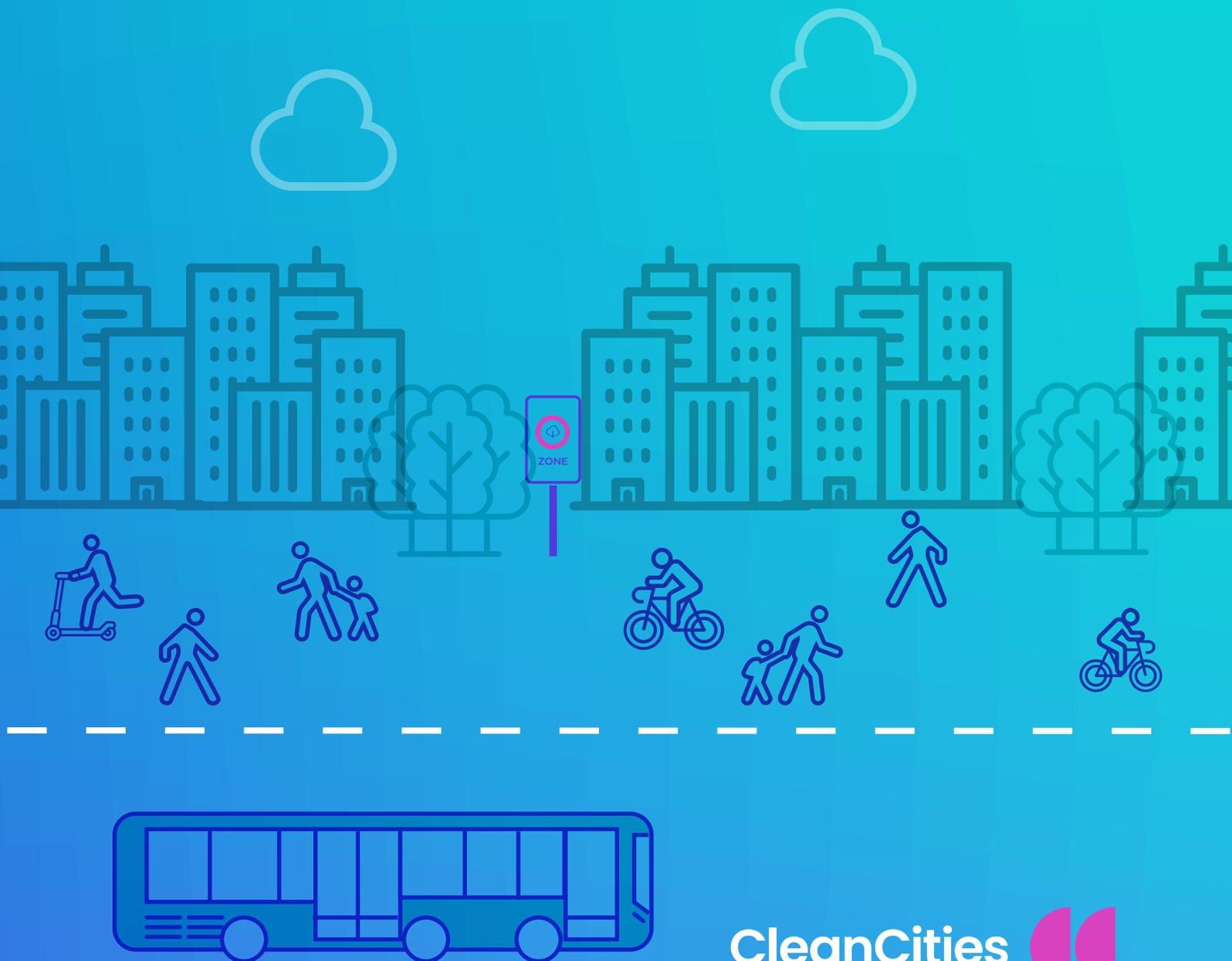


CLEAN CITIES

Benchmarking European cities
on creating the right conditions
for zero-emission mobility



CleanCities



This briefing was prepared by the Clean Cities Campaign, a campaign hosted by Transport & Environment, using data compiled by Ricardo Energy & Environment.

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Foreword

Cleaning up transport is one of the most pressing challenges of our time. It is the only sector where emissions have been increasing since the nineties, with almost a quarter of these (23%) coming from cities.¹

Cities are also where the majority of Europeans live, making them major contributors to the climate crisis. On the flipside is the air pollution health emergency: Air quality standards continue to be breached in more than 100 European cities², choking urban populations, causing a myriad of health problems, as well as hundreds of thousands of premature deaths each year.³

But transitioning to zero-emission mobility isn't 'just' about acting for our climate and reducing air pollution. It is also about creating spaces where human happiness and wellbeing can thrive.

Research shows that the built environment has an immense impact on our overall health. Proximity to green spaces, such as parks, playgrounds, and greenery, can help people live for longer by allowing for psychological relaxation and stress alleviation, stimulating social cohesion, supporting physical activity, and reducing exposure to air pollutants, noise and excessive heat.⁴ Similarly, active mobility and the use of public transport increases overall physical activity. In walkable communities, social connectedness also increases, which hugely benefits mental health.

Happiness, health, connection. This is what zero-emission mobility is all about.

We envisage a city where the air is clean and people

have easy access to green space. They have the choice to freely get around on foot, on bicycles and e-scooters and, for larger distances, to use a robust, reliable, and affordable public transport network powered by renewable energy, or shared electric vehicles.

We know that, in part, this vision already exists given the dozens of great examples from across Europe. We also know that it will not be easy for this to be fully realised in all cities by 2030. This transformation will require everyone to work together.

Thankfully, the belief that our cities should be clean and green is also shared by the majority of European city dwellers,⁵ who want mayors to prioritise clean transport, greenery and better air quality. We also know that the EU Commission has put cities front and center in its plans to make the EU climate neutral,⁶ and that the UK Government aims for half of all journeys in towns and cities to be walked or cycled by 2030.⁷

The task at hand may seem overwhelming, but people often overestimate what can be done in the short term and wildly underestimate what can be achieved in the longer term. This is why we believe that now is the time to take stock and draw up a clear and pragmatic roadmap for all cities in Europe to lean in towards realising the path towards zero-emission mobility by 2030.

Through this research we have laid out both the vision and the timeline. We also have all the technology at our disposal, ready and waiting. The conditions are ripe, and the time is now. We just need the political will to make it happen.

Barbara Stoll
Director, Clean Cities Campaign



Executive Summary



Photo: Andreeew Hoang / Unsplash

Cities hold the key to leading Europe towards healthy and climate-friendly mobility. Not only do almost 3 in 4 Europeans live in urban areas⁸, mobility in cities is also responsible for 23% of the EU's greenhouse gas emissions from transport – the only sector that has seen its emissions rise since 1990.⁹ Many urban areas also remain hotspots of toxic air pollution, with EU air quality limits still being breached in more than 100 cities across the continent.¹⁰

If the continent is to be carbon neutral by 2050 as foreseen in the European Union's Green Deal, action needs to be taken now and cities need to lead the way by creating a zero-emission urban transport system by 2030. The Covid-19 pandemic and policies adopted to combat the spread of the virus have created a window into a possible future with more space for people, cleaner air and quieter, safer streets. City leaders need to urgently test new ideas, learn from each other and take decisive action now.

The dense populations of cities offer ideal conditions for a shift towards zero-emission mobility, ranging from walking, cycling and wheeling to public and shared transport as well as electric vehicles. Yet, it is currently still difficult to benchmark the performance of cities when it comes to zero-emission urban mobility. There is a clear lack of comparable

data, as the new Urban Mobility Framework that the European Commission published in December 2021 also underlines.¹¹

The Clean Cities Campaign has therefore developed a rating and ranking of European cities to fill this gap. It covers 36 major European cities and is based on the campaign's vision of the conditions that need to be in place in order to stand a chance of achieving zero-emission mobility by 2030.

Mobility in cities is responsible for 23% of the EU's greenhouse gas emissions from transport

A set of five categories with a total of 11 indicators have been selected based on this vision, ranging from urban space, road safety and public transport to electric vehicle charging infrastructure, and policies such as low and zero emission zones and air quality. The performance of cities has been benchmarked against official or widely accepted references (e.g. the World Health Organization air quality guidelines and the EU's "Vision Zero" for road safety) or, where such references do not exist, a "best in class" approach has been applied. The data collection and analysis has been carried out by Ricardo Energy & Environment, using Europe-wide datasets wherever possible and contacting each city in order to request additional local data.

The main results of the analysis are summarised in the following table:

POSITION	CITY	COUNTRY	OVERALL % SCORE	GRADE					
					Space for people	Safe roads	Access to climate-friendly mobility	Policies	Clean air
1	Oslo	Norway	71.5	B	56	88	70	93	60
2	Amsterdam	Netherlands	65.5	B	64	62	69	93	40
3	Helsinki	Finland	64.2	B	69	80	64	34	72
4	Copenhagen	Denmark	62.3	B	63	58	69	63	57
5	Paris	France	61.9	B	42	65	79	85	41
6	Stockholm	Sweden	61.7	B	57	66	56	78	58
7	Ghent	Belgium	58.7	C	60	43	70	70	43
8	Munich	Germany	57.5	C	51	67	62	59	51
9	Brussels	Belgium	57.0	C	40	79	55	70	51
10	Barcelona	Spain	56.9	C	54	79	58	66	28
11	Lyon	France	56.6	C	54	58	54	58	63
12	London	UK	55.8	C	32	69	53	88	51
13	Vienna	Austria	55.5	C	50	87	56	44	44
14	Bilbao	Spain	55.0	C	55	81	51	47	44
15	Lisbon	Portugal	53.5	C	37	56	73	59	42
16	Madrid	Spain	52.8	C	49	73	42	63	45
17	Birmingham	UK	52.8	C	38	74	38	69	59
18	Antwerp	Belgium	52.0	C	52	40	58	70	36
19	Berlin	Germany	51.6	C	41	72	44	66	45
20	Milan	Italy	51.1	C	44	54	53	63	44
21	Strasbourg	France	50.6	C	47	80	42	51	40
22	Liège	Belgium	49.7	D	49	61	51	39	49
23	Turin	Italy	49.3	D	41	57	63	51	33
24	Hamburg	Germany	48.4	D	42	74	48	36	46
25	Cologne	Germany	47.0	D	46	51	38	59	46
26	Marseille	France	46.6	D	28	63	44	48	61
27	Granada	Spain	46.2	D	55	75	37	39	25
28	Ljubljana	Slovenia	45.7	D	47	61	50	33	35
29	Prague	Czech Republic	45.1	D	47	66	45	40	28
30	Manchester	UK	42.1	D	34	70	31	39	47
31	Edinburgh	UK	41.3	D	31	71	42	39	29
32	Rome	Italy	40.4	D	23	44	41	56	46
33	Tri-city*	Poland	39.5	E	50	49	35	33	30
34	Warsaw	Poland	38.7	E	40	53	41	33	25
35	Krakow	Poland	37.9	E	32	62	32	33	37
36	Naples	Italy	37.8	E	27	51	35	44	46

*Gdansk, Sopot and Gdynia

Table 1 – main results with an overall rating and ranking and per category

Key results and recommendations

Summarising these results, we have found the following:

- ▶ **All of the cities analysed need to make significant improvements in several areas to have a chance of achieving zero-emission mobility by 2030.**
- ▶ The analysis shows that **local measures aiming to decarbonise transport can make a big difference.** Cities with very different contexts, geographies and histories can be equally successful in creating the conditions for a zero emission mobility future. There is no one pathway to success - cities can choose to prioritise different measures, however, eventually, improvements in all categories will be necessary.
- ▶ The project also confirmed that **better quality data that is collected in a consistent way is urgently needed to conduct effective policies**, as also highlighted by the European Commission.¹² Conducting effective policies and tracking progress is near impossible without sufficient data available.

Based on these results, the Clean Cities Campaign makes the following policy recommendations:

- ▶ **Cities must set a clear zero-emission urban mobility goal for 2030:** Cities must have a clear vision, timeline and pathway for fully transitioning to active, shared and electric mobility by 2030.

- ▶ **The EU and governments must support cities by reviewing key legislation:** Cities play a central role but national governments and the European Union must put in place support structures to enable the transformation that cities have to undergo. Governments should give cities the legal power to take rapid and ambitious local action – e. g. through a low and zero emission zone framework – and should also provide sufficient funding. The EU can play an important role by making zero-emission targets a compulsory element of Sustainable Urban Mobility Plans (SUMP) in the upcoming update of SUMP guidance documents. Indeed, the European Commission has proposed that SUMP become compulsory in the 424 cities that are considered “urban nodes” in the TEN-T Regulation revision according to the 2021 Urban Mobility Framework, hence the importance of making these plans ambitious.¹³ The conditionality for accessing EU funding upon the development of such plans should also be reinforced.
- ▶ **Measure the right data and monitor progress:** Cities must develop data strategies that cover all relevant parts of transport and allow them to measure where they stand and what progress they make.

The Clean Cities Campaign primarily sees this piece of work as an invitation to decision-makers, researchers and civil society to engage in a dialogue, in an effort to profoundly transform our cities in the coming years, to protect our climate and our health. We will strive to update this ranking and rating in the future and welcome any feedback and suggestions. Our future is dependent on action taken by city leaders today.



Introduction



Photo: Damon Evans / Clean Cities Campaign

This briefing has been authored by the Clean Cities Campaign, a European coalition of more than 60 organisations campaigning for zero-emission urban mobility by 2030.

It summarises the context, methodology and findings of the research the Clean Cities Campaign conducted between May and December 2021 with the help of its European network and Ricardo Energy & Environment, rating and ranking 36 major European cities on indicators related to sustainable urban mobility and liveability.

The ranking and rating aims to provide a robust and transparent benchmark of the performance of cities, and encourage them to improve in areas where they score the least but that are needed to reach zero-emission mobility by 2030. The details of the methodology as well as the full data of this research can be found in the accompanying [technical report](#) that has been delivered by Ricardo Energy & Environment.¹⁴

I. Context and aim of the research

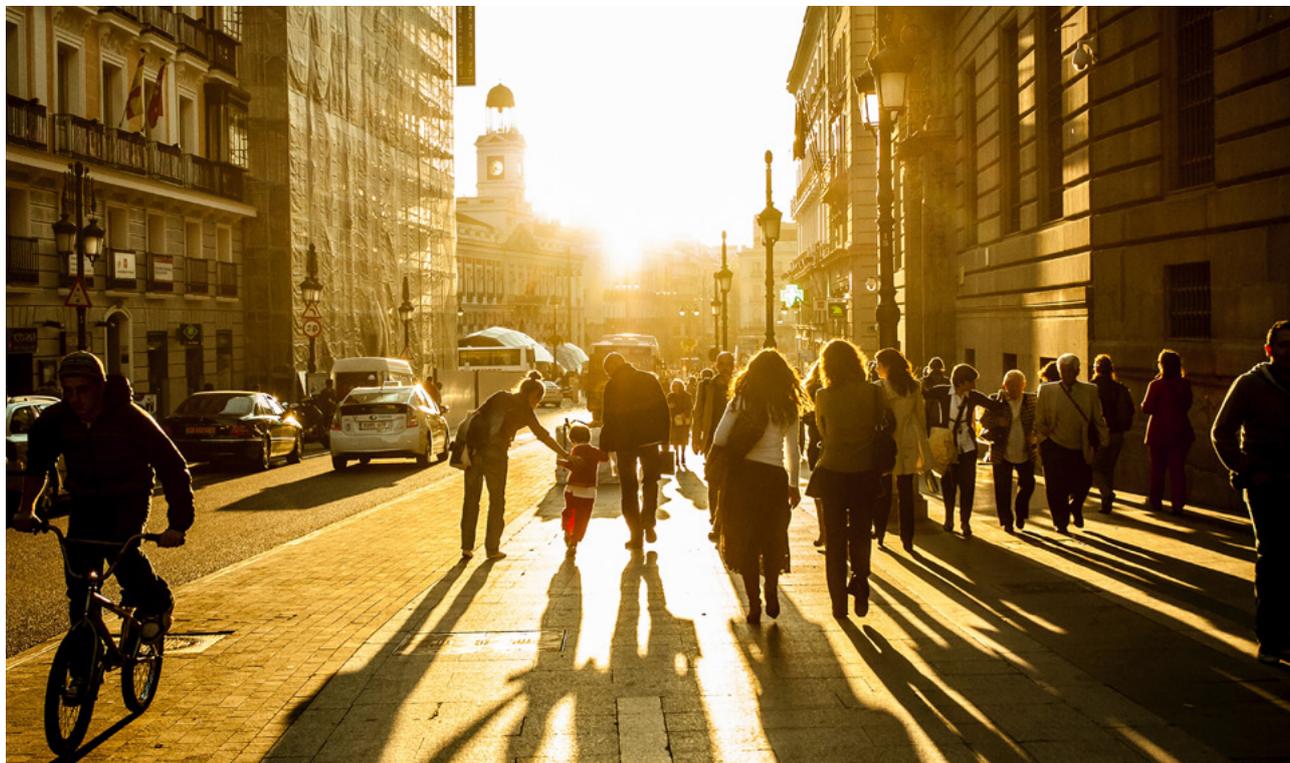


Photo: Robert Tjalondo / Unsplash

This first chapter demonstrates how cities play a central role in the most pressing mobility challenges and explains the added value of this particular rating and ranking.

Both the problems and opportunities are concentrated in cities

The overwhelming majority of Europeans (almost 75%) live in urban areas.¹⁵ Cities are therefore decisive for combating the climate emergency, especially given that urban mobility is responsible for 23% of the EU's greenhouse gas emissions from transport¹⁶. In fact, transport is the only sector that has seen its greenhouse gas emissions increase compared to 1990. This trend needs to be reversed given the urgency of the climate crisis, as has recently been reaffirmed by the latest report from the United Nations' Intergovernmental Panel on Climate Change (IPCC)¹⁷. The current trajectory could lead

to a 2.5°C–3.5°C rise in global average temperatures compared to the pre-industrial era, which would have dramatic, and sometimes irreversible consequences unless there are “immediate, rapid, and large-scale reductions of GHG emissions”.¹⁸

Many urban areas also remain hotspots of toxic air pollution, with EU air quality limits still being breached in more than 100 cities across Europe.¹⁹ Air pollution is “the biggest environmental risk to health” and “a public health emergency”²⁰ causing more than 300,000 premature deaths a year²¹ on the continent in addition to various illnesses.* Road transport continues to be one of its main sources, especially that of nitrogen dioxide (NO₂).²² What is more, the World Health Organization (WHO) has

* These range from asthma to heart disease, cancer and strokes. New research is also pointing to mental illness such as dementia. An exhaustive list can be found at <https://www.theguardian.com/environment/ng-interactive/2019/may/17/air-pollution-may-be-damaging-every-organ-and-cell-in-the-body-finds-global-review>

recently increased the sense of urgency and updated its air quality guidelines,²³ making them even stricter than before. It is clear that there are no safe levels of air pollution.

Cities are ideal places for change and urbanites are ready to embrace cleaner mobility

The dense populations of cities offer ideal conditions for a shift towards zero-emission mobility, which is defined as not emitting any direct greenhouse gas or pollutant emissions. The available solutions range from active (walking, cycling, wheeling), public and shared transport (including, for instance, car sharing and on-demand services) to electric vehicles.

The Covid-19 pandemic and policies adopted to combat the spread of the virus have created a window into a possible future with more space for people, cleaner air and quieter, safer streets. A clear majority in European cities want mayors to prioritise clean transport, greenery and better air quality, a recent survey commissioned by the Clean Cities Campaign has shown.²⁴ If the continent is to be carbon neutral by 2050 as foreseen in the European Union's Green Deal²⁵ action needs to be taken now.

Many cities have already made climate commitments. At the recent UN Climate Change Conference (COP26), more than 1,000 cities and local governments pledged to raise climate ambition in order to limit global temperature rise to 1.5°C and achieve a net-zero future.²⁶

The Covid-19 pandemic and policies adopted have created a window into a possible future with more space for people, cleaner air and quieter, safer streets

Change will only happen if we create the right conditions

The realisation of zero-emission mobility in cities will only be possible through the combined efforts of local policies supported by national and European measures.

The EU now also officially acknowledges the crucial role of cities. "Cities are hubs of creativity, innovation and learning and have the capacity to affect systemic changes across a range of critical environmental issues,"²⁷ the European Environment Agency found in its evaluation of urban sustainability in Europe. The EU has had a growing

role in urban mobility issues since the end of the 1990s and is now a major player in this policy area. The European Commission has recently published its new Urban Mobility Framework, which is a revision of the 2013 Urban Mobility Package, that aims to fast-forward the transition to zero-emission mobility by defining new rules for funding and planning.



Photo: Damon Evans / Clean Cities Campaign

Moreover, the European Commission recently started a new 'Mission For 100 climate-neutral Cities by 2030' and a 'Green City Accord' to encourage local commitments. These initiatives have the potential to propel the most progressive cities into the future. Similarly, the recent UK Transport Decarbonisation Plan includes a clear aim for less motor traffic in urban areas and explains how "we cannot simply believe that zero-emission cars and lorries will meet all our climate goals or solve all our problems".²⁸

And while these initiatives are welcome, they cannot succeed without bold and rapid action by the cities themselves. City leaders need to urgently rethink urban transport, test new ideas, learn from each other and concentrate all efforts on creating a zero-emission transport system by the end of the decade.

The added value of a rating and ranking of European cities in sustainable urban mobility

One important driver of ambitious local policies has been the comparison between European cities. Cities don't only learn from each other, often encouraged by dedicated initiatives of the European Union such as the CIVITAS and ELTIS programmes,²⁹ but they also compete for attention, investments, and policy leadership. Citizens and civil society groups also encourage cities to follow the positive example of their peers.

Despite the strong interest in city comparisons, it is currently difficult to benchmark the performance of cities in zero-emission urban mobility. There is a clear lack of comparable data between cities,³⁰ which is why the EU has taken several initiatives to define and measure consistent indicators.^{31 32 33} Work on a common set of "Sustainable Urban Mobility Indicators (SUMI)"³⁴ is ongoing but has so far not resulted in a widely used way of measuring transport and mobility. In the new Urban Mobility Framework that the European Commission published in December 2021, several initiatives have been announced in order to improve and streamline the set of SUMI and to support Member States in collecting harmonised data.³⁵

Given the positive impetus of city comparisons and the current lack of robust, consistent data, the Clean Cities Campaign has decided to fill the gap and conduct its own city rating and ranking. Taking inspiration from similar previous initiatives, including



Photo: Salmen Bejaoui / Unsplash

Greenpeace's "Living. Moving. Breathing. Ranking of European Cities in Sustainable Transport",³⁶ the Sootfree for the climate ranking,³⁷ and the IS Global Ranking of Cities,³⁸ we have designed this rating and ranking in order to:

- ▶ **provide robust and comparable data** that allows cities and citizens to assess where their cities stand on reaching zero-emission mobility by 2030, where they should be going and what primary areas of improvement there are,
- ▶ **spur a healthy "race to the top"** that accelerates the transition to healthy, climate-friendly and liveable cities,
- ▶ **track trends and progress** over time through future updates.

The results are also meant to provide a starting point for constructive discussions between city leaders, civil society, campaigners, policymakers and researchers.

II. Overview of the methodology



Photo: Quentin Guyot / Clean Cities Campaign

In this second chapter we explain the guiding principles of our research, provide an overview of the process that has been followed and explain how the indicators and cities have been selected. We also summarise the data sources and highlight the uncertainties and limitations of our analysis. Please see the [technical report](#) for the full details.

Guiding principles of the analysis

Given the context and objectives of this project described in chapter I, we defined a set of guiding principles for the entire piece of research. They reflect the Clean Cities Campaign's commitment to evidence-based and constructive campaigning:

- ▶ **Transparency and robustness:** We strive for maximum transparency when it comes to the data, the process and the criteria of this analysis. This also means that publicly available sources have been used wherever possible.
- ▶ **Coherence:** This research is not an academic

project and is designed as a practical instrument to allow local decision makers, citizens and campaigners to benchmark various cities on urban transport. This also means that we had to balance complexity with coherence. For example, instead of covering all aspects of urban mobility, we prioritised indicators that we consider the most relevant to achieving zero-emission urban mobility.

- ▶ **Collaboration:** We followed an open and collaborative approach. We involved our network of local partner organisations as well as selected academic partners in the design and analysis phases of the process. We also kept each city informed so that we could obtain the most accurate data and invite constructive feedback.
- ▶ **Prioritising zero-emission mobility:** The overarching benchmark for our analysis is the full transition to zero-emission mobility by 2030. We have no time for solutions that only marginally reduce emissions and are incompatible with a switch to climate-neutral, healthy mobility.

A clear process to implement these guiding principles

We followed a stepwise process (see image 1) in order to implement these guiding principles. This also includes transparent communication about the choices that the Clean Cities Campaign made in this process. We defined the scope of the research based on our vision for cities and main policy demands,³⁹ and selected relevant categories and indicators as well as cities (see details below).

The data collection and analysis were carried out primarily by Ricardo Energy & Environment under the guidance of the Campaign core team. Each city administration was contacted to ask for local data as well as feedback about data that was either missing or of poor quality (see details below). Conclusions and policy recommendations were drawn up by the Clean Cities Campaign, based on an analysis of the results.



Image 1 - The process followed for the project

The selection of indicators

Our choice of indicators were guided by the mission and vision of the Clean Cities Campaign, which – for the reasons explained above – consists in encouraging cities to become healthy, climate-friendly and liveable by fully transitioning to zero-emission mobility by 2030.

We kept the research coherent by selecting a small set of five categories and 11 indicators (see Image 2). Air quality has been included as a cross-cutting indicator that is both a precondition for healthy, liveable cities and active transport but also a result of a successful switch to zero-emission mobility.

Furthermore, the limited availability of consistent data across European cities also had to be taken into account, which means that we could not design all the indicators in the most optimal way. For instance, data on the modal split in cities is not available in a comparable format due to stark differences in data collection (e.g. surveys, traffic counts, etc.) and the way in which commuters are taken into account. This also meant that we could not compare the number of fatal accidents of pedestrians and cyclists to the number of the kilometers walked and cycled but compared those to the city population as has been done in previous, similar studies.⁴⁰

Table 2 on pages 14 and 15 provides an overview of categories and indicators as well as their relevance and how they were measured.



Image 2 - Overview of how the categories and indicators were selected

Category	Indicator	Why this matters	Measurement unit
Space for people 	Opportunity for walking	Walking is an essential element of zero-emission mobility and creating a healthy, liveable city, and is often the most efficient way of moving around in cities. Encouraging walking requires providing enough inclusive and safe space and infrastructure to pedestrians.	Infrastructure designated for pedestrians, calculated by the total length of separate infrastructure for pedestrians (km)/Total length of roads (km)
	Opportunity for cycling	Cycling is an essential element of zero-emission transport and creating a healthy, liveable city. It also is one of the most efficient ways of moving people and goods in cities. Promoting cycling requires providing sufficient dedicated space and infrastructure to cyclists, to ensure they feel safe.	Infrastructure designated for cyclists, calculated by cycle path length (km)/ Total road length (km)
	Traffic congestion	Large traffic congestion is a result of inadequate response to mobility needs, as other transport solutions are not available or attractive. It increases air pollution, noise, accidents and stress levels.	Ratio of travel time during peak hours and uncongested hours, averaged over three years (2018, 2019, and 2020.) ⁴¹
Safe roads 	Pedestrian safety	Making the city safe for pedestrians is a precondition for the uptake of more walking.	Ratio of fatalities per 100k residents calculated by three year average number of fatalities/ population
	Cyclist safety	Making a city safe for cyclists is a precondition for the larger uptake of cycling as an alternative means of transport.	Ratio of fatalities per 100k residents calculated by three year average number of fatalities/population (thousands)
Access to climate-friendly mobility 	Public transport affordability	Public transport is the backbone of mobility in most cities and needs to be affordable so it is appealing and accessible to everyone.	Percentage share of the average household income (%) calculated from the price of the monthly public transport price / Average monthly household income
	Access to public transport	Everyone should be given access to public transport. A high number of stops should be available across the urban area so the network is inclusive and convenient.	Public transport stops per km ² is calculated by a ratio of number of stops per km ²

Category	Indicator	Why this matters	Measurement unit
Access to climate-friendly mobility (cont.) 	Access to charging infrastructure	A switch to electric vehicles is critical to achieving zero-emission mobility. This can only be achieved if public and semi-public charging infrastructure is made available and easily accessible as research has shown a strong correlation between public chargers per population and the electric vehicle uptake. ⁴² At the same time, it should be kept in mind that reducing the total number of cars in cities remains an important objective for cities and it should not be the objective to maximise the number of charge points.	Power (kW) per 1000 of population calculated using the total charging power of public and semi-public electric vehicle charging infrastructure in kW / the population of the city
Policies 	Policies	City leaders have a responsibility to accelerate the shift towards zero-emission mobility through policy and regulation. We assess whether low and zero emission zones exist and whether regional or national policies have been adopted to phase-out the sales of vehicles with internal combustion engines, which can support local efforts for zero-emission transport. When it comes to promoting alternatives, we assess whether car and bike sharing systems and “Mobility as a Service” (MaaS) apps are available.	A number of points out of a total of 20 based on the current and planned policies, with a maximum of 15 points for low and zero emission zones as well as policies setting an end date for the sales of vehicles with internal combustion engines, and a maximum of 5 points for bike sharing, car sharing and “Mobility as a Service” offers
Clean air 	Current air quality	Polluting cars and vans in cities contribute to poor air quality. Achieving the levels recommended by the World Health Organization (WHO) guidelines is essential to protect the health of citizens.	Average concentrations of nitrogen dioxide and particulate matter (PM10, PM2.5) over three years combined
	Air quality trends	Some cities suffer poor air quality far greater than others owing to a high prevalence of non-transport sources, topological and meteorological conditions. Monitoring trends enables us to ascertain whether cities are taking some level of action to combat pollution.	The percentage improvement trend of air pollution levels (NO2, PM10 and PM2.5) over five years

Table 2 – Overview of the categories and indicators

Data sources and use of local data

Selecting reliable and comparable data sources is essential to ensure cities can be compared in a sound way. Following the principle of transparency, we used publicly available data wherever possible. Priority was also given to Europe-wide datasets in order to use a uniform approach. The accompanying [technical report](#) provides a detailed overview of the data sources as well as a data quality rating for each indicator and each city.

In order to use the best available information and check European datasets against local data, we contacted each city administration to ask for local data as well as feedback about data that was either missing or of poor quality. Many cities were responsive and shared their feedback and additional data with us. This was scrutinised and included in the analysis where possible. The data collection and analysis was completed on the 6th of December 2021 and more recent developments or data shared after this data has not been taken into account.*

How cities were selected and defined

In Europe there are more than 440 cities with more than 100,000 inhabitants.⁴³ In order to produce a meaningful rating and ranking, and given the limited resources of the non-profit Clean Cities Campaign, we had to select a limited number of cities to include in the analysis.

We applied the following criteria:

- ▶ Major cities that have a **prominent role in the debate on urban mobility** in their countries and at the European level,
- ▶ **A sufficiently broad geographical spread,**
- ▶ Prioritising **countries and cities that the Clean Cities Campaign is currently active in** so that local partner organisations can engage in a constructive dialogue with city leaders,
- ▶ Cities for which **sufficient data** was available or could be obtained through contacts with city administrations.

Selecting cities also meant that the exact territory of each city or metropolitan area had to be

defined, which also impacted the results. Given that European cities vary in size, density, location, governance structure, etc. there is no approach that would account for all the particularities of each city. We could also not arbitrarily redefine administrative city boundaries. We therefore applied the following criteria:

- ▶ To ensure accountability, we selected the **area where the mayor or equivalent city leader has the power to implement critical** policies, such as low and zero emission zones.
- ▶ **To ensure coherence, we considered what citizens refer to** when they think of a given city (e.g. the city itself or the metropolitan area) and also took into account the area and city population, which led to the inclusion of inner London in the rating – in order to make the comparisons between the various cities fairer.

Maps and georeferenced data were used for an exact definition (see details in the accompanying [technical report](#)).

Two types of benchmarks: widely accepted references and “best in class”

The points for each of the indicators were calculated following two approaches:

- ▶ Where possible, an **absolute benchmark** with official or widely accepted references was used, such as the World Health Organization air quality guidelines and the EU’s “Vision Zero” for road safety.
- ▶ Where such reference points were not available, we applied a **“best in class”** approach to compare cities based on their relative performance. Where the best in class performance is insufficient to achieve zero-emission transport or is an outlier in the dataset, a higher reference point has been defined in line with available evidence and the vision of the Clean Cities Campaign (see table 4 in the Appendix).

The points for each category were added up in order to calculate the overall total score. For details please refer to the [technical report](#).

* The analysis of local and national policies was concluded on 15 November 2021.

III. Summary of the results



Photo: Jacek Dylag / Unsplash

In this chapter, the results of the rating and ranking are presented and important insights are highlighted.

The table on page 18 contains the overview of the results for all cities and categories as well as the total

score, rating and ranking. For the sake of understandability, the points for each category as well as the overall points were translated into grades (see table 5 in the Appendix.)

POSITION	CITY	COUNTRY	OVERALL % SCORE	GRADE					
					Space for people	Safe roads	Access to climate-friendly mobility	Policies	Clean air
1	Oslo	Norway	71.5	B	56	83	70	93	60
2	Amsterdam	Netherlands	65.5	B	64	62	69	93	40
3	Helsinki	Finland	64.2	B	69	80	64	34	72
4	Copenhagen	Denmark	62.3	B	63	58	69	63	57
5	Paris	France	61.9	B	42	65	79	85	41
6	Stockholm	Sweden	61.7	B	57	66	56	78	58
7	Ghent	Belgium	58.7	C	60	43	70	70	43
8	Munich	Germany	57.5	C	51	67	62	59	51
9	Brussels	Belgium	57.0	C	40	79	55	70	51
10	Barcelona	Spain	56.9	C	54	79	58	66	28
11	Lyon	France	56.6	C	54	58	54	58	63
12	London	UK	55.8	C	32	69	53	88	51
13	Vienna	Austria	55.5	C	50	87	56	44	44
14	Bilbao	Spain	55.0	C	55	81	51	47	44
15	Lisbon	Portugal	53.5	C	37	56	73	59	42
16	Madrid	Spain	52.8	C	49	73	42	63	45
17	Birmingham	UK	52.8	C	38	74	38	69	59
18	Antwerp	Belgium	52.0	C	52	40	58	70	36
19	Berlin	Germany	51.6	C	41	72	44	66	45
20	Milan	Italy	51.1	C	44	54	53	63	44
21	Strasbourg	France	50.6	C	47	80	42	51	40
22	Liège	Belgium	49.7	D	49	61	51	39	49
23	Turin	Italy	49.3	D	41	57	63	51	33
24	Hamburg	Germany	48.4	D	42	74	48	36	46
25	Cologne	Germany	47.0	D	46	51	38	59	46
26	Marseille	France	46.6	D	28	63	44	48	61
27	Granada	Spain	46.2	D	55	75	37	39	25
28	Ljubljana	Slovenia	45.7	D	47	61	50	33	35
29	Prague	Czech Republic	45.1	D	47	66	45	40	28
30	Manchester	UK	42.1	D	34	70	31	39	47
31	Edinburgh	UK	41.3	D	31	71	42	39	29
32	Rome	Italy	40.4	D	23	44	41	56	46
33	Tri-city*	Poland	39.5	E	50	49	35	33	30
34	Warsaw	Poland	38.7	E	40	53	41	33	25
35	Krakow	Poland	37.9	E	32	62	32	33	37
36	Naples	Italy	37.8	E	27	51	35	44	46

*Gdansk, Sopot and Gdynia

Table 3 – main results with an overall rating and ranking and per category

The results presented above hold several **important insights** with regard to urban mobility and primarily policies at the local level but also national, and European levels. In our view, the most important insights are:

- ▶ **Most importantly, all of the cities need to make significant improvements in several areas to have a chance of achieving zero-emission mobility by 2030.** Even leading cities in our rankings, such as the ones in the Nordic regions or Amsterdam, are far away from creating all the conditions deemed essential for shifting fully to active, shared and electric mobility by the end of the decade. The findings clearly highlight an urgent need to acknowledge the current situation and step up efforts.
- ▶ **Local action can make all the difference.** Our results show that although cities from Northern Europe perform better overall, where namely low levels of traffic congestion, safer roads and access to electric vehicle charging infrastructure make a difference, it is also true that cities from different regions with different histories, such as Southern and Eastern European cities, can achieve similar results in our analysis. For example Barcelona is among the cities with the highest total score, and Ljubljana has achieved better results than other cities from Southern and Central Europe.
- ▶ **There are many different pathways to success.** Our analysis shows that cities apply different strategies when it comes to urban mobility. This does not only reflect different contexts and historical features but also political choices. Some cities have primarily bet on promoting cycling, while others have prioritised public transport or walking. Yet, cities with different strategies can achieve similar results in our rating and ranking. This shows that there is more than one path to success. That said, it will still be necessary for all cities to broaden their strategies to achieve fully zero-emission mobility by 2030.

Even the leading cities in our rankings are far away from creating all the conditions deemed essential for shifting fully to active, shared and electric mobility by 2030

- ▶ **Better data is urgently needed to conduct effective policies.** This project confirmed that it is difficult to obtain consistent and robust data across European cities. As deplored by the European Commission,⁴⁴ there often is a lack of data on transport both at the local and the European level. Some cities do not even collect relevant data themselves. Conducting effective policies and tracking progress is near impossible without sufficient data available. There are,

however, cities that do collect and publish a lot of data in high quality and pursue ambitious transport data strategies, which should be applauded. The Greater Paris area (Île-de-France) and London are examples of cities that collect and publish transport data and strategies.* Vienna provides extensive open data on urban greenery, which can also play an important role in improving liveability, air quality and climate resilience.**

The following remarks should be taken into consideration for individual cities:

- ▶ Regarding the **air quality data for Milan**, it has to be noted that there is a higher degree of uncertainty concerning the data quality and in particular the representativeness of the measurements. Non-governmental organisations have been highlighting questions around the siting of the monitoring stations and whether the official data captures the highest concentrations that can be found in the city. A court case is pending before the Lombardy (Milan) Administrative Court (case 2472/2018) lodged by “Cittadini per l’aria”, a partner of the Clean Cities Campaign, against the regional environment agency. The results of the city rating and ranking should be read in conjunction with this information. The actual levels and trends of air

* The Open Data portals of “Transport for London” (<https://tfl.gov.uk/info-for/open-data-users/our-open-data?intcmp=3671#on-this-page-2>) and the Île-de-France (<https://data.iledefrance-mobilites.fr/map/+e5ddb67335a43b2/edit/>) already provide comprehensive mobility data.

** The “Open Data Österreich” portal provides, inter alia, data on green space and trees in cities. See https://www.data.gv.at/katalog/dataset/stadt-wien_baumkatasterderstadt-wien

pollution may not be fully reflected in the official data that has been used for this research.

- ▶ **Concerning the air quality data for Munich**, it should be noted that while many German cities have significantly improved their air quality in the last two years with the help of extensive funding programmes and pressure from civil society, Munich is one of the few German cities where air quality in 2021 still does not meet the limits that have been mandatory since 2010. Despite many years of litigation by non-governmental organisation “Deutsche Umwelthilfe”, the city has not taken measures to further restrict the use of polluting vehicles, namely diesel cars. In 2020, nitrogen dioxide pollution was still up to 35% above the limit value despite a decrease in traffic due to the COVID-19 pandemic.⁴⁵
- ▶ As far as the **affordability of public transport in Vienna** is concerned, it should be noted that the city has made considerable efforts, namely by introducing an annual pass for the price of 365 euros (which equals 1 euro per day). A similar approach has recently been introduced at the national level. The indicator used in this rating and ranking does not reflect these efforts as it compares the monthly prices of public transport passes, which in many cities are becoming more relevant with an increase in (partial) teleworking resulting from the Covid-19 pandemic.

- ▶ On the **affordability of public transport in London**, the city authority has to raise 72% of its operating income from passenger fares owing to national policy, whereas it is only 47% in Madrid and 38% in Paris.⁴⁶ This must be a key consideration when evaluating why the cost of public transport in London is higher compared to other cities. This report has used a monthly Zone 1-3 London travelcard for comparison but it is worth noting that a monthly travelcard excluding tube journeys (i.e. bus and tram only) is 50% cheaper at £84.10.
- ▶ With regard to the **cyclist safety data for Naples**, a specific approach had to be chosen as the city was an outlier to which the design of this indicator – comparing the fatalities over three years to the city population – could not be applied in a meaningful way. Naples is the only city that did not record any fatalities during the three years taken into account but also has the lowest share of cycling infrastructure among all 36 cities (more than a standard deviation below the average for all cities). The absence of fatal accidents involving cyclists can therefore not be interpreted as a reflection of particularly safe roads. For these reasons and to avoid a misinterpretation of the safety data for Naples, the city has not been evaluated on cyclist safety and only the other indicators have been taken into account. This means that the city is not penalised for this lack of meaningful data.



Photo: Sophie Bauer / Clean Cities Campaign

IV. Policy recommendations

Based on the insights of this analysis, we are making the following policy recommendations:

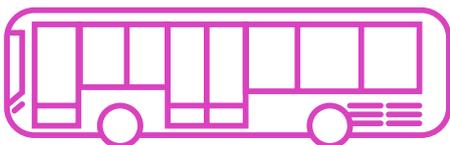
1. Cities must set a clear zero-emission urban mobility goal for 2030: Cities must have a clear vision, timeline and pathway for fully transitioning to active, shared and electric mobility by 2030. This requires an evidence-based assessment of the current state of play and specific, measurable goals and policies to get there. Communicating this goal, involving citizens and building new alliances across political parties is crucial in order to start changing mindsets and expectations and thereby behaviours and the decisions of citizens and businesses.

2. The EU and governments must support cities by reviewing key legislation: Cities play a central role but national governments and the European Union must put in place support structures to enable the transformation that cities have to undergo. Governments should give cities the legal power to take rapid and ambitious local action – e. g. through a low and zero emission zone framework – and should also provide sufficient funding to ensure a just transition. The EU can play an important role by making zero-emission targets a compulsory element of Sustainable Urban Mobility Plans (SUMP) in the upcoming update of SUMP guidance documents. Indeed, the European Commission has proposed that SUMP become

Cities must have a clear vision, timeline and pathway for fully transitioning to active, shared and electric mobility by 2030.

compulsory in the 424 cities that are considered “urban nodes” in the TEN-T Regulation revision according to the 2021 Urban Mobility Framework, hence the importance of making these plans ambitious.⁴⁷ The conditionality for accessing EU funding upon the development of such plans should also be reinforced. And new initiatives such as the EU “Mission for 100 Climate-Neutral Cities by 2030” are very important and cities should seize these opportunities.

3. Measure the right data and monitor progress: Better data is the key to making informed decisions. Cities must develop data strategies that cover all relevant parts of transport and allow them to measure where they stand and what progress they make. The work on ‘Sustainable Urban Mobility Indicators’ (SUMI) underway at the European level can be a good starting point, but it must make swift progress and funding by national governments and the EU must be unlocked and utilised by cities. This is all the more important given that the European Commission proposed that data collection on greenhouse gas emissions, congestion, deaths and serious injuries caused by road crashes, modal share for all modes, and access to mobility services, as well as data on air and noise pollution in cities, should become mandatory in urban nodes in its 2021 Urban Mobility Framework.⁴⁸



V. Conclusions



Photo: Quentin Guyot / Clean Cities Campaign

Cities play a crucial role in tackling the climate emergency and curbing toxic air pollution in Europe. Our rating and ranking has assessed to what extent 36 selected major European cities are on track towards fully zero-emission mobility by 2030.

The results show that none of the cities, not even the ones that fare better, are close to what we think is necessary for this transition. This is an alarming finding that should prompt mayors, governments and the European Union to step up action and refocus all efforts on a clear zero-emission mobility goal for the end of this decade. Solutions are available and already implemented in certain cities across Europe and the pandemic has shown that change is possible sometimes even overnight. But large-scale, swift, and decisive implementation is lacking.

By providing an extensive evidence-based benchmark of many large European cities, our analysis contributes to an informed debate on the role and future of cities. It confirmed serious shortcomings when it comes to the availability, quality, and comparability of transport data in European cities. In addition, although there is some positive action across all areas, the current level of ambition is not nearly sufficient if we are to avert the worst of the climate crisis. As cities are where the majority of the population live and where most of the emissions are coming from, city leaders with the support of national

governments and the EU must step up action now, without further delay.

A clearly defined goal (zero-emission mobility) and timeline (by 2030) are crucial to be set and various pathways to success must be drawn up whilst ensuring that meticulous data collection is enforced. Only then will cities be able to make significant improvements in all areas that this research has examined and that are all necessary to drive down transport emissions and create healthy and livable urban environments. In addition, cross sectoral collaboration and a meaningful dialogue among all stakeholders, including companies, non governmental organisations, academia and others is also crucial in order to ensure success and to find creative solutions to the challenges.

The Clean Cities Campaign primarily sees this piece of work as an invitation to decision-makers, researchers and civil society to engage in a collective effort to profoundly transform our cities in the coming years in order to protect our climate and our health. We will strive to update this ranking and rating in the future and welcome any feedback and suggestions.

Our future is dependent on action taken by city leaders today. We must commit to tackling the biggest challenge of our time.

Appendix Scaling of indicators

Category	Indicator	Measurement unit	Lower threshold (min. points)	Upper threshold (max. points)	Rationale
Space for people	Opportunity for walking	Total length of separate infrastructure for pedestrians/ Total length of roads (in %)	0%	70%	There is no official or widely accepted reference for this indicator and a modified “best in class” approach has therefore been chosen. A recent survey commissioned by the Clean Cities Campaign showed that even in the cities with the most extensive pedestrian infrastructure, more than two thirds of citizens still demand more space for walking, ⁴⁹ which is why an upper threshold has been chosen that still leaves room for improvement for all cities.
	Opportunity for cycling	Cycle network length/Total road length (in %)	0%	35%	<p>There is no official or widely accepted reference for this indicator and a modified “best in class” approach has therefore been chosen. There is however a consensus among cities and in the cycling community that it is not necessary to build a cycle network that equals the length of all roads, e. g. because cyclists will also use shared space. Paris, for example, recently announced plans to become a “100% cyclable city” by adding additional cycle lanes.⁵⁰</p> <p>When it comes to the upper threshold, even the cities with the highest share of cycling infrastructure plan further expansions of that infrastructure. Amsterdam, for example, is implementing targeted improvements as part of its “Multiannual Cycling Plan 2017-2022”⁵¹. A survey from Ghent, that ranks third with regard to the share of cycling infrastructure, shows that the satisfaction with cycling infrastructure is only medium (3.5 out of 5 points), which means that even the leading cities in our ranking need to go further and the upper threshold has been chosen accordingly.⁵² This is also confirmed by a recent survey that the Clean Cities Campaign commissioned in 2021 and that showed strong demand for an expansion of cycling infrastructure in European cities.⁵³</p>
	Traffic congestion	Average value over a period of three years of the ratio between travel time during peak hours and uncongested hours	50%	15%	The scale of the original data source, the Traffic Index by Tomtom International BV, has been used.*

* It has to be noted that the urban area boundaries used by TomTom follow their own methodology and may not fully match the administrative boundaries used in the rest of the analysis. See details at https://www.tomtom.com/en_gb/traffic-index/about/

Category	Indicator	Measurement unit	Lower threshold (min. points)	Upper threshold (max. points)	Rationale
Safe roads	Pedestrian safety	Fatalities per 100k residents	Modified worst in class	0	The European Union has officially adopted a “Vision Zero” for road safety which aims at moving close to zero deaths by 2050. ⁵⁴ This goal has been used as the upper threshold, and the highest number of fatalities as the lowest score as there is no acceptable level of fatal accidents that could be determined.
	Cyclist safety	Fatalities per 100k residents	Worst in class	0	The European Union has officially adopted a “Vision Zero” for road safety which aims at moving close to zero deaths by 2050. ⁵⁵ This goal has been used as the upper threshold, and the highest number of fatalities as the lowest score as there is no acceptable level of fatal accidents that could be determined.
Access to climate-friendly mobility	Public transport affordability	Price of the monthly public transport pass as a share of the average household income	17%	Best in class	Official EU data shows that households spend between 6.6% and 16.9% of their household expenditure on transport overall. ⁵⁶ Using this reference point, the lower threshold has been set at 17% and upper threshold at the lowest value found in this analysis (1.33% of the household income in Copenhagen).
	Access to public transport	Public transport stops per km ²	0	Best in class	There is no official or widely accepted reference for this indicator and a “best in class” approach has therefore been chosen. Paris not only achieved the highest results in our analysis but previous research on the number of residents in a city who live within a short walking distance (1 km) of high-quality rapid transit also gave Paris the full score and identified the city as a global leader. ⁵⁷
	Access to charging infrastructure	Total charging power (in kW) of public and semi-public electric vehicle charging infrastructure per 1000 population	0	Modified best in class (50 kW)	The lower threshold has been defined as the absence of charging points. When it comes to the upper threshold, a modified best in class approach has been chosen. Amsterdam and Oslo possess far more charging power compared to the population than all other cities and previous research has shown “the gap in charging density between metropolitan regions in the Netherlands and Norway compared to the rest of Europe - the number of chargers per capita in Oslo, Amsterdam, and Utrecht is over three times that of any other metropolitan region.” ⁵⁸ These cities have therefore been treated as outliers and an upper threshold of 50 kW has been set. The EU is currently working on a new methodology for setting objectives for charging infrastructure that takes into account the size and composition of the vehicle fleet. ⁵⁹

Category	Indicator	Measurement unit	Lower threshold (min. points)	Upper threshold (max. points)	Rationale
Polluting cars out, shared mobility in (policies)	Polluting cars out, shared mobility in	A number of points out of a total of 20 based on the current and planned policies	None of these policies and services are currently in place	All of these policies and services are currently in place	The existence of important policies and shared mobility has been evaluated on a point scale. This included low and zero emission zones, policies to phase-out the sales of cars with internal combustion engines, bike and car sharing schemes as well as "Mobility as a Service" cards and apps. If all policies and services are in place, the full score is attributed. A scaled approach was taken to score different levels of implementation between no policies in place to the full implementation of all policies in place.
Clean air	Current air quality	Levels of nitrogen dioxide and particulate matter (PM10, PM2.5) concentrations over the past three years	Average pollution levels exceed the current EU limits	Average pollution levels are below the new WHO air quality guidelines (published in Sept. 2021)	The current EU air quality legislation has been applied step-wise over the past two decades. ⁶⁰ If the average pollution levels exceed the EU limits that are to be met even in pollution hotspots, a score of zero is attributed to the city. If the recently published new air quality guidelines of the World Health Organization (WHO) are already achieved by the average pollution levels in cities, the full score is attributed to the city, ⁶¹ which does not mean that air pollution hotspots no longer exist and need tackling.
	Air quality trends	Trend of air pollution levels over the past three years	Stagnation or deterioration of air quality (i.e. concentrations increasing or remaining the same)	Best in class (10% improvement for NO2, 7% in PM10, PM2.5)	If there are no improvements or even a deterioration of air quality in a given city, the lowest possible score is attributed to a city. The strongest improvements in concentration reductions result in the highest score being achieved.

Table 4 - Overview of the scaling of the indicators

Translating the points into a rating

For the sake of understandability, the points for each category as well as the overall points were translated into grades using the following conversion table:

Percentage brackets	Grade
80 - 100%	A
60 - <80%	B
50 - <60%	C
40 - <50%	D
30 - <40%	E
<30%	F

Table 5- Calculation of the rating

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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, encouraging European cities to become champions of active, shared and electric mobility for a more liveable and sustainable urban future.

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