

## THE POLITICS AND BUSINESS OF CLIMATE CHANGE

### 4. EMISSIONS:

#### UC Berkeley deploys first city-level greenhouse gas sensor system in Oakland

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Researchers at the University of California, Berkeley, announced last week they are deploying the first city-scale carbon dioxide sensor network in order to get a better picture of greenhouse gas emissions from urban areas.

The Berkeley Atmospheric CO<sub>2</sub> Observing Network (BEACON) uses 40 sensors spread over a 27-square-mile grid next to Oakland, Calif. The idea is to get a higher-resolution emissions profile of an individual city and see how these trends change over time.

"I think we're in a state where emissions from cities are going to change over the next few years," said project leader Ronald Cohen, a chemistry professor at UC Berkeley.

With California moving toward implementing a cap-and-trade policy for greenhouse gases, greater use of electric vehicles and a nationwide push for more energy-efficient lifestyles, pollution from dense metropolises may change, said Cohen. To what extent and in what ways are questions that remain uncertain, but BEACON could help policymakers find out what's working to solve climate change, what isn't and what still needs to be addressed.

The advantage of a regional monitoring network like this is it can track the atmosphere at scales that respond more readily to human activities in real time, unlike global monitoring networks that aggregate emissions over the whole planet, which are meant to track climate change over decades. In fact, many sensors for global monitoring are deliberately placed far from cities to prevent localized fluctuations.

The hope is BEACON will allow cities like Oakland, which Cohen said account for one-third of the planet's carbon dioxide emissions, to develop strategies tailored to their unique neighborhoods and terrain to mitigate their impact on the environment.

#### Who emits how much goes online

Regulators can also verify emissions when enforcing a carbon price and trace them to cars, factories or generators.

"The higher-resolution measurements we get from a city with a network like this gives us a very good idea of where the carbon dioxide is coming from," said Virginia Teige, a doctoral student in chemistry at UC Berkeley who works with Cohen.

The gray, shoebox-sized sensors cost about \$5,000 each and cost about as much to install. The devices use an infrared spectrometer to monitor carbon dioxide, as well as nitrogen dioxide, ozone and carbon monoxide. The information is then wirelessly relayed to the Berkeley campus.

Though the instruments are less sensitive than those used for global emissions monitoring, Cohen said they overcome quality with quantity.

Researchers are placing these sensors on top of offices and schools, partly to encourage local students to get involved with the project. About one-third of the sensors have been installed so far throughout the city, including the Chabot Space & Science Center, the Oakland Zoo, five elementary schools and two high schools.

Teige said she is working to develop a science curriculum for local schools so they can incorporate BEACON data into their classwork, giving students a tangible lesson on the climate.

"It gives you a kind of science you can touch and feel," she said. "Most people understand air quality. A lot of people understand that carbon dioxide is linked to global warming."

Oakland residents can track emissions data [online](#).

The entire sensor array is expected to be online by the end of the summer, and the scientists hope the experiment will help them develop a deployment model for similar sensors in other cities. "The next step is we'd like to measure

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the whole Bay Area," said Tiege, who also wants to eventually include particulates and methane in their assessments.

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