

Peak emissions at London station worse than road-side equivalents

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Peak-time emissions from diesel trains at London's Paddington Station exceed the European recommendations for outdoor air quality, and are higher than nearby roadsides on the majority of days.

These are the conclusions of a study published today, 9 September 2015, in the journal *Environmental Research Letters*.

Air quality has been linked to a variety of health effects, and as such, guidelines in place in Europe to control 'outdoor' air quality have driven reduced [emissions](#) from road vehicles. Paddington Station—a semi-enclosed railway station in London—is like all UK rail stations, not required to comply with air quality standards.

"We looked at several measures of air quality" explains Adam Boies, the lead author on the paper. "And we've shown that there are a number of times where the nitrogen dioxide (NO₂) concentrations exceed the EU hourly mean limits for outdoor [air quality](#)."

Measurements were made at five locations around Paddington Station, covering two platforms, the main cooking area, a main exit and the roadside. Whilst the measurements were constrained to 8 hr readings, they showed elevated measurements of particulate matter, NO₂, and sulphur dioxide (SO₂) compared to the roadside in Marylebone and North Kensington.

Fortunately, a relatively cheap solution may exist, according to Boies. "Many of the trains at Paddington do not have a simple diesel particulate filter—much like you might have on your car—and these would reduce the emissions significantly."

"It was a shame we could not do longer-term measurements" continues Boies. "But we were limited partly by the sensors available, and partly by the time constraints on the station security. These would have allowed us a more direct comparison to the roadside limits."

Cooking fumes also contribute to the emissions, as these are not vented outside the station. "I was slightly surprised to see this" adds Boies. "But we've not shown a significant contribution from these emissions to the total."

The electrification of the Great Western Main Line, one of the major lines feeding into Paddington station, will improve matters significantly. "Obviously, replacing these diesel trains with electric trains will also remove the emissions" states Boies. "The majority of the locomotives in use at Paddington were 'grandfathered' (made exempt from the regulations for modern diesel locomotives). Newer diesel locomotives

also have much lower emissions."

Patrick Hallgate, Network Rail's managing director for the Western route, said: "Our Great Western Electrification Programme will bring Brunel's railway into the 21st century, by electrifying the main line that runs from London Paddington to Swansea in preparation for the arrival of a new fleet of electric trains.

"These trains will not only provide passengers with faster journeys, more seats and a more comfortable travelling experience, but they are also quieter and greener, significantly reducing noise and air pollution for passengers and our thousands of line-side neighbours."

Boies is now studying emissions from methane-burning engines. Whilst methane-burning is cleaner than other fossil fuels, any methane not burnt and released in the emissions from the engine has a much greater warming effect than oil-based fuel.

More information: 'Air quality evaluation of London Paddington train station' 2015 *Environ. Res. Lett.* 10 094012, iopscience.iop.org/1748-9326/10/9/094012.

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