2022 SUSTAINABLE CITIES INDEX

METHODOLOGY

INTRODUCTION

The Corporate Knights Sustainable Cities Index is the world's first interactive, crowd-sourced sustainability index for cities. When the index goes live on June 15, 2022, local government officials will be able to log in to our user-friendly data hub, provide 15 simple data points, and join municipalities from around the world in a comparative assessment of sustainability metrics. The interactive data hub will promote engagement with the participating cities and continuous improvements in the index.

We have drawn on leading world experts and our 20 years of experience in rating and ranking to produce a concise and robust index that tracks 12 key indicators of urban sustainability related to climate change, air quality, land use, transportation, water, waste, policy, and resilience.

Our research division has seeded the quantitative, outcomes-focused index with an initial group of 50 cities using public data that will grow as cities visit the interactive data hub and submit their metrics to the database.

FAST FACTS

Overview:

- Annual ranking of cities' sustainability performance
- Released each year in Corporate Knights magazine

Approach:

- The inaugural ranking is based on publicly disclosed data (e.g., C40 Knowledge Hub, CDP Cities, International Association of Public Transport, REN21, World Bank, and UN Habitat Urban Indicators Database)
- Cities are encouraged to engage in our user-friendly data hub for data submission to participate in the ranking
- Methodology is based on 12 key indicators of city sustainability performance

Eligibility:

- Universe: While the 50 cities included in the initial release of the index were chosen based on their size or established sustainability reputation, any municipality is welcome to visit the data hub (as of June 15, 2022), enter their information in the database and receive a scorecard.

PRINCIPLES

RELEVANCE

This sustainable city ranking is meant to be representative of sustainable cities in the current context.

TRANSPARENCY

The precise methodology of ranking and results of the process are fully disclosed.

OBJECTIVITY

Cities are assessed using quantitative data and performance indicators.

PUBLIC DATA

This ranking relies primarily on data points that are in the public domain and mostly accessible from free databases.

COMPARABILITY

Cities are compared on the same indicators.

ENGAGEMENT

Cities selected for the inaugural ranking were informed prior to publication and invited to review data.

STAKEHOLDERS

Stakeholder feedback is actively solicited throughout the project.

INDICATORS

The 2022 Sustainable Cities Index is composed of 12 quantitative indicators of environmental sustainability performance. The method is simple: for each of the indicators, the necessary data points are collected, either from public data sources or directly from the cities themselves, through our interactive data hub.

INDICATOR	METHOD
Scope 1 GHG emissions	Divide the city's sector-based inventory of Scope 1 emissions by the city's population. This indicator reflects fossil fuel consumption in the city.
Consumption-based emissions	Divide the city's consumption based GHG emissions inventory by the city's population. Corporate Knights developed a simplified method for estimating a city's consumption-based inventory, described below. Cities' GHG footprints typically far exceed the emissions included in their direct, sector-based inventories, and this indicator captures that aspect of urban sustainability.
Air quality	Micrograms of fine particulates (less than 2.5 µm diameter) per cubic metre of air, a standard indicator of air quality.
Open public space	Divide city area for public parks, recreation areas, greenways, and other areas accessible to the public by total city area.
Water access	The percentage of city population with access to potable water.
Water consumption	The average amount of water consumed in litres per capita per day.
Vehicle dependency	Divide number of registered road vehicles by number of households.
Road infrastructure efficiency	Divide the length of the road network in kilometres by square kilometres of city area.
Sustainable transport	Divide number of trips by sustainable modes (walking, cycling, or public transit) by the total of all trips.
Solid waste generated	Divide the amount of municipal solid waste generated in tonnes per year by the city population.
Climate change resilience	Divide the national Notre Dame GAIN Readiness Score by the Notre Dame GAIN Vulnerability Score. A higher ratio indicates a high level of readiness for climate disasters and/or a low level of vulnerability to climate disasters.
Sustainable policies	Starting with an assessment of the number of key policies tracked by REN21 that the city has enacted: (i) renewable energy target, (ii) electric vehicle target, (iii) emission reduction target, (iv) net-zero GHG target, and (v) renewable energy enabling policy. Amended with additional information to support renewable energy policies and targets as provided by cities.

SCORING AND WEIGHTING

Values of each of the 12 indicators are converted to a score out of 1.0 as described in the table below. Based on the scores of each indicator, each city will receive a letter grade and rank for their overall score on the index.

INDICATOR	SCORE	WEIGHT
Scope 1 GHG emissions	Score is inversely related to the indicator, with a score of 1.0 equated to the average of the lowest indicator values in the database. All other cities' indicator values are scaled against this standard.	10%
Consumption-based emissions	Score is inversely related to the indicator, with a score of 1.0 equated to the average of the lowest indicator values in the database. All other cities' indicator values are scaled against this standard.	10%
Air quality	A score of 1.0 to cities below the WHO Guideline annual average of 10 µg/m3 and all other cities are ranked against that standard.	20%
Open public space	A score of 1.0 equated with the average percentage of top cities in the database. All other cities ranked against that standard.	5%
Water access	A score of 1.0 is given to cities with 100% potable water access, where any access less than 100% is given a score equivalent to the percentage of the population with potable water access.	5%
Water consumption	Score is inversely related to the indicator, with a score of 1.0 equated to the average of the lowest indicator values in the database. All other cities' indicator values scaled against this standard.	5%
Vehicle dependency	Score is inversely related to the indicator, with a score of 1.0 equated to the average of the lowest indicator values in the database. All other cities' indicator values scaled against this standard.	5%
Road infrastructure efficiency	Score is inversely related to the indicator, with a score of 1.0 equated to the average of the lowest indicator values in the database. All other cities' indicator values scaled against this standard.	5%
Sustainable transport	A score of 1.0 equated with the average percentage of top cities in the database. All other cities ranked against this standard.	5%
Solid waste generated	Score is inversely related to the indicator, with a score of 1.0 equated to the average of the lowest indicator values in the database. All other cities' indicator values scaled against this standard.	10%
Climate change resilience	A score of 1.0 equated with the average percentage of top ratios in the database. All other cities scaled against that standard.	10%
Sustainable policies	0.2 points for each policy, for a maximum score of 1.0.	10%

CONSUMPTION BASED EMISSIONS

A unique feature of this index is the inclusion of consumption-based emissions of cities. A country or city's consumption-based emissions are the GHG emissions that result from production and delivery of all the goods and services consumed in the country, regardless of where those goods and services are produced. It differs from the more commonly employed sector-based emissions inventory, which counts the emissions that take place within the city or country, whether they are the result of production for domestic consumption and does not count emissions embedded in goods and services imported from outside the city and country.

The calculation of detailed and precise consumption-based inventories is complex, but they can be estimated with simple methods, which is the approach we have taken.

1 | We begin with the country's sector-based inventory, using the Emissions Database for Global Atmospheric Research (EDGAR) and partition it into two parts: the emissions associated with the final consumption of the household sector, which we call the final consumption emissions, and the emissions that are used to generate the country's GDP, which we call the productive economy emissions.

2 | Emissions associated with final consumption in the household sector are estimated as the sum of three components:

a. The EDGAR residential sector emissions from fuel combustion, plus 50% of the waste sector emissions in the EDGAR inventory
b. the EDGAR power sector emissions multiplied by the portion of national electricity consumption in the residential sector, according to the IEA World Energy Balances, and
c. the EDGAR transportation sector emissions multiplied by the portion of transportation energy used for personal transportation, according to the IEA Energy Efficiency data product.

This sum is then divided by the country population to get per capita final consumption emissions. This is multiplied by city population to estimate the final consumption emissions for the city.

CONSUMPTION BASED EMISSIONS CONT'D

3 | After subtracting the emissions from final consumption in the household sector from the EDGAR inventory to get the emissions of the productive economy, we divide the country's productive economy emissions into the portion associated with domestic consumption and the portion that is exported. We do this by multiplying the country's productive economy emissions by the percent of the country's GDP that is exported, according to the World Bank trade statistics. This involves the simplifying assumption that the portion of a country's productive economy emissions that is exported can be equated with the portion of a country's GDP that is exported. The emissions related to domestic consumption of the output of the productive economy are divided by population to get a per capita value for emissions embedded in domestic consumption, and this is multiplied by city population to assign a share of the productive economy emissions to the city.

4 | Two of these three components of the country's emissions inventory – the final consumption emissions and the portion of the productive economy emissions associated with domestic consumption – form two components of the consumption-based emissions. What remains is to estimate the emissions that are embodied in imports.

5 | To estimate emissions that are embodied in imports, we start with the portion of each country's emissions inventory that is exported, as calculated in Step 2 above. Using World Bank data, we distribute each country's exported emissions to each other country on the assumption that the share of the emissions embedded in a country's exports that are received by another country is equal to the share of exports received by that country. We can then sum the imported emissions for each country to get an estimate of the total emissions embedded in imports for each country. This total is pro-rated to cities on a per capita basis.

6 | We add the result of Step 5 to the final consumption emissions and the share of the productive economy emissions associated with domestic consumption to obtain the consumption-based emissions.

CITIES UNIVERSE

The inaugural Sustainable Cities Index includes populous cities and several mid-sized cities (based on their record of sustainability leadership as known by Corporate Knights), with a total of 50. Cities are in Canada, the United States, Central & South America, the UK & Europe, Africa, Asia & Oceania and China.

Accra	Beijing	Berlin	Bogotá	Buenos Aires
Calgary	Canberra	Cape Town	Chicago	Copenhagen
Curitiba	Dar es Salaam	Dhaka	Edmonton	Guangzhou
Halifax	Helsinki	Houston	Istanbul	Johannesburg
Lagos	Lahti	London	Los Angeles	Madrid
Medellín	Mexico City	Minneapolis	Montréal	Moscow
Mumbai	New York City	Oslo	Ottawa	Paris
Rio de Janeiro	San Francisco	São Paulo	Seattle	Seoul
Shanghai	Shenzhen	Singapore	Stockholm	Sydney
Tianjin	Tokyo	Toronto	Vancouver	Washington, D.C.

Cities that wish to be included in the Corporate Knights Sustainable Cities Index are encouraged to submit their city's sustainability data in our data hub as of June 15, 2022.

CONTACT & LEARN MORE

- To confirm the correct contacts for your city or to have your city added to our database, please email cities@corporateknights.com.
- Sign up for email updates on future rankings and research from Corporate Knights.

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