CITY MOONSHOT
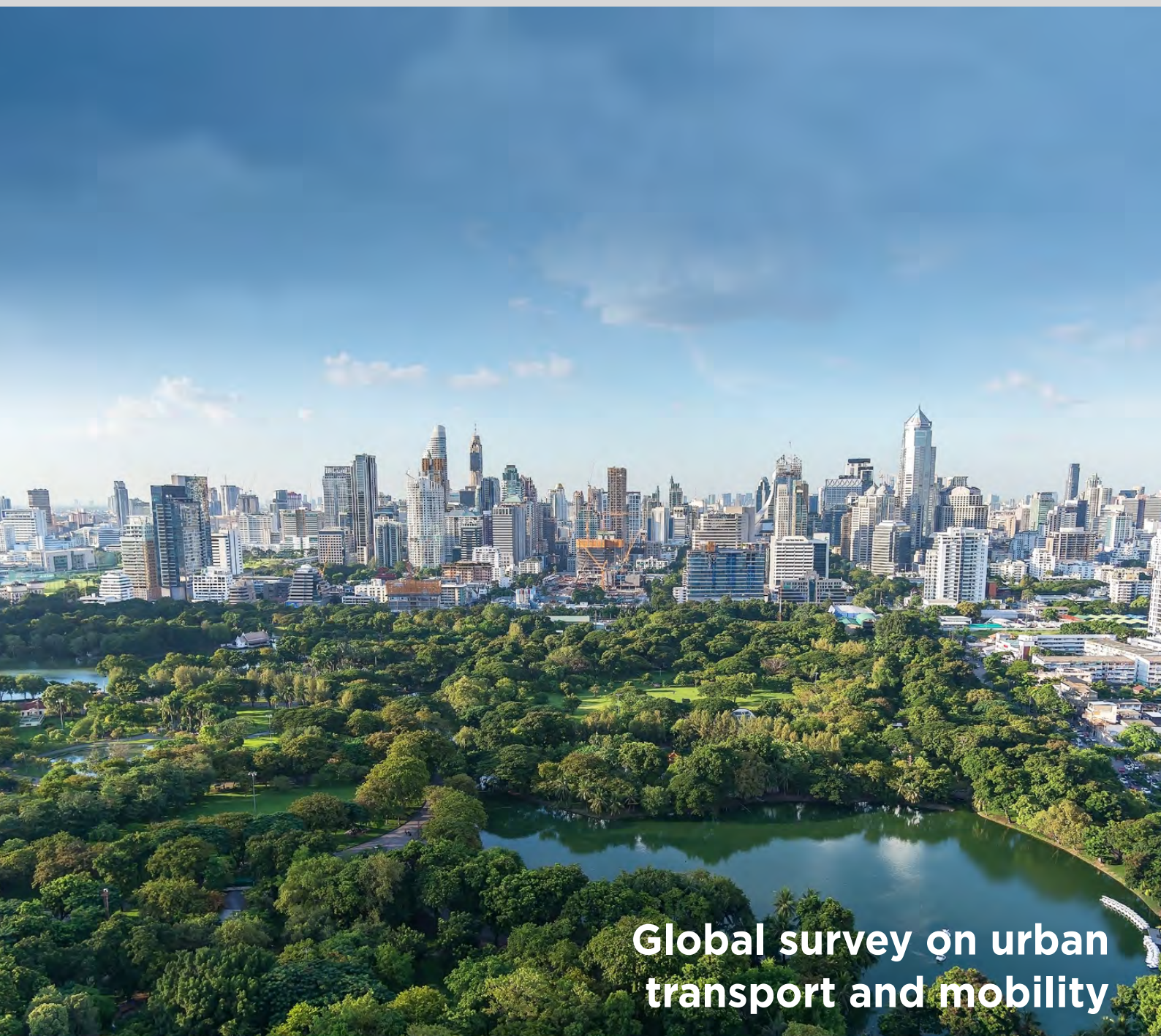
ELECTROMOBILITY and URBAN AIR MOBILITY

Focus on Report

ERTICO | ERTICO CITY MOONSHOT

Global survey on urban transport and mobility

Results of Phase II

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ERTICO – ITS Europe

ERTICO – ITS Europe is a European public-private partnership of over 120 public and private organisations working on and with Intelligent Transport Systems (ITS). Partners come from eight sectors where ERTICO connect the dots: public authorities (cities, regional and national road/transport authorities), service providers, the traffic and transport industry, suppliers, user organisations, connectivity providers, research institutes and universities, and vehicle manufacturers. The partnership promotes and enhances the benefits of ITS, working towards zero fatalities, zero transport inefficiencies and eliminating road transport's negative impact on the environment and its contribution to the climate crisis.

The Partnership conducts research, develops, evaluates, promotes and deploys smart mobility solutions in the field of Intelligent Transport Systems & Services (ITS) and aims that these solutions serve the needs of mobility users and enhance their quality of everyday life. The ERTICO Partnership's work is delivered through various activities, including public-private ITS stakeholders' cooperation on European co-funded projects, self-funded innovation platforms, and other activities while also contributing to international cooperation. ERTICO brings the wider ITS and smart mobility community together by organising annual ITS Congresses in Europe and abroad with its counterparts in the ITS America and ITS Asia-Pacific regions.

ACKNOWLEDGEMENTS

WELCOME NOTE

Dear Friends,

It is my pleasure, as the CEO of ERTICO - ITS Europe, to present the City Moonshot - Electromobility and Urban Air Mobility Focus on Report.

ERTICO's partnership is a dynamic community of public and private stakeholders working together to advance smart and sustainable mobility. A key pillar of our approach has been direct engagement with cities across Europe and globally. The City Moonshot initiative exemplifies this, having established itself as a platform for meaningful dialogue. During the first phase[1], we collaborated with over 150 cities, focusing on themes like sustainability, air quality, data sharing, and Mobility-as-a-Service (MaaS). Building on this foundation, the second phase has now involved over 215 cities, maintaining focus on sustainability and MaaS while expanding into the emerging priorities of Electromobility and Urban Air Mobility (UAM).

The findings presented here provide a valuable perspective on how cities are approaching these emerging mobility solutions. By exploring advancements in vehicle electrification (and related infrastructure and services) and the integration of urban air transport, as well as the policies and challenges shaping their implementation, this report offers a clear view of the priorities and strategies urban leaders are focusing on today.

The journey does not end here. The City Moonshot initiative continues, with the ambitious goal of reaching 300 interviews to further explore the most pressing topics and challenges shaping the transport and mobility industry.

A heartfelt thanks to our dedicated team and the participating city representatives for their time and valuable contributions.

Sincerely,

Joost Vantomme,

CEO

ERTICO-ITS Europe

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1   City Moonshot first report: https://ertico.com/wp-content/uploads/2023/05/Ertico-Moonshot-Report-Final-1.pdf

EXECUTIVE SUMMARY

The City Moonshot Initiative is a strategic effort launched by ERTICO to address the critical challenges cities face in achieving climate-neutral and sustainable urban mobility. Building on the success of Phase I, which involved interviewing 150 cities globally, the initiative has entered Phase II. This new phase broadens its scope to explore two key new topics: Electromobility (E-mobility) and Urban Air Mobility (UAM). While all four areas of Phase II (Sustainability, Mobility-as-a-Service, E-mobility and UAM) are essential for understanding the future of urban mobility, the current report focuses specifically on E-mobility and UAM due to their transformative potential and the urgency of addressing these areas in the evolving landscape of ITS and urban transportation.

Cities worldwide are increasingly confronting the challenges of climate change, urbanization, and technological advancements. Frameworks such as the European Green Deal[2], the UN Sustainable Development Goals[3], and Sustainable Urban Mobility Plans[4] emphasize the need for innovative solutions tailored to the unique characteristics of urban areas. By engaging directly with cities, the City Moonshot Initiative provides valuable insights that inform local and global strategies, fostering collaboration and aligning efforts to meet these shared challenges.

The decision to focus this report on Electromobility and UAM reflects the transformative impact of these topics on urban transport. E-mobility is critical in reducing greenhouse gas emissions and improving air quality. As cities transition to electrification, they face both opportunities, such as the expansion of EV infrastructure, and challenges, including ensuring equitable access and addressing vehicle affordability. These insights are vital for cities striving to achieve their climate goals and enhance the quality of urban life.

Urban Air Mobility represents a groundbreaking approach to addressing congestion and connectivity issues in urban areas. Although passenger electric Vertical Take-Off and Landing (eVTOL) services remain in development, the deployment of drones for logistics and emergency services offers immediate, practical applications. By examining these areas, the report equips cities with the knowledge to develop appropriate policy and strategies to integrate UAM effectively into existing transport systems, ensuring alignment with sustainability and accessibility goals.

Phase II of the initiative continues to deepen the dialogue with cities, strengthening relationships established during Phase I and addressing new topics essential for advancing urban mobility. This targeted report aims to provide actionable insights, prioritizing depth and practicality over breadth. By focusing on E-mobility and Urban Air Mobility, it offers guidance that is both timely and relevant, supporting cities in making informed decisions that align with global trends and local priorities. Through these efforts, the City Moonshot Initiative reaffirms its commitment to shaping sustainable, inclusive, and innovative urban mobility systems worldwide.

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2   European Commission. (2019). *The European Green Deal.* Retrieved from European Commission.
3   United Nations. (2015). *Sustainable Development Goals.* Retrieved from United Nations.
4   European Commission. (2013). Sustainable Urban Mobility Plans. Retrieved from European Commission.

ABBREVIATIONS

AI	Artificial Intelligence
AFIR	Alternative Fuels Infrastructure Regulation
BICI	Bloomberg Initiative for Cycling Infrastructure
BRT	Bus Rapid Transit
CAD	Connected and Automated Driving
CCAM	Cooperative, Connected and Automated Mobility
C-ITS	Cooperative Intelligent Transport Systems
eVTOL	Electric Vertical Take-Off and Landing
EC	European Commission
ERTICO	European Road Transport Telematics Implementation Coordination Organisation
EU	European Union
EV	Electric Vehicle
GDPR	EU General Data Protection Regulation
GHG	Greenhouse Gas
ICE	Internal Combustion Engines
ITDP	Institute for Transport Development and Policy
ITS	Intelligent Transport Systems
LEV	Light Electric Vehicle
LEZ	Low Emission Zones
MaaS	Mobility as a Service
OECD	Organisation for Economic Co-operation and Development
SUMP	Sustainable Urban Mobility Plans
TRL	Technology Readiness Level
UAM	Urban Air Mobility
UIC2	Urban-Air-Mobility Initiative Cities Community
UN	United Nations
UKRI	Innovate UK Research and Innovation
UVAR	Urban Vehicle Access Regulation
WRI	World Resources Institute

CITY MOONSHOT IN CONTEXT

The City Moonshot initiative emerged from collaborative discussions within the ERTICO partnership, aiming to address the pressing challenges faced by urban areas in the context of climate-neutrality and sustainable mobility. In the years leading up to the COVID pandemic, ERTICO experts anticipated significant transformations in transport and mobility, driven largely by the climate crisis. As cities began declaring climate emergencies, they recognized the urgent need for action to mitigate the effects of air pollution, which contributes to millions of premature deaths and strains healthcare systems globally[5].

In this evolving landscape, gaining a comprehensive understanding of the unique characteristics and needs of cities and regions has become increasingly relevant. The European Union's ambition to achieve climate neutrality across its cities by 2050 underscores the necessity of tailored strategies that reflect local contexts[6]. Moreover, urban nodes identified in the Trans-European Transport Network (TEN-T) play a critical role in fostering connectivity and sustainable transport solutions[7]. By recognizing the specific requirements of these nodes, infrastructure and mobility services can be enhanced.

The EU's Intelligent Transport Systems (ITS) Directive aims to improve transport efficiency and sustainability through technology, and understanding how cities can effectively implement these systems ensures alignment with local needs[8]. Additionally, Sustainable Urban Mobility Plans (SUMPs) are essential for planning integrated transport solutions, and a thorough comprehension of urban environments enables the development of effective SUMPs that prioritize sustainability and community engagement[9].

The ethical deployment of artificial intelligence in transport, as emphasized in the EU's AI Act, also benefits from insights into local contexts, ensuring that AI solutions enhance mobility while maintaining public trust[10]. Furthermore, the City Moonshot initiative aligns with the UN Sustainable Development Goals, reflecting a global commitment to fostering sustainable urban environments[11]. Understanding the diverse challenges faced by different cities and regions is crucial for implementing effective solutions that contribute to these goals.

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5   WHO. (2021). Air Quality and Health. World Health Organization. Retrieved from WHO & European Environment Agency. (2020). Air quality in Europe — 2020 report. EEA.
6   European Commission. (2020). EU Climate Law. EU Commission
7   European Commission. (2021). TEN-T: Trans-European Transport Network. Retrieved from European Commission.
8   European Commission. (2019). Intelligent Transport Systems (ITS) Directive. Retrieved from European Commission.
9   European Commission. (2013). Sustainable Urban Mobility Plans. Retrieved from European Commission.
10   European Commission. (2021). *Artificial Intelligence Act*. Retrieved from European Commission.
11   United Nations. (2015). *Transforming our World: The 2030 Agenda for Sustainable Development.* Retrieved from United Nations.

By engaging with cities and regions through the City Moonshot initiative, ERTICO aims to gather valuable insights that inform decision-making and policy development. This effort is pivotal in shaping the future of urban mobility, ensuring that it is not only innovative and efficient but also sustainable and inclusive. To date, the City Moonshot has conducted 250 interviews with 215 cities and metropolitan regions worldwide, divided geographically as follows: 157 in Europe, 28 in the Americas (both South and North), 21 in Asia, 6 in Africa, and 3 in Oceania. For phase II of the initiative, four major topics have been identified to guide this comprehensive survey, reflecting international decision-making priorities likely to resonate at the local level:

1. **Sustainability** (climate change and air quality)

2. **Mobility as a Service** (MaaS)

3. **Electromobility** (E-mobility)

4. **Urban Air Mobility** (UAM)

As the initiative progresses toward its goal of engaging with 300 cities and regions, this report will delve into two of these critical topics: **E-mobility** and **Urban Air Mobility**.

The cities and regions

Total interviews 251

Europe

City	Country
Bashkia Shkoder	Albania
Graz	Austria
Vienna	Austria
Minsk	Belarus
Antwerp	Belgium
Brussels	Belgium
Leuven	Belgium
Liège	Belgium
Namur	Belgium
Banjaluka	Bosnia and Herzegovina
Sarajevo	Bosnia and Herzegovina
Mostar	Boznia and Herzegovina
Sofia	Bulgaria
Burgas	Bulgaria
Heraklion[1]	Crete
Dubrovnik	Croatia
Zagreb	Croatia
Nicosia[1]	Cyprus
Brno	Czech Republic
Ostrava	Czech Republic
Prague	Czech Republic
Copenhagen	Denmark
Middelfart	Denmark
Tallinn	Estonia
Tartu	Estonia
Helsinki	Finland
Lahti	Finland
Turku	Finland
Tampere	Finland
Bordeaux	France
Lyon	France
Rouen	France
Grenoble	France
La Rochelle	France
Paris	France
Strasbourg	France
Toulouse	France
Versailles	France
Tbilisi	Georgia
Bremen	Germany
Essen	Germany
Hamburg	Germany
Karlsruhe	Germany
Munich	Germany
Leipzig	Germany
Dresden	Germany
Frankfurt	Germany
Stuttgart	Germany
Athens[1]	Greece
Lamia[1]	Greece
Larissa	Greece
Rafina & Pikermi[1]	Greece
Thessaloniki	Greece

City	Country
Trikala[1]	Greece
Lamia[1]	Greece
Budapest	Hungary
Cagliari	Italy
Florence	Italy
Milan	Italy
Rome	Italy
Trieste	Italy
Turin	Italy
Verona	Italy
Taranto	Italy
Bologna	Italy
Genova	Italy
Firenze	Italy
Bari	Italy
Naples	Italy
Reykjavik	Iceland
Cork	Ireland
Dublin	Ireland
Limerick	Ireland
Riga	Latvia
Liepaja	Latvia
Kaunas	Lithuania
Klaipeda	Lithuania
Kehlen	Luxembourg
Gozo	Malta
Chisinau	Moldova1
Podgorica	Montenegro
Amsterdam	Netherlands
Enschede	Netherlands
Helmond	Netherlands
Rotterdam	Netherlands
Utrecht[2]	Netherlands
Utrecht	Netherlands
Groeningen	Netherlands
Enschede	Netherlands
Noord-Brabant	Netherlands
Skopje	North Macedonia
Bergen	Norway
Oslo	Norway
Stavanger	Norway
Kristiansund	Norway
Gdynia	Poland
Krakow	Poland
Warsaw	Poland
Guimarães	Portugal
Faro	Portugal
Lisbon	Portugal
Porto	Portugal
Alenquer	Portugal
Braga	Portugal
Slobozia	Romania
Constanta	Romania
Bucharest	Romania

City	Country
Alba Iulia[1]	Romania
Cluj-Napoca	Romania
Timisoara	Romania
Moscow	Russia
Belgrade	Serbia
Kruševac	Serbia
Novi Sad	Serbia
Subotica	Serbia
Martin	Slovakia
Novo Mesto	Slovenia
Maribor	Slovenia
Ljubljana	Slovenia
Barcelona	Spain
Bilbao	Spain
L'Hospitalet de Llobregat	Spain
Las Palmas	Spain
Lloret de Mar	Spain
Logrono	Spain
Madrid	Spain
Sevilla	Spain
Pamplona	Spain
Valencia	Spain
Vitoria-Gasteiz	Spain
La Coruna	Spain
Borlänge	Sweden
Gothenburg	Sweden
Malmo	Sweden
Östersund	Sweden
Stockholm	Sweden
Umea	Sweden
Basel	Switzerland
Bern	Switzerland
Zurich	Switzerland
Ankara	Turkey
Bursa	Turkey
Gaziantep	Turkey
Istanbul	Turkey
Izmir	Turkey
Kiev	Ukraine
Aberdeen	United Kingdom
Belfast	United Kingdom
Cambridgeshire[4]	United Kingdom
Coventry	United Kingdom
Glasgow	United Kingdom
Hull	United Kingdom
Kent[4]	United Kingdom
London	United Kingdom
Manchester	United Kingdom
Milton Keynes	United Kingdom
Northern Ireland[3]	United Kingdom
Oxfordshire[4]	United Kingdom
West Midlands[4]	United Kingdom

North and South America

City	Country
Buenos Aires	Argentina
Sao Paulo	Brazil
Brampton	Canada
Toronto	Canada
Vancouver	Canada
Windsor	Canada
Winnipeg	Canada
Santiago	Chile
Trujillo	Peru
Montevideo	Uruguay
Alexandria	United States (Virginia)
Arlington	United States (Texas)
Boston	United States (Massachusetts)
Chattanooga	United States (Tennessee)
Eugene	United States (Oregon)
Los Angeles	United States (California)
Las Vegas	United States (Nevada)
Minneapolis	United States (Minnesota)
New York	United States (New York State)
New Orleans	United States (Louisiana)
Olympia	United States (Washington)
Pennsylvania[1]	United States
Philadelphia	United States (Pennsylvania)
Pittsburgh	United States (Pennsylvania)
San Diego	United States (California)
San Francisco	United States (California)
Suffolk	United States (Virginia)
West Hollywood	United States (California)

Africa

City	Country
Addis Ababa	Ethiopia
Maputo	Mozambique
Lagos	Nigeria
Cape Town	South Africa
Johannesburg	South Africa
Kampala	Uganda

Australia and Oceania

City	Country
Brisbane	Australia
Queensland (Brisbane)	Australia
Auckland	New Zealand
Christchurch	New Zealand

Asia

City	Country
Baku	Azerbaijan
Beijing	China
Nanjing	China
Shenzhen	China
Qingdao	China
Eilat	Israel
Jerusalem	Israel
Tel Aviv Yafo	Israel
Almaty	Kazakhstan
Doha	Qatar
Lahore	Pakistan
Pasig	Phillipines
Yekaterinburg	Russia
Yuzhno-Sakhalinsk	Russia
Gangneung	South korea
Sejong	South Korea
Dubai	United Arab Emirates
Ras Al Khaimah[1]	United Arab Emirates
Tashkent	Uzbekistan

Scan the QR code to see the larger version of the interviewed cities world map

Why a phase II of the initiative?

As urban mobility continues to evolve in response to technological innovations, regulatory shifts, and changing societal demands, the need for ongoing exploration and adaptation becomes paramount. ERTICO recognizes that a Phase II of the City Moonshot initiative is essential not only to address these emerging trends but also to reinforce the commitment to sustainability goals set forth in global frameworks like the UN Sustainable Development Goals and European ones like the Green Deal. By building on the insights gained from the initial 150 city interviews, Phase II aims to share valuable knowledge that can guide urban planners and policymakers in developing effective mobility strategies. Moreover, strengthening the relationships established during Phase I will foster deeper collaboration with city authorities and stakeholders, ultimately enhancing the initiative's impact and relevance in the dynamic landscape of urban mobility.

Addressing Emerging Trends

The urban mobility landscape is rapidly evolving, driven by technological advancements, policy changes, and shifting societal needs. Phase II focuses on some of the current trends, such as e-mobility and urban air mobility, to ensure that the initiative remains relevant and forward-looking.

Supporting Sustainability Goals

The initiative aligns with global sustainability targets, including the UN Sustainable Development Goals and the European Green Deal. Phase II can further emphasize the importance of sustainable practices in urban mobility, helping cities reduce their carbon footprints and improve air quality.

Sharing Valuable Insights

Following the successful completion of Phase I, ERTICO aims to disseminate the insights gathered from interviewing 150 cities. This sharing of knowledge helps to inform best practices and strategies for urban mobility, benefiting not only the participating cities but also the broader community of urban planners and policymakers.

Engagement

The connections made during the first 150 interviews (Phase I), further strengthened in Phase II, fosters ongoing collaboration with city authorities and stakeholders. This continuity leads to deeper engagements and more effective follow-up on the findings from the initial phase.

Introduction to the topics

As cities tackle dual challenges of climate change and urbanization, **E-mobility** and **Urban Air Mobility** emerge as vital components in shaping the future of sustainable urban transport. E-mobility encompasses the transition to electric and alternative fuel vehicles, aimed at reducing greenhouse gas emissions and improving air quality. Meanwhile, Urban Air Mobility introduces innovative aerial transportation solutions that can alleviate congestion and enhance connectivity in urban areas.

Electromobility

E-mobility is pivotal in the transition toward sustainable urban transport systems. As cities grapple with the dual challenges of greenhouse gas (GHG) emissions and air pollution, the electrification of transport presents a viable pathway to reduce these impacts. The transportation sector currently accounts for approximately 25% of global GHG emissions, with an urgent need to curb these levels to meet the ambitious targets outlined in international agreements such as the European Green Deal[12]. By promoting electric vehicles (EVs) and supporting the necessary infrastructure for charging stations, city authorities can significantly decrease their carbon footprints while also improving urban air quality. Furthermore, the shift to e-mobility not only addresses environmental concerns but also aligns with the growing demand for innovative and efficient urban mobility solutions - not just cars, but also e-buses, light EVs (LEVs) and e-micromobility (bicycles, cargo bike, scooters). As a result, cities that prioritize e-mobility initiatives can enhance the quality of life for their residents while also demonstrating commitment to broader sustainability goals[13].

Urban Air Mobility

Urban air mobility (UAM) emerges as a transformative element in the broader context of urban transport systems, representing an innovative solution to alleviate congestion and enhance connectivity. As urban areas continue to expand, traditional ground-based transport systems face increasing strain, leading to traffic congestion and longer travel times. UAM can provide a complementary mode of transport that leverages airspace to create efficient links between urban nodes, particularly in areas identified within the Trans-European Transport Network (TEN-T)[14]. Moreover, UAM aligns with sustainability initiatives by potentially reducing travel time and emissions when integrated with existing public transport systems. The advancement of UAM technologies, including electric vertical take-off and landing (eVTOL) aircraft, not only promises to reshape urban mobility but also contributes to achieving climate-neutral city goals, as emphasized in global sustainability frameworks, such as the United Nations Sustainable Development Goals[15]In this context, understanding the perspectives of cities regarding UAM is essential for ensuring its successful deployment and integration into urban transport strategies.

12   European Commission. (2019). The European Green Deal. Retrieved from EU Green Deal
13   International Energy Agency. (2021). Global EV Outlook 2021. Retrieved from IEA EV Outlook
14   European Commission. (2020). The European Commission's Urban Mobility Action Plan. Retrieved from EU Urban Mobility
15   United Nations. (2015). Transforming our world: the 2030 Agenda for Sustainable Development. Retrieved from UN Sustainable Development Goals

ELECTROMOBILITY and URBAN AIR MOBILITY – RESULTS

ELECTROMOBILITY

The Phase II City Moonshot survey includes nine questions linked to the ERTICO Green and Urban Mobility focus area and inspired by work on ERTICO's projects such as SOLUTIONSplus, eCharge4Drivers and ELVITEN. The projects have shown that cities are increasingly taking steps to encourage more sustainable vehicles and lower emissions in their cities. Phase II was interested in understanding how cities were responding to national and international requirements such as the Fit for 55[16], and the Alternative Fuels Infrastructure Regulation[17] (AFIR) at the European level. Cities that are part of the EC's 112 Climate Neutral and Smart Cities[18] were targeted as exemplar cities.

Trends

The City Moonshot found that cities are increasingly measuring emissions with:

- **Almost all cities (except two) monitoring air quality, and**

- **Two thirds of cities implemented carbon emissions monitoring:**

The replacement of internal combustion engine vehicles with electrified alternatives plays a significant part in reducing carbon and improving air quality emissions. Travel and New Mobility Tech[19] indicate that electric buses and cars have half the per passenger km carbon emissions (when considered on a whole-life basis). Electric vehicles are also increasingly cheaper on a whole-life basis than the petrol or diesel equivalent in 19 out of 22 European Countries[20].

Electric vehicle sales are increasing, with the share of electric cars rising from 4% of the total in 2020 to 18% in 2023[21] (worldwide figures, but with almost 95% of global EV sales concentrated in China, Europe and the USA). Although this is a growing percentage, it is still a small proportion. The Alternative Fuels Observatory[22] notes that 80% of EV owners in the EU have their own driveway and for those that don't own an EV, that lack of charging facilities is a big barrier (after the price of the vehicle).

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16   Council of the European Union. (n.d.). Fit for 55: Delivering the EU's 2030 Climate Target on the Way to Climate Neutrality. Retrieved from consilium.europa.eu
17   European Union. (2023). Regulation (EU) 2023/1804 of the European Parliament and of the Council of 12 July 2023 on Enhancing Sustainable Urban Mobility. Retrieved from eur-lex.europa.eu
18   European Commission. (2022, June 5). Discover the 100 Cities Selected for the Cities Mission. Retrieved from ec.europa.eu
19   TNMT. (n.d.). Carbon Emissions by Transport Type. Retrieved from tnmt.com
20   World Economic Forum. (2023, February 21). Electric vehicles are now cheaper than petrol cars in Europe. Retrieved from weforum.org
21   International Energy Agency (IEA). (n.d.). Electric Vehicles. Retrieved from iea.org
22   European Commission. (2024). EU Aggregated Report 2023: Alternative Fuels Observatory. Retrieved from alternative-fuels-observatory. ec.europa.eu

With this in mind, cities need to consider both push and pull methods to encourage their uptake in order to replace ICE vehicles. Push methods are where cities implement policies to discourage undesired behaviours, whereas pull factors are one where cities implement policies to encourage desired behaviours.

During the interviews of Phase II of the initiative cities were asked to report on two policy levers:

- **Encouraging the adoption of electric vehicles (pull factors)**: through policy to adopt vehicles and the provision of public charging points, and

- **Restricting the use of certain vehicles and encouraging switching (push factors):** through the introduction of low emission zones.

Electric Vehicles and Charging

Cities are prioritising plans to electrify buses and / or municipal vehicles, with almost all cities reporting some plans in this area either to electrify their own vehicles or supporting private operators in their region to electrify. There were only two cities which reported no such plans. As well as EVs, some cities reported the switch to natural gas powered or hydrogen powered vehicles.

Only 35% of cities reported that they had a Sufficient network of public charging points (for the demand they currently have for charging). This includes it being easy to access (common card or app in most cases, suitable for different vehicles and cable connector types)

35%
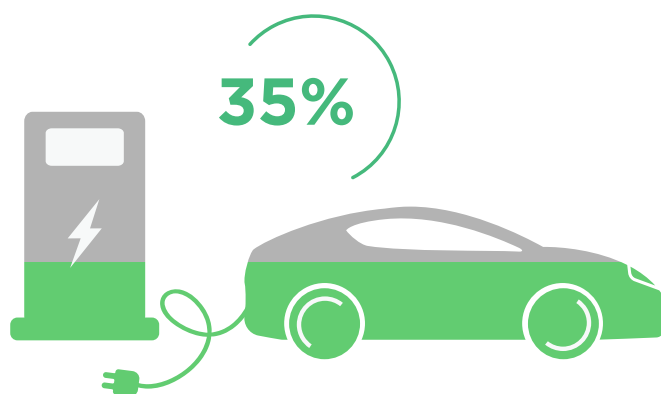
Figure 1 - Network of public charging points

What is clear is that cities plan to expand their EV charging networks with **62% reporting plans to improve the network of charging points.** Providing charging points on-street provides challenges for public authorities. Important considerations for public authorities are:

- **Obstruction:** Charging points should not cause an obstruction on the pavement, either through trailing cables or the charging point itself.

- **Accessible charge points:** Charging points should be accessible to all types of drivers, including those with disabilities. There are some emerging guidelines like those produced by BSI. ERTICO Partner SWARCO has provided accessible charging points in Dundee meeting these guidelines and allowing wheelchair access all around the charging bay and level access to the chargers.

- **Location of charging points:** Due to cost and other practicalities, public authorities will not be able to provide chargers for every space. The location of these charging points needs to be carefully considered as part of an overall strategy.

- **Parking / charger management:** It is important that the charging point is effectively used

for charging vehicles. This might need specific parking restrictions and enforcement. Alternatively, in more residential areas, residents might be able to manage this informally through WhatsApp groups or similar.

- **Provision of power supply:** there needs to be a suitable power supply that can provide the necessary power for the chargers, particularly if multiple chargers are provided.

Some local authorities are experimenting with innovative solutions, such as providing gulleys in pavements, allowing a charger to be located in housing but avoiding the risk of trailing wires across pavements. There are also solutions with removable charging wands. The UK Department's for Transport recently held a workshop with UK local authorities on this topic[23].

Share bike schemes often now feature electric bikes and deliveries are increasing being carried out by electric bikes. This means that local authorities need to increasingly consider charging and / or battery swapping facilities for electric bikes as well as electric cars and other vehicles.

Low Emission Zones / UVARs

Many cities around the world, are implementing Low Emission Zones or Urban Vehicle Access Regulations (UVAR) to limit access or encourage certain types of vehicles. The European Commission has developed guidance for UVAR[24]. They note their ability to reduce emissions and improve safety but note challenges around the functioning of the single market and enforcement, particularly of vehicles registered in other countries. Some national governments have mandated the introduction of Low Emission Zones, for example Spain[25], where a Low Emission Zone is mandatory for cities over 50,000 people.

Of the cities surveyed in Phase II of City Moonshot, the majority were planning some kind of zone and a third of cities having operational zones at the time of interview.

Does your city have a clean air or low-emissions zone (LEZ)?

- **Yes, operating now**
- **In planning or under development**
- **Under consideration / feasibility / consultation**
- **No plans at present**
- **Considered implementing but rejected**
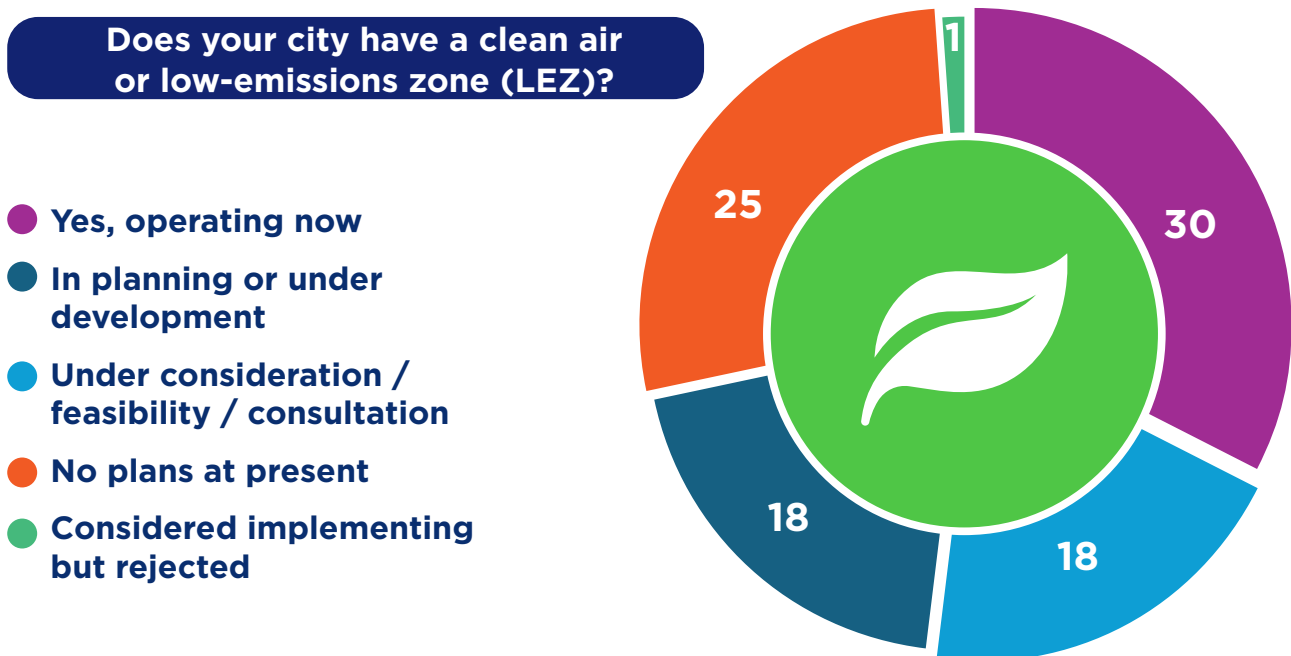
Figure 2 - Clean air or low-emissions zone

23   Transport Technology Forum. (2024, February 26). TTF's EV Working Group Meeting Hears the Importance of Parking and Chargepoint Location Synergies. Retrieved from https://ttf.uk.net/2024/02/26/ttfs-ev-working-group-meeting-hears-the-importance-of-parking-and-chargepoint-location-synergies/
24   European Commission. (2024, March). Adoption of Recommendations on Urban Vehicle Access Regulations (UVARs). Retrieved from https://transport.ec.europa.eu
25   Ministry for the Ecological Transition and the Demographic Challenge. (2024). *Low Emission Zones in Spain.* Retrieved from MITECO.

Talking to cities, there were a wide range of restrictions applied, although there was a strong trend to limit diesel vehicles, with a third of respondents suggesting this was the focus of their zone. Other cities looked to limited certain types of vehicles, for example cars or heavy goods vehicles. Others looked to create change by limiting older vehicles while other zones focused on only allowing low-polluting or electric vehicles into the area.

Most cities have taken a selective approach, with zones generally restricted to certain areas. Although a few cities (such as Madrid[26] and Bologna[27]) noted they had applied metropolitan area wide zones. Cities reported challenges around resistance from the public to new zones (including vandalism of cameras), creating challenges to regulation and enforcement technologies.

Typically, Low Emission Zones focus on the engine type – an electric vehicle is assumed to be beneficial regardless of the size of vehicle. However, worldwide, there has been a trend for larger and heavier vehicles, with SUVs (Sports Utility Vehicles) representing 48% of vehicles sold worldwide and 55% of new electric vehicles in 2023[28]. This meant that some cities starting to think about how to discourage this trend, a recent example being Paris voting to introducing higher charges for SUVs[29].

Electromobility success stories/case-studies

This section highlights inspiring electromobility success stories from across the globe, showcasing how cities like Madrid, Pasig City, and Addis Ababa are implementing innovative solutions to advance sustainable urban mobility.

Europe: Madrid

Madrid currently has 30 zero-emission bus lines and is the city in Spain with the most routes that are fully electric. It is in the process of expanding its zero-emission fleet with 250 electric and 10 hydrogen buses. These new vehicles are being funded by a loan from the European Investment Bank[30].

Madrid took part in the SOLUTIONSplus project[31], upgrading the Carabanchel bus depot to include smart charging at 50 charging stations and tried a novel inverted pantograph charging. This reduced the grid load by 1.5 to 3 MW (approximately 335) and saved €50,000 a year.

Like other cities, Madrid is keen to share knowledge with its peers. In September 2023, Empresa Municipal de Transportes (EMT) de Madrid hosted a SOLUTIONSplus three-day study tour, bringing together partners from Europe, Africa, Asia and Latin America. Based on the training needs of the regions, the tour covered topics on which EMT Madrid had expertise and best practices to share. Besides presentations about EMT's e-bus policy, about bus retrofitting, about shared light electric vehicles (LEVs), and about the city's mobility policy framework and relevant regulations, the programme encompassed a visit to an e-bus depot.

26   Urban Access Regulations (UAR). (n.d.). Madrid Low Emission Zone (LEZ). Retrieved from https://urbanaccessregulations.eu
27   Urban Access Regulations (UAR). (n.d.). Bologna Urban Access Regulations. Retrieved from https://urbanaccessregulations.eu
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29   BBC News. (2023, October 23). EU plans to curb SUV emissions with stricter standards. Retrieved from https://www.bbc.co.uk
30   European Investment Bank. (2024). *EIB and EMT Madrid sign EUR 50 million loan to expand zero-emissions urban bus fleet.* Retrieved from European Investment Bank.
31   BBC News. (2023, October 23). EU plans to curb SUV emissions with stricter standards. Retrieved from https://www.bbc.co.uk

Asia: Pasig City

Pasig City is a city of 800,000 people located in the Philippines and is part of the Metro area of the Philippines' Capital City Manilla. The city is actively exploring electromobility and UVAR. The city has introduced a number coding scheme or formally the Unified Vehicle Volume Reduction Program (UVVRP)[32], which limits access vehicles by the last digit of their number plate on a certain weekday as shown in the table below:

Last digit	Limit day
1 or 2	Monday
3 or 4	Tuesday
5 or 6	Wednesday
7 or 8	Thursday
9 or 0	Friday

Table 1 - Access limitations of vehicles in the city of Manila

During the limit day, vehicles cannot travel between 7 and 10am and 5 to 8pm in Pasig. If the driver is caught travelling during these hours they will be fined. Window hours are from 10:01 to 16:59 hours on that day and generally allow travel without being fined, but certain roads are exempt. There are exemptions for public and municipal transport, emergency services, electric/hybrid vehicles and motorbikes.

Under the Electric Vehicle Industry Development Act (EVIDA) of 2022[33], Pasig City, like other local governments units in the Philippines has to increase the share of electric vehicles in their fleets. The city took part in the SOLUTIONSplus project to help meet this aim. The aim of Pasig City was to explore the potential for electric-quadricycles vehicles as replacement for the current internal combustion engine vehicles in the City Government's fleet. In December 2022, as part of the SOLUTIONSplus project, prototypes of the e-quadricycle were launched in Pasig City and in total 15 vehicles were developed. Each vehicle can carry a load of 450kg and four people.

Africa: Addis Ababa

Ethiopia like many other African countries, is looking to reduce its reliance on fossil fuels and is looking to electrify its vehicle fleet. The national government has ambitious goals to introduce new EVs and is looking at incentives. Within the capital city Adis Ababa, 30 new electric buses were launched in April 2024 (utilising support from the National government). These vehicles used Chinese components but were assembled locally.

We spoke to Addis Ababa in June 2024: like a lot of cities we have interviewed around the world, Addis Ababa is pursuing a range of initiatives. It is working on mega-projects such as expanding its Bus Rapid Transit (BRT) with dedicated right of way, over 90% of the over 100 km of road corridor construction as well as local initiatives that can improve the city's overall road coverage and transport flow. The City Non-Motorized Strategy[34], a 10-year plan with 12 initiatives including cycle infrastructure, pedestrian precincts and bike sharing schemes. Bikes and electric four wheelers are also of interest. An E-mobility Strategy is being drafted.

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32   Republic of the Philippines. (2024). *Electric Vehicle Industry Development Act (EVIDA) Implementing Rules and Regulations.* Retrieved from The Supreme Court E-Library.
33   Republic of the Philippines. (2024). *Electric Vehicle Industry Development Act (EVIDA) Implementing Rules and Regulations.* Retrieved from The Supreme Court E-Library.
34   Addis Ababa Road and Transport Bureau. (2018, November). Addis Ababa Non-Motorised Transport Strategy. Retrieved from globaldesigningcities.org

Intelligent Transport Systems also feature a smart urban system, and the new traffic management control system is expected to be launched within 2024. The introduction of this technology requires an uplift in skills and capacity for local officials. The city is collaborating with international organizations through the ITDP and WRI. The city was recently awarded funding through the Bloomberg Cities Initiative (BICI).

URBAN AIR MOBILITY

Urban Air Mobility (UAM[35]), using electric Vertical Take-off and Landing (eVTOL) vehicles and drones, is emerging as a transformative force in urban transportation. Cities globally are exploring UAM's potential to enhance mobility, improve delivery efficiencies, and provide alternative transport solutions in urban settings.

Urban Air Mobility (UAM) Adoption and Opportunities in Cities

The Urban Air Mobility terminology has been widely adopted by industry and public bodies over the last ten years, and popularised following the publication of the Uber Elevate report in 2015. This broadly corresponds with a similar timeline to the widespread adoption of Mobility as a Service (MaaS) terminology, which emerged between 2013-2015 (and featured prominently in 2015 at the ITS World Congress in Bordeaux). However, the current level of adoption of UAM, regulatory awareness, and public acceptance varies widely among cities, highlighting both the potential and challenges of integrating UAM into existing urban landscapes. These responses contrast with the more comprehensive discussion on MaaS, even though the concepts both emerged at a similar time.

Current State of UAM Involvement

Many cities are still in the initial stages of exploring UAM. Out of those surveyed:

- **Conducted Trials and Feasibility Studies**: twenty cities have undertaken UAM trials, while another eight have conducted feasibility studies. Only four cities currently operate UAM services, indicating that operational integration is in its infancy.

- **Policy Development**: A minority (6 cities) have developed specific policies for UAM, showing a regulatory lag in preparing for this new transport mode.

- **Non-engagement**: A substantial number of cities (55) report no current involvement in Urban Air Mobility (UAM) activities. This lack of engagement often stems from various challenges, including budgetary constraints, insufficient regulatory frameworks, and limited awareness or interest in UAM technologies.

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35   Urban Air Mobility is generally considered as an umbrella term for the operation of aerial services in a largely urban environment. This can be divided into two distinct categories; those operated by airframes classified by FAA / EASA as being typically highly automated, electrically powered, and with vertical take-off and landing capability (eVTOL), and often referred to as flying taxis. The other category are drones, which are defined as all aircraft designed to fly without a pilot on board. Whilst these could in theory be full sized aircraft, they are typically categorised as a small or medium sized airframe with no crew or passengers on-board. They are typically referenced as being Unmanned Aerial Vehicles (UAVs).

Cities involved with (electric) Vertical Take-off and Landing (VTOL) Vehicles and/or drones

6

4

8

55

13

20

● **Conducted trials**

● **Conducted feasibility**

● **Operating services**

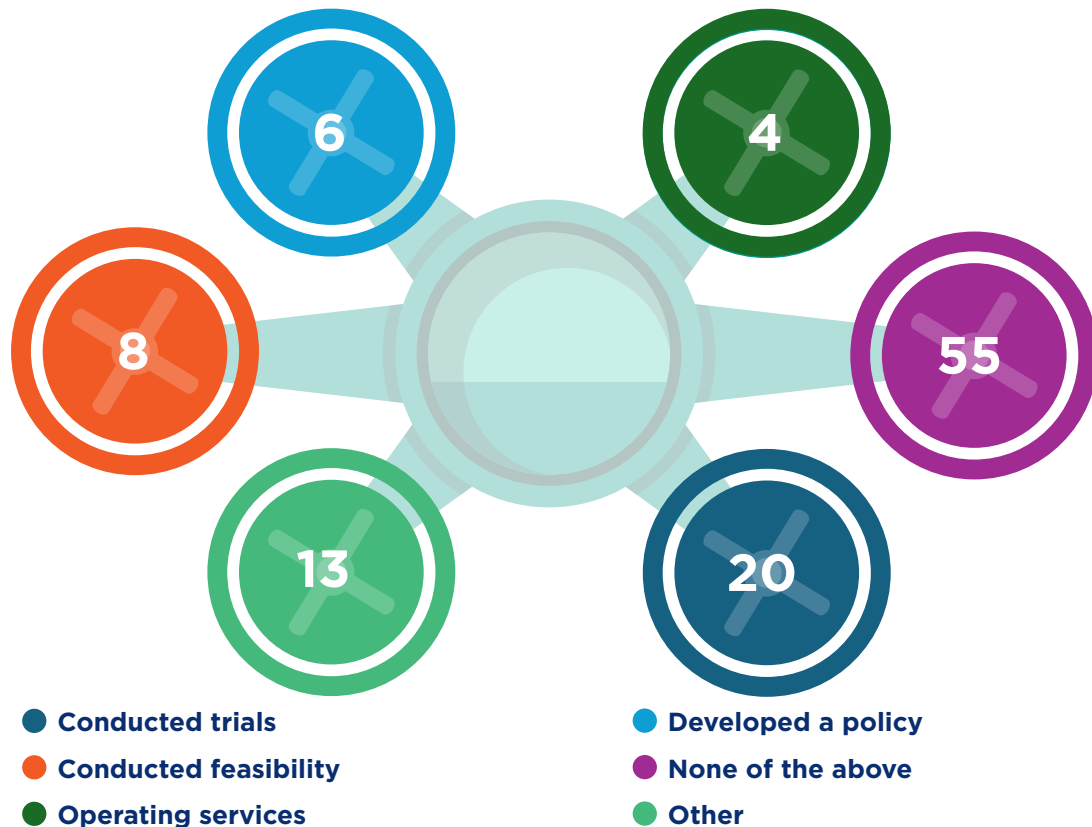● **Developed a policy**

● **None of the above**

● **Other**

Figure 3 - Cities involved with (e)VTOL and/or drones

The non-engagement on UAM by a significant proportion of cities is in marked contrast to engagement by cities on MaaS over the last ten years, where virtually all cities have a position. This may be explained that from a city perspective, they spend significant amounts of money on tackling surface transport congestion and providing public transport, whereas they generally do not have any jurisdiction or regulatory powers relating to aviation, nor are many of them airport operators.

The supporting technologies that underpin and enable MaaS to function are at high Technology Readiness Levels (TRL[36]) levels, so MaaS was immediately relevant to cities by the mid part of the last decade. An example of this is the deployment of eScooters, where not only was the hardware at TRL 9 (an actual system proven in operational environment), but also the supporting mobile booking, payment and fulfilment systems.

In contrast, there may also be a perception amongst cities that UAM is at a much lower TRL compared to other technologies. This to a large extent is due to the media focus on passenger eVTOL services, and hype cycle comparisons with other technologies such as autonomous vehicles and hyperloop. Even within the UAM industry, there is considerable debate about TRL progress,but broadly the progress of the prototype aircraft appears to be around TRL 5 or 6, and therefore less of an immediate risk to city authorities.

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36   European Commission defines Technology Readiness Levels (TRL) as a type of measurement system used to assess the maturity level of a particular technology. Each technology project is evaluated against the parameters for each technology level and is then assigned a TRL rating based on the projects progress. There are nine technology readiness levels. TRL 1 is the lowest and TRL 9 is the highest. Retrieved from: https://ec.europa.eu/research/participants/data/ref/h2020/other/wp/2018-2020/annexes/h2020-wp1820-annex-g-trl_en.pdf

However, unpicking the complex sub-systems that enable UAM reveals that many of these enablers are the same technologies that underpin MaaS, such as 5G mobile networks, Artificial Intelligence, smart routing algorithms, HD digital mapping, etc. From a supporting infrastructure, most of the technology is at TRL9, if not the regulatory environment.

Purpose of UAM services

Following on from the modest level of involvement in UAM, it is not surprising that those cities who have investigated what UAM services could be delivered are more focused on deliveries than passenger applications, especially in sectors with logistical and access challenges:
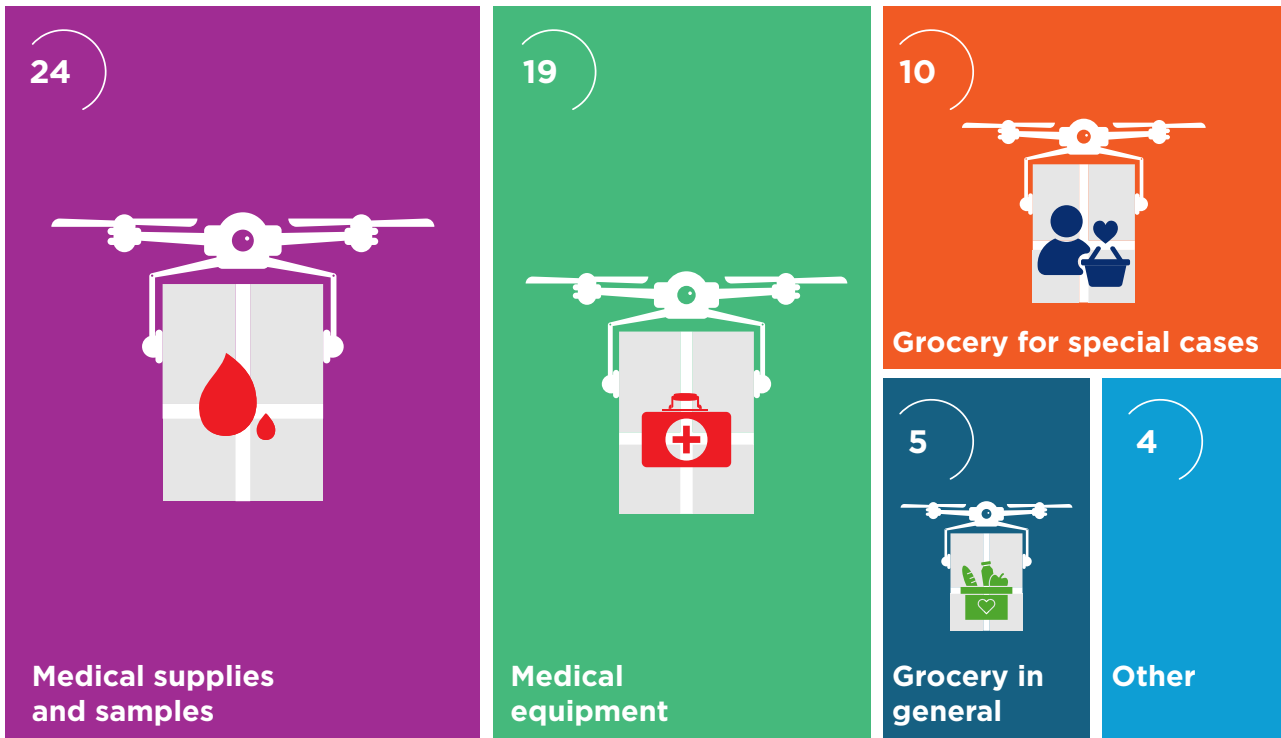

Figure 4 - Purpose of UAM services for deliveries

- **Passenger Mobility**: Passenger mobility via UAM is seen in specialized contexts, such as medical and emergency use (16 cities), but also show potential to bridge gaps in urban and peri-urban transportation as city-airport shuttles (9 cities) and commuting for regions with limited ground infrastructure (7 cities).

- **Deliveries**: Medical supply delivery (e.g., medicines, blood samples) is the most cited potential use (24 cities), followed by the transportation of medical equipment (19 cities). This focus highlights the role of UAM in emergency response and healthcare support.

In terms of passenger services, the cities tend to have a focus on commuting applications, whereas tourism, leisure and business travel is unreported. It is also clear that cities have a concern about the cost of eVTOL services and their target audience – there is little evidence to suggest cities believe that the cost of passenger eVTOL services will be affordable to the wider public in the near future. Nevertheless, this will not preclude commercial opportunities for eVTOL services outside of conventional commuting options in the long-term, and how these sectors are addressed.

In terms of consideration of UAM as a complementary mobility mode, whilst most cities are aware of the possibility, there is a significant minority who are either not aware or do not feel empowered to consider the potential for passenger eVTOL services. This corresponds with responses regarding Mobility as a Service, where none of the cities made the link to UAM being part of a portfolio of mobility options.

The majority of cities prioritized applications that deliver socially beneficial outcomes, such as emergency and medical support services. In contrast, overtly commercial use cases received minimal emphasis, as they, despite their potential to generate significantly higher traffic volumes, are less aligned with cities' social priorities. This trend highlights a clear commitment from cities to focus on use cases that directly enhance the well-being and safety of their residents. It also suggests that cities are leveraging technology and innovation not for profit-driven purposes, but rather to address pressing social needs and to ensure equitable benefits for their communities.

Although this does not mean that cities have necessarily overlooked freight, logistics and commercial deliveries, or service-related applications as significant traffic generators, it suggests that the hype surrounding eVTOL passenger services may be masking more market ready applications. If passenger eVTOL TRL levels are decoupled from the very high readiness levels for drones, this demonstrates that commercial use cases for drones are potentially much closer to realisation.

Regulatory Awareness and Integration Potential

Awareness of upcoming regulations governing low-level airspace is uneven among city staff:

- **Mixed Awareness**: 39% report full awareness of forthcoming low altitude airspace regulations, but most cities interviewed have limited or no knowledge, indicating a need for further training and capacity-building.

- **Interest in Learning**: There is a clear interest among city officials (22%) in learning more about the opportunities UAM can bring to urban mobility, particularly through structured information sessions and training.

Whereas many cities have traditionally had limited or no responsibility or authority over airspace within their jurisdictions, land use planning, noise and other planning policies are widely used tools to manage and balance the challenges of conventional aircraft and helicopters. With a focus on passenger eVTOL services, these tools may prove to be adequate for managing emerging demand and the ability to build new infrastructure such as Vertiports.

However, as explored previously in this chapter, whereas the TRL for flying taxis is still relatively low, many of the enablers for the use of drones within an urban environment are fully mature i.e. they use the same technologies as other transport modes and are at TRL 9. Therefore, the hype around passenger eVTOLs may be masking the ability to deploy drones at large scale once low altitude airspace regulations for fully autonomous drones are approved. Whereas most cities interviewed see beneficial use cases for medical and emergency service operations, many cities have not considered the impact of commercial drone operations within the city environment, and which may not fall within beneficial societal use case scenarios.

Public Acceptance and Key Concerns

Cities recognize that public acceptance is crucial for UAM's success and are considering a range of engagement strategies:

- **Public Demonstrations and Awareness Campaigns**: eighteen cities suggest conducting public demonstrations, while twenty-one recommend awareness campaigns targeting key stakeholders. These approaches are aimed at increasing familiarity and trust in UAM technology.

- **Engagement in Pilot Projects**: thirteen cities have expressed interest in joining research consortia and pilot projects, indicating a proactive approach to testing UAM's feasibility on a local scale.
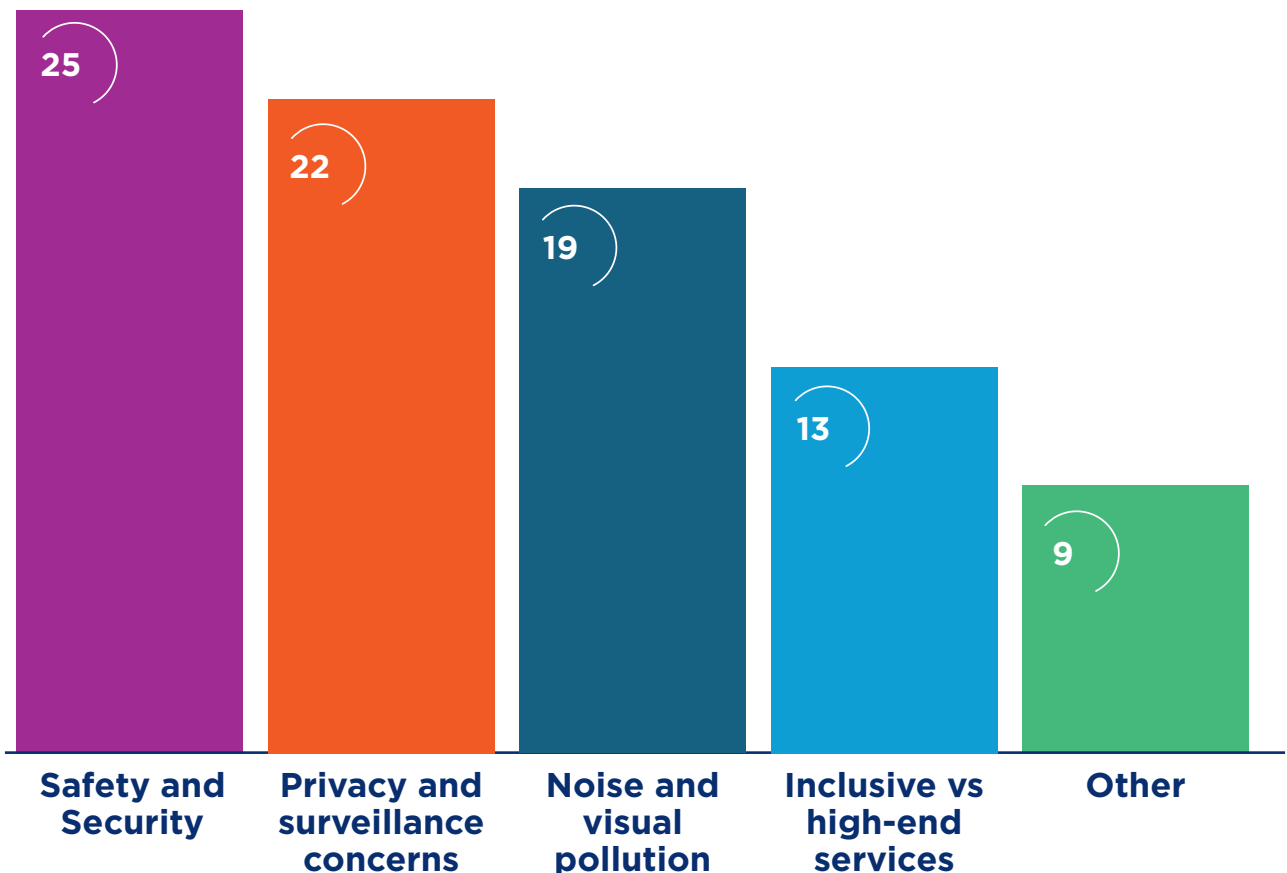

Figure 5 - Public concerns on UAM adoption

As touched upon in the regulatory discussion, several public concerns could hinder UAM adoption:

- **Safety and Security**: Safety is the top concern (25 cities), highlighting the need for rigorous safety standards and protocols.

- **Noise and Privacy Issues**: Noise pollution and privacy concerns, especially regarding low-flying drones with cameras, are also significant barriers (19 and 22 cities, respectively).

- **Inclusivity and Cost**: Concerns about exclusivity and potential high costs suggest that cities are wary of UAM becoming a luxury service accessible only to a privileged few.

Most of the trials conducted by cities to date have used drones for these demonstrations and focused on beneficial use cases such for medical and emergency services purposes with supportive partners. Very few have conducted these public demonstrations with passenger eVTOL aircraft given that only eHang in China has a certified product able to carry passengers.

However, given the TRL maturity of the drone industry, in the same way that shared bike and eScooter operators were able to take advantage of opaque regulations to deploy at scale and at speed, it is entirely possible that a similar scenario could take place with service and delivery drones for fast food orders.

And if the airspace operator is bound by commercial considerations and safety requirements, it may be difficult for city authorities to manage large traffic volumes from multiple locations within the confines of existing surface transport regulation.

Examples of projects/initiatives on the UAM topic:

HARMONY (Trikala, Greece)

Explored innovative solutions for urban mobility by integrating UAM into city logistics. In Trikala, Greece, the project demonstrated the use of drones for the delivery of medical supplies and other goods to improve logistics efficiency. This pilot highlighted how UAM can enhance urban freight delivery systems, reduce road congestion, and support sustainable urban development.

ITS-Driven Innovative Aerial Services (IDI)

Launched in September 2024, the IDI Platform focuses on integrating aerial services into existing transport and city operation frameworks to meet the growing demand for innovative and sustainable mobility solutions. The platform fosters collaboration among governments, businesses, academia, and civil society, ensuring all stakeholders contribute to shaping future urban and regional mobility. By addressing regulatory challenges, setting standards, and promoting cross-sectoral initiatives, the IDI Platform aims to create safe, efficient, and sustainable systems for aerial services. Its efforts bridge Intelligent Transport Systems with emerging aerial technologies, preparing cities and regions for the future of integrated mobility at all dimensions.

Urban Air Mobility success stories/case-studies Hamburg

Hamburg has established itself as a pioneer in the exploration and responsible integration of drone technology in urban and metropolitan environment. Building on years of innovative projects and initiatives as showcased in the timeline below. While these projects represent some of the most significant milestones, they are part of a broader effort to explore the transformative potential of drones in urban environments. From the Windrove drone network's launch in 2017 to its recognition as an EU model region for UAM (beyond mobility to wider applications of innovative aerial services under UIC2 (EU's UAM Initiative Cities Community), Hamburg has spearheaded initiatives that tackle critical challenges such as, drone traffic management (U-Space), and emergency response (Falke, medifly). More recently, in late 2024, Hamburg became a Founding Member of the ITS-Driven Innovative Aerial Services (IDI) platform, launched at the ITS World Congress. These projects and initiatives underline Hamburg's forward-thinking approach, balancing technological advancement with the complexities of public acceptance, safety, security, efficient airspace management and integrated traffic and mobility management.
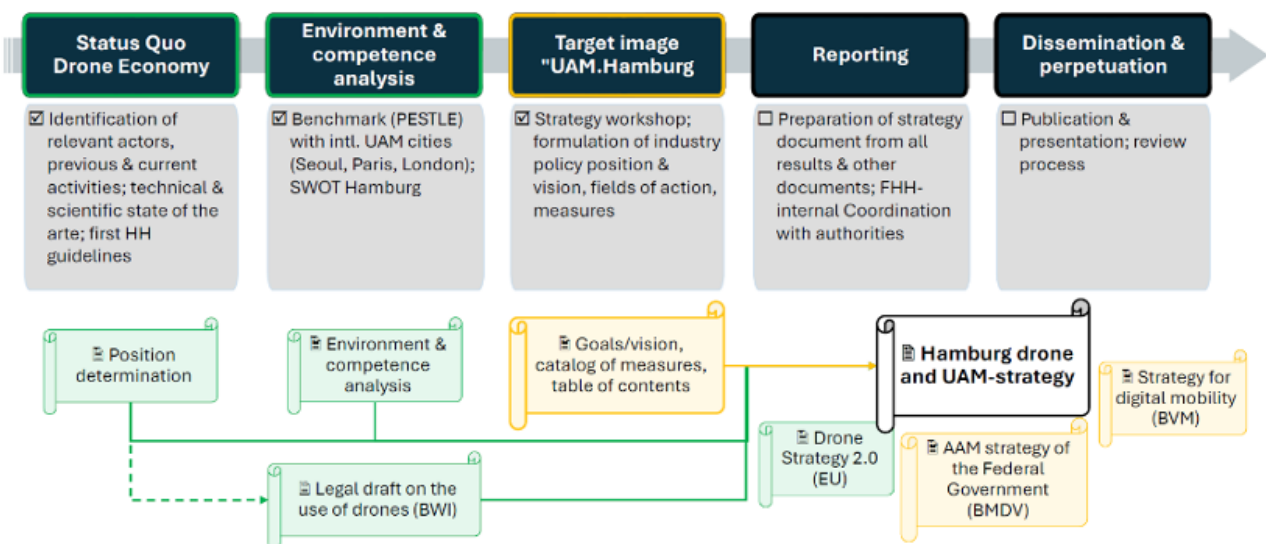

Figure 6 - Timeline of showcased innovative project and initiatives in the city-state of Hamburg

Drones present a transformative opportunity to support, enhance, and in some cases replace, when desired, human activities, particularly in public services (e.g. surveillance of dangerous critical infrastructure such as bridges). Further, drone applications are well-suited for essential tasks such as firefighting, disaster protection, and medical transport, offering solutions that are faster and more readily available than traditional methods. These benefits are especially relevant in urban environments, where time, reachability, and efficiency are critical. However, the adoption of drone technologies is not without challenges. Managing drone traffic responsibly and effectively, including determining capacity and purposes, remains a significant hurdle. Additionally, ensuring the safety and security of drone operations is paramount, with risks to both airspace and ground operations requiring careful mitigation. Another critical barrier is public acceptance, as communities may resist drone use without clear demonstration of the benefits, safety and security measures.

Understanding drones as an opportunity, Hamburg aims to embrace their potential while addressing challenges. Guided by an ongoing dynamic UAM Strategy Process (see Figure 2), the city-state is taking a structured approach that begins with analysing the status quo of the drone economy, benchmarking international best practices, and conducting a PESTLE and SWOT analysis to identify opportunities and challenges.
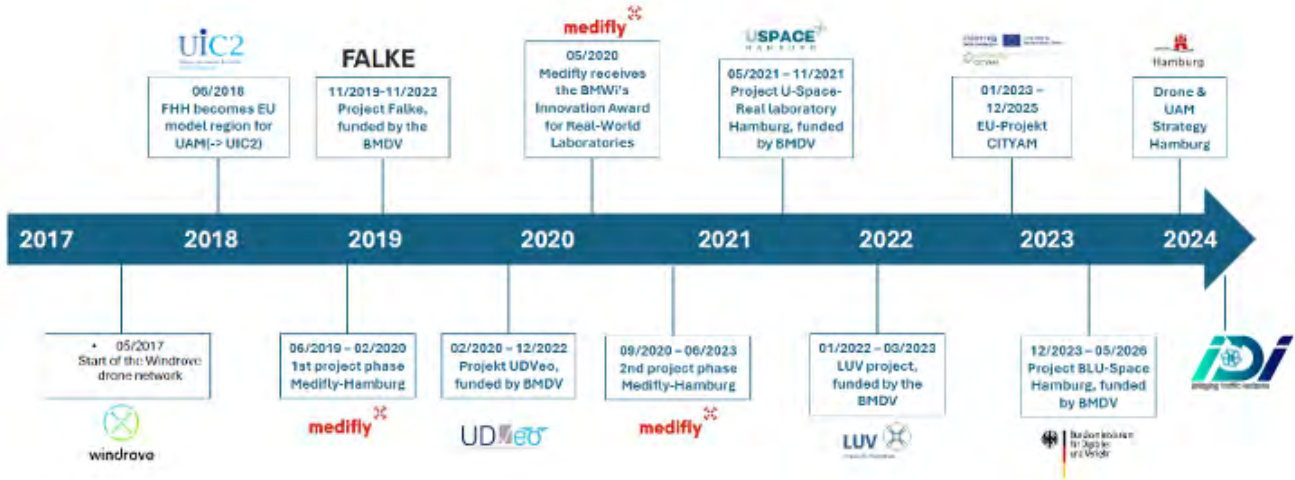

Figure 7 - Strategic framework for UAM development in the city-state of Hamburg

In this context, and in view of ensuring safe, secure, responsible and efficient drone traffic, Hamburg is developing a framework tailored to its needs, prioritising co-creation and continuous collaboration with diverse, cross-sectoral stakeholders. For example, the strengthening of Hamburg as a hub for industrial production and drone services as a key goal, is supported by a range of necessary research and strategic measures identified during co-creation workshops and follow up collaboration activities. This comprehensive and participatory strategy formulation, positions Hamburg as a leader in integrating drones responsibly into urban and metropolitan environments.

CITY MOONSHOT AND THE DIALOGUE WITH THE WIDER ITS COMMUNITY

Along the realisation of the 250 interviews, different activities to support the City Moonshot initiative were carried out. Among others, articles and on-line webinars are especially relevant.

Webinars

4 webinars

over 200 city representatives

200 participants

Presented in more than

15 events & conferences

Articles

18

Congresses

3 ITS World Congresses (Hamburg 2021, Los Angeles 2022, Dubai

3 ITS European Congresses (Toulouse 2022, Lisbon 2023,

Website

www.ertico.com/city-moonshot/

Figure 8 - Activities to support the City Moonshot initiative

Webinars

One of the features that supports the initiative are the ERTICO webinars on interesting findings of the City Moonshot. There have been various webinars on the City Moonshot initiative:

- To introduce the initiative to the public[37];

- Focused on Mobility as a Service (jointly with the MaaS Alliance)[38];

- Focused on traffic management and preliminary results of the survey on this topic (jointly with ERTICO innovation platform TM 2.0), celebrating 100 interviews[39];

- On UAM (ERTICO City Moonshot presents: Navigating the urban Skies) to give the opportunity to cities to present their advancement on the topic[40].

Additionally, the initiative has presented its results in various events such as: ERTICO Focus on micromobility[41], UAM Plazza Accelerator, POLIS Conference, World Bank and EU Delegation virtual event in Turkey[42].

The webinars offered an opportunity for interviewed cities to discuss and learn more about the topics of the initiative. The webinars were well attended, with participants having the chance to ask questions on the entire process and methodology of the endeavour.

Articles

A total of 18 articles have been published about the City Moonshot initiative, covering various aspects of its progress. The most recent article highlights our team's alignment with the EU Cities and Regions' mission to empower communities by fostering global knowledge-sharing. Additionally, a 'Behind the Scenes' article was released, offering insights into the project's development, including challenges, and key discoveries in urban mobility solutions.

Congresses

The initiative organizes various session and workshops during the following ERTICO arranged congresses ITS World Congress in Hamburg (2021), the ITS European Congress in Toulouse (2022), the ITS World Congress in Los Angeles (2022), the ITS European Congress in Lisbon (2023), the ITS World Congress in Dubai (2024) and the ITS European Congress Seville (2025).

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37   ERTICO Network. (2020, July 1). ERTICO City Moonshot Takes Off. Retrieved from erticonetwork.com
38   ERTICO Network. (2020, December 3). City Moonshot Ignites Discussion with Cities on MaaS. Retrieved from erticonetwork.com
39   ERTICO Network. (2021, January 15). Optimising Traffic Management in Cities. Retrieved from erticonetwork.com
40   ERTICO Network. (2021, March 4). ERTICO Launches Smart Traffic Insights. Retrieved from erticonetwork.com
41   ERTICO Network. (2022, September 20). ERTICO Focus on Event Micromobility and Intelligent Transport Systems. Retrieved from erticonetwork.com
42   ERTICO Network. (2023, October 5). ERTICO City Moonshot Supports Turkey's ITS Deployment. Retrieved from erticonetwork.com

CONCLUSIONS & LESSONS LEARNED

The key conclusions and lessons learned from the City Moonshot initiative highlight cities' progress in Electromobility and Urban Air Mobility while identifying challenges and opportunities for advancing sustainable urban transport solutions.

ELECTROMOBILITY

The first report of the City Moonshot initiative revealed that air quality and climate change are key priorities for cities and regions, driving an increasing focus on monitoring these factors. This growing environmental awareness is also reflected in cities leading the transition to electrically powered vehicles.

Key findings on this topic include:

1. **Almost all cities are planning to replace ICE vehicles with electric ones** either through direct electrification of their own vehicles or supporting operators present in their cities. There are challenges in financing the electrification of the fleet (as electrified vehicles typically have a higher up-front cost).

2. **Availability of electric vehicle charging points is a general issue and cities need to increase their charging networks**: less than a third of cities reported that they felt they had sufficient charging points.

3. **Urban Vehicle Access Restrictions are increasingly common**, with a third of Phase II cities reporting.

4. **There are lots of different models for urban vehicle access restrictions and no consistent model currently for them**: restricting diesel vehicles is common but there are approaches based on engine type, vehicle type, vehicle age or even number plate (as shown in the Passig City Case study).

5. **Capacity building could support the adoption of Urban Vehicle Access Regulations** including how to foster acceptance, how to deal with resistance from the public (including vandalism) to new zones, creating regulations and enforcement technologies.

6. **Cities outside Europe can be a model for new and smaller electric vehicles** as they are pioneering the use of electric motorbikes, rickshaws and small three/four wheelers, which are less common in many parts of Europe**.**

7. **Cities are starting to consider more innovative approaches for encouraging behaviour changes:** for example, Paris looking to charge SUVs further.

In summary, cities are committed to electrifying and adopting measures to improve their air quality and reduce carbon emissions. There is a mixture of incentives and regulations such as Urban Vehicle Access Regulations being explored but the approach for each city differs, with no consistent approach currently. There is also a move towards new approaches for the most forward-thinking cities, looking at new approaches to parking charges, for example based on vehicle size or weight.

UAM

The survey results highlight a cautious but growing interest in UAM as an innovative solution to urban mobility challenges. While many cities are intrigued by the potential of eVTOL and drone technology for emergency services, healthcare and logistics, the introduction of passenger services is less well defined. Furthermore, whereas many cities have explored and adopted policy positions on concepts such as Mobility as a Service, there appears to be a disconnect with the potential for UAM to be integrated into the urban mobility ecosystem. This is likely to reflect existing priorities, a level of pragmatism and the level of perceived low level of maturity of UAM.

However, there are clear differences between the Technology Readiness Levels of emerging passenger eVTOL aircraft ('flying taxis') and established drone platforms, suggesting that city authorities may have underestimated the relative ease of deployment once low altitude airspace regulation is approved. It also suggests strategic land use and transportation plans may not be sufficiently robust to address deployment of drone technologies, and city regulations should be reviewed under a different lens.

Widespread adoption is contingent upon:

1. **Enhanced regulatory frameworks**: There is a pressing need for clear regulatory guidelines that not only address airspace management, safety, and privacy issues, but also how deliveries and services are managed and regulated at a local level to foster equitable deployment.

2. **Political support**: Many administrations are mandated to focus on conventional public transport or traffic management services, and therefore political direction (and funding) will be critical to empower cities to take leadership outside their traditional remits.

3. **Public awareness initiatives**: To boost public acceptance, cities should invest in comprehensive awareness campaigns and public demonstrations, allowing citizens to experience the benefits and understand the safety measures surrounding UAM services.

4. **Pilot programs and research collaborations**: Engaging cities in pilot programs and research consortia will provide valuable insights into UAM's feasibility, public perception, and best practices for integration into existing transport networks.

5. **Focus on equity and accessibility**: Ensuring UAM services are inclusive and affordable will be critical in preventing the technology from becoming a high-end service limited to a small demographic group.

6. **Decoupling terminology**: Urban Air Mobility is popularly associated with passenger eVTOL services or 'Flying Taxis.' This has negative connotations for many audiences and diverts attention away from drone services. Adopting more accurate nomenclature such as Innovative Aerial Services will help to reset discussions, particularly around drones which use many existing technologies and are much closer to mass deployment.

In summary, while UAM has significant potential to address urban transportation challenges, its successful implementation will require cities to balance technological advancements with regulatory, social, and ethical considerations. Collaborative efforts among public authorities, UAM providers, and regulatory bodies will be essential to creating a sustainable and widely accepted UAM ecosystem.

NEXT STEPS

As the **City Moonshot** Initiative progresses toward its goal of completing 300 interviews with cities and regions worldwide, the focus remains on gathering actionable insights and fostering dialogue on urban mobility challenges and solutions. Building on the 215 interviews conducted so far, the next stages will prioritise engaging with additional cities and national authorities to ensure diverse representation across geographic regions and varying urban contexts. This effort will continue to explore the topics of E-Mobility, Urban Air Mobility, Sustainability, and Mobility as a Service, with the aim of providing a comprehensive understanding of global trends and local priorities in urban transportation.

The initiative will expand its scope through the launch of the **National Moonshot**. This new phase will involve interviews with public national authorities to complement city-level perspectives with a broader understanding of national policies, frameworks, and strategies that shape urban mobility. By incorporating these insights, the initiative aims to bridge local and national priorities, fostering a more cohesive approach to addressing mobility challenges and promoting sustainable development. This dual focus will enhance the impact and relevance of the City Moonshot Initiative, ensuring that it continues to provide valuable guidance for stakeholders at all levels.

ANNEX

METHODOLOGY

A well-structured methodology is essential for efficiently conducting 250 interviews while maintaining scientific rigor. The City Moonshot initiative employs a three-step approach, ensuring optimal outcomes.

Questionnaire Development

The City Moonshot initiative employs a three-step approach, ensuring optimal outcomes. Each step is outlined below.

Step 1: Identifying the topics. The initiative focuses on 4 main themes:

- **Sustainability (climate change and air quality)**

- **Mobility-as-a-Service (MaaS) in the European context, known as Mobility on Demand in North America.**

- **Electromobility (E-mobility)**

- **Urban Air Mobility (UAM)**

Step 2: Definition of objectives. Specific objectives were established for each topic to guide question formulation, ensuring relevant information is gathered:

- **Sustainability**: Investigate climate change impacts on transport and measures for improving air quality.

- **MaaS**: Assess the policy framework and readiness of cities for MaaS implementation.

- **E-Mobility**: Explore the integration of electric vehicles (EVs) into existing transport systems, barriers to adoption, and the availability of charging infrastructure to support sustainable urban mobility.

- **Urban Air Mobility**: Investigate the potential for integrating aerial transport solutions into urban environments, including regulatory challenges, public acceptance, and the implications for urban planning and infrastructure development.

- **Expanding Scope**: Additional questions were included to capture cities' transport challenges, their engagement in Intelligent Transport Systems (ITS), and citizen engagement strategies.

Step 3: Question formulation. Questions were categorized as open-ended or multiple-choice, balancing depth and manageability of data. Feedback from ERTICO experts and partners led to revisions and tailored additions.

- **For the Electric Mobility section**: The questions related to E-Mobility were inspired by ongoing e-mobility projects, cities' interests in electric vehicle integration, and expert inputs from the ERTICO Team.

- **For Urban Air Mobility**: Collaboration with the Urban Air Mobility Initiative Cities Community (UIC2) provided insights and support in formulating questions relevant to urban mobility trends.

Additionally, in the light of the introduction of the two new topics — E-Mobility and Urban Air Mobility (UAM) — a decision was made to re-interview several cities that participated in Phase I.

This led to the creation of a shorter version of the questionnaire, referred to as the "short version." This revised questionnaire included the two new topics, and a few follow-up questions aimed at capturing updated insights from these cities.

Meanwhile, new cities and regions were provided with the longer version of the questionnaire, which encompassed all four topics: Sustainability, Mobility-as-a-Service (MaaS), E-Mobility, and UAM. This approach ensured that both returning and new participants could provide comprehensive feedback tailored to their experiences and evolving urban mobility landscapes.

The last step were the trial runs. The revised questionnaire underwent trials with partner cities to ensure clarity and effectiveness.

Interviews

Following the methodology used during Phase I of the initiative, the following considerations were taken:

- **Stakeholder Identification**: Engaging appropriate city representatives, particularly Directors of Transport/Mobility, proved challenging. ERTICO's existing connections facilitated outreach, aided by partners and associations like ITS Nationals.

- **Conducting Interviews**: Most interviews were conducted by two ERTICO colleagues: one facilitating the discussion and the other taking detailed notes.

- **Language Considerations**: While interviews were primarily conducted in English, some were conducted in other languages, allowing for a more fluid discussion. This multilingual approach facilitated better communication and encouraged participants to express their insights and experiences more comfortably, enhancing the quality of the data collected.

- **Regional and Size Limitations**: While aiming for a balanced geographical representation, 157 cities from Europe and 58 from other regions were interviewed. A variety of city sizes were included to capture the diverse needs and challenges faced by urban areas of different scales and contexts.

- **GDPR Compliance**: Most interviews were recorded for analysis, with strict confidentiality maintained. Data will only be shared in aggregated form unless written consent is obtained.

Data Analysis

The analysis employed a quantitative method, primarily using descriptive and exploratory techniques. This approach highlighted trends across the responses of the participating cities, with plans for future qualitative analysis based on open-ended responses.

For each section of the survey, E-mobility and Urban Air Mobility, results were filtered and analysed. Secondly, thanks to the implementation of descriptive and exploratory techniques, data points have been described, showed and summarised in a way that allows relevant patterns to emerge.

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