are developing strategic initiatives to increase local value creation and improve well-being within the community. For example, Barcelona announced its intention to expand the Superblock concept to create 21 pedestrian plazas at intersections in the Eixample district, with work starting in 2022.^{xxv}

In addition, the increasing number of people who are teleworking is stimulating life in neighbourhoods through more mixed use of places. A survey by Eurofound shows that more than a third of European employees worked solely from home in the month of July 2020, while fewer than 1 in 20 employees reported working in this way regularly in 2018.^{xxvi} The transformation is significantly affecting usual commuting patterns, with more flexible working arrangements allowing rush hours in public transport and on the roads to be avoided, or at least minimised.

3.2.2 Social cohesion and interactions

Stronger neighbourhoods also mean better (micro) social interactions between inhabitants and the creation of a community feeling at local level that improves social cohesion and fosters citizen participation.

EIT Urban Mobility is supporting initiatives aimed at favouring the implementation of tactical urbanism measures to invite citizens to use streets differently, in a more flexible and inclusive way. The CLEAR project provides a good illustration of this approach.

City Liveability by redesign (CLEAR)

The CLEAR project aims to enhance the value of urban spaces by reshaping mobility, enhancing the uptake of innovative alternative mobility concepts, and enabling systemic change in urban mobility. The project focuses on “transition experiments” in city streets, which are temporary partial or total closures of streets to motorised traffic. Such activities include, for example, the redefinition of the boundaries between pedestrian and street areas through removable devices and colourful transformation of the asphalted

ground, with the participation of citizens. This encourages nonmotorized mobility and a redefinition of public space uses (e.g. playing, socialising, recreating) by means of interventions and activity programming, and joint introduction of new mobility options as alternatives to individual motorised transport. Citizen and stakeholder participation in all phases of the transition experiments is central to the project.

The CLEAR project has created a website featuring results of the transition experiments and examples of public space redesign.



More information: <https://www.streetexperiments.com/>

EIT Urban Mobility partners involved: City of Milan, AMAT, City of Amsterdam, City of Munich, Technical University Munich, UN Studio, University of Amsterdam

Such projects highlight the importance of having the right infrastructure in place to spark and generalise more sustainable mobility behaviours. Larger pedestrian spaces and safe cycling infrastructure help to achieve modal shift through initiatives such as reduced lane width and limits on the number of off-street parking places.

Putting emphasis on short, walkable distances and traffic-calmed streets shapes an environment where active mobility is easy, attractive, and cheaper than motorised individual mobility. Similarly, planning strategies aimed at reducing speed or limiting through traffic across lively neighbourhoods constitute effective means of giving inhabitants more creative ownership of their streets.

3.2.3 Health benefits of mobility transformations

The wider behaviour change resulting from small-scale transformations also has a direct positive impact on citizens' health, as more active mobility thanks to comfortable infrastructure for pedestrians and cyclists reduces the risk of chronic diseases and depression, while enabling healthy living and active ageing.^{xxvii}

While active mobility contributes to the prevention of physical and mental health problems, its uptake also means less air and noise pollution caused by motorised traffic. This is of particular importance in Europe, where the European Environment Agency estimates that poor air quality causes 400 000 premature deaths per year, mostly because of heart disease and strokes.^{xxviii}

In parallel, the multiplication of green spaces induced by urban redesign has the potential to create more liveable neighbourhoods, encouraging interactions between people in calmer, quieter environments. Such strategies also contribute to decreasing mobility's carbon footprint in cities, contributing to the overarching objective of reducing GHG emissions.

The multi-faceted impacts of urban redesign and infrastructure deployment for walking and cycling show that they can achieve more than a modal shift, and that they also contribute to reduced congestion and pollution, while stimulating healthier ways of life.

3.3 Smarter mobility for people and goods

Encouraging people to adopt more sustainable mobility solutions is a cornerstone of the urban mobility transition towards more liveable spaces. To set the right conditions and put this change into action, citizens need access to clean, on-demand mobility options that complement reliable public transportation services.

3.3.1 Scaling on-demand mobility solutions

The personalisation of urban mobility offers has been an important trend in mobility over recent years and is best illustrated by the popularity of ride-hailing and micromobility services in European cities. With public transport networks as the backbone of most recent innovative mobility concepts, the combination of improved traditional transport services and new, on-demand mobility offers will help to reshape urban spaces.

To reach this goal, increasing the attractiveness of shared transport solutions, including public transport, is a required strategy for providing commuters with suitable alternatives to the private car. This requires high frequency of service, enhanced reliability, and greater availability close to home and work. To achieve this, comprehensive mobility data analysis is a pre-requisite for cities aiming to optimise their mobility systems and tailor their mobility offers to citizens' needs. In this regard, data-based tools can support policy-makers and practitioners to target and monitor the roll-out of disruptive solutions in urban areas.

Urban Mobility Assessment Model (UMAM)

UMAM is an online self-assessment tool that analyses the mobility performance of cities and monitors their long-term progress based on a range of city impact indicators. Learning from previous experience and other tools such as the MaaS Maturity Index and Morgenstadt, the tool supports cities in the acceleration of their strategic development

and plans. UMAM measures the maturity of urban mobility systems and shares relevant best practices adapted to specific city characteristics.

Cities assessed using UMAM are provided with automated scoring reports revealing the maturity level of their urban mobility system. In addition, cities can opt for a more in-depth analysis including recommended solutions from the EIT Urban Mobility Best Practice Database.



More information: <https://www.eiturbanmobility.eu/projects/urban-mobility-assessment-model/>

EIT Urban Mobility partners involved: CARNET, CTAG, University College London, Bable

3.3.2 Bringing the three revolutions into action, locally

Three major revolutions are radically changing the way people move around and go from A to B: electrification, automation, and sharing.

As seen in section 2.2, transport electrification has experienced a rapid growth over recent years, in part as a result of objectives set by European regulators. This trend is creating opportunities for more comprehensive approaches to the possible synergies between the transport and mobility sectors. The deployment of zero-emission vehicles in cities, including the roll-out of both emission-free buses and cars used for the completion of public services (as foreseen by the Clean Vehicles Directive), is an important enabler of this transition.^{xxix}

Vehicle automation constitutes a change of similar magnitude with significant opportunity to increase road safety while optimising traffic flows. It is expected that by 2040, autonomous vehicles (SAE level 4 and above) will account for about 66% of total passenger kilometres worldwide^{xxx}. Still, this revolution relies on the deployment of proper infrastructure and standards to enable communication between vehicles and infrastructure. Combined with connected on-demand mobility packages, autonomous vehicles – for example in the form of robotaxis – have the potential to further increase the attractiveness of shared mobility overall.

Especially in newly developed areas, the implementation of shared, electric, and autonomous mobility solutions can accelerate behaviour change towards more sustainable choices, decoupled from vehicle ownership.

3.3.3 Toward optimised urban deliveries

The rapid increase in parcel and meal deliveries over recent years has spurred a range of innovations aimed at optimising city logistics and reducing related congestion and pollution. This trend has accelerated further since the pandemic outbreak: according to the OECD, online orders in Europe surged by 50% during the first quarter of 2020.^{xxxi} Centralised package delivery systems, with appropriate large infrastructure close to major transport nodes and city depots in urban areas, are efficient solutions for reducing the traffic caused by home deliveries.

Shared micro depots for urban pickup and delivery (SMUD)

SMUD takes micro depots to the next stage. Micro depots are a complementary approach to last-mile logistics concepts, offering space for intermediate storage and for parking, loading, and charging facilities for last-mile logistics technologies. With its pilots deployed in Helsinki and Helmond, the SMUD project shows how shared micro depots used by a minimum of two companies can work and scale: the companies sharing the micro depot deliver with their own fleets to the micro depot, and one single white-label company takes care of last-mile dispatch. Alternatively, customers can pick up their parcels directly from the micro depot. This increases the efficiency of urban logistics and offers practical solutions for last-mile deliveries, especially in areas where delivery vehicle traffic is restricted.

For planning and designing shared micro depots, cities require support, as the most suitable business model may not initially be apparent, especially when it comes to a multi-user approach. Hence, city-specific contexts need to be taken into consideration, with a wide variety of actors involved, and different types of goods, vehicles, business models, and technologies available. For this reason, the project has developed a toolbox with a wide range of solutions and best practices regarding location planning, design fit of the micro depots, operational design, and business models.



More information: <https://www.eiturbanmobility.eu/projects/shared-micro-depots-for-urban-pickup-and-delivery/>

EIT Urban Mobility partners involved: Fraunhofer, City of Helmond, Forum Virium Helsinki, Stadtwerke München MVG, Technion – Israel Institute of Technology, Technical University of Catalonia, Gateways

Similarly, to manage the negative externalities of increasing deliveries in cities, cycle logistics solutions are being deployed along with electric delivery vehicles for silent last-mile services, for instance during the night when there is less traffic. Looking forward, the use of drones for parcel or medicine deliveries offers opportunities to diversify and further optimise urban logistics.



INTERVIEW WITH

Fredrik Hånell

Director, Business Creation

How do mobility start-up ecosystems in Europe compare internationally?

In Europe there is not one single ecosystem yet. The situation across Europe varies a lot between countries, each with different strengths and set-ups. Because of these disparities between countries, Europe can seem weaker compared with the US. But within specific areas, you can find enormous strengths in Europe. For instance, the areas of Barcelona and Munich are some of the leading ecosystems worldwide.

If you look at the US, the availability of capital and the risk willingness of venture capitalists and investors is much higher than in Europe. Unfortunately, this is still an established truth. But there is also a different attitude within US and European start-ups. For instance, in Europe, young companies tend to seek engagement with local governments before starting to operate, as the regulatory environment develops. From the investors' perspective, getting the highest valuation possible for start-ups in the US is more of an objective than in Europe, where adapting to other stakeholders and demonstrating a social value-added is especially important.

Do you see room for improvement? How can EIT Urban Mobility contribute to these improvements?

You might think that the urban mobility environments are very different between cities because they look different at first sight, but the basic issues they face do not vary greatly. Cities' problems and challenges across Europe are quite similar. It therefore makes sense to take a European approach to supporting ecosystems for start-ups.

What I have seen in our programmes so far is that there are great start-ups coming from across Europe but important disparities regarding the amount of funds they have access to. This is why we are trying to raise the level of ecosystems in countries where they are weaker.

We also need to push local innovators to look beyond their own ecosystems, even if often in Europe, language remains a barrier. At EIT Urban Mobility, we involve many different partners from different ecosystems and foster their collaboration and cross-fertilisation in order to build truly European ecosystems.

What, in your view, are the missing links that could accelerate the transition from innovation to start-up creation?

We need to look at incubation to bridge the gap between successful innovation projects and creating a company with a first minimum viable product out of the door.

What our accelerator programme does is to take already existing start-ups and bring them to the next step. But if you are an entrepreneur and still do not really know what your business model is, you will need support and money to be able to succeed with your idea. That is what incubators are here for – giving entrepreneurs space to meet, discuss, and take the first step towards creating their company. Existing incubators in Europe are still very much Member State-based, and in many cases part of local universities as well, which does not always facilitate business creation.

How can start-ups' innovation potential best be matched with current challenges faced by European cities?

I think we need to increase the number of living labs and pilots where cities can test start-up potential in live environments. This helps to overcome cultural differences between city administrations and entrepreneurs: cities are used to long-term planning and long projects, while start-ups are looking for decisions within weeks or months. So, set-ups like pilots or living labs are very useful for cities to understand how to best interact with entrepreneurs. They also teach entrepreneurs what the true challenges of cities are.

At EIT Urban Mobility, cities are at the root of everything we do, so cities and their challenges guide our start-up programmes. The start-ups we take on our programmes must therefore address the cities' challenges. We then involve the cities directly in our programmes so that they can give precious feedback to start-ups.

4. The *Urban Mobility Next* series

EIT Urban Mobility is launching the *Urban Mobility Next* series to share the most relevant project outputs and experience with the urban mobility community.

4.1 Urban Mobility focus areas and the objective of the series

4.1.1 Strategic objectives at the heart of the mobility transformation

As a result of consultations with all its partners, EIT Urban Mobility has defined strategic objectives that are key to creating impact and delivering sustainable urban mobility systems and liveable urban spaces. Achieving these urban mobility goals in European cities will contribute to mitigating climate change, improving quality of life, creating jobs, and strengthening city economics. These objectives are:



Create liveable urban spaces

Encourage the development of more efficient and integrated transport systems across various modes and the uptake of new mobility services that take up less public space, minimise the environmental impact of transport, and reduce oil dependency. We will facilitate new urban form design principles and public realm improvements — from designing cities for cars to designing cities for people – to improve the well-being and health of citizens by reshaping public space and bringing public life back to city streets.



Close the knowledge gap

Reskill and upskill the workforce. The mobility sector is undergoing a transformation driven by the demand for safer, cleaner, and more efficient solutions in combination with new enabling technologies and a changed vision regarding the role of the car. The need to re- and upskill the existing workforce is especially pronounced regarding utilising new technology, moving from supplying products to offering or co-creating services.



Deploy user-centric, integrated mobility solutions

Ensure the fundamental right of mobility for all by fostering the take-up of novel mobility solutions designed around people's needs and offer citizens access to a new generation of clean, safe, affordable, and equitable travel options while reducing private car use (and ownership) and boosting the use of alternative modes of transport, and at the same time addressing air quality and public health concerns.



Accelerate market opportunities

Build an enabling environment in Europe to become the world leader in innovative urban mobility solutions.



Promote effective policies and behavioural change

Act as the change agent for urban mobility policies and behaviour change by effectively engaging with citizens in co-creation activities.

To achieve these objectives, EIT Urban Mobility will focus on delivering the following intermediate outcomes:



An intermodal transport system, services, and infrastructure to access work, education, and leisure.

Urban design needs to encourage walking and cycling through adequate infrastructure. Better integration of public transport with other modes will further enable intramodality and promote alternatives to the private car, along with improved traffic and parking management.



Green and efficient city logistics for goods deliveries for businesses and people

Urban logistics can be improved through the expanded deployment of smaller, zero-emission and quieter delivery vehicles in dense urban centres, combined with effective off-hour deliveries. Likewise, better management of loading/unloading bays reduces the impact on traffic. In parallel, the policy environment needs to adapt to the increasing e-commerce and home delivery habits.



A mobility system that protects and fosters people's health and well-being

Putting active travel at the centre of our mobility systems enables us to boost green mobility, thereby improving urban dwellers' health and reducing air and noise pollution. Focusing on active mobility will also positively impact safety and enable us to achieve "vision zero" by 2050.



A green and human-friendly urban environment

Improving the quality of public spaces is vital for enabling people to spend time together. It also increases inclusiveness for all groups and enhances social cohesion by creating a sense of community.



Europe's industry is leading sustainable urban mobility transition

Fast piloting and scaling of projects will accelerate the urban mobility transition, together with transparency and sharing of knowledge and experience across cities. Likewise, giving start-ups and SMEs easy access to living labs and available knowledge leads to optimised entrepreneurial and innovation capacity. Ultimately, involving cities and citizens in the development of mobility solutions is key to the success of European mobility innovations.

Both the strategic objectives and intermediate outcomes will steer the *Urban Mobility Next* series, which will tackle these transformations using a pragmatic, practitioner-oriented approach. The series will help cities, industry, research, and academia to identify new opportunities in the urban mobility sector. By featuring cutting-edge innovations as solutions to some of the most pressing city challenges, the series aims to inspire the replication of local successes on a larger scale.

4.1.2 Sharing lessons learned with the community

The *Urban Mobility Next* series will draw on lessons learned from the mobility transformations supported by EIT Urban Mobility and deployed by its partners. The series' results-oriented approach will explore the impacts of urban mobility projects conducted across European cities on a wide range of topics. The knowledge gathered from these experiments will provide a toolbox for replication of similar initiatives, helping solutions to scale while supporting cities that face similar challenges.

Thanks to its unique positioning at the nexus of urban mobility's triple helix of innovation, EIT Urban Mobility acts as a platform for knowledge exchange and dissemination of experience across stakeholder profiles and geographies. Throughout the *Urban Mobility Next* series, EIT Urban Mobility intends to fulfil its mission as a catalyst of change for sustainable mobility in cities by connecting innovators and fostering synergies between public and private entities at local, national, and European level.

While projects supported by EIT Urban Mobility focus first and foremost on real-world demonstrations, the *Urban Mobility Next* series will provide insights for urban mobility practitioners looking for both policy and business innovations. In so doing, the series will leverage and multiply the impact of local transformations and support long-lasting change in urban mobility across Europe.



Stay in touch

Future Urban Mobility Next publications will be available on the EIT Urban Mobility website

To keep up with the latest from our community, subscribe to our [newsletter](#)

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