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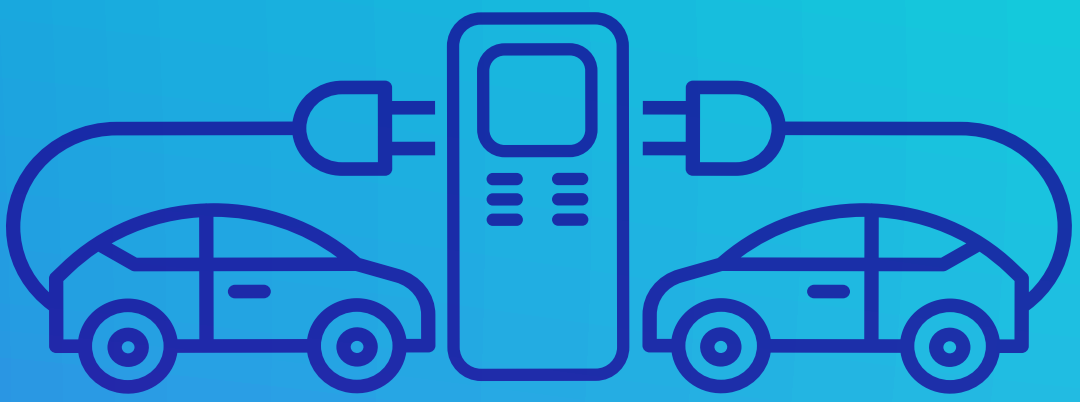
The state of shared and zero-emission mobility in European cities



CleanCities

This briefing was written by the Clean Cities Campaign, a campaign hosted by Transport & Environment.

Lead author: Martin Baierl
Contributors: Barney Jeffries (copywriting), Jens Müller (review)
Design: Laura Yates, laurayates.co.uk

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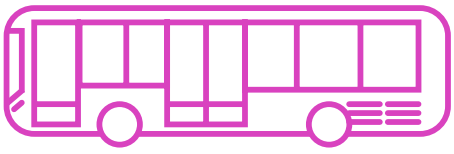

Executive Summary

Shared transport options have a number of advantages over individually owning them. Shared vehicles and infrastructure typically require less space, energy and raw materials, and therefore help tackle the climate emergency and toxic levels of air pollution. They are also often more affordable, which is particularly important in view of the cost of living crisis. Shared mobility solutions can, however, only achieve their full potential if they are zero-emission, minimising climate impact, energy use and noise.

The *Clean Cities Campaign* (CCC), a European coalition of 80+ civil society organisations campaigning for zero-emission urban mobility, therefore considers that shared, zero-emission mobility solutions should be an integral pillar of every urban transport system. As part of the campaign's efforts to promote mutual learning and a healthy race to the top, an analysis of 42 European cities has been carried out. In line with the campaign's vision, a broad definition of shared mobility has been applied, comprising the following zero-emission solutions that cities can typically shape through local policies:

- Shared bikes and e-scooters,
- Zero-emission buses,
- Shared electric cars,
- Public charging infrastructure for electric vehicles.

The data collection and analysis took place in the first quarter of 2023 with the help of the CCC's network and experts from global sustainability consultancy *Ricardo Energy & Environment*. Consolidated databases from specialised providers were used where possible. Each city and, where necessary, each operator was contacted to request the best available data. Details can be found in the accompanying technical report.

The main results of the analysis are:

- **More than the usual suspects:** Although well-known urban transport leaders (such as Copenhagen, Oslo, Paris and Amsterdam) occupy the top positions, a number of cities that did not obtain high scores in the CCC's wider urban mobility ranking outperform their peers on shared, zero-emission transport (including Milan, Ljubljana, Budapest, Sofia and the Polish Tri-City). This indicates that shared mobility can be a shortcut to future-proofing urban transport systems as progress can rapidly be made with relatively limited public funding.
- **Political leadership makes the difference:** The wide variation seen in the results of otherwise similar cities points to the importance of local leadership. The best-performing cities are those where decision-makers set clear, strong objectives and make targeted investments.
- **Encouraging public transport trends:** Several cities, such as Oslo, Copenhagen and Amsterdam are on track to achieve zero-emission public transport by 2030.
- **Towards electric car sharing:** Zero-emission car sharing is being rolled out rapidly in many cities, including Oslo, Copenhagen and Amsterdam, but also in cities such as Ljubljana and Hamburg. On average, a higher percentage of shared cars is electric compared to privately owned cars.
- **Charging infrastructure gap:** The difference in the availability of (semi-)public EV charging infrastructure between the leaders (such as Amsterdam, Oslo, Copenhagen and Ghent) and the laggards represents about an order of magnitude. Many cities need to step up local policies to accelerate the roll-out.

> Shared mobility can be a shortcut to future-proofing urban transport systems

The *Clean Cities Campaign* therefore calls on city leaders and governments to:

- **Acknowledge and use the full potential of shared and zero-emission solutions** as a shortcut to future-proof urban transport,
- **Provide and prioritise space and infrastructure for shared mobility by reallocating road space** to improve road safety and reduce conflicts between different user groups,
- **Roll out EV charging infrastructure** in a strategically planned way.

Position	City	Country	Shared bikes and e-scooters (out of 10)	Shared electric cars (out of 10)	Zero-emission buses (out of 10)	EV charging infrastructure (out of 10)	OVERALL SCORE (out of 40)	OVERALL SCORE (%)	GRADE	EXPECTED* CHANGE
1	**Copenhagen**	Denmark	7.3	10.0	7.3	10.0	34.6	86.5%	A	
2	**Oslo**	Norway	6.0	8.1	8.4	10.0	32.5	81.3%	A	
3	**Paris**	France	10.0	6.5	5.0	6.3	27.8	69.5%	B	▼ (60.8%)
4	**Amsterdam**	Netherlands	2.4	10.0	4.9	10.0	27.3	68.3%	B	
5	**Hamburg**	Germany	7.4	7.6	3.8	8.1	26.9	67.3%	B	
6	**Helsinki**	Finland	10.0	2.2	6.8	6.0	25.0	62.5%	B	
7	**Milan**	Italy	7.5	4.7	7.1	3.8	23.1	57.8%	C	
8	**Lyon**	France	8.5	5.0	4.2	3.0	20.7	51.8%	C	
9	**Ljubljana**	Slovenia	2.6	10.0	0.0	7.8	20.4	51.0%	C	
10	**Lisbon**	Portugal	10.0	0.0	0.6	9.3	19.9	49.8%	C	
11	**Brussels**	Belgium	10.0	3.1	1.2	5.5	19.8	49.5%	C	▼ (39.5%)
12	**Antwerp**	Belgium	6.3	2.8	0.2	10.0	19.3	48.3%	C	
13	**Berlin**	Germany	6.5	6.1	2.6	3.7	18.9	47.3%	C	
14	**Cologne**	Germany	7.7	2.6	3.9	4.6	18.8	47.0%	C	
15	**Munich**	Germany	7.1	3.7	0.8	7.0	18.6	46.5%	C	
16	**Turin**	Italy	5.0	2.4	3.4	5.5	16.3	40.8%	C	
17	**Budapest**	Hungary	3.8	3.5	2.8	5.7	15.8	39.5%	D	
18	**Ghent**	Belgium	2.2	3.1	0.3	10.0	15.6	39.0%	D	
19	**Stockholm**	Sweden	5.2	3.6	0.4	6.1	15.3	38.3%	D	
20	**Sofia**	Bulgaria	0.5	4.8	6.8	2.2	14.3	35.8%	D	
21	**Strasbourg**	France	1.6	2.2	5.6	4.4	13.8	34.5%	D	
22	**Madrid**	Spain	1.6	5.9	2.6	3.2	13.3	33.3%	D	▲ (35.3%)
23	**Tri-City****	Poland	5.0	0.0	6.1	1.7	12.8	32.0%	D	▲ (38.5%)
24	**Greater London**	United Kingdom	1.7	0.5	5.3	5.0	12.5	31.3%	D	
25	**Glasgow**	United Kingdom	0.6	0.3	6.4	4.5	11.8	29.5%	D	
26	**Krakow**	Poland	5.7	1.2	3.3	1.3	11.5	28.8%	D	
27	**Warsaw**	Poland	6.4	1.0	2.7	1.3	11.4	28.5%	D	
28	**Rome**	Italy	3.7	1.5	1.1	4.1	10.4	26.0%	D	
29	**Marseille**	France	4.7	2.2	0.3	2.7	9.9	24.8%	D	
30	**Prague**	Czech Republic	2.7	1.8	0.0	4.0	8.5	21.3%	D	
31	**Bucharest**	Romania	2.1	2.3	3.2	0.8	8.4	21.0%	D	
32	**Barcelona**	Spain	2.9	0.1	1.9	3.3	8.2	20.5%	D	▲ (21.8%)
33	**Vienna**	Austria	1.8	0.6	0.7	4.6	7.7	19.3%	E	
34	**Naples**	Italy	1.3	0.9	3.0	1.3	6.5	16.3%	E	
35	**Bilbao**	Spain	0.9	0.0	2.3	2.7	5.9	14.8%	E	
36	**Liège**	Belgium	3.3	0.0	0.0	2.6	5.9	14.8%	E	
37	**Valencia**	Spain	1.5	0.1	1.1	2.6	5.3	13.3%	E	
38	**Edinburgh**	United Kingdom	0.0	0.5	0.6	3.8	4.9	12.3%	E	
39	**Birmingham**	United Kingdom	0.7	0.0	0.8	3.2	4.7	11.8%	E	
40	**Granada**	Spain	1.1	0.0	0.8	2.2	4.1	10.3%	E	
41	**Dublin**	Ireland	1.7	0.2	0.0	1.6	3.5	8.8%	F	
42	**Greater Manchester**	United Kingdom	0.4	0.0	0.5	2.4	3.3	8.3%	F	▲ (14.5%)

Table 1 – main results with score by category and overall results

* Expected revised overall score following major changes that have been announced/confirmed but not yet fully implemented

** Gdansk, Sopot and Gdynia

Introduction

Photo: Bastien Nvs / Unsplash

The *Clean Cities Campaign (CCC)* is a European coalition of more than 80 civil society organisations campaigning for zero-emission urban mobility by 2030. This report summarises research into clean shared transport solutions that was carried out in early 2023, with the help of the European network of the *CCC* as well as *Ricardo Energy & Environment,* a global sustainability consultancy. It provides a ranking of 42 major European cities based on indicators reflecting the state of shared and zero-emission urban mobility.

The following section explains why shared and zero-emission urban mobility solutions play a key role in the transition to climate-friendly, healthy and liveable cities, and summarises the aims of the research. This is followed by a brief overview of the methodology and a summary of key results and findings. The conclusions lead to a set of policy recommendations for cities, national governments and the European Union.

A detailed methodology and full results can be found in the accompanying technical report from *Ricardo Energy & Environment* that is available on the CCC website.

Context and aim of the research

A triple challenge – and why urban transport matters

Cities and their residents are facing a triple threat from climate change, air pollution and the cost of living crisis.

Record-breaking summer heatwaves in 2022 caused at least 15,000 excess deaths across Europe[1], underscoring the need for urgent action to tackle the climate emergency. To have a chance of limiting the average global temperature increase to 1.5°C, emissions need to peak and reduce as soon as possible. In Europe, around a quarter of greenhouse gas emissions come from transport, which is one of the only economic sectors in the EU where emissions today are higher than they were in 1990.[2]

Air pollution causes more than 275,000 premature deaths each year across Europe.[3] It contributes to a huge range of health conditions, from asthma and heart disease to various cancers, potentially affecting every organ of the body.[4] In 2021, 97% of the urban population in the EU was exposed to concentrations of fine particulate matter above safe levels.[5] Transport is the main source of air pollution in European cities.[6]

In addition, the ongoing cost of living crisis affects the life and mobility of millions of Europeans, especially those in low-income households. As a consequence, many of them suffer from transport poverty[7] - they are not able or struggle to afford and access transport options or are locked into 'forced car ownership'[8] to get about their day to day activities.

Therefore, there is an urgent need to transition to a sustainable, affordable and people-centred mobility system. The EU and national governments have set ambitious targets for reducing greenhouse gas emissions, air pollution and traffic fatalities – but progress is patchy.

With three out of four Europeans living in urban areas, cities are where these issues are the most critical – and where there is greatest potential for rapid transformation at scale. The high population density offers opportunities to roll out zero-emission shared mobility solutions – not just traditional and new forms of public transport, but also shared bikes and e-scooters, (electric) car sharing and public charging infrastructure. Doing so will improve the health and quality of life for tens of millions of European citizens.

To tackle the climate crisis, improve people's health and wellbeing and create more equitable cities, zero-emission and shared mobility solutions are vital

Shared mobility has become increasingly popular in the past few years. Throughout 191 cities in Europe, the data aggregator service Fluctuo counted on average around 150,00 shared bikes and 480,000 shared e-scooters in 2022.[9] In its mobility barometer, INVERS estimates that in the first quarter of 2023, more than 50,000 free-floating shared cars were available in Europe[10], on top of which there is a fleet of more than 29,000 station-based car sharing vehicles.*

Likewise, the number of electric buses registered in Europe has increased six-fold from 2016 to 2021 to over 9,000 units[11], with electric buses accounting for 30% of the city bus market in Europe in the first half of 2022.[12] Equally, charging infrastructure for EVs has been rolled out at impressive speed, growing from 127,704 charging points in the first quarter in 2020 to 512,339 in the second quarter of 2023.[13]

* Estimate based on national car sharing association figures: 15,360 station-based car sharing vehicles in Germany (BCS 2023), 10,372 in France (AAA 2022), 1,229 in Italy (ONSM 2022) and 2,491 in Belgium (AD 2022) alone.

The benefits of shared mobility and shifting to zero-emission mobility

Shared and zero-emission mobility solutions are integral to tackling our climate, air pollution and transport equity challenges. Modes of transport based on sharing are more efficient overall, reducing emissions, raw material demand and the use of scarce space in cities. They are often also more affordable. Car sharing, for example, is cheaper than owning a car for most user groups.

This research focuses on four crucial elements of shared, zero-emission urban mobility that city authorities have the opportunity to shape, using a broad definition of shared mobility that comprises public transport and public charging infrastructure:

- Micromobility – specifically **shared bikes, e-bikes and e-scooters** – complements walking and cycling, providing a low-carbon alternative that has the potential to replace many short car trips in cities.
- By replacing multiple individual cars, car sharing reduces emissions and space use, and **shared electric cars** ensure this form of mobility is as clean as possible.
- Public transport is already a more sustainable and low-carbon transport mode, but a clean, climate-friendly urban transport system requires a shift to **zero-emission buses.**
- Zero-emission cars – in particular electric vehicles – already perform significantly better than combustion engine cars when it comes to greenhouse gas and pollutant emissions, but their rollout depends on providing the necessary **charging infrastructure.**

Why is shared, zero-emission mobility an essential part of the solutions?

Why shared?

Reasons	Evidence (key figures & references)
▸ Reduces car ownership and GHG emissions ▸ Space, energy and resource efficient ▸ More affordable ▸ More flexible (e.g. free-floating vehicles across cities) ▸ Popular among many user groups, including younger citizens and lower-income households	▸ Shared mobility , such as bike and car sharing, reduces the need to own and use private vehicles and devices and can therefore reduce carbon emissions, though the effect depends on the type of service and local context. ▸ Given that private vehicles tend to be unused and take up space during most of the day, shared mobility is more space efficient, which is particularly valuable in cities where public space is often limited. Similarly, the shared use and higher utilisation of vehicles makes them more energy and resource efficient. ▸ For many users and in many use cases, shared mobility is also more affordable than private ownership, as you only pay for its use, but have little to no upfront costs or financing. ▸ Shared mobility also has the benefit of being flexible (vehicles and devices can be found throughout the city when needed) and is also popular amongst groups that would otherwise rely on private cars or tend to be affected by transport poverty. ▸ The scientific evidence for these effects of shared mobility can be found in the references, see [14, 15, 16, 17, 18 19, 20]

Why zero emissions?

Reasons	Evidence (key figures & references)
▸ Climate protection ▸ Health protection ▸ Ecosystem protection ▸ Reduces costs ▸ Independence from fossil fuel imports	▸ Over its lifetime, an electric car in the EU emits on average three times less CO_2e* than an equivalent petrol car (from at least 37% to up to 83%).[21] ▸ In 2020, road transport was responsible for 37% of nitrogen oxide emissions and 9% of fine particle emissions in the EU[22] - zero-emission vehicles can drastically reduce air pollution.[23] ▸ Zero-emission vehicles generate less noise and air pollution (both in terms of particle matters and nitrous oxides) when compared to vehicles powered by internal combustion engines.[24] ▸ While the upfront costs of zero-emission vehicles are still higher than for the equivalent fossil fuel vehicles, the lower running costs result in net savings for the owner, even under pessimistic assumptions.[25] ▸ As with private cars, zero-emission buses have significantly lower greenhouse gas emissions throughout their lifetime.[26] While it will take a few more years for electric buses to cost the same as diesel buses, the overall lifetime costs might already be the same.[27] ▸ Shifting to zero-emission technology reduces Europe's dependence on foreign oil imports from authoritarian, human-rights abusing regimes.[28]

Table 2 - Benefits of shared and zero-emission mobility

Why this city benchmark?

Some cities across Europe have made encouraging strides in these areas, but others are lagging far behind. In general, the potential of shared mobility is not fully appreciated by policymakers or society.

With this research, the *Clean Cities Campaign* offers an evidence-based overview of the state of shared and zero-emission mobility in 42 major European cities. Currently, no such overview exists. By providing a robust and transparent benchmark of cities' performance, the campaign aims to accelerate progress and help decision-makers identify actions they need to take to achieve zero-emission mobility by 2030.

The research complements the *Clean Cities Campaign's* wider City Ranking[29] published in 2022, which focused on space for and safety of active mobility, public transport affordability and accessibility, clean air, mobility policies and electric vehicle charging infrastructure. The present study is meant to encourage and inspire cities across Europe to step up their efforts to tackle climate change, air pollution and transport poverty and to create clean, people-friendly transport systems that are fit for the future.

* CO_2e = CO_2 equivalent, used to compare the emissions from various greenhouse gases on the basis of their global-warming potential (GWP), by converting amounts of other gases to the equivalent amount of carbon dioxide with the same global warming potential.

Overview of the methodology

Developing this ranking was a collaborative, transparent and stepwise process. While the data collection was led by the *Clean Cities Campaign* core team and *Ricardo Energy & Environment*, the *CCC*'s network of local partners and experts were involved in developing the indicators and reviewing the findings. Cities and transport operators also contributed data, complementing data purchased from specialised providers (see below). Feedback from local partners and cities helped shape the research and the recommendations the *Clean Cities Campaign* has drawn from it.

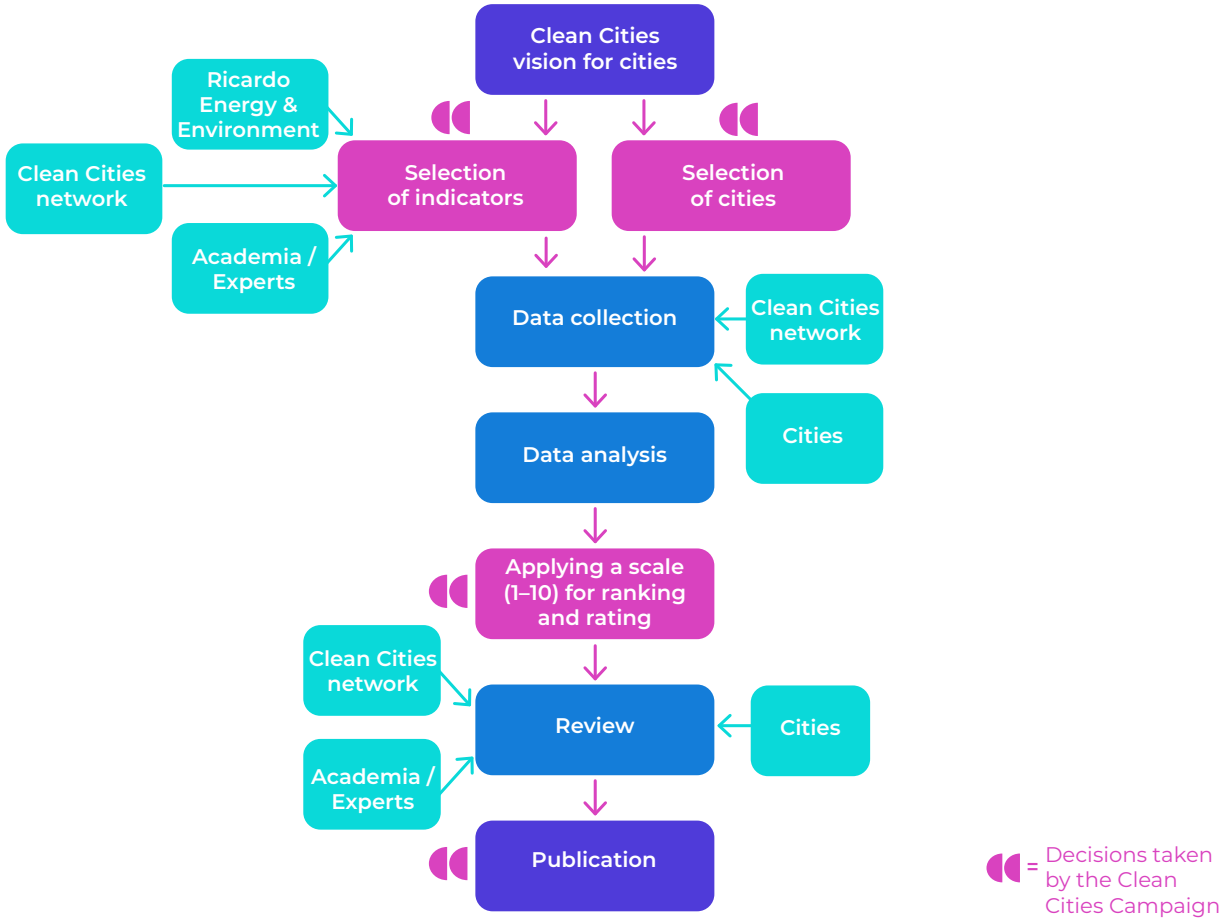

Image 1 - Overview of the process followed

Indicator development

The choice of indicators was guided by the *Clean Cities Campaign*'s vision for healthy, climate-friendly and liveable cities through zero-emission mobility by 2030. The indicators aim to represent the state of shared and zero-emission mobility. The CCC has prioritised clarity over complexity. Choosing practical, quantitative indicators inevitably has limitations, but the authors believe they illustrate key puzzle pieces that are essential for a successful transition to zero-emission mobility in cities. The fact that cities that are leading the way on the wider transition to zero-emission transport (as identified by the CCC's wider City Ranking) also perform strongly on shared, zero-emission transport (see below) confirms that there is a strong link between the two.

Shared, zero-emission mobility is not, however, sufficient in itself to deliver a clean mobility system, nor are the indicators intended to reflect every aspect of zero-emission mobility (such as walking and private transport).

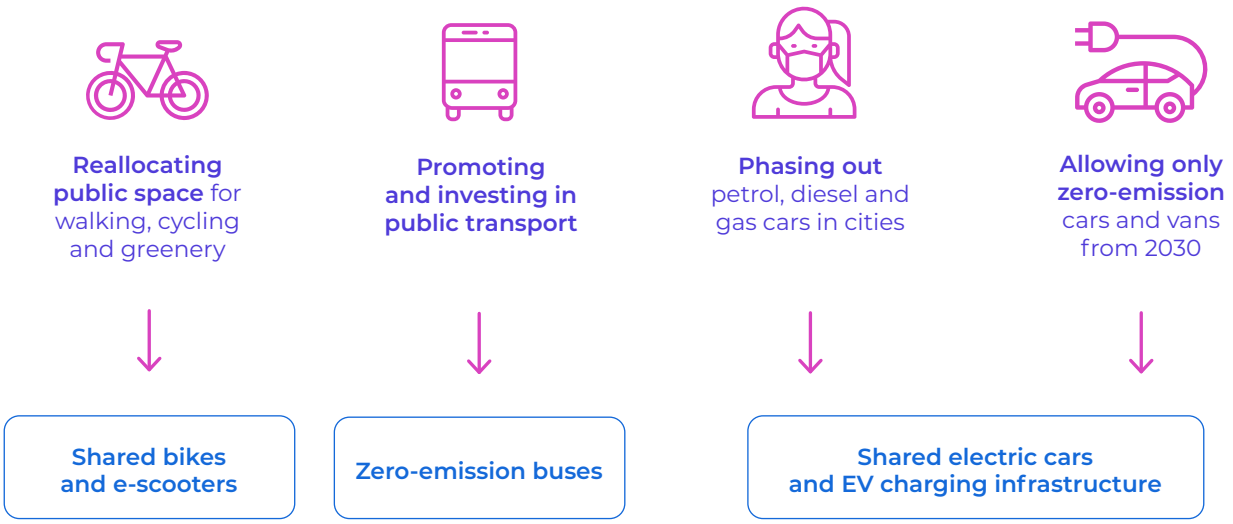

Image 2 - Alignment of the CCC objectives and the selected indicators

Indicator	Why it matters	Metric	Data source
Shared bikes and e-scooters	Shared e-scooters and (e-)bikes are a convenient way to get around in cities, complement public transport and have the potential to replace many short car trips with a cleaner, more climate-friendly mode of transport.	Number of shared e-scooters + (e-)bikes available per 1000 inhabitants	Fluctuo, city and operator data
Shared electric cars	Car sharing reduces the number of cars in cities; and shared electric vehicles make it as clean and climate-friendly as possible and reduce costs for users and cities.	Number of shared electric cars available per 1000 inhabitants	Fluctuo, city and operator data
Zero-emission buses*	Public transport is the climate-friendly backbone of mobility in most cities. Buses should fully switch to zero emission by 2030 at the latest as they minimise greenhouse gas and pollutant emissions, reduce noise and have become cost-competitive.	Share of the urban bus fleet that is zero-emission	City, public transport authority and operator data
EV charging infrastructure	Public and semi-public charging infrastructure are an essential part of the overall charging infrastructure for electric vehicles. It allows for charging during longer trips or for people that cannot charge at home or at work.	Publicly available charging power per 1000 inhabitants	Eco-Movement

Table 3 – Overview of the indicators, metrics and data sources

City selection

The CCC's wider City Ranking included 36 major cities from across Europe. The current research includes all these cities plus six more to give a total of 42.

We chose cities that have a prominent role in the debate on urban mobility in their countries and/or at a European level, while ensuring a broad geographical spread to represent the diversity of European cities. We prioritised countries and cities where the *Clean Cities Campaign* has an active presence, so that our local partner organisations can engage in a constructive dialogue with these city leaders. We also chose cities where sufficient data was available, or could be obtained through contacts with city administrators.

The below table lists the 42 cities included in this study, together with the corresponding city area and number of inhabitants. The city area and population correspond to the municipality with the same name unless stated otherwise. Population size ranges between 195,278 for the smallest city (Liège) and 8,799,730 inhabitants for the largest city (Greater London).

* Defined as buses with no tailpipe emissions

City	City area (km2)	Population
Amsterdam	219.0	882,633
Antwerp	203.7	530,630
Barcelona	100.8	1,636,732
Berlin	891.8	3,677,472
Bilbao	41.3	344,678
Birmingham	268.0	1,140,525
Brussels (Brussels-Capital Region)	162.4	1,222,637
Bucharest	239.0	2,161,347
Budapest	1,044.9	1,706,851
Cologne	406.7	1,073,096
Copenhagen	93.6	644,431
Dublin	128.4	588,233
Edinburgh	273.0	527,620
Ghent	157.9	264,666
Glasgow	176.4	635,130
Granada	88.1	231,775
Hamburg	742.5	1,904,000
Helsinki	214.0	658,457
Krakow	326.8	802,583
Liège	68.4	195,278
Lisbon	84.7	545,923
Ljubljana	275.1	294,113
Greater London	1,595.2	8,799,730
Lyon	48.0	518,635
Madrid	604.9	3,305,408
Greater Manchester	1,276.9	2,848,286
Marseille	242.1	868,277
Milan	181.8	1,374,582
Munich	311.4	1,515,860
Naples	118.5	922,094
Oslo	480.8	702,543
Paris	105.4	2,175,601
Prague	496.3	1,301,432
Rome	1,285.8	2,823,000
Sofia	1,339.0	1,248,452
Stockholm	215.8	978,770
Strasbourg	78.3	284,677
Tri-city (Gdansk, Sopot and Gdynia)	418.4	763,690
Turin	130.1	858,205
Valencia	139.3	792,492
Vienna	414.9	1,914,743
Warsaw	517.2	1,863,056

Table 4 – City size by area and population

Data sources and quality

To create a credible ranking, the CCC sought to obtain robust, transparent and comparable data. Where possible, we used uniform Europe-wide datasets from specialised providers, such as Eco-Movement (on electric vehicle infrastructure and power, which is also used by the European Commission) and Fluctuo (on shared e-scooters, shared (e-)bikes and car sharing).

We contacted administrators from each city to request data and to receive feedback on the information received from data providers. Where necessary and possible, we also contacted public transport authorities, operators and service providers to request data and to receive feedback.

Data collection began in January 2023 and was completed by 14 April 2023. The results are based on the latest available data.* Subsequent significant changes were only incorporated if data was available before 12 May 2023, otherwise the results do not account for more recent developments. Where we are aware of any announced significant changes (notably on shared mobility), these are mentioned in the technical report and highlighted in the last column of the results table.

Scoring and grading

For each indicator, cities received a score between 0 (worst) and up to 10 (best) depending on their performance. The highest grade was awarded for any score corresponding to or exceeding a maximum value defined by the research team, taking into account the distribution of results and existing research on the subject to determine an appropriate threshold. The overall result sums up the individual scores for each indicator,** therefore ranging from 0 (worst) to 40 (best). Total results are also presented in percentages and converted into a school grade system, with A being the best and F being the worst grade.

A more detailed overview of the process, methodology, indicators and data sources, as well as a data quality rating for each indicator and each city, can be found in the accompanying technical report produced by *Ricardo Energy & Environment* which is available on the Clean Cities website.

* Data on shared mobility reflects the situation in Q1 2023. Data on EV charging infrastructure reflects the situation in January 2023. For zero-emission buses, the data ranges from 2021 to 2023, depending on the data source and the data provided by cities and operators.

** For EV charging infrastructure, public charging points (fully accessible 24/7) were weighted with 1.0, while restricted charging points (not accessible 24/7) were weighted 0.5. For the indicator on zero-emission buses, the share of zero-emission buses in the total bus fleet contributed 75%, and the number of zero-emission buses vehicles contributed 25%.

Results and key findings

Photo: Sustainable Bus

This chapter summarises the results and key findings. The table below gives an overview of the results and ranks the 42 European cities covered. Cities are ranked according to their combined score across the four indicators. We've also given each city an overall grade to reflect their current performance. Where we are aware of any announced significant changes (notably on shared mobility), these are highlighted in the last column, which provides an estimate of the future overall score once the change has been implemented. A more detailed overview of the anticipated changes can be found in the technical report.

Our ranking provides important insights and new data on the state of shared and zero-emission urban mobility across Europe. While geographic location and income levels clearly had an influence, they were not the main factors affecting cities' performance.

Several Northern/Western European cities have a strong track record in sustainable urban mobility overall, and these cities also tended to score highly on shared, zero-emission services. The top four cities – Copenhagen, Oslo, Paris and Amsterdam – were all in the top five of the wider CCC City Ranking. But not all the high performers fell into this category. There was a strong overall showing from several cities in Southern and Eastern Europe, with Ljubljana and Lisbon making the top 10.

Position	City	Country	Shared bikes and e-scooters (out of 10)	Shared electric cars (out of 10)	Zero-emission buses (out of 10)	EV charging infrastructure (out of 10)	OVERALL SCORE (out of 40)	OVERALL SCORE (%)	GRADE	EXPECTED CHANGE*
1	**Copenhagen**	Denmark	7.3	10.0	7.3	10.0	34.6	86.5%	A	
2	**Oslo**	Norway	6.0	8.1	8.4	10.0	32.5	81.3%	A	
3	**Paris**	France	10.0	6.5	5.0	6.3	27.8	69.5%	B	▼ (60.8%)
4	**Amsterdam**	Netherlands	2.4	10.0	4.9	10.0	27.3	68.3%	B	
5	**Hamburg**	Germany	7.4	7.6	3.8	8.1	26.9	67.3%	B	
6	**Helsinki**	Finland	10.0	2.2	6.8	6.0	25.0	62.5%	B	
7	**Milan**	Italy	7.5	4.7	7.1	3.8	23.1	57.8%	C	
8	**Lyon**	France	8.5	5.0	4.2	3.0	20.7	51.8%	C	
9	**Ljubljana**	Slovenia	2.6	10.0	0.0	7.8	20.4	51.0%	C	
10	**Lisbon**	Portugal	10.0	0.0	0.6	9.3	19.9	49.8%	C	
11	**Brussels**	Belgium	10.0	3.1	1.2	5.5	19.8	49.5%	C	▼ (39.5%)
12	**Antwerp**	Belgium	6.3	2.8	0.2	10.0	19.3	48.3%	C	
13	**Berlin**	Germany	6.5	6.1	2.6	3.7	18.9	47.3%	C	
14	**Cologne**	Germany	7.7	2.6	3.9	4.6	18.8	47.0%	C	
15	**Munich**	Germany	7.1	3.7	0.8	7.0	18.6	46.5%	C	
16	**Turin**	Italy	5.0	2.4	3.4	5.5	16.3	40.8%	C	
17	**Budapest**	Hungary	3.8	3.5	2.8	5.7	15.8	39.5%	D	
18	**Ghent**	Belgium	2.2	3.1	0.3	10.0	15.6	39.0%	D	
19	**Stockholm**	Sweden	5.2	3.6	0.4	6.1	15.3	38.3%	D	
20	**Sofia**	Bulgaria	0.5	4.8	6.8	2.2	14.3	35.8%	D	
21	**Strasbourg**	France	1.6	2.2	5.6	4.4	13.8	34.5%	D	
22	**Madrid**	Spain	1.6	5.9	2.6	3.2	13.3	33.3%	D	▲ (35.3%)
23	**Tri-City****	Poland	5.0	0.0	6.1	1.7	12.8	32.0%	D	▲ (38.5%)
24	**Greater London**	United Kingdom	1.7	0.5	5.3	5.0	12.5	31.3%	D	
25	**Glasgow**	United Kingdom	0.6	0.3	6.4	4.5	11.8	29.5%	D	
26	**Krakow**	Poland	5.7	1.2	3.3	1.3	11.5	28.8%	D	
27	**Warsaw**	Poland	6.4	1.0	2.7	1.3	11.4	28.5%	D	
28	**Rome**	Italy	3.7	1.5	1.1	4.1	10.4	26.0%	D	
29	**Marseille**	France	4.7	2.2	0.3	2.7	9.9	24.8%	D	
30	**Prague**	Czech Republic	2.7	1.8	0.0	4.0	8.5	21.3%	D	
31	**Bucharest**	Romania	2.1	2.3	3.2	0.8	8.4	21.0%	D	
32	**Barcelona**	Spain	2.9	0.1	1.9	3.3	8.2	20.5%	D	▲ (21.8%)
33	**Vienna**	Austria	1.8	0.6	0.7	4.6	7.7	19.3%	E	
34	**Naples**	Italy	1.3	0.9	3.0	1.3	6.5	16.3%	E	
35	**Bilbao**	Spain	0.9	0.0	2.3	2.7	5.9	14.8%	E	
36	**Liège**	Belgium	3.3	0.0	0.0	2.6	5.9	14.8%	E	
37	**Valencia**	Spain	1.5	0.1	1.1	2.6	5.3	13.3%	E	
38	**Edinburgh**	United Kingdom	0.0	0.5	0.6	3.8	4.9	12.3%	E	
39	**Birmingham**	United Kingdom	0.7	0.0	0.8	3.2	4.7	11.8%	E	
40	**Granada**	Spain	1.1	0.0	0.8	2.2	4.1	10.3%	E	
41	**Dublin**	Ireland	1.7	0.2	0.0	1.6	3.5	8.8%	F	
42	**Greater Manchester**	United Kingdom	0.4	0.0	0.5	2.4	3.3	8.3%	F	▲ (14.5%)

Table 5 – main results with score by category and overall result

* Expected revised overall score following major changes that have been announced/confirmed but not yet fully implemented

** Gdansk, Sopot and Gdynia

We also found that:

- Shared mobility is evolving rapidly – this is reflected in significant variations between cities, including fluctuating fleet sizes and different forms of regulation.
- Several cities are on track to achieve zero-emission public transport by, or even before, 2030, showing the way forward for others.
- Zero-emission car sharing is being rolled out rapidly and is growing in many cities, but car sharing is still dominated by combustion engines.
- Cities are ramping up provision of electric charging infrastructure, but levels of ambition differ strongly throughout Europe.

Photo: Javy Go / Unsplash

Shared bikes and e-scooters

There was significant variation between cities in the numbers of shared bikes, e-bikes and e-scooters available. While in some cities there are more shared bikes, in others there are more e-scooters, providing a range of choices that can lead to good results.

Paris, Copenhagen and Milan have the most shared bikes per capita, while Helsinki, Lisbon and Brussels have the most shared e-scooters. Helsinki, Lisbon, Brussels and Paris all offer more than 20 bikes or scooters per 1,000 inhabitants* – although Parisians recently voted to ban shared e-scooters. Edinburgh was the only city in the ranking with currently no shared bikes or scooters at all.

British and Spanish cities (except London and Madrid) performed poorly in this category, perhaps due to the existing mobility culture as well as regulatory challenges. In the UK, for example, e-scooter rental schemes are only being trialled.

Fleet sizes are fluctuating rapidly. This is partly due to seasonal variations (the data collected reflects the winter period for most cities), but is also influenced by regulatory changes and market dynamics as different operators move in and out of cities.

Shared electric cars

Copenhagen, Amsterdam and Ljubljana offer the most vehicles for electric car sharing per capita. Larger cities where there are more potential shared car users also did well, including Paris, Berlin, Hamburg, Madrid and Milan.

Cities that have a long history of car sharing and have promoted it strongly, such as Amsterdam and Hamburg, tended to score highly. But some cities have leapfrogged their way up the ranking by encouraging shared electric cars.

Ljubljana, Sofia, Milan and Budapest notably outperformed their peers. By contrast, seven cities scored zero for this indicator. In particular, cities in Spain (outside Madrid) and the UK are lagging behind.

The data collected in the 42 cities suggests that the percentage of electric vehicles is generally higher amongst shared cars than privately owned cars.

Photo: Cambio

* Following a non-binding referendum in April 2023, the mayor of Paris announced that shared e-scooters operators will have to cease operating from September 2023. In the Brussels-Capital Region, the government has published plans to tender the operation of shared e-scooters and e-bikes and to limit the number of shared e-scooters to 8,000 (down from currently around 21,000).

Photo: Angelo Abear / Unsplash

Zero-emission buses

Since being introduced for regular service in the early 2010s, electric buses are now rapidly being deployed throughout European cities. Several cities are on track to have a 100% zero-emission bus fleet by 2030.

Oslo is leading the race: two-thirds of its bus fleet is currently electric, and its entire fleet will be zero emission by 2028. In absolute numbers, by far the most electric buses are found in London (>900) and Paris (>650). But the top 10 cities for this indicator also include some more unexpected names, including Sofia, Milan, Glasgow and the so-called Tri-city of Gdańsk, Gdynia and Sopot in Poland. These cities maintained their existing trolleybus networks (Sofia, Milan, Tri-city) or made an early choice to invest in electric buses (Milan, Glasgow).

Cities that backed alternative, non-zero emission technologies performed less well. These include hybrid diesel-electric, methane (CNG) and biodiesel buses. With the exception of London and Glasgow UK cities (Manchester, Birmingham, Edinburgh) performed poorly,* as did the Belgian cities with the exception of Brussels (Ghent, Antwerp and Liège). Three cities – Dublin, Liège and Ljubljana – did not have a single zero-emission bus in their fleet.

Electric vehicle charging infrastructure

Electric vehicle charging infrastructure was one of the indicators that was also included in the *CCC*'s wider City Ranking. Since then, there has been an overall increase of charging stations and power in all cities, but little change in their relative performance.

Amsterdam and Oslo led this category by quite some distance: second-placed Oslo has almost 50% more charging capacity per person than third-placed Copenhagen. Ghent and Antwerp also scored highly.

Beyond Northern Europe, Lisbon and Ljubljana performed impressively. But cities in Poland, Spain and Italy – highly motorised countries – are falling behind in the rollout of electric vehicle infrastructure.

Photo: Ernest Ojeh / Unsplash

* Starting in September 2023, local buses in Greater Manchester are being brought back under local control, and operators in both Greater Manchester and Birmingham have purchased significant numbers of electric buses that will be delivered within the next year, which will improve their position in the ranking. The revised score is presented in the table under the column 'Expected change'.

Conclusions and policy recommendations

Photo: Victor Keri / Unsplash

Liveable, healthy, low carbon and future-proof cities come in different shapes and forms, but shared and zero-emission mobility will be an integral part of all of them. Our research shows that **some cities are making impressive progress – but there is a long way to go.**

The wide range of results revealed **big and surprising differences, even among otherwise comparable cities.** Many of Europe's major cities are still a long way from providing their citizens with the shared, zero-emission services necessary to enable the switch to a clean, zero-emission, people-friendly urban transport system.

Given the ever-increasing cost of failing to address the climate, air pollution and road safety challenges faced by cities in Europe, this is worrying. Overwhelming evidence shows that **the social, public health and environmental benefits of transforming our cities far outweigh the costs.**[30, 31] Cities must change gear and accelerate this transition.

The wide variation seen in the results reflects the **importance of local leadership.** The four indicators used in this study represent solutions that are under the control of city authorities. The best-performing cities are those where decision-makers set clear, strong objectives and continue to work towards them. **Political will and persistence are as vital as funding and expertise.**

The *Clean Cities Campaign* hopes this ranking will help city leaders to benchmark their performance in these key areas and encourage a "race to the top". As for the 2022 City Ranking, **obtaining data and information at city level was challenging:** data availability is limited and the quality is variable, as was the speed with which organisations were able to share it. Organisational silos as well as lack of funding mean that information is often not readily available. This is not just a problem for researchers: city authorities themselves often seem unaware of the exact state of mobility services in their own city. Urban mobility indicators at EU level could aid monitoring and evaluation, as well as research and decision-making.

We call on city leaders to be more ambitious, to take inspiration and learn from each other to strengthen shared, zero-emission mobility solutions. By transforming urban mobility systems, we can make our cities more liveable, improve people's health and protect our climate.

Policy Recommendations

1) **Acknowledge and use the full potential of shared and zero-emission solutions as a shortcut to future-proof urban transport**

2) **Provide and prioritise space and infrastructure for shared mobility by reallocating road space to improve road safety and reduce conflicts between different user groups**

3) **Roll out EV charging infrastructure in a strategically planned way.**

Overall, the most important recommendation is that the potential of shared and zero-emission transport as a fully-fledged mode of transport should be acknowledged and fully exploited through policy changes.

Shared mobility can be a shortcut to future-proof urban transport systems. City leaders should acknowledge and leverage the potential of shared, zero-emission transport, be more ambitious and learn from each other.

To do so, the following measures should be made a priority at different levels of governance:

Cities:

- **Provide and prioritise space and infrastructure for shared mobility** – including drop zones, cycling infrastructure, bus lanes, charging stations and parking for car sharing, as well as e-mobility hubs. This will also help **avoid conflicts between pedestrians, cyclists and e-scooter users.**
- **Regulate and enforce regulation of shared micromobility** in cooperation with users, civil society, people with reduced mobility and operators.
- **Make the electrification of the bus fleet a priority** and set ambitious targets, in cooperation with public transport authorities and operators.
- **Accelerate the roll-out of electric charging infrastructure** based on forecast demand and the supply of private charging infrastructure, while making sure that road space rather than the pavement is repurposed.

National governments:

- **Provide a flexible legal framework for cities to roll out and regulate shared mobility** in accordance with local needs on the basis of uniform principles such as road safety, tendering rules, etc.
- **Provide funding and support for the ongoing electrification of the bus fleet** to public transport authorities and operators.
- **Support the strategic roll-out of electric vehicle charging infrastructure in cities** through planning and permit laws and with funding and financial incentives, aiming to go beyond European requirements for vehicle charging infrastructure.

Shared mobility can be a shortcut to future-proof urban transport systems. City leaders should acknowledge and leverage the potential of shared, zero-emission transport, be more ambitious and learn from each other.

European Union:

- **Make Sustainable Urban Mobility Plans (SUMPs) binding for all urban nodes on the Trans-European Transport Network (TEN-T)** and include shared mobility more prominently.
- **Make EU funding for cities conditional on the switch to zero-emission mobility, including shared mobility,** and phase out all investments into fossil-fuel-based infrastructure or services.
- **Revise the EU's Sustainable Urban Mobility Indicators (SUMI) to make them easier to use and comparable** and to include data on traffic performance and emissions (e.g. total number of vehicle-kilometres, tonnes of CO_2 equivalent).

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Contacts

Barbara Stoll
Director, Clean Cities Campaign
barbara.stoll@cleancitiescampaign.org

Jens Müller
Deputy Director and Head of Policy & Research,
Clean Cities Campaign
jens.mueller@cleancitiescampaign.org

Find out more

The Clean Cities Campaign is a European coalition of organisations hosted by Transport & Environment. Together, we aim to encourage cities to transition to zero-emission mobility by 2030 and to become champions of active, shared and electric mobility for a more liveable and sustainable urban future.

www.cleancitiescampaign.org
info@cleancitiescampaign.org

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