EARTHSENSE

Case Study
Coventry City Council

Client

Coventry City Council are a local government body who are responsible for the City of Coventry in the West Midlands, England. EarthSense worked with the Council's Transport, Infrastructure, and Innovation department to carry out the project.

Overview

EarthSense worked alongside Coventry City Council to integrate Zephyr® air quality data with existing traffic management systems. EarthSense deployed a network of 12 solar powered and hard-wired Zephyr® air quality sensors in areas of the city centre identified as having high levels of congestion and air pollution. This data was used to trigger messaging about pollution (nitrogen dioxide, NO_2) levels and encourage usage of alternative routes via Variable Messaging Signs (VMS) to divert motorists away from heavily congested roads and pollution hotspots.

The Challenge

Coventry City Council worked with the Joint Air Quality Unit (JAQU) to develop an Air Quality Action Plan (AQAP) to reduce NO_2 levels in the city. The council released a tender to procure air quality sensors that could help to quickly identify NO_2 levels in the city, were compatible with external systems, offered a complete data service and came with hardware that could measure ambient air. EarthSense successfully met all of the requirements and were awarded the project to work alongside Coventry City Council to see if air quality data could be utilised to dynamically manage traffic and reduce NO_2 concentrations in the city.
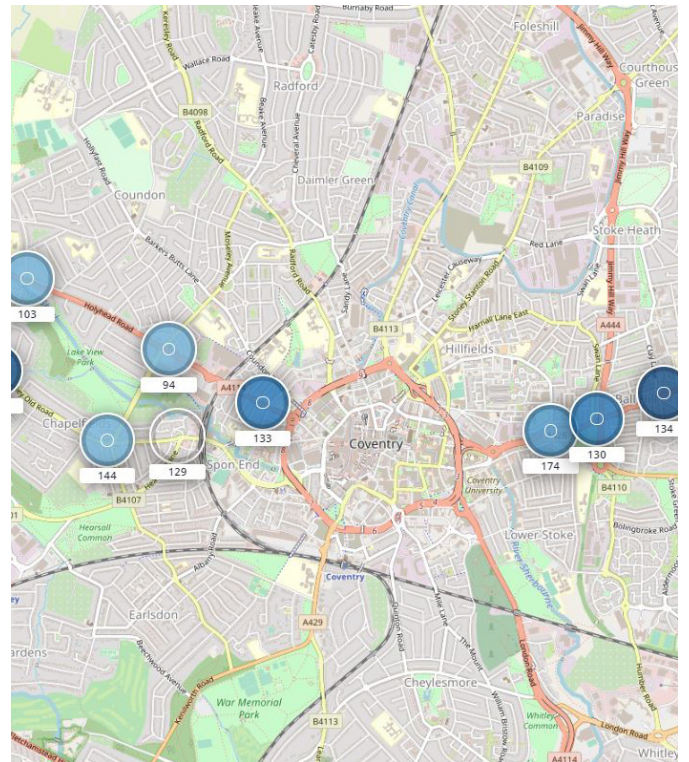

Figure 1: literactive map in MyAir® showing the labelled Zephyr® sensor locations and coloured in the EarthSense colourscale to represent pollution concentrations.

The Solution

The Council wanted to manage the traffic issues contributing to poor air quality and change behaviours in the way members of the public travel using their existing technology. To do this, they needed to understand the changing levels of pollution in order to divert motorists away from congestion by providing clean alternative routes and prevent them from contributing to already polluted areas.

As a first step, the Council received a network of 6 hardwired and solar powered sensors which were deployed by the EarthSense engineers to lighting columns particularly around the A4600 at Walsgrave Road, a major link in and out of the city that experiences high levels of traffic, and Holyhead Road, both of which had previously been identified as pollution hotspots.

Figure 2: Zephyr® air quality sensor deployed to a lighting column in Coventry City Centre

Once calibrated and deployed, Zephyr® sensors began measuring air quality to outline real-time pollution concentrations and to identify breached levels of NO_2 as recommended by the EU.

Zephyr® sensors have since measured air quality in real time through its active sampling mechanism, which draws local air into the cartridge every 10 seconds to measure pollutant and subsequently released through the separate air outlet. Measured air quality data is fed via an API to EarthSense's Zephyr® partner, Siemens Mobility traffic management system, Stratos, providing Coventry City Council with visualised integrated traffic and emission data.

Outcomes

Since deploying Zephyr® air quality sensors at Walsgrave Road and Holyhead Road, measured pollutant information has identified breached concentrations of the EU NO_2 hourly guidelines of $40\mu g/m^3$. When Zephyr® sensors measure spikes in air pollution an alert is sent to the Urban Traffic Management Centre which automatically triggers messaging on Variable Messaging Signs (VMS) at each location in the city, notifying motorists and pedestrians of the high pollution levels whilst also suggesting cleaner routes for travel by diverting traffic away from already congested and polluted hotspots.

As a result of the project, Coventry City Council have been able to successfully work towards a smarter, cleaner city using intelligent transport systems through the integration of Zephyr® air quality data and managing air quality for residents. Access to real-time data has helped prevent traffic build-up contributing to areas suffering from high pollution levels through diverting motorists away from pollution hotspots through VMS signs. Introducing such initiatives also encourages people to think twice about how they travel, pushing behavioural changes and decisions towards using green methods of transport on a large scale.

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> A key part of Coventry's Local Air Quality Action Plan is the ability to manage traffic flows away from air quality hotspots. The City Council needs to have real-time monitoring of air quality on the main routes into the city, and to be able to link the data directly into the traffic management systems to allow rapid response to changing air quality conditions. We've achieved this with collaborative working between Earthsense & Siemens and currently testing in real-life conditions.
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> **Shamala Evans**
> Environmental Control Officer

Long Term Health Benefits

By dynamically managing traffic through implementing ITS across Coventry the council will be able to better manage a range of hazardous gases and particulates, in particular NO_2, so will be able to lessen the risk of people developing and suffering from pollution related respiratory and cardiovascular problems, such as lung or heart disease. This also means that those already suffering from health problems, such as asthma, experience improved symptoms during times that otherwise may have been problematic.

Additionally, since the spread of the Coronavirus pandemic, research has emerged suggesting that an increase in air quality levels may contribute to a 10% increase in Covid infections and a 15% rise in Coronavirus related deaths, which equates to around 14,248 cases and 2,737 deaths. Therefore, further benefits of measuring and mitigating pollution levels means the Council will be able to reduce the spread of Coronavirus throughout residents.

Get in Touch

info@earthsense.co.uk

www.earthsense.co.uk