

# Innovation transforms CO<sub>2</sub> monitoring in San Francisco

VAISALA

## Case Study



### The client:

University of California,  
Berkeley

### Vaisala solution:

Vaisala CARBOCAP® Carbon  
Dioxide Probe GMP343

The University of California, Berkeley (UC Berkeley) has taken a bold step toward addressing air pollution by integrating the Vaisala CARBOCAP Carbon Dioxide Probe GMP343 into their innovative Berkeley Environmental Air Quality and CO<sub>2</sub> Network (BEACO2N) project. This case study highlights how this cutting-edge technology is redefining the landscape of air quality and greenhouse gas (GHG) monitoring, providing air quality management professionals and environmental protection agencies with the tools they need to safeguard our environment.

### THE CHALLENGE:

#### Measuring CO<sub>2</sub> cost-effectively across a broad area

The San Francisco Bay Area, a region known for its technological advancements and urban density, grapples with significant air quality and GHG emission issues.

Traditional monitoring methods such as high-end gas analyzers are accurate but are too expensive to be used at scale for sensor networks, which are necessary to inform effective climate action. UC Berkeley recognized the critical need for a detailed, dynamic and cost-effective approach to address these challenges.

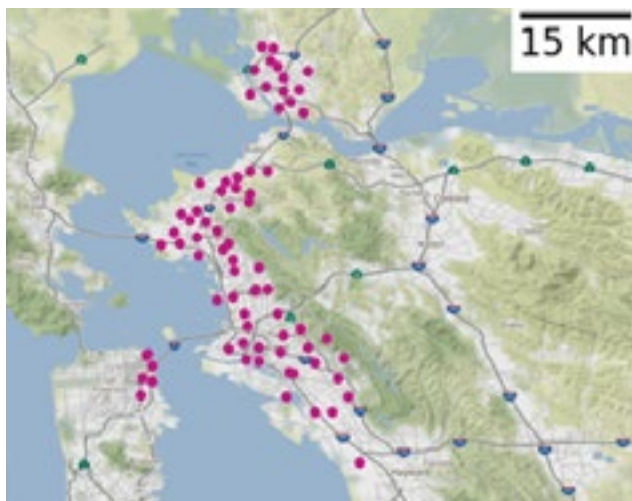
## THE APPROACH:

### High-resolution measurements with real-time monitoring and evaluation

GMP343 is a state-of-the-art sensor that delivers unparalleled accuracy and reliability in CO<sub>2</sub> concentration measurement. Its integration into the BEACO2N project has transformed environmental monitoring in the region.

The BEACO2N project uses a dense network of sensors or “nodes”, placed approximately 1 mile apart.

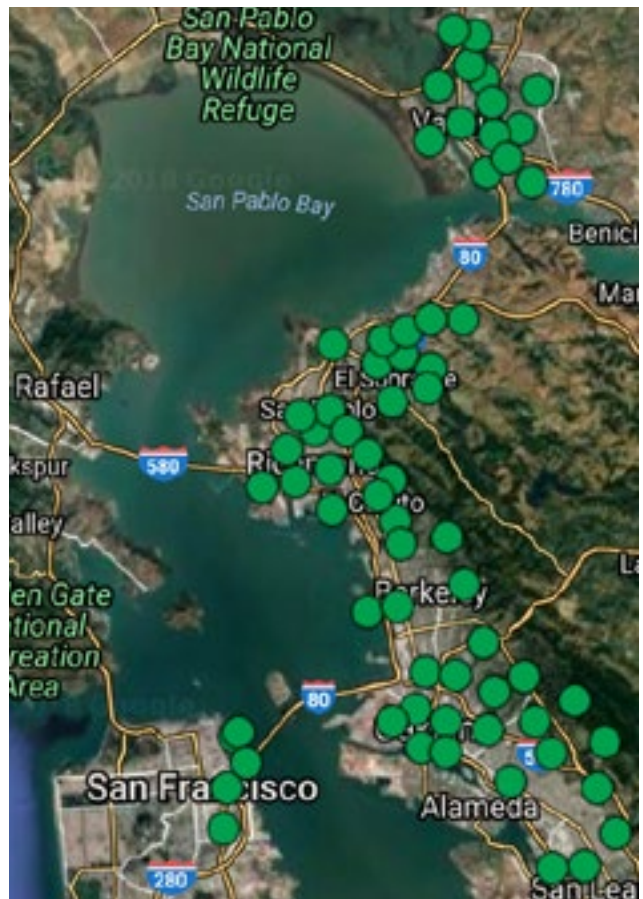
The nodes measure CO<sub>2</sub> concentrations in addition to other air quality metrics, such as particulate matter, nitrogen oxides, ozone, and carbon monoxide. The well-designed dense network is combined with data quality control and high-resolution inversion and assimilation models that help interpret the measured concentrations. Every two days, nodes calibrate by comparing GMP343 data against a reference site and adjusting as needed to ensure accuracy.



BEACO2N network in San Francisco Bay Area

This data provides a detailed map of pollutant concentrations in near-real time, helping researchers evaluate the effectiveness of local and regional efforts to reduce GHG emissions, improve air quality, and enhance public health.

The project extends beyond scientific research to include a robust educational component and inspire climate action. Nodes on school rooftops provide K-12 students with hands-on learning experiences in environmental science, which also raises awareness about the importance of monitoring and mitigating GHG emissions.



## THE RESULTS:

### Accurate, effective and scalable CO<sub>2</sub> monitoring for climate action

The integration of the GMP343 into the BEACO2N project has yielded remarkable results for climate action and community involvement:

- Enhanced data accuracy: GMP343's precision and reliability have significantly improved the accuracy of CO<sub>2</sub> concentration measurements, providing a more reliable basis for policymaking
- Informed policy decisions: Near-real time data has enabled air quality decision makers to identify and address pollution hotspots more effectively, leading to more targeted and effective climate action strategies
- Community transparency: Data collected by the nodes is publicly available for viewing and download, promoting transparency and community involvement

*"Using GMP343 sensors in the BEACO2N project has been a game-changer, offering precise data that enhances our understanding of local CO<sub>2</sub> dynamics. The project is a big win for this region and other cities."*

*Ronald Cohen  
Professor of Chemistry & Earth and Planetary  
Science, University of California, Berkeley*

UC Berkeley has set a new standard in environmental monitoring with GMP343. By providing real-time, high-resolution data on CO<sub>2</sub> levels, this technology is not only advancing scientific re-search but also empowering city authorities to take more informed and effective actions.

Since its successful implementation in 2013 in the San Francisco Bay Area, the BEACO2N network has expanded to more than 350 nodes and deployed in other cities such as Los Angeles, California; Providence, Rhode Island; and Glasgow, Scotland. BEACO2N stands as a testament to the power of innovation in addressing one of the most pressing challenges of our time.

## Why Vaisala?

As the global leader in weather and environmental measurements, Vaisala provides trusted weather observations for a sustainable future. With nearly 90 years of innovation and expertise plus customers in 170+ countries from the North and South Poles to Mars, we help provide the most reliable and accurate weather and climate information for better and safer daily lives.

Our instruments and intelligence are known as the gold standard for precision and reliability. As a sustainability leader we enable meteorology professionals to better understand, forecast and explain climate change. We continue to channel our curiosity into climate action and new ways of enabling a better planet for all.

