CDP GHG Emissions of U.S. Cities, States, and Regions – Data Analysis Summary

Business Statement

The CDP (Carbon Disclosure Project) is a not-for-profit platform that provides a standardized system for public and private organizations to report their environmental impacts and GHG (Greenhouse Gas) emissions. The CDP enables these groups to measure their efforts in sustainability and allows them to be more transparent in their operations. Data on these reports are made available to the public for all participating organizations and are self-reported through a questionnaire provided by the CDP.

Historical data for organizations will be analyzed to understand their GHG emission trends over time and identify their emission goals. Organizations in this analysis include only U.S. cities, states, and regions. This analysis seeks to identify if organizations are trending downward in emissions (or toward a set emission reduction targets) and visualize the quantitative and qualitative aspects of their implemented climate strategies. This goal of project is to provide descriptive analysis to offer insight for stakeholders with vested interest in supporting sustainability efforts for both public and private bodies.

Data Sources

This data was collected in partnership by CDP and ICLEI - Local Governments for Sustainability. All data used was provided by CDP's public database.

Terminology

Report year – the year an organization submits their questionnaire.

Inventory year – the year in which the GHG emissions were collected for.

GHG emissions, total annual emissions, emissions – all iterations are used interchangeably to refer to any given year's total annual emissions.

Questionnaire – questionnaire provided by CDP for organizations to submit their climate plan report/information.

Results and Findings

Data used in this analysis was cleaned, organized, and analyzed in Excel and MySQL. Datasets for various report years were manipulated and combined to create an emission trend for each organization in the analysis. Tableau was used to visualize the data.

GHG Emissions, Baselines, and Targets

A total of 183 organizations reported to the CDP between the years of 2017 and 2022. Of 183 organizations, 125 reported enough GHG emission data to analyze and visualize (minimum of 2 values).

- 109 out of 125 (87.2%) organizations had reported a base year emission (a baseline amount to measure the progress of their climate goals)
- 30 out of 125 (24%) organizations had an increase in total annual emissions from their most recent inventory year, and their total base year emission
- 95 out of 125 (76%) organizations had a decrease in total annual emissions from their most recent inventory year, and their total base year emission
- 125 organizations had set a target year to implement a climate strategy plan

Visualization for individual organizations comparing emissions and years on Tableau

Climate Strategy Details

Out of 183 organizations, 140 organizations answered at least one question regarding details on their climate strategies on the questionnaire.

- 126 out of 140 (90%) organizations reported a type of funding source
- 131 out of 140 (93.6%) organizations reported a type of financial instrument
- 136 out of 140 (97.14%) organizations noted their primary plan authors
- 14 out of 140 (10%) organizations reported their plan implementation costs

Visualization showing the total make up of climate strategy details on Tableau

Limitations

The questionnaire provided by the CDP are comprehensive and ask questions in detail about a myriad of subjects relating to their climate strategies. Although these subjects can all affect the how the emission values are calculated, they were not considered in the analysis to address the business task at a fundamental level. Some of the subjects include:

- The framework, protocol, and or method in which data was reported collected
- Tools used to compile emission inventory data
- Reported, physical boundaries for which the organization is collecting emission data within
- Population size of each organization for any given year

Since the organizations can have varying goals in their climate strategies, the frequency and accuracy of the some of the datasets were found to be inconsistent between years. A report for any given year can include emission data for previous inventory years. Between these reported years, some obstacles encountered while cleaning and analyzing the datasets include:

- Change in report format, and how emissions are calculated in each column/category
- Duplicate emission values across different inventory years
- Different emission values for the same inventory year
- Outlier values, such as “1” for emission values

Assumptions were made to homogenize the structure of the data and eliminate potentially erroneous values.

Recommendations

Although the CDP provides reporting guidance for their climate strategy questionnaires, there is still room for alternative interpretations of the definitions and explanations provided in the documentation. Since what is released to the public is entirely self-reported, any stakeholders attempting to gauge emission trends may receive an inaccurate picture of an organization’s progress if there are errors during the reporting process. I would recommend that the CDP encourages their participants to allocate resources to audit their questionnaires before submitting. Or to whatever extent the CDP might be capable of, to build a simple tool or system that can audit and contrast data between report years.

The “plan implementation cost” climate plan question had the lowest number of responses from the questionnaires. Less than 10% of participation organizations had included a value in their submitted report. Since funding at the government level can be bureaucratic and slow moving, finances could be an obstacle when it comes to implementing a plan and having the resources to maintain it. The CDP should find a way encourage organizations to submit the costs of implementing their climate strategies. This way stakeholders may be able to better identify organizations that are struggling due to monetary reasons, whether in part or as a whole.