#### WHITE PAPER

# A Policy Path to Achieving Europe's Green Digital Revolution with Sustainable, Smart and Seamless Mobility

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### **KEY TAKEAWAYS**

- To achieve its ambitious mobility policy goals in the Sustainable and Smart Mobility Strategy and European Green Deal, the European Union needs clear and specific policy changes that allow for a connected, cooperative, and autonomous mobility (CCAM) transportation network.
- The European Union can take action in at least three key
  policy areas in the near future to enable the private and public
  sectors to unlock the full potential of digital transformation and
  catalyze a green transition to CCAM.
- Without acting, the EU risks harmful monopolization across the mobility service sector, uneven growth of digital mobility services and innovation, missing its emission reduction goals, and continued dependence on oil.



A Policy Path to Achieving Europe's **Green Digital** Revolution

# **Executive Summary**

The European Union (EU) aims to reduce transport sector emissions by 90% by 2050. This ambitious goal is laid out in the European Commission's Sustainable and Smart Mobility Strategy and the European Green Deal. This emissions reduction target is possible with bold policies and targeted investment in a green digital transition across Europe's transport systems. A decarbonized mobility future, with reduced dependence on oil and authoritarian regimes, will only be realized if public and private sectors act now.

The Coalition for Reimagined Mobility (ReMo) believes to achieve such an ambitious and essential-target, all private and public sector mobility innovators must play their part in shaping the future of mobility across Europe. To "shift the existing paradigm of incremental change to fundamental transformation"—as the Sustainable and Smart Mobility Strategy puts it—the EU should take bold action in at least three key policy areas in the near future:

- 1. Develop a new Mobility as a Service (MaaS) Directive that comprehensively incentivizes the availability and uptake of zero-emission, multimodal, digital mobility services and sets a minimum European standard for digitized, integrated, and sustainable mobility services that people actually want to use.
- 2. Mandate regulatory sandboxing and knowledge capture, to test emerging mobility technologies in controlled pilots and measure and share learnings broadly across EU member states.
- 3. Support interoperable, industry-led neutral data standards, as part of the forthcoming European Mobility and Energy Data Spaces.

A failure to act could lead to consolidation of harmful monopolistic power in the mobility service sector, an uneven distribution of mobility innovation and know-how across Europe, and a failure to realize the full potential of digitalization in the mobility and energy sectors.

The following brief provides policy recommendations to leverage private sector innovation for a more efficient, sustainable, and people-centered mobility revolution. This mobility revolution can achieve the zero-emission connected, cooperative, and autonomous mobility (CCAM) future necessary to meet the EU's Sustainable and Smart Mobility Strategy targets.

## Go Beyond Ticketing: Establish a new MaaS Directive that sets a European Standard for Mobility Services on Demand across the Single Market

Mobility as a Service (MaaS) is a concept of the future of mobility that can truly revolutionize transportation systems by offering people a comprehensive menu of mobility services—both public and private. MaaS can be offered by way of a private or publicly managed digital platform, or access to mobility services can be integrated as an added benefit to non-transport services like insurance or banking services.

MaaS, if implemented effectively, could practically integrate existing mobility services like public transport and new mobility services—including bikeshare, micromobility<sup>ii</sup>, and ridehailing—into a single transport system.<sup>iii</sup> In this way, MaaS can offer people timely and convenient integration of available mobility choices. Presented with the convenience of mobility options, people can choose the right transport mode for their journey. This leads to less roadway congestion, and the option to forgo the costly expense of owning a private vehicle. This is complementary to trends showing that up to one in three Europeans would consider not having a personal car in the future, particularly younger Europeans and those living in larger cities. iv The European Commission's forthcoming Multimodal Digital Mobility Services (MDMS) proposal will address some key market challenges in the ticketing and payment aspects of mobility services for long-distance mobility services. However the need for basic regulatory harmonization in mobility is much wider than ticketing and payment for long-distance services.

In dense urban European cities like Barcelona, Paris, Szczecin, and Brussels, a harmonized approach to mobility services that includes shared public autonomous vehicles, integrated mobility platforms featuring multiple providers, and enhanced public transit, could help deliver up to €2.4 billion in annual societal benefits by 2030, mostly from congestion reductions. In lower-density European municipalities, a harmonized approach to mobility services that includes more shared mobility for those who cannot

Hensher, D. A., & Hietanen, S. (2023). Mobility as a feature (MaaF): rethinking the focus of the second generation of mobility as a service (MaaS). Transport Reviews, 1-5.

Hensher, D. A., Mulley, C., Ho, C., Wong, Y., Smith, G., & Nelson, J. D. (2020). Understanding Mobility as a Service (MaaS): Past, present and future. Elsevier.

iii Ibid.

iv Mobility; one in three European car owner could consider not having a personal car in the future (20) February 2023, Ipsos & Europ Assistance).

Bouton, S., Hannon, E., Knupfer, S., & Ramkumar, S. (2017). The future (s) of mobility: How cities can benefit. McKinsey Global Institute. City selections based on 2018 calculations of the densest European cities form the Global Human Settlement Layer – see Europe's most densely populated square kilometres - mapped (22 March 2018, The Guardian).

drive and higher impact public transit, would complement the transition to privately owned electric vehicles that use CCAM technologies, and deliver an additional €480 million in annual societal benefits by 2030, again mostly from congestion reductions. vi

Furthermore, the widespread adoption of MaaS in an urban European setting could deliver air pollution and greenhouse gas emissions reductions of up to 54%. vii

However, despite its transformative potential, MaaS has failed to take off in Europe due to a lack of harmonized regulation and competitive bottlenecks for operators and users. When left to the market alone, the results of pilot programs have been unimpressive, with commercial MaaS platform providers reluctant to share transparent usage data, demonstrating no obvious value proposition for users. The lack of successful real-life implementations of MaaS means there is no broad public understanding of the MaaS concept, and how it could improve people's daily lives and transport choices across Europe.

Yet some well-designed European MaaS projects, involving strong public and private collaboration, do show tangible results including significant travel time reductions and valuable insights on people's everyday travel preferences. For example, recent MaaS pilots that offered subscription packages to different mobility modes in Turin and its metropolitan area:<sup>x</sup>

- reduced travel times for a majority of participants by up to 15 minutes;
- showed that people's preferred modes were public transport, car sharing, and e-scooters; and
- showed that cashback mechanisms are very effective at changing people's everyday travel behavior.

In short, people like choice and MaaS, done correctly, gives them the ability to choose the right mode of travel for them for any given trip with ease. However, broad regulatory action and ambitious policy measures are needed to address the uneven competitive dynamics in mobility service markets across the EU, and the fact that mobility services are still usually less convenient for people to navigate than the same journey in a private vehicle. The European Commission's Multimodal Digital Mobility Services proposal will address ticketing and payment for long-distance services, but there is a wider need for basic regulatory harmonization in European mobility. This justifies an EU-level policy intervention to establish a standard European position on interoperability and digitalization across all types of mobility services, that applies across the Single Market.

vi Ibid

vii Labee, P., Rasouli, S., & Liao, F. (2022). The implications of Mobility as a Service for urban emissions. Transportation Research Part D: Transport and Environment, 102, 103128.

wiii Mobility as a Service is still evolving – ACM is positive, but keeps a close watch on bottlenecks (2021, Netherlands Authority for Consumers and Markets).

<sup>&</sup>lt;sup>ix</sup> MaaS faces its make-or-break moment (8 September 2021, Cities Today).

<sup>\* &#</sup>x27;MaaS for the Public Good in Torino' (2022).

The EU should develop a new MaaS Directive, modelled on Finland's 2018 Act on Transport Services, with improvements based on research and best practice.

To keep the door open to ambitious mobility policy that can truly unleash the potential of multimodal digital mobility services, the European Union should consider the need for a new Mobility as a Service Directive.

### A MaaS Directive could require:

- member states to consolidate their transport legislation into a single piece of legislation, which frames "mobility" as a single service that could be provided by different modes. The Directive should enshrine the freedom of member states, regions, and municipalities to design and plan for mobility services to suit people's needs, but this should be founded on an agreed upon common European approach to mobility services across the Single Market, recognizing their role in the digital and green transition.
- mobility services to be digitized and for there to be data exchange between these operators, for the purpose of improving people's visibility and access to all types of mobility options.
- · operators to make ticketing functionality or trip access available between different and multiple operators, with enforcement mechanisms for non-compliance.
- · mobility services to be accessible, as far as practicable, to people of all physical or cognitive abilities, to ensure coherency with the European accessibility act.

### A MaaS Directive should also include:

- an experimentation clause to mandate regulatory sandboxing.
- · recognition of the rights of individual users to control and transfer their personal account data between operators, giving people control over their travel information and personal data.
- a ticketing framework for a standardized form of MaaS Transport Pass to give all people simple and affordable access to different types of urban and regional mobility services in their member state, including public transport, shared micromobility, carsharing, and future modes such as electric, shared autonomous shuttles.
- · Additionally, the Directive should enable appropriate compensation to be paid to different kinds of operators and financial incentives to be paid to users, to stimulate the greater supply and uptake of mobility services.

### Existing Market & Regulatory Obstacles to MaaS

Existing transportation legislation in most EU member states is a barrier to integrating new and existing CCAM services because regulations are typically defined in relation to existing silos of specific services, such as public transport or traditional taxis.

Without regulatory action, there is no natural incentive for public or private mobility operators to, for example, share a common MaaS platform or enable interoperable ticketing with their potential competitors.

If left to the market, integration between mobility operators is likely to be ad-hoc and could strengthen the monopolistic power of certain operators as they jockey for competitive edge.xi

Member states, regions, and cities need freedom to plan, contract for, and manage mobility services in ways that best suit local needs. However, the fragmentation and competition imbalances in mobility service markets across the EU justify a basic level of broad regulatory harmonization and a standard European position on interoperability and digitalization of mobility services. A standard position at the European level on MaaS will bolster efforts already underway at city and municipality levels across the EU to create integrated MaaS ecosystems. It could also be designed to complement the European Commission's forthcoming Multimodal Digital Mobility Services proposal.

### Policy impacts of a MaaS Directive

Adopting a MaaS Directive as outlined above would comprehensively support several actions under the Sustainable and Smart Mobility Strategy's flagship 6, "Making connected and automated multimodal mobility a reality." Such a Directive also supports the EU's goals of the digital transformation of the public and private sector in a way that tangibly benefits people, in this case using technology to expand access to opportunities for social and economic advancement.

Conversely, a failure to take regulatory action at the EU level, in the context of a challenging investment outlook for private mobility operators, xii risks the emergence of a monopolistic aggregator MaaS platform that would negatively impact both the supply and quality—of mobility services while undermining the potential benefits for consumers.xiii

There is already evidence emerging in Europe and globally that, to achieve profitability, different private mobility operators are seeking to develop a "super app" approach to mobility that would aggregate and consolidate multiple short-distance and longdistance mobility modes, and even other services, into a single technology platform to achieve market dominance.xiv Regulatory action at the European level could ensure a level-playing field for all mobility services across the Single Market that would encourage innovation, support the scale up of promising initiatives and prevent concentration through network effects.

xi Vij, A., & Dühr, S. (2022). The commercial viability of Mobility-as-a-Service (MaaS): what's in it for existing transport operators, and why should governments intervene? Transport Reviews, 1-22.

xii European Shared Mobility Index Q2 2022. Fluctuo.

xiii Vij, A., & Dühr, S. (2022). The commercial viability of Mobility-as-a-Service (MaaS): what's in it for existing transport operators, and why should governments intervene?. Transport Reviews, 1-22.

xiv Uber adds planes and trains to cars in renewed 'super app' push (Financial Times, 6 April 2022); Mobility as a Service Report 2022 (FreeNow); Grab vs Gojek vs AirAsia: Superapps compete for supremacy in Southeast Asia (Techwire Asia, 19 September 2022).

Appropriate regulatory intervention on MaaS at a European level can help to ensure that the benefits of digital integration and consumer-focused digital mobility platforms do not also distort competition dynamics in a way that ultimately harms society, as seen with the behavior of technology platforms in other sectors wielding monopolistic power. Regulatory action to set a level playing field for mobility services in general can help ensure that consumers will be able to choose their preferred interface for multimodal mobility services, regardless of whether this interface is provided by a public transport authority, private mobility operator, a mobility service aggregator, or even a non-mobility service provider (for example, an insurer or financial services provider).

Regulatory intervention at the European level can therefore make a tangible difference for people's everyday experience of mobility services—simplifying the user experience so that the user is neither locked into a single MaaS platform nor is required to navigate multiple apps to access mobility services.

A standardized benchmark of harmonized, digitized, and interoperable mobility service regulation across the EU would substantially reduce the compliance costs and regulatory complexity faced by the mobility service sector. Currently, mobility operators operating across multiple European city and country markets must comply with differing operational, integration, and data exchange requirements.

# Mandate Regulatory Sandboxing and Knowledge Capture for New Mobility Innovations

Regulatory sandboxing is a structured framework to pilot mobility innovation concepts in the real world, in a controlled regulatory environment. The purpose of regulatory sandboxes is to learn about the opportunities and risks that a particular innovation carries and to develop the right regulatory environment to accommodate it. Regulatory sandboxing is a globally recognized way of providing a dynamic, evidence-based regulatory environment to test emerging technologies.\*\* This is because sandboxes provide the empirical evidence that is needed to support policy development, where it is not clear what level of regulation or risk management is required for a new innovation.

An example of a mobility innovation supported by effective regulatory sandboxing and experimentation clauses is the **Hamburg Electric Autonomous Transportation** project, which tests fully-automated electric minibuses on urban roads.\*\*vi

w World Bank. (2020). Global Experiences from Regulatory Sandboxes, IX.

xvi Sections 21 and 70 of the German Road Vehicles Registration and Licensing Regulations.

The beneficial impact of regulatory sandboxing can be exponentially enhanced by standardized reporting on the results of sandboxing activities, mandatory incorporation of findings into regulatory development, and the widespread dissemination of the results of regulatory experimentation. This is a critical next step that is typically missing in the use of regulatory sandboxes and the pilots that they enable.

ReMo recommends that the EU mandate regulatory sandboxing and knowledge capture for novel mobility applications.

To take regulatory sandboxing and experimentation clauses to the next level of supporting policy innovation, the EU should:

- mandate regulatory sandboxing and knowledge capture in a new MaaS Directive;
- ensure that mobility operators that deploy and operate innovative technologies can benefit from the provisions relating to regulatory sandboxing in the Net Zero Industry Act proposal; or
- develop a mobility-centered Regulatory Sandbox Act, that is modeled on a concept for draft German legislation.

Regardless of the preferred policy or legislative measure, a future-focused approach to regulatory sandboxing for mobility applications must include a requirement for standardized reporting on the results of all sandboxing activities to a central national or EU authority. This is so that the results and key learnings can be widely disseminated and acted upon by other public authorities. Additionally, there must be a requirement for policymakers to incorporate the findings of regulatory sandboxing experiments when developing mobility sector regulation.

### Overcoming the status quo

There is a need to improve awareness throughout EU member states and municipalities about how to successfully implement regulatory sandboxing and experimentation clauses for mobility applications. There is also no standardized reporting mechanism to share the outcomes and lessons learned from all pilots enabled by experimentation clauses.

Development of standardized knowledge capture and dissemination practices would enable the dynamic development of appropriate regulation for new mobility innovations across the EU. Currently, policymakers without extensive expertise in mobility innovation cannot easily find and benefit from standardized and centralized information about best regulatory sandboxing practices from other locations.

The EU-funded GECKO project on mobility service governance identified regulatory sandboxes and pilot projects as being a key component of a governance model that supports new mobility innovations.xvii The European Council has also recognized the important role of sandboxing and experimentation clauses in developing future-proofed regulation.xviii The European Commission has recently launched regulatory sandboxing initiatives for artificial intelligence and blockchain applications. Yet there is no Europeanlevel regulatory sandboxing and knowledge capture initiative for the mobility sector.

The Net Zero Industry Act proposal has signalled that the Commission recognizes regulatory sandboxing is critical to accelerating a clean energy transition. Yet there is no European-level regulatory sandboxing and knowledge capture initiative targeted specifically to the mobility sector.

### Unlocking the full potential of mobility innovation

Advanced regulatory sandboxing, when partnered with effective monitoring and evaluation, has been shown in South Korea to directly lead to job growth, increased investment, and business expansion.xix

A regulatory sandboxing requirement, specifically in the mobility space, would complement the regulatory sandboxing provisions in articles 53-55 of the European Parliament and Council's proposed **Artificial Intelligence Act**.

Such a requirement would also complement the Commission's recent adoption of requirements for the type approval of automated driving systems (ADS), and plans to develop and adopt requirements for whole vehicle type approval fully autonomous vehicles by July 2024. These regulations enable the standardized approval of ADS and autonomous vehicles at a European level—but they do not solve how these technologies can overcome regulatory barriers to testing and deployment on the ground, in real cities and regions across the EU.

Experimentation clauses provide the opportunity to test and learn about how to appropriately regulate, on a member state and local level, partially and fully autonomous mobility services that have achieved European-level type approval.

Knowledge from these regulatory experiments, gathered and disseminated in a standardized way, can then stimulate an iterative approach to regulatory development, as well as helpfully informing how civil liability and insurance frameworks should be adapted at the member state level. In this way, a "belt and braces" approach to regulatory sandboxing and knowledge capture meaningfully supports the safe and effective deployment of advanced CCAM technologies throughout the EU.

xvii UITP, GECKO (2021). Governance and Regulation Models to Manage Disruptive Mobility Services.

xviii Regulatory sandboxes and experimentation clauses as tools for better regulation: Council adopts conclusions (2020).

xix Appaya, M. S., Gradstein, H. L., & Haji Kanz, M. (2020). Global Experiences from Regulatory Sandboxes. World Bank.

## Support Industry-led Open, Neutral Mobility Data Standards and Interoperability to Accelerate the Development of the **European Mobility Data Space**

Standardized knowledge capture and dissemination of the results of regulatory experiments and subsequent regulatory actions can then benefit policymakers elsewhere, as well as supporting an evidence-based harmonization of regulation, insurance and liability frameworks across Europe.

Data exchange is essential to realizing all the economic, societal, and environmental benefits of MaaS and a CCAM future. It is essential that the EU support private industry in facilitating the development of data exchange ecosystems like the European mobility data space and the forthcoming European energy data space. A data ecosystem—a platform that combines data from numerous providers and builds value through the use of processed data—must lower barriers to entry in order to build economies of scale, as well as cultivate a collaborative network of users.xx

Neutral data standards make it possible for people to easily switch between mobility modes, pay fares for different transportation options from the same device or app, access arrival time information for busses and trains, locate micromobility services, and many other aspects of travel planning.

Neutral data standards also ensure that the communications protocols for vehicle to grid (V2G) and vehicle to everything (V2X) communications interfaces for both private and shared electric vehicles are interoperable across Europe.

The European mobility data space will be built on the interaction and exchange of multiple platforms and ecosystems, which means interoperability between new and existing data exchange ecosystems is key.

The EU must ensure that European mobility and energy data spaces enable, rather than suppress existing, industry-led mobility data standards and models.

For the European mobility data space to develop organically and become a more open marketplace for both passenger and freight mobility, neutral data standards already widely used by the private sector must therefore continue to flourish. The European Commission has a critical role to play as a funder and convener to support third party collaborative stakeholder groups in standards and model development.

xx McKinsey & Co. (2021). Data ecosystems made simple.

For example, the EU should not suppress industry-led mobility data standards and models for passenger mobility, with high levels of adoption, that are light-weight and serve specific use cases—like the General Transit Feed Specification (GTFS)—in favor of mandating European-specific models and standards such as Transmodel and SIRI. This would hinder interoperability between new and existing data ecosystems. That interoperability promotes competition among and within data platforms, enhancing the beneficial network effects for customers.xxi

The Coalition for Reimagined Mobility (ReMo) has performed research which shows that there are significant operational benefits to digitalization and that data exchange standards can be implemented across our transportation systems and mobility services in the near term to improve efficiencies, resilience, and environmental sustainability.xxii

### Based on that research, ReMo found:

- · Neutral third-party groups are best placed to bring together industry and public sector stakeholders to develop data standards and models through consensusdriven processes, though they require continual financial support and robust leadership and governance structures.
- · Standards designed by membership-based and/or international organizations should not be mandated prematurely prior to proof of concept and widespread industry buy-in.
- Structures responsible for data governance—such as the European Data Innovation Board and its subgroup(s) established by the Data Governance Act—should feature participatory governance structures that give all interested stakeholders a fair opportunity to shape how data sharing and exchange is governed. This requires balanced representation from industry and interested civil society bodies as well as standards organizations.

Neutral data standards enable interoperability, which is key to unlocking the benefits of MaaS and allow a CCAM future to thrive.

The European Commission has also set an objective of facilitating interoperability between common European data spaces.

Ensuring neutral, open (free to access and use) industry-led data standards is in the interest of both the European mobility data space and the forthcoming common European energy data space. The importance of neutral data standards and interoperability also extends to electric vehicle (EV) charging, not just on the front end to enable a seamless charging experience for the EV driver or EV service operator, but also on the back end with interoperable standards and data exchange.

Interoperable, industry-led data standards—relevant to both front-end and back-end applications—are thus also critical to the success of the simple recharging and payment requirements under the recently agreed Alternative Fuels Infrastructure Regulation.

xxi Mancini, J. (2021). Data Portability, Interoperability and Digital Platform Competition: OECD Background Paper. Interoperability and Digital Platform Competition: OECD Background Paper (June 8, 2021).

xxii Solving the Global Supply Chain Crisis with Data Sharing (2022, Coalition for Reimagined Mobility).

There have been efforts to standardize the communication protocols for V2G and V2X communications interfaces for bi-directional charging and discharging of EVs, most notably in the form of the proposed International Organization for Standardization (ISO) standard 15118, though not all industry stakeholders prefer this standard.

Even the terms "V2G" and "V2X" need to be standardized across the industry and energy ecosystem, xxiii along with safety and technology standards. However, standards designed by membership-based and/or international organizations should not be mandated prematurely prior to proof of concept and widespread industry buy-in.

Therefore, an approach to data spaces and interoperability that properly considers the overlap between mobility and energy data is critical to realize the true potential of European data spaces.

ReMo will soon be publishing further analyses of the importance of standards and interoperability in cross-border mobility, specifically global supply chains.

### Reshaping mobility to benefit people and the planet

The mobility policy goals in the Sustainable and Smart Mobility Strategy and European Green Deal can only be achieved with decisive and specific policy changes that allow for a connected, cooperative, and autonomous mobility (CCAM) transportation network.

In order to achieve transformative change in mobility, policy must target systems-level change. An incremental approach to regulatory reform will not tackle the fundamental unsustainability and oil dependency of the European Union's mobility systems, the unhealthy competition dynamics, the risks of monopolistic service platforms emerging, or the uneven distribution of mobility innovation throughout European member states, regions, and cities.

The European Union can take bold action in the near future to set a minimum standard of integrated, digital European mobility services across the Single Market, stimulate an innovative and iterative approach to mobility regulation, and unlock the full potential of truly interoperable mobility and energy data spaces. The ambitious, systems-level policy approaches advocated within this brief can help the private and public sectors to unlock the full potential of digital transformation and catalyze a green transition to CCAM in Europe.

xxiii V2X capability refers to an EV and/or an EV charger equipped with bidirectional, or two-way, charging capability that enables the battery on board the vehicle to discharge power to a home, building, the electric grid, or other facility—with broad applications.

### **Acknowledgments**

ReMo staff Kim Watts, Jason Islas, Justin Klaparda and Isabelle Dupraz contributed to the preparation of this white paper.



### About the Coalition for Reimagined Mobility

The Coalition for Reimagined Mobility (ReMo) is a global initiative of SAFE, advancing new mobility technologies and services to shape transportation systems that are better for people and planet. Bringing together stakeholders across transportation, technology, and sustainability, ReMo conducts research and policy advocacy in the U.S. and Europe to create more efficient, sustainable, equitable, and secure ways to move people and goods. For more information visit, reimaginedmobility.org.



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