



THE STATE OF SHARED AND ZERO-EMISSION MOBILITY IN EUROPE

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EXECUTIVE SUMMARY

This report presents the methodology, data sources and results of the study ‘*The state of shared and zero-emission mobility in Europe*’, which has been commissioned by the Clean Cities Campaign (CCC). The CCC is a European coalition hosted by Transport & Environment (T&E) that unites more than 75 organisations campaigning for active, shared and zero-emission mobility for a more liveable and sustainable urban future.

This study was commissioned to provide a comprehensive overview of the state of shared and zero-emission mobility across European cities. More details on the background of this can be found in the CCC briefing which should be read alongside this report.

To provide this overview, four quantitative indicators reflecting the state of shared and zero-emission mobility were developed and calculated. This study rates and ranks 42 cities based on these four indicators, which are:

Indicator	Overview	How measured
Shared bikes and e-scooters	Availability of shared bikes (including conventional bicycles and e-bikes) and e-scooters	Number of shared bike and e-scooter units available per 1,000 population
Shared electric cars	Availability of shared electric cars	Number of shared electric cars available per 1,000 population
Zero-emission buses	Proportion of the bus fleet that has been converted to zero-emission technology	Proportion of zero-emission buses (battery electric, fuel cell, ultracapacitor and trolley buses) in the total bus fleet
EV charging infrastructure	Availability of electric vehicle charging infrastructure	Publicly available power output available per 1,000 population

Each city has been ranked for each of the indicators, so it is possible to see where different cities are excelling and where cities have room for improvement. The individual scores have also been combined to provide an overall rating and ranking for the cities.

This report aims to allow the cities within the study to benchmark their performance against other cities when it comes to shared and zero-emission urban mobility solutions that help create liveable zero-emission cities.

1. INTRODUCTION

This report presents the methodology, data sources and results of the study ‘*The state of shared and zero emission mobility in Europe*’, which has been commissioned by the Clean Cities Campaign (CCC). The CCC is a European coalition hosted by Transport & Environment (T&E) that unites more than 75 organisations campaigning for active, shared and zero-emission mobility for a more liveable and sustainable urban future.

The study aims to provide a robust, transparent and evidence-based benchmark of progress, to encourage cities to step up their efforts to achieve zero-emission mobility by 2030 and to help decision-makers identify the scope of action that is needed. Specifically, this study focuses on shared and zero-emission mobility in European cities. It complements the Clean Cities Campaign City Ranking, published in 2022, which focused on space for and safety of active mobility, public transport affordability and accessibility, access to electric charging infrastructure, as well as clean air and mobility. More details on the background can be found in the CCC briefing which should be read alongside this report.

For this study, four quantitative indicators reflecting the state of shared and zero-emission mobility were developed and calculated. This study rates and ranks 42 European cities based on the four indicators, which are:

- Shared bikes and e-scooters
- Shared electric cars
- Zero-emission buses
- EV charging infrastructure

This report aims to allow the cities within the study to benchmark their performance against other cities when it comes to shared and zero-emission urban mobility solutions that help create liveable zero-emission cities.

Since transparency of the indicators was of great importance, all information sources used in the calculation of indicators are included in the Appendices to this technical report (see Appendix 2). To support this transparency, the calculation method is also described in detail in this report (see Section 2.2). The accuracy, completeness and robustness of the underlying datasets have also been considered in compiling the results for this study, and a data quality rating has been developed for each indicator to reflect the reliability of the underlying data.

The cities have been ranked for each of the indicators so it is possible to see where selected cities are excelling and where other cities have room for improvement. The scores for each of the four indicators have been aggregated to create a total score for each city out of 40 (translated into a percentage total score), which has subsequently been awarded a grade (see Table 3-7 for final grade for each city)

The selection of cities included in the study was informed by the aforementioned City Ranking prepared in 2022¹. 36 cities were previously selected based on the following criteria and considerations:

- Prioritising cities that have a prominent role in the debate on urban mobility in their countries and at a European level
- A sufficiently broad geographical spread across Europe
- Prioritising countries and cities that the CCC is currently active in
- Selecting cities with sufficient data available

A further six cities have been added to the original list of cities², with selections made using the same criteria outlined above. The full list of cities included in this focused edition of the rating and ranking can be viewed in Appendix 1.

This report describes the general approach taken to develop the indicators and calculate the results (Section 2) and presents the results for each indicator (Section 3). The detailed information used to calculate indicator results is provided in the Appendices.

¹ Clean Cities Campaign (2022) City ranking <https://cleancitiescampaign.org/ranking-2022-edition/>

² New cities include Bucharest (RO), Budapest (HU), Sofia (BG), Valencia (ES), Glasgow (UK) and Dublin (IE)

2. HOW THE INDICATORS WERE CALCULATED

2.1 OVERALL APPROACH

This project was designed to support the work of the CCC. The aim of the campaign is to reinforce the leading role of cities in the **transition to zero-emission mobility**. The project was organised into the following stages:

- Development of an initial set of potential indicators.
- Presentation of the initial set of potential indicators at a workshop with the core team and partner organisations of the CCC, to obtain feedback on the suitability of the indicators in capturing the key themes of the CCC and to discuss potential challenges in calculating the indicators.
- Data collection, including identification of any standard and centralised data sources that could be used to calculate the indicators for the 42 cities included in the study. For some indicators, standard and centralised datasets were not available; in this instance, data were obtained through direct contact with city officials, public transport authorities, bus operators and public transport/micromobility service providers/operators, or from city plans, operator reports, and internet searches. As part of the process, the cities included in the study were contacted and asked to confirm if the data included in the indicator calculations were correct for their city, and/or if additional or more accurate datasets were available.
- Development of the scoring system for each indicator.
- Presentation of the collected data and scoring system at a second stakeholder workshop, to obtain feedback on the proposed methodology, the scoring system for each indicator, and potential methods of addressing any remaining gaps in the underlying datasets.
- Finalisation of the indicator calculations and scoring.
- Finalisation of the scaling factors within the scoring matrix once all results were finalised for all cities.

2.1.1 Development of indicators

A shortlist of indicators was developed based on discussions with the CCC and the likely availability of datasets that could be found across all of the chosen cities. As the indicators were being developed, data were being collected to ensure the indicators could be calculated. Some adjustments to the proposed indicator calculations were needed as it became apparent that certain datasets were not available for a number of cities or would be difficult to obtain in the timescale of the project.

In order to guide the development of the indicators, it was agreed that the results of this study should:

- Allow cities to benchmark their performance when it comes to shared and zero-emission urban mobility solutions that help create liveable cities.
- Be transparent wherever possible. Limitations and uncertainty in the available datasets should be noted for transparency.
- Be robust, in terms of the accuracy of the datasets and in terms of how the final scores reflect each city's actual situation.
- Be understandable, for citizens and policy-makers alike.

2.1.2 First stakeholder workshop

The initial shortlist of indicators and their proposed calculation methodology were presented at a stakeholder workshop organised by the CCC on the 1st December 2022. At this workshop, the campaign core team and partner organisations provided feedback on the proposed indicators, including suggestions for methodology, possible data sources and potential challenges in collecting data or calculating results. Input was also provided on potential additional cities (up to 6).

2.1.3 Refinement of indicators and data collection

Feedback from the workshop resulted in the indicators being refined with the CCC team to ensure that the study would reflect priority topics identified by the stakeholders. It was agreed that selected indicators would

be taken forward focusing on shared modes and zero-emission public transport. Minor changes to the additional cities to include were also made.

Important considerations for this study included ensuring that the data used was transparent, that the methodology to collect the data was as consistent between the different cities, and that the study would be repeatable in future years so that it may be possible for cities to improve their ranking over time.

Indicator data collection templates were created for each city and completed as far as possible via desk research using known publicly available data sources. Indicator data collection templates were subsequently compiled and sent to all cities via the CCC city network and contacts were asked to verify and/or supply the most up to date data for each of the indicators.

Where it was identified that data needed to be purchased (this was the case for EV charging infrastructure data, which was obtained from Eco-Movement³, a provider for data on electric vehicle charging stations, and for data on shared bikes, e-scooters and electric cars, which was obtained from Fluctuo⁴, an aggregator of shared mobility data), this was undertaken simultaneously. Purchased data was subsequently cross-checked and validated with any data identified from alternative sources (i.e. desk research or direct from city contacts). Where data differed, a decision was then made as to which data would be used in the final indicator calculation, based on a combination of an assessment of the quality of the data/reliability of the source. For further details on validation of specific datasets, please see section 2.2.

As the data collection was being carried out and the indicators were being finalised, the following considerations were taken into account to ensure a robust dataset was collected:

- **City boundaries:** City boundaries (determined in the previous study for 36 cities) were typically defined by the municipal boundary. Consideration was given to factors such as the geographical extent that would be considered part of the city by residents, the area over which policies by the city could be applied, and the geographical area corresponding to available datasets. The city populations and areas are provided in Table 3-1. For Brussels, the area considered corresponds to the Brussels Capital Region. For London, the area considered corresponds to Greater London and includes all 32 boroughs. For Manchester, the area considered corresponds to the Greater Manchester metropolitan county. Tri-city, Poland, corresponds to the cities of Gdansk, Sopot and Gdynia, which constitute one functional urban area and were therefore included as one city.
- **Known changes to data during the data collection phase:** It was agreed that data would be purchased from Eco-Movement (EV charging stations and power) and Fluctuo (shared e-scooters, bikes, and cars) and delivered during January 2023. However, in some cases it was known that there were significant changes to the data in the subsequent months prior to publication that would affect a city's score. The decision was taken to present the indicators from an agreed common date where possible (January to March 2023), but to also note any significant changes (e.g. above a certain percentage threshold, 50%), where these were made known to us, either via desk research or information obtained from cities directly. In most cases, where a change was still to come into effect, it was decided to present the original data, but include information on the planned changes as a caveat, acknowledging that this would potentially affect the city's score (see Table 2-4 for further details).

2.1.4 Second stakeholder workshop - Stakeholder workshop to present final indicators, the scoring structure and data collected

A second stakeholder workshop was arranged by the CCC on the 30th March 2023. At this second workshop, Ricardo presented the finalised set of indicators and methods for calculating them, along with a proposed scoring system that would be used to rate the cities. In addition, Ricardo shared the data collected for some of the indicators, and requested assistance where data was unavailable for some cities. At this stage the stakeholders started to feed into the quality assurance of the data and helped to fill gaps in the data.

After reviewing and taking into account the feedback from the stakeholders, a total of four indicators were selected to take forward, as listed below. Additional details on the aim of each indicator, the approach to indicator calculations and the underlying datasets are described in Section 2.2.

³ <https://www.eco-movement.com/>

⁴ <https://fluctuo.com/>

Table 2-1: Indicators

Indicator	Overview	How measured
Shared bikes and e-scooters	Availability of shared bikes (including conventional bicycles and e-bikes) and e-scooters	Number of shared bike and e-scooter units available per 1,000 population
Shared electric cars	Availability of shared electric cars	Number of shared electric cars available per 1,000 population
Zero-emission buses	Proportion of the bus fleet that has been converted to zero-emission technology	Proportion of zero-emission buses (battery electric, fuel cell, ultracapacitor and trolley buses) in the total bus fleet
EV charging infrastructure	Availability of electric vehicle charging infrastructure	Publicly available power output available per 1,000 population

2.1.5 Finalisation of results and scoring metrics

After the data for all of the indicators was finalised and the indicator results were calculated, the results for each indicator were converted to a scoring system. All indicators were assigned a maximum score of 10 points (see Table 3-2 to Table 3-6 for the final indicators scores for each of the cities).

In some cases, weighting was applied to certain aspects of the results, affecting the final score. This is summarised in Table 2-2 and further details are provided in the relevant sub-sections in Section 2.2.

Table 2-2: Weightings applied in indicator calculations

Indicator	Aspect	Weighting applied
Zero-emission buses	Percentage of zero-emission buses in total bus fleet	0.75
	Number of zero-emission buses	0.25
EV charging infrastructure	Publicly accessible EV chargers	1.00
	Restricted accessibility EV chargers	0.50

For the final results considering all four indicators, scores out of 100% were assigned letter grades between A and F based on the scale below (see Table 3-7 for the final grading for each of the cities).

Table 2-3: Scores out of 100% and corresponding grades

Score out of 100%	Grade
80% up to 100%	A
60% up to 80%	B
40% up to 60%	C
20% up to 40%	D
10% up to 20%	E
< 10%	F

2.2 APPROACH FOR EACH INDICATOR

2.2.1 Shared bikes and e-scooters

This indicator represents the availability of shared bikes and e-scooters, or ‘micromobility’ (including conventional bicycles, e-bikes and e-scooters) in each of the cities, by considering the number of shared units available⁵ to the general public⁶. Shared bikes and e-scooters offer an additional reliable, fast and space-efficient zero-emission alternative and are very popular in many cities. Two separate indicators were originally envisaged for ‘Shared bikes and e-scooters’, comprising the individual indicators ‘Shared bikes’ and ‘Shared e-scooters’. However, following Workshop 2, the decision was taken to combine the two modes to present the overall picture of available shared bikes and e-scooters available in each city. Combining the two modes provides an indication of the overall availability of micromobility in the city, without focusing on the specific details of whether a city is investing in shared bikes, shared e-scooters, or both.

The number of shared bike and e-scooter units available for 1,000 people in the city was calculated using the following formula:

$$\text{Shared bikes and e – scooters per capita} = \frac{(\text{number of shared bikes}) + (\text{number of shared e – scooters})}{\text{city population (per 1,000 people)}}$$

For this indicator, the majority of the data was obtained from Fluctuo. Fluctuo gathers and frequently updates datasets on shared mobility in European cities. This data was not freely available and was purchased by the CCC for this study. The Fluctuo dataset includes shared conventional bikes, e-bikes⁷, and e-scooters.⁸ Data obtained was subsequently sense-checked by the study team and city representative contacts. This included a review of any results indicating zero availability of shared bike and e-scooter units, or particularly high/low results. Where desk research indicated that there were operators or fleets potentially not accounted for in the Fluctuo data, the study team reached out to both operators and city contacts to verify this information, including checking for the presence of an operating scheme and number of units.

It should be noted that the operating area/city area for bikes and e-scooters used by Fluctuo does not always correspond directly to the city boundaries used for our study. This can therefore potentially lead to both under and over-estimation of bike and e-scooter provision for the cities. There are currently no consolidated datasets available that correspond exactly to the geographical extents of the city areas used in this study. Fluctuo clarified that for those cities where a larger area was used by Fluctuo for data collection, operating boundaries have been selected to include the entire operating area and extra buffer area, although the majority of the fleets are concentrated in the cities’ central areas. Based on this, it is unlikely that there is any significant overestimation. For cities where there was a smaller area used for the Fluctuo data, it is likely that this is reflective of the actual operating area (i.e., being concentrated in a central area).

Results for the shared bikes and e-scooter indicator are presented in Table 3-2. The data quality was rated as ‘good’ for all of the cities for this indicator, because the shared bike and e-scooter availability data was primarily obtained from Fluctuo, and in some cases updated with city/operator-specific information (see Appendix 2 for details on sources used and data quality ratings). Fluctuo spend considerable time and effort in cleaning, checking and updating their dataset to ensure that it is current and accurate, and that it includes the majority of operators currently in operation in each city. It is important to note that both bike and e-scooter fleets, and e-scooters in particular, are evolving rapidly with the entry and exit of operators in specific markets and due to regulatory changes in cities. They are also subject to important seasonal fluctuations where operators will reduce or increase available fleets as considered appropriate.

The scale of this indicator was set so that no availability of shared bikes and e-scooters would score 0 points and an upper threshold of 20 per 1,000 capita would score 10 points⁹. It should be noted that the upper threshold is not an evidence-based target, but was selected by taking into consideration the distribution across the study cities.

⁵ Shared rather than rented – must be available by the minute/hour

⁶ Publicly accessible – not including company/campus sharing and Business to Business (B2B) sharing

⁷ Category L1Ae, excluding speed pedelecs (category L1Be)

⁸ Electric kick scooters falling into the category of personal light electric vehicles (PLEV), but does not include ‘mopeds’ (category L1Be)

⁹ The highest value for shared bikes and e-scooters is 31.3 per 1,000 population (Helsinki), with four cities scoring 10.0.

It should be acknowledged that this indicator only considers availability of total shared bikes and e-scooters for individual cities for the purposes of making a comparison across Europe. It does not make recommendations as to the desired level of provision of either shared bikes or e-scooters. Appropriate levels of provision should be determined and managed by individual cities, taking into account a range of aspects, including local demand, available supporting infrastructure and parking facilities, and rules and legislation relating to their safety and use, etc.

Finally, it is known that the number of shared bikes and e-scooters will change significantly over the coming months in selected cities, which would affect their score for this indicator and their overall score and ranking. The known significant changes are outlined in Table 2-4.

Table 2-4: Expected changes in shared bikes and e-scooters 2023/24 and direction of change for indicator scores

City	Country	Shared mode affected	Anticipated change	Direction of change
Barcelona	Spain	E-bikes	Up to 2,500 additional e-bikes during 2023 (from current 4,813)	↑
Brussels (Brussels Capital Region)	Belgium	E-scooters	Introducing a cap of 8,000 e-scooters (from current 22,897) in 2024	↓
Madrid	Spain	E-bikes	New BiciMad e-bike scheme up to 7,500 bikes (from current 4,050) by September 2023	↑
Paris	France	E-scooters	Ban on shared e-scooters expected to come into force by September 2023 (from current 14,281)	↓
Rome	Italy	E-scooters	Reduction in number of e-scooters to a total of 9,000 across three operators (3,000 each) from 1 st July 2023 (from current 13,590)	↓
Stockholm	Sweden	E-bikes	E-bike scheme paused mid-May 2023 (due to bicycle safety concerns). 2,200 e-bikes were recorded previous to the pause. It is anticipated that provision will be reintroduced in 6-9 months when a solution is found.	↑
Tri-city (Gdansk, Sopot, Gdynia)	Poland	E-bikes	Confirmed 3,000 e-bikes in May/June 2023 (from current zero)	↑
Tri-city (Gdansk, Sopot, Gdynia)	Poland	Bikes	Confirmed 1,000 bikes in May/June 2023 (from current zero)	↑

2.2.2 Shared electric cars

This indicator represents the availability of shared electric cars in each of the cities, by considering the number of shared electric cars available to rent by the general public. For this indicator, only shared fully electric cars were included; hybrid or internal combustion engine (ICE) shared cars were not included. This approach ensures that the zero-emission ambition was pursued. Electric car sharing offers a more environmentally-friendly, affordable and space-efficient alternative to private car use and ownership.

For the purposes of this indicator, car sharing was also defined as “*Single vehicle used among multiple drivers for a fee, free-floating (rentals without fixed stations) or station-based, and including one and two-way services within a geographical boundary defined by city¹⁰*”. This does not include the following:

- Ride sharing services (riders sharing a vehicle and a route), or carpooling / ride-hailing services (rider hires a driver to take them to a destination, e.g. Uber and Lyft)
- Car rental, peer-to-peer (P2P¹¹) car sharing, and services such as Getaround or business-to-business (B2B¹²) car sharing providers
- Shared hybrid cars, shared ICE cars, electric quadricycles (microcars)

The number of shared electric cars available for 1,000 people in the city was calculated using the following formula:

$$\text{Shared electric cars per capita} = \frac{\text{number of shared electric cars}}{\text{city population (per 1,000 people)}}$$

For this indicator, the majority of the data was obtained from Fluctuo. Fluctuo aggregates and frequently provides data on shared mobility in European cities. This data was not freely available and was purchased by the CCC for this study. The Fluctuo dataset includes all shared cars (total of electric cars, hybrids and ICEs). Data obtained was subsequently sense-checked by the study team and city representative contacts. This included a review of any results indicating no shared electric cars, or particularly high/low results. Where desk research indicated that there were operators or fleets potentially not accounted for in the Fluctuo data, the study team reached out to both operators and city contacts to verify this information, including checking for the presence of an operating scheme and number of units.

Results for the shared electric cars indicator are presented in Table 3-3. The data quality was rated as ‘medium’ to ‘good’ for all of the cities for this indicator, because the shared car availability data presented a higher degree of uncertainty compared to the data for shared bikes and e-scooters. It was not always possible to verify the fleet sizes of each operator or confirm that operators were active in some cities (see Appendix 2 for details on sources used and data quality ratings). It should be noted that the operating area/city area for shared cars used by Fluctuo does not always correspond directly to the city boundaries used for our study. This therefore can lead to both under and over-estimation of shared cars available for the cities. However, there was no way to obtain accurate figures corresponding to the exact geographical extents of the city areas used in this study.

The scale of this indicator was set so that no availability of shared electric cars would score 0 points and an upper threshold of 1.0 per 1,000 population would score 10 points¹³. It should be acknowledged that whilst the upper threshold of 1 shared electric vehicle per 1,000 population is considered low, many of the cities have more shared cars available to the general public, but these include ICE and hybrid vehicles. In the future it is expected that this upper threshold would increase as more shared car fleets switch from ICE and hybrid vehicles to electric cars.

2.2.3 Zero-emission buses

This indicator represents progress in the achievement of zero-emission bus fleets within each city. For the purpose of this study, zero-emission buses were defined as buses with zero tailpipe emissions, and therefore include battery electric buses, fuel cell buses, ultracapacitor buses and electric trolley buses. Public transport is more efficient than private car use when it comes to energy use, emissions and space, but the full benefits of public transport can only be unlocked if it is zero emission too.

It was initially planned that this indicator would also recognise the contribution of other potentially zero-emission public transport modes within cities (e.g. metro, tram etc.) through determining the proportion of the public transport network that they cover, and subsequently the proportion of the fleet or kms travelled that were

¹⁰ Boundary usually refers to where vehicles can be picked-up/left within an defined area.

¹¹ Peer-to-peer (P2P) car sharing – Process whereby existing vehicle owners make their vehicles available to rent for short periods of time.

¹² Business-to-business (B2B) car sharing – Process whereby a business owns a vehicle/vehicles and they are available for use by employees of that business (fixed or flexible amount of time).

¹³ The highest value for shared electric cars is 1.8 per 1,000 population (Copenhagen), with three cities scoring 10.0.

zero emission. However, despite requesting information directly from cities to calculate the indicator on this basis, the required data was not consistently available for all 42 cities. The decision was therefore taken to focus solely on zero-emission bus fleets (as defined in the previous paragraph), where more data was available. In the majority of cities concerned, buses were also the only public transport fleet that still required electrifying, indicating that the cities often also have electrified tram and metro systems. This is in addition to selected local trains, which are often not controlled by the city or typically classed as urban transport.

The proportion of zero-emission bus fleet is based on:

$$\text{Percentage of bus fleet that is zero – emission} = \frac{(\text{number of zero – emission buses}) + (\text{number of trolleybuses})}{\text{total number of all buses and trolleybuses}} \times 100\%$$

If it were possible to calculate results for this indicator using the number of vehicle/seat-km travelled using electric buses, as a portion of the total vehicle/seat-km travelled using all buses, this would likely be considered a more accurate representation of the cities' progress towards electrification of their bus services. However, that level of detail was not available, and therefore the number and portion of zero emission buses were used as the best proxy data available.

For this indicator, data was obtained directly from the cities (including public transport authorities), desk research and from publicly available reports (including those produced by UITP¹⁴). Results for zero-emission buses are presented in Table 3-4. The data quality was rated as “poor” to “good” depending on the sources used for each city (see Appendix 2 for details on sources used and data quality ratings). There were a number of limitations of the data, including the following:

- The operating area of the bus services within cities does not always correspond to the city boundary as defined for this study, for example, in some cases the bus service operating area relate to the metropolitan area instead.
- In some cases, data relating all bus operators within a city could not be included due to the lack of available data or data not being provided. In these cases it was usually the main operator or dataset that has been included.
- Only urban bus transport data has been included. Where possible, inter-city, regional buses/suburban buses and coaches have been excluded.
- Only buses in operation should be included – the study has had to rely on the available data to provide this information.

The scale of this indicator was set so that no availability of zero-emission buses would score 0 points and an upper threshold of 30% (% zero-emission buses in the total bus fleet) would score 10 points. Further weighting was applied to the zero-emission buses indicator to take into account and recognise the size of the total bus fleets in the cities. Where a city has a considerable bus fleet, much greater finance/time is required to replace the existing ICE bus fleet. In many cases, these larger cities with larger bus fleets already have a large number of zero-emission buses, but percentage wise in comparison to smaller cities with smaller fleets they appear to be doing worse. To balance these considerations, the percentage of zero-emission buses in a city accounts for 0.75 (75%) of the indicator score, and the size of the zero-emission bus fleet in a city accounts for 0.25 (25%) of the indicator score¹⁵.

Additional information was also collated during the city outreach exercise relating to the 100% zero-emission ambition at the city level for their bus fleets. Where this information was available, this is presented in Table 3-5. Cities are making progress towards this stated ambition. Supporting legislation includes the revised Clean Vehicle Directive (EU 2019/1161) requiring that national targets are defined for procuring clean vehicles, including clean¹⁶ or zero-emission¹⁷ buses.

¹⁴ UITP (2022) ASSURED Clean Bus Report: <https://www.uitp.org/publications/assured-clean-bus-report/>

¹⁵ The highest value for percentage of zero-emission buses was 66.86% (Oslo). The highest score awarded with weightings applied was 8.4 (Oslo).

¹⁶ 'Clean' - any truck or bus using one of the following alternative fuels: hydrogen, battery electric (including plug-in hybrids), natural gas (both CNG and LNG, including biomethane), liquid biofuels, synthetic and paraffinic fuels, LPG.

¹⁷ 'Zero-emission' - All vehicles running on any of the alternative fuels listed in the Alternative Fuels Infrastructure Directive (Directive 2014/95); in order to reflect their performance in terms of air quality and decarbonisation, zero-emission heavy-duty vehicles are given a separate definition.

2.2.4 EV charging infrastructure

This indicator represents how easy it is to access electric vehicle charging stations, by considering the number of charging stations that are accessible to the general public and the speed (power output) of the charging stations to determine charging availability within the city.

The power output available for charging per 1,000 people in the city was calculated using the following formula:

$$\text{Power (kW) per capita} = \frac{\text{public power output (kW)} + (\text{restricted power output (kW)} \times 0.5)}{\text{city population (per 1,000 people)}}$$

For this indicator, all of the information on charging station location and power output was sourced from Eco-Movement¹⁸. Eco-Movement gather and frequently update a comprehensive dataset containing detailed information about charging infrastructure across Europe. This data is not freely available and was purchased by the CCC for this study. The Eco-Movement dataset categorises charging stations as ‘public’ if they are fully accessible to the public, 24 hours a day and 7 days a week. Stations that are sometimes accessible to the public but have some sort of restriction on their usage, such as being located in a car park that is closed overnight, are classified as ‘restricted’ stations. For this indicator, the power output from fully publicly accessible stations was given full weighting in the calculation and the power output from restricted stations was multiplied by 0.5 to account for the restricted access.

The scale of this indicator was set so that a lower threshold of 0 kW available per 1,000 population would score 0 points, and an upper threshold of 50 kW available per 1,000 population would score 10 points¹⁹. The upper threshold was set based on considering the range of output power available in most of the cities included in this study.

Results for the access to electric vehicle charging indicator are presented in Table 3-6. The data quality was rated as “good” for all of the cities for this indicator, because the charging station information was obtained from Eco-Movement. Eco-Movement is one of the leading suppliers of data on EV charging infrastructure and Eco-Movement data is used by the European Commission in the European Alternative Fuel Observatory (EAFO) and for the TEN-T.

2.2.5 E-mobility hubs

A final indicator was considered for the study which focused on cities’ progress with implementing electric mobility hubs, also known as ‘e-mobility hubs’ or ‘e-hubs’. These hubs facilitate the use and interchange between more sustainable transport modes, including electric micromobility options. Although there is currently no formally agreed definition of e-mobility hubs at the European level, they can be described as a location where several shared electric vehicle types are available to the public on an ‘as needed’ basis. E-mobility hubs can promote intermodal behaviour instead of car use and tend to combine zero-emission services with efficient use of space. E-mobility hubs have seen a strong growth in European cities recently, and this indicator aims to capture progress.

The focus on this potential indicator was on ‘multimodal e-mobility hubs’, where interchange takes place between public transport and shared modes/micromobility (see Table 2-5), all modes that have been recognised in the first four indicators.

Table 2-5: Defining a multimodal e-mobility hub

Group 1 Public transport (one or more)		Group 2 Shared modes / Micromobility (one or more)	
Bus stop	Tram stop	Shared e-scooter	Shared e-cargo bike
Bus station	Metro station	Shared e-bike	Shared electric car
Train station		Shared bike	

¹⁸ Eco-movement: <https://www.eco-movement.com/>

¹⁹ The highest value for EV charging infrastructure is 147.3 kW per 1,000 population (Amsterdam), with five cities scoring 10.0 (Amsterdam, Oslo, Copenhagen, Ghent, and Antwerp).

As part of the city outreach exercise, city contacts were asked to supply information and data on the number and scale of e-mobility hubs implemented in their cities. However, it was evident from the responses that this information is not regularly collated or recorded, particularly in the context of an ‘e-mobility hub’ comprising multiple transport modes. More often, separate datasets are available for the individual modes contributing towards informal e-mobility hubs, e.g. the number of public transport stops or the number of shared e-bikes in the city.

Some examples of e-mobility hubs are provided in Figure 2-1.

Figure 2-1: Examples of E-Mobility hubs in European cities

<p>Berlin (DE) Jelbi</p> <ul style="list-style-type: none"> • Berlin’s transport authority (BVG) and e-mobility partners leading the Jelbi project • Bundling e-sharing services in one location: <ul style="list-style-type: none"> • Subways, buses, trams, in addition to e-scooters, e-bikes/bikes and shared cars • Jelbi stations offer customers flexibility to book, use and combine locally available offers • Jelbi app – Integrates all of Berlin’s public and shared mobility options into a one-stop-shop  <p>Source: https://www.jelbi.de/en/jelbi-stations/</p>	<p>Vienna (AT) WienMobil</p> <ul style="list-style-type: none"> • Living lab in Vienna as part of the SmartHubs project (2021-24) • Designing a citywide mobility hub network • WienMobil app – Plan,book and pay for modes in Vienna, including public transport, bike, e-scooter, car sharing, taxi or on foot.  <p>Source: https://www.wienerlinien.at/wienmobil/stationen</p>
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3. INDICATOR RESULTS

The following sub-sections provide the final indicator data, ranking and scoring for each of the indicators.

3.1 GENERAL CITY STATISTICS

Table 3-1: City area and population statistics

City	City area (km ²)	Population	Population density (people per km ²)
Amsterdam	219.0	882,633	4,030.3
Antwerp	203.7	530,630	2,604.5
Barcelona	100.8	1,636,732	16,243.2
Berlin	891.8	3,677,472	4,123.6
Bilbao	41.3	344,678	8,337.1
Birmingham	268.0	1,140,525	4,255.9
Brussels (Brussels Capital Region)	162.4	1,222,637	7,526.8
Bucharest	239.0	2,161,347	9,044.2
Budapest	1,044.9	1,706,851	1,633.5
Cologne	406.7	1,073,096	2,638.8
Copenhagen	93.6	644,431	6,886.2
Dublin	128.4	588,233	4,582.9
Edinburgh	273.0	527,620	1,932.4
Ghent	157.9	264,666	1,675.8
Glasgow	176.4	635,130	3,600.5
Granada	88.1	231,775	2,630.5
Hamburg	742.5	1,904,000	2,564.3
Helsinki	214.0	658,457	3,076.9
Krakow	326.8	802,583	2,455.5
Liège	68.4	195,278	2,854.0
Lisbon	84.7	545,923	6,442.0
Ljubljana	275.1	294,113	1,069.3
Greater London	1,595.2	8,799,730	5,514.4
Lyon	48.0	518,635	10,809.4
Madrid	604.9	3,305,408	5,464.3
Greater Manchester	1,276.9	2,848,286	2,230.6
Marseille	242.1	868,277	3,585.8
Milan	181.8	1,374,582	7,560.0
Munich	311.4	1,515,860	4,867.8

City	City area (km ²)	Population	Population density (people per km ²)
Naples	118.5	922,094	7,783.4
Oslo	480.8	702,543	1,461.3
Paris	105.4	2,175,601	20,643.1
Prague	496.3	1,301,432	2,622.4
Rome	1,285.8	2,823,000	2,195.5
Sofia	1,339.0	1,248,452	932.4
Stockholm	215.8	978,770	4,535.4
Strasbourg	78.3	284,677	3,636.1
Tri-city (Gdansk, Sopot and Gdynia)	418.4	763,690	1,825.2
Turin	130.1	858,205	6,594.8
Valencia	139.3	792,492	5,690.4
Vienna	414.9	1,914,743	4,615.4
Warsaw	517.2	1,863,056	3,602.2

3.2 SHARED BIKES AND E-SCOOTERS

Table 3-2: Scores and city ranking for: Shared bikes and e-scooters

Rank (equal scores)	City	Shared bikes and e-scooters per 1000 population (based on weighting factors)	Data quality rating	Score out of 10	Anticipated direction of change (2023/24) ²⁰
1	Helsinki	31.3	Good	10.0	
2	Lisbon	29.7	Good	10.0	
3	Brussels (Brussels Capital Region)	24.3	Good	10.0	↓
4	Paris	20.4	Good	10.0	↓
5	Lyon	16.9	Good	8.5	
6	Cologne	15.4	Good	7.7	
7	Milan	14.9	Good	7.5	
8	Hamburg	14.7	Good	7.4	
9	Copenhagen	14.5	Good	7.3	
10	Munich	14.2	Good	7.1	
11	Berlin	13.0	Good	6.5	
12	Warsaw	12.7	Good	6.4	
13	Antwerp	12.6	Good	6.3	
14	Oslo	11.9	Good	6.0	
15	Krakow	11.4	Good	5.7	
16	Stockholm	10.4	Good	5.2	↑
17	Turin	10.0	Good	5.0	
18	Tri-city (Gdansk, Sopot and Gdynia)	9.9	Good	5.0	↑
19	Marseille	9.4	Good	4.7	
20	Budapest	7.5	Good	3.8	
21	Rome	7.3	Good	3.7	↓
22	Liège	6.6	Good	3.3	
23	Barcelona	5.7	Good	2.9	↑
24	Prague	5.3	Good	2.7	
25	Ljubljana	5.1	Good	2.6	
26	Amsterdam	4.7	Good	2.4	
27	Ghent	4.3	Good	2.2	

²⁰ Based on known changes to availability of bikes/e-scooters announced for the 2023/24 period. See Table 2-4 for further details.

Rank (equal scores)	City	Shared bikes and e-scooters per 1000 population (based on weighting factors)	Data quality rating	Score out of 10	Anticipated direction of change (2023/24) ²⁰
28	Bucharest	4.2	Good	2.1	
29	Vienna	3.5	Good	1.8	
30	Greater London	3.4	Good	1.7	
31	Dublin	3.4	Good	1.7	
32	Strasbourg	3.2	Good	1.6	
33	Madrid	3.1	Good	1.6	↑
34	Valencia	3.0	Good	1.5	
35	Naples	2.5	Good	1.3	
36	Granada	2.2	Good	1.1	
37	Bilbao	1.8	Good	0.9	
38	Birmingham	1.3	Good	0.7	
39	Glasgow	1.2	Good	0.6	
40	Sofia	1.0	Good	0.5	
41	Greater Manchester	0.7	Good	0.4	
42	Edinburgh	0.0	Good	0.0	

3.3 SHARED ELECTRIC CARS

Table 3-3: Scores and city ranking for: Shared electric cars

Rank (equal scores)	City	Shared electric cars per 1000 population	Data quality rating	Score out of 10
1	Copenhagen	1.76	Good	10.0
2	Amsterdam	1.47	Medium	10.0
3	Ljubljana	1.02	Good	10.0
4	Oslo	0.81	Medium	8.1
5	Hamburg	0.76	Medium	7.6
6	Paris	0.65	Medium	6.5
7	Berlin	0.61	Medium	6.1
8	Madrid	0.59	Medium	5.9
9	Lyon	0.50	Medium	5.0
10	Sofia	0.48	Good	4.8
11	Milan	0.47	Medium	4.7
12	Munich	0.37	Good	3.7
13	Stockholm	0.36	Good	3.6
14	Budapest	0.35	Medium	3.5
15	Brussels (Brussels Capital Region)	0.31	Medium	3.1
16	Ghent	0.31	Medium	3.1
17	Antwerp	0.28	Medium	2.8
18	Cologne	0.26	Medium	2.6
19	Turin	0.24	Medium	2.4
20	Bucharest	0.23	Good	2.3
21	Marseille	0.22	Good	2.2
22	Helsinki	0.22	Medium	2.2
23	Strasbourg	0.22	Medium	2.2
24	Prague	0.18	Medium	1.8
25	Rome	0.15	Medium	1.5
26	Krakow	0.12	Medium	1.2
27	Warsaw	0.10	Medium	1.0
28	Naples	0.09	Medium	0.9
29	Vienna	0.06	Medium	0.6

Rank (equal scores)	City	Shared electric cars per 1000 population	Data quality rating	Score out of 10
30	Greater London	0.05	Medium	0.5
31	Edinburgh	0.05	Good	0.5
32	Glasgow	0.03	Medium	0.3
33	Dublin	0.02	Medium	0.2
34	Barcelona	0.01	Good	0.1
35	Valencia	0.01	Medium	0.1
36	Greater Manchester	0.00	Good	0.0
37	Birmingham	0.00	Medium	0.0
38	Bilbao	0.00	Medium	0.0
39	Granada	0.00	Medium	0.0
40	Liège	0.00	Medium	0.0
41	Lisbon	0.00	Good	0.0
42	Tri-city (Gdansk, Sopot and Gdynia)	0.00	Medium	0.0

3.4 ZERO-EMISSION BUSES

Table 3-4: Scores and city ranking for: Zero-emission buses

Rank (equal scores)	City	Number of electric/hydrogen buses	Total number of buses	Percent of bus fleet electrified (%)	Data quality rating	Score out of 10 (weighted)
1	Oslo	339	507	66.9	Good	8.4
2	Copenhagen	340	1,324	25.7	Good	7.3
3	Milan	352	1,420	24.8	Medium	7.1
4	Sofia	222	890	24.9	Good	6.8
5	Helsinki	316	1,317	24.0	Medium	6.8
6	Glasgow	150	623	24.1	Good	6.4
7	Tri-city (Gdansk, Sopot and Gdynia)	136	594	22.9	Good	6.1
8	Strasbourg	56	258	21.7	Good	5.6
9	Greater London	970	8,800	11.0	Good	5.3
10	Paris	652	4,848	13.4	Medium	5.0
11	Amsterdam	44	231	19.0	Good	4.9
12	Lyon	145	945	15.3	Medium	4.2
13	Cologne	63	422	14.9	Good	3.9
14	Hamburg	226	1,768	12.8	Good	3.8
15	Turin	96	753	12.7	Good	3.4
16	Krakow	79	631	12.5	Good	3.3
17	Bucharest	159	1,401	11.3	Good	3.2
18	Naples	59	514	11.5	Medium	3.0
19	Budapest	121	1,204	10.0	Good	2.8
20	Warsaw	162	1,812	8.9	Good	2.7
21	Berlin	138	1,572	8.8	Medium	2.6
22	Madrid	180	2,095	8.6	Medium	2.6
23	Bilbao	13	141	9.2	Good	2.3
24	Barcelona	79	1,132	7.0	Good	1.9
25	Brussels (Brussels Capital Region)	37	862	4.3	Good	1.2
26	Valencia	22	517	4.3	Good	1.1
27	Rome	75	2,111	3.6	Medium	1.1
28	Munich	24	763	3.1	Good	0.8
29	Granada	6	201	3.0	Poor	0.8
30	Birmingham	54	2,000	2.7	Good	0.8

Rank (equal scores)	City	Number of electric/hydrogen buses	Total number of buses	Percent of bus fleet electrified (%)	Data quality rating	Score out of 10 (weighted)
31	Vienna	12	423	2.8	Medium	0.7
32	Edinburgh	12	533	2.3	Good	0.6
33	Lisbon	15	732	2.0	Good	0.6
34	Greater Manchester	35	2,141	1.6	Good	0.5
35	Stockholm	15	931	1.6	Good	0.4
36	Ghent	3	269	1.1	Good	0.3
37	Marseille	6	623	1.0	Good	0.3
38	Antwerp	13	2,294	0.6	Good	0.2
39	Prague	1	1,216	0.1	Good	0.0
40	Dublin	-	1,045	0.0	Good	0.0
41	Liège	-	472	0.0	Good	0.0
42	Ljubljana	-	219	0.0	Good	0.0

Table 3-5: 100% electrification/zero-emission bus fleets – Summary of city targets

Target year	City (and details)
2025	Amsterdam, Barcelona, Copenhagen (city network), Ghent (urban network), Oslo (city network by 2023, entire network in the region by 2028)
2030	Berlin, Birmingham (main bus operator), Cologne, Copenhagen (Movia), Milan, Sofia, Hamburg (early 2030s), Greater Manchester (2032 ²¹), Greater London (2034 ²²)
2035	Antwerp, Dublin, Ghent (entire network), Helsinki, Munich
Other targets	Ljubljana (30% electric/hydrogen buses by 2030. Ambition to have 70% biomethane buses in fleet by 2030) Madrid (25% by 2025) Paris (25% by 2025) Prague (purchase of electric buses and trolleybuses to fulfil Climate Plan by 2030 – number unknown) Rome (25% by 2026, 50% by 2030) Stockholm (to replace a large proportion of the fleet with electric buses during period 2024-2026 – number unknown) Strasbourg (replace diesel buses with a mix of electric and biogas buses) Turin (85% electric or CNG by 2024) Vienna (20% by 2025) Warsaw (25% by 2030)

²¹ Manchester has an interim target of 33% by 2027

²² Greater London/TfL target could be brought forward to 2030 subject to government funding: <https://content.tfl.gov.uk/bus-action-plan.pdf>

Target year	City (and details)
Unknown	Bilbao
	Brussels (Brussels Capital Region)
	Bucharest
	Budapest
	Edinburgh
	Glasgow
	Granada
	Krakow
	Liege
	Lisbon
	Lyon
	Marseille
	Naples
	Tri-city
Valencia	

3.5 EV CHARGING INFRASTRUCTURE

Table 3-6: Scores and city ranking for: EV charging infrastructure

Rank (equal scores)	City	Power (kW) per 1000 population (based on weighting factors)	Data quality rating	Score out of 10
1	Amsterdam	147.30	Good	10.0
2	Oslo	133.80	Good	10.0
3	Copenhagen	89.50	Good	10.0
4	Ghent	86.70	Good	10.0
5	Antwerp	59.80	Good	10.0
6	Lisbon	46.40	Good	9.3
7	Hamburg	40.60	Good	8.1
8	Ljubljana	38.80	Good	7.8
9	Munich	35.10	Good	7.0
10	Paris	31.40	Good	6.3
11	Stockholm	30.30	Good	6.1
12	Helsinki	29.80	Good	6.0
13	Budapest	28.50	Good	5.7
14	Brussels (Brussels Capital Region)	27.40	Good	5.5
15	Turin	27.40	Good	5.5
16	Greater London	25.20	Good	5.0
17	Vienna	22.90	Good	4.6
18	Cologne	22.80	Good	4.6
19	Glasgow	22.70	Good	4.5
20	Strasbourg	22.00	Good	4.4
21	Rome	20.70	Good	4.1
22	Prague	20.10	Good	4.0
23	Milan	19.00	Good	3.8
24	Edinburgh	19.00	Good	3.8
25	Berlin	18.40	Good	3.7
26	Barcelona	16.60	Good	3.3
27	Madrid	16.10	Good	3.2
28	Birmingham	15.80	Good	3.2
29	Lyon	14.90	Good	3.0
30	Bilbao	13.40	Good	2.7
31	Marseille	13.30	Good	2.7
32	Valencia	13.00	Good	2.6
33	Liège	12.90	Good	2.6
34	Greater Manchester	12.10	Good	2.4
35	Sofia	11.20	Good	2.2
36	Granada	11.10	Good	2.2
37	Tri-city (Gdansk, Sopot and Gdynia)	8.50	Good	1.7
38	Dublin	7.80	Good	1.6
39	Naples	6.50	Good	1.3
40	Warsaw	6.40	Good	1.3

Rank (equal scores)	City	Power (kW) per 1000 population (based on weighting factors)	Data quality rating	Score out of 10
41	Krakow	6.30	Good	1.3
42	Bucharest	3.90	Good	0.8

Table 3-7: Summary of indicator scoring and grading

City	Indicators										
	Shared bikes and e-scooters		Shared electric cars		Zero-emission buses		EV charging infrastructure		Total score (out of 40)*	Total score (out of 100%)	Grade
	Score out of 10	Data quality	Score out of 10	Data quality	Score out of 10	Data quality	Score out of 10	Data quality			
Amsterdam	2.4	Good	10.0	Medium	4.9	Good	10.0	Good	27.3	68.3%	B
Antwerp	6.3	Good	2.8	Medium	0.2	Good	10.0	Good	19.3	48.3%	C
Barcelona	2.9	Good	0.1	Good	1.9	Good	3.3	Good	8.2	20.5%	D
Berlin	6.5	Good	6.1	Medium	2.6	Medium	3.7	Good	18.9	47.3%	C
Bilbao	0.9	Good	0.0	Medium	2.3	Good	2.7	Good	5.9	14.8%	E
Birmingham	0.7	Good	0.0	Medium	0.8	Good	3.2	Good	4.7	11.8%	E
Brussels (Brussels Capital Region)	10.0	Good	3.1	Medium	1.2	Good	5.5	Good	19.8	49.5%	C
Bucharest	2.1	Good	2.3	Good	3.2	Good	0.8	Good	8.4	21.0%	D
Budapest	3.8	Good	3.5	Medium	2.8	Good	5.7	Good	15.8	39.5%	D
Cologne	7.7	Good	2.6	Medium	3.9	Good	4.6	Good	18.8	47.0%	C
Copenhagen	7.3	Good	10.0	Good	7.3	Good	10.0	Good	34.6	86.5%	A
Dublin	1.7	Good	0.2	Medium	0.0	Good	1.6	Good	3.5	8.8%	F
Edinburgh	0.0	Good	0.5	Good	0.6	Good	3.8	Good	4.9	12.3%	E
Ghent	2.2	Good	3.1	Medium	0.3	Good	10.0	Good	15.6	39.0%	D
Glasgow	0.6	Good	0.3	Medium	6.4	Good	4.5	Good	11.8	29.5%	D
Granada	1.1	Good	0.0	Medium	0.8	Poor	2.2	Good	4.1	10.3%	E
Greater London	1.7	Good	0.5	Medium	5.3	Good	5.0	Good	12.5	31.3%	D
Greater Manchester	0.4	Good	0.0	Good	0.5	Good	2.4	Good	3.3	8.3%	F
Hamburg	7.4	Good	7.6	Medium	3.8	Good	8.1	Good	26.9	67.3%	B
Helsinki	10.0	Good	2.2	Medium	6.8	Medium	6.0	Good	25.0	62.5%	B
Krakow	5.7	Good	1.2	Medium	3.3	Good	1.3	Good	11.5	28.8%	D
Liège	3.3	Good	0.0	Medium	0.0	Good	2.6	Good	5.9	14.8%	E

City	Indicators										
	Shared bikes and e-scooters		Shared electric cars		Zero-emission buses		EV charging infrastructure		Total score (out of 40)*	Total score (out of 100%)	Grade
	Score out of 10	Data quality	Score out of 10	Data quality	Score out of 10	Data quality	Score out of 10	Data quality			
Lisbon	10.0	Good	0.0	Good	0.6	Good	9.3	Good	19.9	49.8%	C
Ljubljana	2.6	Good	10.0	Good	0.0	Good	7.8	Good	20.4	51.0%	C
Lyon	8.5	Good	5.0	Medium	4.2	Medium	3.0	Good	20.7	51.8%	C
Madrid	1.6	Good	5.9	Medium	2.6	Medium	3.2	Good	13.3	33.3%	D
Marseille	4.7	Good	2.2	Good	0.3	Good	2.7	Good	9.9	24.8%	D
Milan	7.5	Good	4.7	Medium	7.1	Medium	3.8	Good	23.1	57.8%	C
Munich	7.1	Good	3.7	Good	0.8	Good	7.0	Good	18.6	46.5%	C
Naples	1.3	Good	0.9	Medium	3.0	Medium	1.3	Good	6.5	16.3%	E
Oslo	6.0	Good	8.1	Medium	8.4	Good	10.0	Good	32.5	81.3%	A
Paris	10.0	Good	6.5	Medium	5.0	Medium	6.3	Good	27.8	69.5%	B
Prague	2.7	Good	1.8	Medium	0.0	Good	4.0	Good	8.5	21.3%	D
Rome	3.7	Good	1.5	Medium	1.1	Medium	4.1	Good	10.4	26.0%	D
Sofia	0.5	Good	4.8	Good	6.8	Good	2.2	Good	14.3	35.8%	D
Stockholm	5.2	Good	3.6	Good	0.4	Good	6.1	Good	15.3	38.3%	D
Strasbourg	1.6	Good	2.2	Medium	5.6	Good	4.4	Good	13.8	34.5%	D
Tri-city (Gdansk, Sopot and Gdynia)	5.0	Good	0.0	Medium	6.1	Good	1.7	Good	12.8	32.0%	D
Turin	5.0	Good	2.4	Medium	3.4	Good	5.5	Good	16.3	40.8%	C
Valencia	1.5	Good	0.1	Medium	1.1	Good	2.6	Good	5.3	13.3%	E
Vienna	1.8	Good	0.6	Medium	0.7	Medium	4.6	Good	7.7	19.3%	E
Warsaw	6.4	Good	1.0	Medium	2.7	Good	1.3	Good	11.4	28.5%	D

APPENDICES

APPENDIX 1 INDICATOR CITIES

The full list of cities involved in this study is as follows:

City ²³	Country
Amsterdam	Netherlands
Antwerp	Belgium
Barcelona	Spain
Berlin	Germany
Bilbao	Spain
Birmingham	United Kingdom
Brussels (Brussels Capital Region)	Belgium
Bucharest	Romania
Budapest	Hungary
Cologne	Germany
Copenhagen	Denmark
Dublin	Ireland
Edinburgh	United Kingdom
Ghent	Belgium
Glasgow	United Kingdom
Granada	Spain
Hamburg	Germany
Helsinki	Finland
Krakow	Poland
Liège	Belgium
Lisbon	Portugal
Ljubljana	Slovenia
Greater London	United Kingdom
Lyon	France
Madrid	Spain
Greater Manchester	United Kingdom
Marseille	France
Milan	Italy
Munich	Germany
Naples	Italy
Oslo	Norway
Paris	France

²³ Unless stated otherwise, the city corresponds to the municipality or administrative entity with the same name. Please refer to section 2.1.3 for additional information on the city boundaries

City ²³	Country
Prague	Czech Republic
Rome	Italy
Sofia	Bulgaria
Stockholm	Sweden
Strasbourg	France
Tri-city (Gdansk, Sopot and Gdynia)	Poland
Turin	Italy
Valencia	Spain
Vienna	Austria
Warsaw	Poland

APPENDIX 2 INDICATOR CALCULATIONS AND REFERENCES

MAIN DATA SOURCES FOR EACH INDICATOR

Indicator	Data source	Data quality rating
Shared bikes and e-scooters	City/operator data (including city/operator outreach and opensource portal)	Good
	Fluctuo dataset	Good
	Website / secondary source	Poor
Shared electric cars	City/operator data (including city/operator outreach and opensource portal)	Good
	Fluctuo dataset	Medium
	Website/secondary source	Poor
Zero-emission buses	City/operator data (including city/operator outreach)	Good
	Official city/operator report	Good
	Official city/operator website	Medium
	ASSURED Clean Bus Report	Medium
	Other secondary source	Poor
EV charging infrastructure	Eco-Movement dataset	Good

POPULATION AND CITY AREA DATA SOURCES

Amsterdam

Population: <https://allecijfers.nl/gemeente/amsterdam/>

City area: <https://opendata.cbs.nl/statline/#/CBS/en/dataset/70262ENG/table?ts=1636555333401>

Antwerp

Population: <https://statbel.fgov.be/en/open-data/population-place-residence-nationality-marital-status-age-and-sex-12>

City area: <https://www.atlas-belgique.be/index.php/en/resources/map-data/>

Barcelona

Population: <https://www.ine.es/jaxiT3/Datos.htm?t=2861>

City area: <http://centrodedescargas.cnig.es/CentroDescargas/catalogo.do?Serie=CAANE>

Berlin

Population: <https://www-genesis.destatis.de/genesis/online>

City area: <https://opendata-esri-de.opendata.arcgis.com/datasets/esri-de-content::vg250-gemeindegrenzen/about>

Bilbao

Population:

https://www.bilbao.eus/cs/Satellite?c=Page&cid=1272993139883&language=es&pageid=1272993139883&pagename=Bilbaonet%2FPage%2FBIO_Observatorio

City area: <http://centrodedescargas.cnig.es/CentroDescargas/catalogo.do?Serie=CAANE>

Birmingham

Population:

<https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/datasets/populationestimatesforukenglandandwalescotlandandnorthernireland>

City area: <https://www.ordnancesurvey.co.uk/business-government/products/boundaryline>

Brussels (Brussels Capital Region)

Population: <https://statbel.fgov.be/en/open-data/population-place-residence-nationality-marital-status-age-and-sex-12>

City area: <https://data.metabolismofcities.org/dashboards/brussels/hub/harvesting/852>

Bucharest

Population: <https://insse.ro/cms/en/content/romania-figures-%E2%80%94-statistical-abstract-english-3>

City area: <http://geo-spatial.org/vechi/download/romania-seturi-vectoriale>

Budapest

Population: https://www.ksh.hu/stadat_files/nep/en/nep0034.html

City area: <https://earthworks.stanford.edu/catalog/stanford-xq382ws2128>

Cologne

Population: <https://www-genesis.destatis.de/genesis/online>

City area: <https://opendata-esri-de.opendata.arcgis.com/datasets/esri-de-content::vg250-gemeindegrenzen/about>

Copenhagen

Population: <https://www.statbank.dk/statbank5a/SelectVarVal/saveselections.asp>

City area: <https://www.opendata.dk/city-of-copenhagen/bydele>

Dublin

Population: <https://data.cso.ie/table/FP003>

City area: <https://data-osi.opendata.arcgis.com/datasets/osi::administrative-areas-osi-national-statutory-boundaries-2019/explore?location=53.380337%2C-6.219040%2C10.59>

Edinburgh

Population: <https://www.nrscotland.gov.uk/files/statistics/council-area-data-sheets/city-of-edinburgh-council-profile.html>

City area: <https://www.ordnancesurvey.co.uk/business-government/products/boundaryline>

Ghent

Population: https://gent.buurtmonitor.be/jive?workspace_guid=b8d83be7-355d-4ae9-aa4d-236d81a31b36

City area: <https://www.atlas-belgique.be/index.php/en/resources/map-data/>

Glasgow

Population: <https://www.nrscotland.gov.uk/files/statistics/council-area-data-sheets/glasgow-city-council-profile.html>

City area: <https://www.ordnancesurvey.co.uk/business-government/products/boundaryline>

Granada

Population: <https://www.ine.es/jaxiT3/Datos.htm?t=2871>

City area: <http://centrodedescargas.cnig.es/CentroDescargas/catalogo.do?Serie=CAANE>

Hamburg

Population: Provided in an email from the city

City area: <https://opendata-esri-de.opendata.arcgis.com/datasets/esri-de-content::vg250-gemeindegrenzen/about>

Helsinki

Population: https://www.stat.fi/tup/suoluk/suoluk_vaesto_en.html#Demographic%20dependency%20ratio%20by%20municipality

City area: https://www.maanmittauslaitos.fi/sites/maanmittauslaitos.fi/files/attachments/2018/01/Suomen_pa_2018_kunta_maakunta.pdf

Krakow

Population: <https://stat.gov.pl/en/topics/population/population/population-size-and-structure-and-vital-statistics-in-poland-by-territorial-division-in-2021-as-of-31-december,3,31.html>

City area: <https://gis-support.pl/baza-wiedzy-2/dane-do-pobrania/granice-administracyjnej/>

Liege

Population: <https://statbel.fgov.be/en/open-data/population-place-residence-nationality-marital-status-age-and-sex-12>

City area: <https://www.atlas-belgique.be/index.php/en/resources/map-data/>

Lisbon

Population:

https://www.ine.pt/xportal/xmain?xpid=INE&xpgid=ine_indicadores&indOcorrCod=0011166&contexto=pi&selTab=tab0

City area: <https://dados.gov.pt/pt/datasets/concelhos-de-portugal/>

Ljubljana

Population: Provided in an email from the city

City area: <https://www.openstreetmap.org/>

Greater London

Population:

<https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/datasets/populationestimatesforukenglandandwalesscotlandandnorthernireland>

City area: <https://www.ordnancesurvey.co.uk/business-government/products/boundaryline>

Lyon

Population: <https://www.insee.fr/fr/statistiques/1405599?geo=FRANCE-1>

City area: <https://www.data.gouv.fr/en/datasets/decoupage-administratif-communal-francais-issu-d-openstreetmap/>

Madrid

Population: <https://www.ine.es/jaxiT3/Datos.htm?t=2881>

City area: <http://centrodedescargas.cnig.es/CentroDescargas/catalogo.do?Serie=CAANE>

Greater Manchester

Population:

<https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/datasets/populationestimatesforukenglandandwalesscotlandandnorthernireland>

City area: <https://www.ordnancesurvey.co.uk/business-government/products/boundaryline>

Marseille

Population: <https://www.insee.fr/fr/statistiques/1405599?geo=FRANCE-1>

City area: <https://www.data.gouv.fr/en/datasets/decoupage-administratif-communal-francais-issu-d-openstreetmap/>

Milan

Population: <http://dati-censimentipermanenti.istat.it/?lang=en#>

City area: https://hub.arcgis.com/datasets/e68ceb0a193e4e378b29255b62ab75e0_0/data?geometry=-28.738%2C35.432%2C54.890%2C46.956

Munich

Population: Provided in an email from the city

City area: <https://opendata-esri-de.opendata.arcgis.com/datasets/esri-de-content::vg250-gemeindegrenzen/about>

Naples

Population: <http://dati-censimentipermanenti.istat.it/?lang=en#>

City area: https://hub.arcgis.com/datasets/e68ceb0a193e4e378b29255b62ab75e0_0/data?geometry=-28.738%2C35.432%2C54.890%2C46.956

Oslo

Population: <https://www.ssb.no/en/statbank/table/01222/tableViewLayout1/>

City area: <https://kartkatalog.geonorge.no/metadata/administrative-units-municipalities/041f1e6e-bdbc-4091-b48f-8a5990f3cc5b>

Paris

Population: <https://www.insee.fr/fr/statistiques/1405599?geo=FRANCE-1>

City area: <https://www.data.gouv.fr/en/datasets/decoupage-administratif-communal-francais-issu-d-openstreetmap/>

Prague

Population: <https://vdb.czso.cz/vdbvo2/faces/en/index.jsf>

City area:
[https://geoportal.cuzk.cz/\(S\(xru2wyncg4cspnziajbgxmbg\)\)/Default.aspx?lng=EN&mode=TextMeta&side=dsady_RUIAN&metadatalD=CZ-CUZK-SH-V&mapid=5&menu=252](https://geoportal.cuzk.cz/(S(xru2wyncg4cspnziajbgxmbg))/Default.aspx?lng=EN&mode=TextMeta&side=dsady_RUIAN&metadatalD=CZ-CUZK-SH-V&mapid=5&menu=252)

Rome

Population: Provided in an email from the city

City area: https://hub.arcgis.com/datasets/e68ceb0a193e4e378b29255b62ab75e0_0/data?geometry=-28.738%2C35.432%2C54.890%2C46.956

Sofia

Population: <https://www.nsi.bg/en/content/2981/population-towns-and-sex>

City area: <https://data.humdata.org/dataset/cod-ab-bgr?>

Stockholm

Population:
https://www.statistikdatabasen.scb.se/pxweb/en/ssd/START_BE_BE0101_BE0101A/BefolkningNy/table/tableViewLayout1/

City area: <https://www.arcgis.com/home/item.html?id=4b1a4eb235e5483fa4619bcb2ad2fae9>

Strasbourg

Population: <https://www.insee.fr/fr/statistiques/1405599?geo=FRANCE-1>

City area: <https://www.data.gouv.fr/en/datasets/decoupage-administratif-communal-francais-issu-d-openstreetmap/>

Tri-city (Gdansk, Sopot and Gdynia)

Population: <https://stat.gov.pl/en/topics/population/population/population-size-and-structure-and-vital-statistics-in-poland-by-territorial-division-in-2021-as-of-31-december,3,31.html>

City area: <https://gis-support.pl/baza-wiedzy-2/dane-do-pobrania/granice-administracyjnej/>

Turin

Population: <http://dati-censimentipermanenti.istat.it/?lang=en#>

City area: https://hub.arcgis.com/datasets/e68ceb0a193e4e378b29255b62ab75e0_0/data?geometry=-28.738%2C35.432%2C54.890%2C46.956

Valencia

Population: <https://www.ine.es/jaxiT3/Datos.htm?t=29005#!tabs-tabla>

City area: <http://centrodedescargas.cnig.es/CentroDescargas/catalogo.do?Serie=CAANE>

Vienna

Population: <https://www.statistik.at/en/statistics/population-and-society/population/population-stock/population-for-the-fiscal-equalisation>

City area: <https://www.data.gv.at/katalog/dataset/1a22d558-544a-46c1-95b9-baa77d2bb485>

Warsaw

Population: <https://stat.gov.pl/en/topics/population/population/population-size-and-structure-and-vital-statistics-in-poland-by-territorial-division-in-2021-as-of-31-december,3,31.html>

City area: <https://gis-support.pl/baza-wiedzy-2/dane-do-pobrania/granice-administracyjne/>

SHARED BIKES AND E-SCOOTERS

Shared bicycles

City	Number of bicycles used	Source	Data quality
Amsterdam	3650	Fluctuo	Good
Antwerp	4111	Fluctuo	Good
Barcelona	4472	City (email - 20/03/23)	Good
Berlin	6268	Fluctuo	Good
Bilbao	0	Fluctuo	Good
Birmingham	1350	Fluctuo	Good
Brussels	2446	Fluctuo	Good
Bucharest	737	Fluctuo	Good
Budapest	1720	Fluctuo	Good
Cologne	4,000	City (email - 21/03/23)	Good
Copenhagen	1500	City (email – 20/03/23)	Good
Dublin	1248	Fluctuo	Good
Edinburgh	0	Fluctuo, confirmed by City (email – 28/03/23)	Good
Ghent	451	Fluctuo	Good
Glasgow	655	Fluctuo	Good
Granada	0	Fluctuo	Good
Hamburg	1952	Fluctuo	Good
Helsinki	4482	Fluctuo	Good
Krakow	0	Fluctuo	Good
Liège	229	City (opensource portal)	Good
Lisbon	504	Fluctuo	Good
Ljubljana	840	City (email – 27/03/23)	Good
Greater London	8804	Fluctuo	Good
Lyon	2200	Fluctuo	Good
Madrid	0	Fluctuo	Good
Greater Manchester	1200	Fluctuo	Good
Marseille	0	Fluctuo	Good
Milan	4280	Fluctuo	Good
Munich	4760	Fluctuo	Good
Naples	0	Fluctuo	Good
Oslo	1800	Fluctuo	Good

City	Number of bicycles used	Source	Data quality
Paris	11109	Fluctuo	Good
Prague	1863	Fluctuo	Good
Rome	0	Fluctuo	Good
Sofia	50	Fluctuo	Good
Stockholm	0	Fluctuo	Good
Strasbourg	500	Fluctuo	Good
Tri-city (Gdansk, Sopot and Gdynia)	0	Fluctuo	Good
Turin	116	Fluctuo	Good
Valencia	2375	Fluctuo	Good
Vienna	150	Fluctuo	Good
Warsaw	4449	Fluctuo	Good

Shared e-bikes

City	Number of e-bikes used	Source	Data quality
Amsterdam	481	Fluctuo	Good
Antwerp	253	Fluctuo	Good
Barcelona	4,813	City (email - 20/03/23)	Good
Berlin	5801	Fluctuo	Good
Bilbao	624	Fluctuo, confirmed by City (email - 21/03/23)	Good
Birmingham	150	Fluctuo	Good
Brussels	4349	Fluctuo	Good
Bucharest	0	Fluctuo	Good
Budapest	0	Fluctuo	Good
Cologne	1,250	City (email - 21/03/23)	Good
Copenhagen	6,350	City (email – 20/03/23)	Good
Dublin	778	Fluctuo	Good
Edinburgh	0	Fluctuo, confirmed by City (email – 28/03/23)	Good
Ghent	700	Fluctuo	Good
Glasgow	105	Fluctuo	Good
Granada	0	Fluctuo	Good
Hamburg	1370	Fluctuo	Good
Helsinki	750	Fluctuo	Good

City	Number of e-bikes used	Source	Data quality
Krakow	213	Fluctuo	Good
Liège	0	City – open source portal	Good
Lisbon	4017	Fluctuo	Good
Ljubljana	120	City (email – 27/03/23)	Good
Greater London	16979	Fluctuo	Good
Lyon	2200	Fluctuo	Good
Madrid	4050	Fluctuo	Good
Greater Manchester	300	Fluctuo	Good
Marseille	3021	Fluctuo	Good
Milan	11780	Fluctuo	Good
Munich	1643	Fluctuo	Good
Naples	606	Fluctuo	Good
Oslo	475	Fluctuo	Good
Paris	18894	Fluctuo	Good
Prague	1266	Fluctuo	Good
Rome	7048	Fluctuo	Good
Sofia	0	Fluctuo	Good
Stockholm	0	Operator data	Good
Strasbourg	300	Fluctuo	Good
Tri-city (Gdansk, Sopot and Gdynia)	0	Fluctuo	Good
Turin	2301	Fluctuo	Good
Valencia	0	Fluctuo	Good
Vienna	2347	Fluctuo	Good
Warsaw	494	Fluctuo	Good

Shared e-scooters

City	Number of e-scooters used	Source	Data quality
Amsterdam	0	Fluctuo	Good
Antwerp	2306	Fluctuo	Good
Barcelona	0	Fluctuo / confirmed by City (email - 20/03/23)	Good
Berlin	35907	Fluctuo	Good

City	Number of e-scooters used	Source	Data quality
Bilbao	0	Fluctuo	Good
Birmingham	0	City / secondary source	Good
Brussels	22897	Fluctuo	Good
Bucharest	8375	Fluctuo	Good
Budapest	1100	Fluctuo	Good
Cologne	11230	Fluctuo	Good
Copenhagen	1500	Fluctuo	Good
Dublin	0	Fluctuo	Good
Edinburgh	0	Fluctuo, confirmed by City (email – 28/03/23)	Good
Ghent	0	Fluctuo	Good
Glasgow	0	Fluctuo	Good
Granada	500	Fluctuo	Good
Hamburg	24631	Fluctuo	Good
Helsinki	15347	Fluctuo	Good
Krakow	8975	Fluctuo	Good
Liège	1064	City – Open data portal (17/02/23)	Good
Lisbon	11681	Fluctuo	Good
Ljubljana	550	Fluctuo	Good
Greater London	4057	Fluctuo	Good
Lyon	4358	Fluctuo	Good
Madrid	6270	Fluctuo	Good
Greater Manchester	468	City	Good
Marseille	5170	Fluctuo	Good
Milan	4475	Fluctuo	Good
Munich	15,148	City	Good
Naples	1700	Fluctuo	Good
Oslo	6100	Fluctuo	Good
Paris	14281	Fluctuo	Good
Prague	3789	Fluctuo	Good
Rome	13590	Fluctuo	Good
Sofia	1250	Fluctuo	Good
Stockholm	10153	Fluctuo	Good
Strasbourg	120	Fluctuo	Good
Tri-city (Gdansk,	7560	Fluctuo	Good

City	Number of e-scooters used	Source	Data quality
Sopot and Gdynia)			
Turin	6168	Fluctuo	Good
Valencia	0	Fluctuo	Good
Vienna	4115	Fluctuo	Good
Warsaw	18770	Fluctuo	Good

SHARED ELECTRIC CARS

City	Number of shared cars (EV) used	Source	Data quality
Amsterdam	1300	Fluctuo	Medium
Antwerp	150	Fluctuo	Medium
Barcelona	10	Fluctuo, confirmed by City (email – 20/03/23)	Good
Berlin	2246	Fluctuo	Medium
Bilbao	0	Fluctuo	Medium
Birmingham	2	Fluctuo	Medium
Brussels (Brussels Capital Region)	378	Fluctuo	Medium
Bucharest	500	Operator data (Spark – email – 18/04/23)	Good
Budapest	605	Fluctuo	Medium
Cologne	277	Fluctuo	Medium
Copenhagen	1131	City (email – 15/03/23)	Good
Dublin	11	Fluctuo	Medium
Edinburgh	24	Operator and city data (email – 28/03/23)	Good
Ghent	83	Fluctuo	Medium
Glasgow	22	Fluctuo	Medium
Granada	0	Fluctuo	Medium
Hamburg	1438	Fluctuo	Medium
Helsinki	142	Fluctuo	Medium
Krakow	97	Fluctuo	Medium
Liège	0	Fluctuo	Medium
Lisbon	0	Fluctuo, confirmed by city (email – 14/04/23)	Good
Ljubljana	300	City (email – 27/03/23)	Good
Greater London	479	Fluctuo	Medium
Lyon	261	Fluctuo	Medium
Madrid	1947	Fluctuo	Medium
Greater Manchester	13	Operator / city	Good
Marseille	193	Operator / city	Good
Milan	640	Fluctuo	Medium

City	Number of shared cars (EV) used	Source	Data quality
Munich	563	City	Good
Naples	80	Fluctuo	Medium
Oslo	570	Fluctuo	Medium
Paris	1450	Fluctuo	Medium
Prague	230	Fluctuo	Medium
Rome	431	Fluctuo	Medium
Sofia	600	Operator data (Spark – email – 18/04/23)	Good
Stockholm	350	Operator data	Good
Strasbourg	64	Fluctuo	Medium
Tri-city (Gdansk, Sopot and Gdynia)	0	Fluctuo	Medium
Turin	206	Fluctuo	Medium
Valencia	5	Fluctuo	Medium
Vienna	113	Fluctuo	Medium
Warsaw	193	Fluctuo	Medium

ZERO-EMISSION BUSES

City	Number of electric/ hydrogen buses (including trolley buses)	Source	Data quality	Total bus fleet used	Source	Year of data	Data quality
Amsterdam	44	Official city/operator report: https://over.gvb.nl/content/uploads/2022/05/230322-Activa-BV-Jaarverslag.pdf	Good	231	Official city/operator report: https://over.gvb.nl/content/uploads/2022/05/230322-Activa-BV-Jaarverslag.pdf	2021	Good
Antwerp	13	Official city/operator report: https://assets.ctfassets.net/32fmeyn9t08i/491Klu7figKXvES46i1AP9/4f222deb09128919cc65180a1df152b/jaarverslag_2021.pdf	Good	2294	Official city/operator report: https://assets.ctfassets.net/32fmeyn9t08i/491Klu7figKXvES46i1AP9/4f222deb09128919cc65180a1df152b/jaarverslag_2021.pdf	2021	Good
Barcelona	79	Confirmed by Operator (TMB – email 24/03/23)	Good	1132	Confirmed by Operator (TMB – email 24/03/23)	2022	Good
Berlin	138	Official city/operator website: https://unternehmen.bvg.de/profil/	Medium	1572	Official city/operator website: https://unternehmen.bvg.de/profil/	2022	Medium
Bilbao	13	Confirmed by City (email – 21/03/23)	Good	141	Confirmed by City (email - 21/03/23)	2023	Good

City	Number of electric/ hydrogen buses (including trolley buses)	Source	Data quality	Total bus fleet used	Source	Year of data	Data quality
Birmingham	54	Official city/operator report: WMCA Bus service improvement plan https://governance.wmca.org.uk/documents/s7586/Appendix%201%20West%20Midlands%20BSIP.pdf https://nxbus.co.uk/west-midlands/zero-emissions-buses	Good	2000	Official city/operator report: WMCA Bus service improvement plan https://governance.wmca.org.uk/documents/s7586/Appendix%201%20West%20Midlands%20BSIP.pdf https://nxbus.co.uk/west-midlands/zero-emissions-buses	2021	Good
Brussels (Brussels Capital Region)	37	Official city/operator report: https://stib-activityreports.brussels/files/statistics_2021_fr.pdf	Good	862	Official city/operator report: https://stib-activityreports.brussels/files/statistics_2021_fr.pdf	2021	Good
Bucharest	159	Confirmed by City (email – 07/03/23)	Good	1401	Confirmed by City (email – 07/03/23)	2023	Good
Budapest	121	Operator (BKK – email – 05/04/23)	Good	1204	Confirmed by City (BKK email – 30/03/23)	2022	Good
Cologne	63	Confirmed by City (Stadt Köln – email – 21/03/23). Supported by operator reports: KVB: https://blog.kvb-koeln.de/unsere-mission-null-e-mission	Good	422	Confirmed by City (Stadt Köln – email – 21/03/23). Supported by operator reports: KVB: https://blog.kvb-koeln.de/unsere-mission-null-e-mission	2023	Good

City	Number of electric/ hydrogen buses (including trolley buses)	Source	Data quality	Total bus fleet used	Source	Year of data	Data quality
		RVK: https://www.rvk.de/fileadmin/documents/News/2022_News/RVK_Energie_und_Umweltpolitik_10-2021.pdf			RVK: https://www.rvk.de/fileadmin/documents/News/2022_News/RVK_Energie_und_Umweltpolitik_10-2021.pdf		
Copenhagen	340	Confirmed by city (City of Copenhagen, email 29/03/23)	Good	1324	Confirmed by city (City of Copenhagen, email 29/03/23)	2023	Good
Dublin	0	Confirmed by city (Dublin City Council, email – 27/04/23)	Good	1045	Confirmed by city (Dublin City Council, email – 27/04/23)	2020	Good
Edinburgh	12	Confirmed by operator (Lothian buses – email – 18/04/23)	Good	533	Confirmed by operator (Lothian buses – email – 18/04/23)	2023	Good
Ghent	3	Confirmed by City (Stad Gent -email – 12/04/23)	Good	269	Confirmed by City (Stad Gent -email – 12/04/23)	2023	Good
Glasgow	150	Confirmed by Operator (First Glasgow via EPTO – email – 14/04/23)	Good	623	Confirmed by Operator (First Glasgow via EPTO – email – 14/04/23)	2023	Good
Granada	6	Other secondary source: https://www.granadahoy.com/granada/Granada-nuevos-autobuses-bajas-emisiones-renovar-flota_0_1774923613.html	Poor	201	Other secondary source: https://www.granadahoy.com/granada/Granada-nuevos-autobuses-bajas-emisiones-renovar-flota_0_1774923613.html	2023	Poor

City	Number of electric/ hydrogen buses (including trolley buses)	Source	Data quality	Total bus fleet used	Source	Year of data	Data quality
Hamburg	226	Confirmed by city (City of Hamburg – email – 08/03/23)	Good	1768	Confirmed by city (City of Hamburg – email – 08/03/23)	2022	Good
Helsinki	316	Official city/operator website: https://www.hsl.fi/hsl/sahkobussit	Medium	1317	Official city/operator website: https://www.hsl.fi/hsl/sahkobussit	2022	Medium
Krakow	79	Confirmed by Operator (MPK - email – 12/04/23)	Good	631	Confirmed by Operator (MPK - email – 12/04/23)	2023	Good
Liège	0	Official city/operator report, Source: https://www.liege.be/fr/vie-communale/services-communaux/mobilite/plan-communal-de-mobilite/monitoring-du-plan-communal-de-mobilite	Good	472	Official city/operator report, Source: https://www.liege.be/fr/vie-communale/services-communaux/mobilite/plan-communal-de-mobilite/monitoring-du-plan-communal-de-mobilite	2021	Good
Lisbon	15	Confirmed by City (City of Lisbon – email – 14/04/23)	Good	732	Confirmed by City (City of Lisbon – email – 14/04/23)	2023	Good
Ljubljana	0	Confirmed by City (email – 27/03/23)	Good	219	Confirmed by City (email – 27/03/23)	2022	Good
Greater London	970	Confirmed by city (GLA/TfL: - - 11/05/23)	Good	8800	Confirmed by city (GLA/TfL – 11/05/23)	2023	Good
Lyon	145	Other secondary source: https://tecelyon.fr/sections.php?op=viewarticle&artid	Medium	945	Other secondary source: https://tecelyon.fr/sections.php?op=viewarticle&artid	2023	Medium

City	Number of electric/ hydrogen buses (including trolley buses)	Source	Data quality	Total bus fleet used	Source	Year of data	Data quality
		artid=21 Official city/operator website https://www.sytral.fr/613-reseau-bus-performant.htm Other secondary source: https://fr.wikipedia.org/wiki/Autobus_de_Lyon#Exploitation			=21 Official city/operator website https://www.sytral.fr/613-reseau-bus-performant.htm Other secondary source: https://fr.wikipedia.org/wiki/Autobus_de_Lyon#Exploitation		
Madrid	180	Official city/operator website: https://www.emtmadrid.es/Empresa/Somos/NuestraFlota Other secondary source: https://www.intelligenttransport.com/transport-news/142783/emt-madrid-becomes-first-major-european-city-100-per-cent-clean-bus-fleet/	Medium	2090	Official city/operator website: https://www.emtmadrid.es/Empresa/Somos/NuestraFlota Other secondary source: https://www.intelligenttransport.com/transport-news/142783/emt-madrid-becomes-first-major-european-city-100-per-cent-clean-bus-fleet/	2023	Medium
Greater Manchester	35	Confirmed by city/operator (TfGM – email – 28/02/23)	Good	2141	Confirmed by city/operator (TfGM – email – 28/02/23)	2022	Good
Marseille	6	Official city/operator report: https://www.rtm.fr/sites/d	Good	623	Official city/operator report: https://www.rtm.fr/sites/de	2021	Good

City	Number of electric/ hydrogen buses (including trolley buses)	Source	Data quality	Total bus fleet used	Source	Year of data	Data quality
		efault/files/docs/RTM_Rapport_activite_2021_compressed%20%281%29.pdf			fault/files/docs/RTM_Rapport_activite_2021_compressed%20%281%29.pdf		
Milan	352	Other secondary source: https://www.solarisbus.com/en/press/more-orders-from-milan-75-electric-solaris-buses-will-make-their-way-to-italy-1772 Official city/operator website: https://www.atm.it/it/IIGruppo/ChiSiamo/Documents/Carta%20della%20Mobilita%202022.pdf	Medium	1420	Other secondary source: https://www.solarisbus.com/en/press/more-orders-from-milan-75-electric-solaris-buses-will-make-their-way-to-italy-1772 Official city/operator website: https://www.atm.it/it/IIGruppo/ChiSiamo/Documents/Carta%20della%20Mobilita%202022.pdf	2021	Medium
Munich	24	Confirmed by city (Stadt München – email – 03/03/23)	Good	763	Confirmed by city (Stadt München – email – 03/03/23)	2023	Good
Naples	59	Official city/operator website: https://www.anm.it/images/stories/carta_mobilita_def_2021.pdf https://www.anm.it/index.php?option=com_content&task=view&id=1357&Itemid=347	Medium	514	Official city/operator website: https://www.anm.it/images/stories/carta_mobilita_def_2021.pdf https://www.anm.it/index.php?option=com_content&task=view&id=1357&Itemid=347	2020	Medium

City	Number of electric/ hydrogen buses (including trolley buses)	Source	Data quality	Total bus fleet used	Source	Year of data	Data quality
Oslo	339	Confirmed by city/operator (email – 13/04/23)	Good	507	Confirmed by city/operator (email – 13/04/23)	2023	Good
Paris	652	Official city/operator website: https://www.ratp.fr/group-e-ratp/programmebus2025 Secondary source: https://tc-infos.fr/reseau/45#title-vehicules	Medium	4848	Official city/operator website. Secondary source: https://tc-infos.fr/reseau/45#title-vehicules	2023	Medium
Prague	1	Confirmed by city (email – 21/02/23)	Good	1216	Confirmed by city (email – 21/02/23)	2021	Good
Rome	75	Official city/operator website: https://www.atac.roma.it/docs/default-source/pubblicazioni/carta-della-qualità-dei-servizi-di-tpl--anno-2022.pdf	Medium	2105	Official city/operator website: https://www.atac.roma.it/docs/default-source/pubblicazioni/carta-della-qualità-dei-servizi-di-tpl--anno-2022.pdf	2021	Medium
Sofia	222	Confirmed by City (email – 11/04/23)	Good	890	Confirmed by City (email – 11/04/23)	2023	Good
Stockholm	15	Confirmed by city (Region Stockholm Trafikförvaltningen – email – 14/03/23)	Good	931	Confirmed by city (Region Stockholm Trafikförvaltningen – email – 14/03/23)	2023	Good

City	Number of electric/ hydrogen buses (including trolley buses)	Source	Data quality	Total bus fleet used	Source	Year of data	Data quality
Strasbourg	56	Confirmed by City (Ville de Strasbourg - email – 06/04/23)	Good	258	Confirmed by City (Ville de Strasbourg - email – 06/04/23)	2022	Good
Tri-city (Gdansk, Sopot and Gdynia)	136	Confirmed by City (City of Gdynia – email – 14/03/23) Official city/operator report (Gdansk): https://download.cloudgdansk.pl/ztm-pl/d/2021061054/pt_gdansk_aktualizacja-2021_-_projekt-do-konsultacji-spolecznych.pdf	Good	594	Confirmed by City (City of Gdynia – email – 14/03/23) Official city/operator report (Gdansk): https://download.cloudgdansk.pl/ztm-pl/d/2021061054/pt_gdansk_aktualizacja-2021_-_projekt-do-konsultacji-spolecznych.pdf	2021 (Gdansk) 2022 (Gdynia)	Good
Turin	96	Confirmed by City (email - 30/03/23)	Good	753	Official city/operator report: Carta della mobilità gtt 220722sito and ASSURED Clean Bus Report (2021)	2021	Good
Valencia	2	Confirmed by city (email – 31/03/23)	Good	489	ASSURED Clean Bus Report (2021)	2022	Medium
Vienna	12	ASSURED Clean Bus Report (2021)	Medium	423	ASSURED Clean Bus Report (2021)	2021	Medium
Warsaw	162	Official city/operator report: www.ztm.waw.pl/wp-content/uploads/2022/05/Raport-Roczny-ZTM-za-rok-2021.pdf	Good	1810	Official city/operator report: www.ztm.waw.pl/wp-content/uploads/2022/05/Raport-Roczny-ZTM-za-rok-2021.pdf	2023	Good

EV CHARGING INFRASTRUCTURE

City	Public connector power sum (kW)	Restricted connector power sum (kW)	Source	Data quality
Amsterdam	105,343	49,328	Eco-Movement	Good
Antwerp	17,897	27,656	Eco-Movement	Good
Barcelona	21,686	11,012	Eco-Movement	Good
Berlin	57,429	20,624	Eco-Movement	Good
Bilbao	3,971	1,272	Eco-Movement	Good
Birmingham	15,402	5,300	Eco-Movement	Good
Brussels (Brussels Capital Region)	24,947	17,090	Eco-Movement	Good
Bucharest	4,979	6,927	Eco-Movement	Good
Budapest	40,601	16,006	Eco-Movement	Good
Cologne	16,470	15,918	Eco-Movement	Good
Copenhagen	31,058	53,217	Eco-Movement	Good
Dublin	3,937	1,279	Eco-Movement	Good
Edinburgh	7,484	5,079	Eco-Movement	Good
Ghent	15,143	15,630	Eco-Movement	Good
Glasgow	12,791	3,270	Eco-Movement	Good
Granada	1,827	1,491	Eco-Movement	Good
Hamburg	66,122	22,282	Eco-Movement	Good
Helsinki	13,709	11,778	Eco-Movement	Good
Krakow	3,495	3,071	Eco-Movement	Good
Liège	1,214	2,599	Eco-Movement	Good
Lisbon	23,224	4,159	Eco-Movement	Good
Ljubljana	8,967	4,884	Eco-Movement	Good
Greater London	171,491	100,059	Eco-Movement	Good
Lyon	6,197	3,085	Eco-Movement	Good
Madrid	43,493	19,528	Eco-Movement	Good
(Greater Manchester)	27,800	13,561	Eco-Movement	Good
Marseille	9,474	4,160	Eco-Movement	Good
Milan	23,713	4,924	Eco-Movement	Good
Munich	44,800	16,694	Eco-Movement	Good
Naples	4,977	1,991	Eco-Movement	Good
Oslo	84,327	19,402	Eco-Movement	Good
Paris	27,435	81,814	Eco-Movement	Good

City	Public connector power sum (kW)	Restricted connector power sum (kW)	Source	Data quality
Prague	20,258	11,688	Eco-Movement	Good
Rome	54,751	7,441	Eco-Movement	Good
Sofia	9,892	8,218	Eco-Movement	Good
Stockholm	12,833	33,683	Eco-Movement	Good
Strasbourg	5,639	1,220	Eco-Movement	Good
Tri-city (Gdansk, Sopot and Gdynia)	5,045	2,837	Eco-Movement	Good
Turin	22,476	2,023	Eco-Movement	Good
Valencia	8,524	3,500	Eco-Movement	Good
Vienna	36,356	15,085	Eco-Movement	Good
Warsaw	8,330	7,152	Eco-Movement	Good



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