# The **2019 US Cities** Sustainable Development Report

SUSTAINABLE DEVELOPMENT SOLUTIONS NETWORK
A GLOBAL INITIATIVE FOR THE UNITED NATIONS

# Methodology

The US Cities Sustainable Development Report measures the progress of US cities towards the United Nations Sustainable Development Goals. Using publicly available, recent data from reputable sources, the index presents an overview of progress towards the SDGs. It builds upon US Cities Indices developed by SDSN in 2017 and 2018. The scores represent progress towards these goals which are meant to be achieved by 2030. The methodology below builds on the methodology established by SDSN and Bertelsmann Stiftung for the SDG Index and Dashboards Report (Sachs, J., Schmidt-Traub, G., Kroll, and C., Lafortune, G., Fuller, G 2018). This section includes: 1) information on indicator and data selection, 2) rescaling and normalizing the data, and 3) aggregating composite index and adding colors.

## Updates to Methodology and European Commission's Independent Statistical Audit

The European Commission Joint Research Centre (JRC) conducted in 2019, for the first time, an independent statistical audit of the underlying methodology of this report, first developed by SDSN and Bertelsmann Stiftung for the SDG Index and Dashboards, now called the Sustainable Development Report. The audit evaluated the statistical and conceptual coherence of the index structure (Sachs, J., Schmidt-Traub, G., Kroll, and C., Lafortune, G., Fuller, G 2018). Based on this audit, a few updates have been made. When considering normalization and weighting, additional tests regarding outliers were put into place. No imputed data is used for this index. Additional information, including raw data, is available online at www.github.com/sdsna/2019USCitiesIndex.

## Indicator Selection Criteria

To determine quality, technically-sound indicators for selection, we used the following criteria:

1. **SDG and US city relevance:** Data is matched to the SDG targets, then matched to suggested indicators as closely as possible. From this list, indicators are selected that are most relevant to city contexts— for example, the index excludes international cooperation indicators. Finally, when possible, indicators should be relevant to a policy context and/or support communities and leaders in policy-making decisions. Alignment of each indicator to the SDG target or indicator is noted on the Annex.
2. **Statistical quality:** Data must be from a reputable source that produces data in a replicable and reliable way. Preference is given to datasets that are updated routinely, so progress can be tracked to 2030, and to datasets that have disaggregated data available, to track progress for all groups.
3. **Timelines:** Data must be published recently, with preference given to data covering the year 2015 or later. In two instances, data was used from earlier years; and in eight instances, data was aggregated from multiple years that include dates prior to 2015 because it was the most reliable source to cover an essential issue. (See the Annex for more information on specific data sources and years covered.)
4. **Coverage:** Datasets must provide data for at least 80% of MSAs. Six variables had less than 80% coverage but were included because when available, these indicators provide essential information about sustainability at the city level (Infant Mortality Rate, Park Area, Natural Parkland, Racial Representation Gap, and Gender Representation Gap, Municipal Equality Index). Many indicators were collected at the county level and aggregated to the MSA level. When data was aggregated to the MSA, it was population weighted when appropriate. County-level indicators were only included when the included

counties covered 75% of the total MSA population. Two indicators— Paid Sick Leave and Paid Family Leave—were included if any county in the MSA had a policy. Finally, two indicators were measured at the state level: Renewable Energy Consumption and Production. Goals 14 and 17 are not included in this index due to issues of data availability and to lack of city-level comparability.

5. **Comparability:** Data was chosen that has a reasonable or scientifically determined threshold. There are several indicators that the UN has recommended for monitoring purposes, that are not well-suited for comparison in an index because there is no consensus on a "best" level of achievement. Indeed, "best" levels may vary by location. This is the case, for example, with passenger and freight volumes (SDG Indicator 9.1.2) or percentage of employment in the manufacturing sector (SDG Indicator 9.2.2) from Goal 9, neither of which have an optimal level of achievement at the city level.
6. **Repeated indicators:** Data should not repeat across Goals. Within the SDGs official indicators, there are indicators that are repeated across multiple Goals. This promotes the idea that the SDGs are interconnected and interdisciplinary. However, in order to prevent double counting of indicators within the index calculations, indicators were not repeated across Goals. In cases where an indicator could reasonably fit within multiple SDGs, it was placed within the Goal with the target that was determined to most closely/directly match the language/intent of the indicator.
7. **Outcome indicators:** Whenever possible, data should measure outcomes. In cases where outcome data was unavailable, process or output indicators were used to track policies or actions that have a research-supported impact on outcomes. For example, paid sick leave and paid family leave legislation were used as an indicator for implementing appropriate social protection systems.

## Rescaling and Normalizing the Data

To rescale and normalize the data, the index followed the methodology developed by SDSN and Bertelsmann Stiftung, detailed below. Indicators were rescaled so they could be compared with one another. The choice of upper and lower bounds with which to rescale the data is a sensitive one and can introduce unintended effects into datasets if extreme values and outliers are not taken into account. (Note: in this section the term "upper bound" is used to refer to the target value, even if the indicator data is descending and the most progress is represented by a smaller number.) Lower bounds are particularly sensitive to outliers as they can impact the rankings of the data (Booysen 2002). Detailed information about each indicator, its bounds, and the rationale for those bounds can be found in the Annex. When the bounds have been set by a previous, comparable report, we have maintained those bounds here. When this was not possible, the following methodology was used to determine upper and lower bounds. All bounds taken from previous reports were also determined by the methodology below.

**The upper bound for each indicator was determined using a five-step decision tree developed by SDSN and Bertelsmann Stiftung:**

1. **Use the absolute quantitative thresholds outlined in the SDGs and targets:** e.g. zero poverty, universal school completion, universal access to water and sanitation, full gender equality. Some SDG targets also propose relative changes (e.g. halve poverty).
2. **Where no explicit SDG target is available, set upper bound to universal access or zero deprivation for the following types of indicators:** a. Measures of poverty (e.g. working poor), consistent with the SDG ambition to "end poverty in all its forms everywhere" (Goal 1); b. Public service coverage (e.g. preschool access); c. Access to basic infrastructure (e.g. broadband access); d. Leave No One Behind (e.g. school poverty disparity), consistent with the SDG ambition to eliminate disparate treatment for all vulnerable groups including those identified by race, indigenous status, religion, gender, sexual orientation, disability, poverty, location, and age.
3. **Where science-based targets exist that must be achieved by 2030 or later, use these to set 100% upper bound:** target value of 1.7 tons of CO2 per capita by 2050 as outlined in the Deep Decarbonization Pathways report for the United States (e.g. Goal 13: Production-related GHG emissions).

4. **Where even the best performing cities lag significantly behind the international community, and the indicator matches one used in international contexts, use the average of the top 5 OECD performers or the top 5 Global Index performers.**
5. **For all other indicators use the average of the top 5 performers.**

**The lower bound for each indicator was determined using a three-step decision tree:**

1. Use science-based thresholds, or expert advice for lowest acceptable or safe performance.
2. Evaluate the skewness and kurtosis of the raw data. When absolute skewness was greater than 2.0 and kurtosis was greater than 3.5, and/or data coverage below was 80%, distributions were analyzed for further adjustments.
3. Use the 2.5 percentile score of the available data to account for outliers.

**For both the upper and lower bounds:**

Each indicator distribution was censored, so that all values exceeding the target value scored 100, and values below the lower bound scored 0. In cases where the bounds were scientifically determined, the normalized score can be interpreted as percentage of progress made towards achieving the SDGs, with 100% meaning that the indicator has been achieved. In many cases, however, a score of zero is simply the lower benchmark of US cities' current progress. In cases where the average of the top 5 is used to determine the score of 100, a "100" indicates only that this threshold level of achievement can be reasonably expected in the US context.

**Calculating the index and assigning colors:**

Goal scores were created by taking the arithmetic average of the normalized indicator scores. Overall score was calculated by averaging the score for the 15 included SDGs.

Color scales were developed by creating interior thresholds that benchmark progress towards achieving the SDGs. The colors reflect the following scale:

Red—poor performance; orange—poor to moderate performance; yellow—moderate to good performance; green— good performance; grey—information unavailable. Green should not be interpreted as meeting the SDG indicator, but rather as an indication that the city is within range of achievement by 2030. As this index provides primarily a benchmark of current achievement, cities could be slowing progress or moving away from achievement, which would not be captured here. Similarly, cities could be within range of achievement but not moving quickly enough to actually achieve the Goal by 2030.

Interior thresholds were developed, when available, by expert or scientifically-determined levels. When this was not possible, interior thresholds were determined using summary statistics, such as using the mean (yellow/orange threshold) and the standard deviation (to set the yellow/green and orange/red thresholds), and then adjusted for clustering within the data. When indicators were measured on a 3-point scale (i.e. 0, 1, 2), three colors were used: red, yellow and green. The colors for Goal-level achievement were determined by mapping the indicator colors to a four-point scale (0-3), and then averaging the value across all indicators for a specific Goal. If any city had more than 1/3 of its indicators red for any Goal, that Goal was automatically determined to be red, to highlight the level of action necessary to achieve that Goal by 2030.