

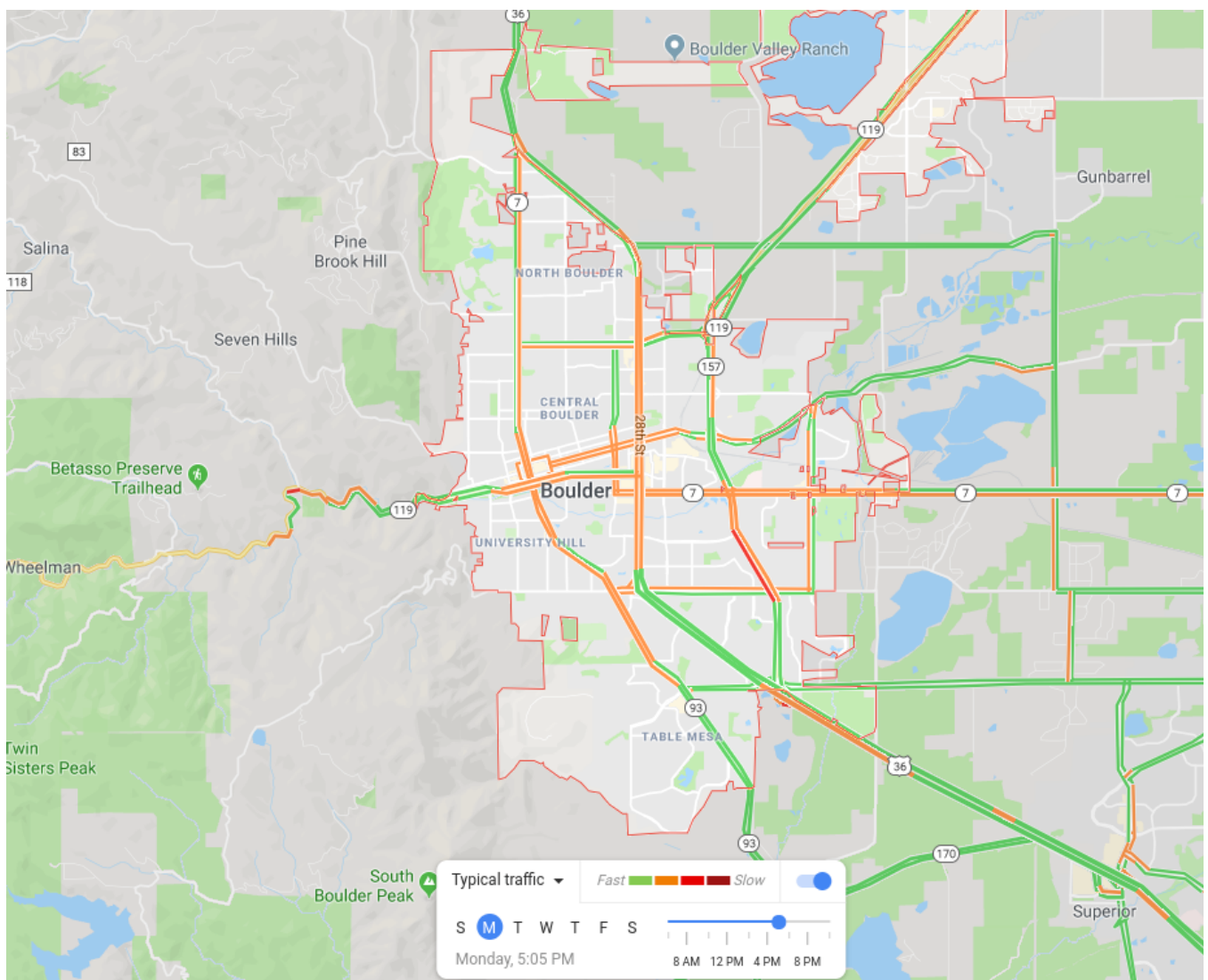
# Accelerating city climate action with high resolution geospatial data

Google Earth



By Saleem Van Groenou, Sr Program Manager, Google Earth Outreach

In every city, there is constant movement of people and their vehicles: from morning and afternoon commutes, to running errands and afternoon jogs in the park. Each trip contributes to a cities' ability to get work done, transition to a low-carbon future, and improve air quality.



*Typical traffic on a Monday afternoon in Boulder, Colorado*

Transportation insights that are locally and continuously measured — and include both emitting sources (such as vehicles) and non-emitting sources (such as bicycling and walking) — can accelerate planning and action towards carbon reduction. Google's [Environmental Insights Explorer](#) (EIE) makes this data freely accessible for city planners around the world.

In recent months, we've been partnering with cities across ten different countries to learn how they currently collect data, plan for reduction projects, take action, and track results. We've been working with these cities, and our city-network partners, to validate EIE's data and approach against existing data sources, and testing our modeled data against actual road sensor counts.

## EIE can be used to address an array of challenges cities face in developing a Climate Action Plan

The results of our efforts to validate EIE show that the insights are unique and have the potential to simplify the time and resources it takes to measure, plan, and manage city greenhouse gas (GHG) reductions in the future.

*"We believe the Environmental Insights Explorer can serve as a critical first step for city sustainability teams to better assess their current situation and more efficiently track and monitor their progress in meeting their climate protection goals."*

Amanda Eichel, Executive Director of the Global Covenant of Mayors for Climate & Energy, the largest global alliance for city climate leadership, including C40, ICLEI-Local Governments for Sustainability USA, and CDP and others.

We also worked with [ICLEI — Local Governments for Sustainability USA](#), a network of local governments committed to sustainability, to understand the landscape of data sources and tools that cities could potentially use.

*"Once a city has decided to commit to taking action on climate, the first step is always to measure their community's GHG emissions. Typically, that requires a city to send off data requests to various utilities, transportation planners, and other third parties. Google's Environmental Insights Explorer can provide inputs into building and transportation sector emissions in one place. Most importantly, it is applicable to any city, whether newly engaged in compiling a GHG Inventory, or for seasoned cities that wish to complement existing data with additional insights like modal choice and congestion impacts."*

ICLEI — Local Governments for Sustainability USA

The [ICLEI white paper report](#) further noted that EIE can provide:

- **Transportation data based on continuous observation:** a more reliable and readily available indication of year-to-year change in on-road transportation activity than most existing data sources, which rely on lengthy model runs and re-calibration cycles.
- **Multi-modal transportation data:** data not only regarding on-road vehicles, but also pedestrian, bicycle, and transit usage. This more complete picture allows for more effective planning for a transportation system that prioritizes active and transit modes, and the ability to measure shifts in mode share over time.

- **Data on building size and usage:** EIE provides total floorspace of residential and non-residential buildings, a useful indicator for understanding emissions changes.

## EIE's estimation of transportation activity matches ground truth sources

Underlying the Environmental Insights Explorer are the same sources of information currently available in Google Maps, such as buildings, road networks, and traffic. By applying a model on top of measured activity, EIE accounts for the emissions of an entire trip across different modes of travel, and all trips that begin or end in the city, on any road. In addition, by aggregating hundreds of millions of trips, small differences in the data for individual intersections become less significant to the total.

For a number of cities we've been working with, road sensor data collected from a few intersections and road segments is considered a 'ground truth' for transportation data. We wanted to test these questions: Is EIE a representative sample of the actual number of vehicles passing over a road sensor? And, is EIE's data representative of the *total* vehicles in a city?

The [Travel Forecasting Guidelines](#) from the California Department of Transportation (Caltrans) recommends a correlation of 0.88 or greater between actual ground counts and the estimated traffic volumes. We completed an assessment in Mountain View, California, (a sample of five intersections with 46,563 vehicles), and Boulder, Colorado (a sample of four intersections with 76,560 vehicles).

The Pearson correlation between the actual ground counts and the modeled traffic volume from EIE ranged from 0.91 to a near maximum 0.99. In addition, the modeled total vehicle counts from EIE were within 6–17 percent of the actual. This result is highly encouraging, and shows the EIE data can be a sufficient alternative to road sensors, with the added benefits of trip distance/duration data and global scale applicability.

## EIE can streamline city efforts to develop climate strategies

We've been grateful for the partnerships with cities worldwide, and inspired by their willingness to evaluate EIE as a new data source for their city efforts. The City of Boulder has helped shape and refine our methodology with the wealth of data that the city currently collects.

*"While the City of Boulder has collected robust vehicle count data for many years, we are excited by the possibilities offered by EIE to supplement our existing data sources and make the data collection process more streamlined and efficient. Additionally, the EIE tool provides the ability for cities to continuously collect data and recognize trends over time. Such offerings should allow cities around the world to more easily track VMT emissions and set new strategies to move to lower emission modes of transportation."*

— Kathleen Bracke, for the City of Boulder, Colorado, Transportation Division

We're encouraged by the reports from cities that have already started to use EIE, as well as our

partners' assessments of EIE's value and accuracy. We've built EIE on the idea that accurate, global scale, widely available data can help accelerate the transition to a low-carbon future. For us, measuring a baseline is only the beginning of this journey towards creating a plan, setting ambitious reduction goals, and tracking progress towards achieving those goals.

We're excited to bring EIE to new cities around the world, and help unlock climate action on a local scale. To learn more about EIE in your city, contact us [here](#) on [insights.sustainability.google](https://insights.sustainability.google).