

PROJECT GREEN LIGHT

Project Green Light is an early-stage research project by Google. The purpose of the project is environmental in nature and aims to reduce vehicle greenhouse gas emissions at city intersections. Accelerating after stopping at intersections (traffic signals) accounts for over half of all emissions at city intersections, which is 29 times higher than emissions on open roads. This project accomplishes its goal of reducing stop-and-go traffic by optimizing traffic light timing configurations. In order for cities to improve traffic light timing, they would traditionally need to install hardware or run manual vehicle counts; both of these solutions are expensive and do not provide all the necessary information.

Green Light uses artificial intelligence and Google Maps driving trends to model traffic patterns and build intelligent recommendations for city traffic engineers to optimize traffic flow. Early numbers indicate a potential for up to 30% reduction in stops and 10% reduction in greenhouse gas emissions (estimated). By optimizing each intersection, and coordinating between adjacent intersections, waves of green lights are created and help cities further reduce stop-and-go traffic. Green Light is now live in 70 intersections in 12 cities and 4 continents, from Haifa, Israel to Bangalore, India to Hamburg, Germany. At these intersections fuel can be saved with lower emissions for up to 30 million car rides monthly.

Green Light reflects Google Research's commitment to use AI to address climate change and improve millions of lives in cities around the world.

How it works:

1. Understanding the intersection - Building on decades-long effort to map cities across the world, Google can infer existing traffic light parameters including cycle length, transition time, green split (i.e. right-of-way time and order), coordination and sensor operation (actuation).
2. Measuring traffic trends - Google creates a model to understand how traffic flows through the intersection. This helps describe typical traffic patterns including patterns of starting and stopping, average wait times at a traffic light, coordination between adjacent intersections (or lack thereof), and how traffic light plans change throughout the day.
3. Developing recommendations for the city - using AI, Project Green Light identifies possible adjustments to traffic light timing. These adjustments are shared as actionable recommendations with the city. The city's traffic engineers review the recommendations, approve them, and they can easily implement them in as little as 5 minutes, using the city's existing policies and tools.
4. Analyzing impact - Google then measures how many stops are saved for drivers, and its impact on traffic patterns. Project Green Light then uses industry standard models to calculate the climate impact of these changes, which are shared with the partner city. Monitoring continues for any changes needed in the future.

Google does not currently charge for Project Green Light, however, if the technology were be utilized in some manner within the City of Miami Beach, the cost associated would be related to the personnel needed to monitor the platform and make changes to the signal timing.

Notwithstanding the ongoing traffic signal optimization ITN, Project Green Light utilization by cities is an interesting and novel idea. Google uses their extensive data, collected from drivers, using Maps driving trends to discover opportunities for traffic signal optimization. Although still an early-stage research project, it seems the project has been able to reduce stop-and-go traffic emissions in a measurable way.

One question that remains is whether there is correlation between the goal of this project, which is to reduce traffic emissions, and the City of Miami Beach goal of reducing traffic congestion. It stands to reason that traffic light synchronization to achieve “waves of green lights,” would also result in reducing congestion. The Police Department was unable to determine at this time if there is any research to support that these are correlated.

One other factor affecting the City of Miami Beach’s ability to participate in Project Green Light and many other potential traffic solutions is that the City does not control any traffic light signalization. All traffic light signalization is controlled by Miami-Dade County. For Miami Beach to participate, Miami-Dade County would have to agree to change signalization based on the recommendations provided by Google. It is unknown what the County’s position would be regarding program participation. However, this may be explored further.