

City Classroom CAP - Series

PBL support for using your City Climate Action Plan as a Living Textbook for local relevance, student agency, and community impact.



Credit: Kevin Lisota

Carbon Commute Count | Baseline Data Analysis

Summary

How we travel is one of the biggest sources of our carbon footprint as a community. Our city is working hard to develop low carbon solutions. We can help by studying our commuting habits.

In this lesson, students collect and analyze classroom or school data on the daily carbon emissions for all of the different ways that students are getting to school and back. They establish a data-driven baseline from which to develop student behavior change campaigns for choosing low-carbon commuting alternatives.

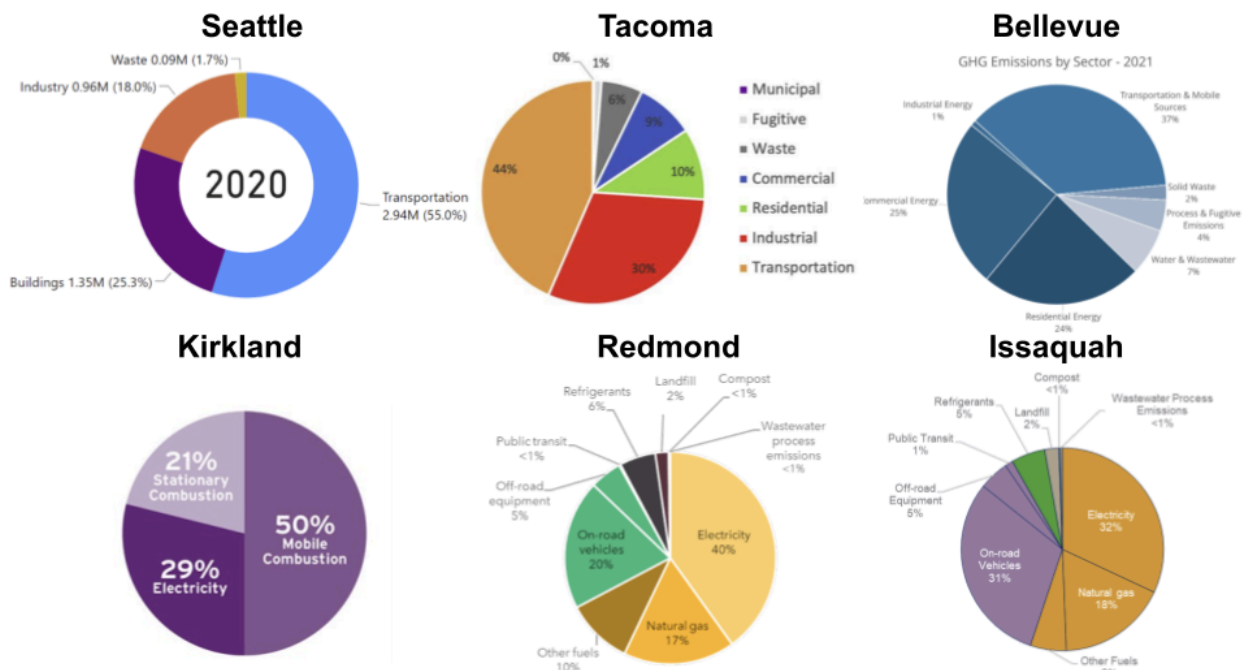
What Percent of GHG Emissions is My Commute to School?

Get the [SLIDES](#)

STATE GHG INVENTORY: Take a look at our state's [GHG Inventory Pie Chart](#). Scroll down to see the sector by sector breakdown. Analyze the Transportation sector. There are some great pie charts in the [Report's Transportation Sector](#) (pages 33) that further breakdown the sources.

KING COUNTY GHG INVENTORY: Compare our State's GHG inventory to King County's. See [the pie chart](#) on page 19, scroll down to page 28 to get the full sector breakdown including handy graphs and charts.

CITY GHG INVENTORY EXAMPLES: (See the [SLIDES](#) for individual Pie Charts)



ENTRY EVENT

Show [Eva's Video](#) [1:07] about how she conducted an observational Carbon Commute Count at Juanita High School in Kirkland. And then take a look at [Eva's Math Calculations and Assumptions](#). Notice how Eva also explores some hopeful projections.

A few inquiries to think about when viewing the video and math...

1. Do you think our school produces more or less CO₂ than Juanita High School in Kirkland? Why or why not?
2. How would we count commuting practices at our school? What is more accurate, collecting observational data or a school-wide survey? Should we do both?
3. Knowing this baseline data story, what actions might we take to improve it?
4. Is our data part of the larger data story revealed in the GHG inventory pie charts trackers by our city, county, and state?

IMPLEMENT THE COUNT

Tips for Collecting Observational Data

1. Students can split up into small groups to count different categories of commuters. For example, one group could survey the parking lot, another count the bus drop offs, another surveys drop offs at the front entrance, etc.
2. Observe all entrances to the school.
3. Count for multiple days to get a more accurate average.
4. Use a physical clicker or an app to keep track of your count!

Tips for Using a Survey Count

1. Use the [Regional Survey](#). We will produce your data report within 24 hours. Just let us now! The advantage of using the Regional Survey is that your students can compare across schools and districts. Contact: info@sustainabilityambassadors.org
2. When collecting this data make sure to distribute your survey across the whole school, or smaller subsets that include every student demographic such as homerooms, assemblies, or required classes across each grade! Otherwise sampling bias will be present in your data.
3. Here are several different ways to get the survey out so that a high percentage of students take it.
 - a. All freshmen via biology class

- b. Identify committed teachers to take one minute of class time to give the survey to sophomores, juniors and seniors. Remember, juniors and seniors can drive so their data is critical.
 - c. Ask ASB to send out a survey during homeroom or link crew (1 minute long).
 - d. Get the Principal to write a 3-sentence cover note for a school-wide email.
4. Once everyone fills out the survey, find out the % of students who take each method, for example: 87 students say they ride public transit out of 239 students who took the survey = 36% of students ride public transit.
5. Next, use that number to find out the rough estimate of how many people use each method of transportation throughout your whole school, ie. 36% of 1,950 total students at school = 710 students who take public transportation)

Tips for Calculating GHG Emissions

1. To estimate the carbon emissions produced by your student body, replicate this [sample student math analysis](#).
2. Since we know the number of miles and the method of transportation, we can then figure out the average carbon emissions for each method of transportation. If distributing the survey, calculate average distance based on the response. For an observational count [use these metrics](#): high school distance is 3.6 miles and middle school is 3.2 miles.
 - a. **Buses CO2 emissions:** [3.3 pounds/mile](#) x ___ buses x ___ miles a day
 - b. **Car CO2 Emissions:** [0.88 pounds per mile](#) x ___ cars x ___ miles a day
 - c. **Bikes/Scooters/Walkers/Skateboarders Emissions:** ZERO!!
3. We add together the data for all of the methods of transportation to find out the **total carbon emissions per day**. (*Remember to calculate for the round trip!*)
 - a. How much per week? (5 days of commuting to school)
 - b. How much per month (20 days of commuting to school)
 - c. How much per school year (180 days of commuting to school)
4. Calculate the **per-capita carbon emissions** for the school so that you can compare your school to any other school no matter how big the student population. Calculate: Total emissions dividend by the total # of Students = Emissions per capita (each student).
5. Have some fun finding different equivalent measurements using the [EPA GHG Equivalencies Calculator](#).

A few inquiries to think about when analyzing the data...

1. How do you get to school? What influences the method of transportation you take?

2. How does our school's geographic attendance area influence how students get to school? Are there large hills, busy areas, or major roads within this area?
3. When you study your City's Master Bike Plan, do you see efforts to improve the safety and distribution of bike routes?
4. What makes a student choose to drive? (Cool factor? Privilege? Convenience?)
5. Are buses overcrowded or empty? Is your school served by school buses or public transit? Any improvements you would suggest?
6. How many students carpool? What would the parking lot look like if 50% of our student body carpooled? How would this impact the carbon footprint of our school commute?
7. Where are our bike racks? Undercover or out in the elements? Are they crowded each morning or pretty empty?

AFTER THE COUNT

So, now that we have baseline data, what actions should we take to improve it?

Here are a few suggestions for Impact Projects and Campaigns. These can be implemented individually, in teams, as a class, or whole school. Some of these campaigns may evolve into annual school-wide traditions led by ASB Student Government.

1. [Bike to School Impact Project Template](#). See 8th grader [Diya's Video Report](#)
2. E-Bike Market Adoption Rate (Action Research project in development)
3. Bike Path Engineering Design from our city's Bike Plan. See: "[My City Bike Plan](#)" [Impact Project TEMPLATE](#)
4. Carpool to School Challenge
 - a. [Template for Carpool Campaign - School-Wide](#)
 - b. [Template for Carpool Impact Project - Individual](#)
 - c. [Example short video by Siena](#)
5. EV Market Adoption Rate and Charging Station Analysis (Action Research project in development)
6. Bus Bingo. See our [Bus Bingo Hub](#) to get a Bus Bingo Board for your City or develop your own. See the backside of each Bingo Board for how students can earn Volunteer Impact Hours.
7. Electric School Bus Math (Action Research project in development)
8. Student clubs required to complete community service hours are encouraged to explore our collection of [Impact Volunteer Hour Packets](#).