

How EMSOL is helping rail companies take action on local air quality, today.

At first glance, rail's contribution to UK emissions seems low. Transport accounts for 26% of UK carbon emissions, for example, but only 1% comes from trains.

Nonetheless, improving air quality is a major priority that demands immediate action. The government has committed to a [2050 net-zero carbon target](#) for the UK, which will take [aggressive pre-planning](#) to meet.

The best long-term solution looks like electrification – only [42% of the UK's railways are electrified](#) and [29% of Britain's current fleet are diesel-only](#)

The number of diesel trains is much higher in rail freight, which uses the rail network to transport cargo – like building supplies. Some freight diesel locomotives even date back to the 1950s.

The problem is, electrification is too far away to realistically solve for now. [Limitations in infrastructure and vehicle technology](#) make electrification complicated, and

costs are high. Equally, diesel isn't the only cause of rail pollution – electrification won't solve issues like brake dust.

Action is needed now – especially as COVID-19 brings increased scrutiny on the link between [pollution exposure and ill health](#).

The recent industry-wide Air Quality Strategy Framework co-ordinated by the Rail Safety and Standards Board (RSSB) emphasises this need for immediate action, pointing out the distinction between long-term decarbonisation and “short-term, location specific air quality mitigation measures [that] are also needed” right now.

So the question becomes, how can rail companies work together to take action today to improve local air quality and meet their clean air targets?

EMSOL worked with National Rail and West Midlands Railway at Birmingham New Street to answer that question.

“ *Much of our fleet is electric but we still have some diesel because the lines aren't electrified. We're at the cutting-edge of what we can achieve with the infrastructure available – now our focus is limiting exposure.* ”

- Charlotte Bryett, Environment & Energy Manager, West Midlands Trains

Birmingham New Street: a major pollution hotspot

Birmingham New Street is the busiest interchange station in Britain, seeing a train enter every 37-seconds. The station serves many unelectrified routes so pollution is already a major issue. That's exacerbated because Birmingham New Street is located in a cutting, under a shopping centre – low ceiling heights mean pollution can't dissipate as it normally might.

With hundreds of staff based or interchanging at Birmingham New Street – plus an average of 170,000 passengers daily – this is a critical site for managing pollution problems within Birmingham.

Network Rail is the owner and infrastructure manager of most of Britain's railway network. They're a public sector arm's length body, which means they have commercial and operational freedom within regulatory and control frameworks defined by the Department of Transport.

West Midlands Railway is a train operating company, currently managing 152 stations and 6 depots across Britain on behalf of Network Rail and the government. West Midlands have a team working from Birmingham New Street and stable some trains there overnight.



Problems with improving air quality at Birmingham New Street

Short- and long-term exposure to NOx and particulate matter has been linked to serious adverse health consequences like aggravated respiratory symptoms, increased cancer incidence, adverse birth outcomes and mortality.

Network Rail have faced significant pressure from the public, staff and regulators to reduce air pollution at the station. As that pressure grows, Network Rail's understood the need for positive action, now.

Network Rail have made extensive efforts to address this challenge.

For instance, they recently installed 97 bidirectional jet fans to take fumes outside the station. They also improved their existing air quality measuring systems to measure NOx as well as CO2.

The challenge with the fans is, they only dissipate air pollution - and they do so at the expense of noise pollution. For staff in Birmingham New Street, the working environment can be challenging – something the noisy fans add to.

Added to this, many train operators call through New Street, with hundreds of trains interchanging here daily.

Network Rail aim to work collaboratively with the train operators to accelerate air quality improvement. The problem is, without granular evidence there's not enough clarity to effectively take action to mitigate pollution. Right now, for example, there's no way to pinpoint that a specific class of fleet is causing emissions breaches.

Taking action with EMSOL

Working with [Innovate UK](#), the EMSOL Platform was installed at Birmingham New Street to collate emissions data and cross-reference against train tracking data. That meant we could correlate emission breaches to train movements, to deliver specific, actionable evidence of polluting assets.

This data empowers Network Rail to operate their ventilator fans more efficiently, to limit unnecessary noise pollution exposure for workers.

It also supports better emissions mapping – a crucial prong of the recently released [Air Quality Strategy Framework](#) – to help protect passengers, staff and the public.

For example, EMSOL found the highest peak of NO2 concentration at New Street was from 6am to 9am. Further monitoring could generate even more insights that could encourage smarter shift pattern scheduling, to help ensure employees aren't consistently exposed during peak pollution times.

This targeted data also supports Network Rail and train operators' collaborative efforts to drive air quality action and meet clean air targets. For instance, where EMSOL can identify specific trains causing recurring breach events, the relevant decision-makers could use those insights to support mitigating action, like retrofitting software upgrades.

That's a pragmatic and cost-effective way to roll-out change, for everyone.

For West Midlands Trains the power of better data also means they can take action to protect their people from peak pollution events. EMSOL's real-time, mobile-first reports and notifications empower small compliance teams to have a disproportionate impact by identifying specific breaches in real-time.

For example, they could quickly pass localised breach information to affected employees to take immediate mitigating action, like opening a window or putting on a mask.

“ If we had real-time monitoring data from all the stations and depots our employees work at, we could help them take small actions to protect themselves. It's not a huge change but it's a big positive. ”

- Charlotte Bryett, Environment & Energy Manager, West Midlands Trains



Small steps to create a lasting difference

Regulatory, public and employee pressure is mounting but air quality improvement won't happen overnight, especially given the complexity of across-the-board electrification.

To meet air quality targets, immediate, practical improvements are needed. This project has proved how EMSOL's platform powers small steps that together, create a lasting difference to passengers, employees and the environment.

Do you want to learn more?

Our air quality experts are ready to help you achieve your emissions targets!

Check out our website at www.emsol.io or email us at sales@emsol.io