



Northern Ireland  
Assembly

## Research and Library Service Briefing Note

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# NO<sub>2</sub> Levels in the Strand Area of Belfast

The following information considers whether it is possible to establish reasons for the increase in NO<sub>2</sub> levels in the Strand Area, with particular reference to aircraft emissions.

### **Central Statistics and Research Branch (DRD)**

Communication with the Central Statistics and Research Branch of the Department for Regional Development, informed that when measuring NO<sub>2</sub> levels for the Northern Ireland Environmental Statistics Report (produced by the Department of the Environment and NISRA)<sup>1</sup>, it was measured in terms of 'Urban Background' and 'Urban roadside' levels (see Figure 2.1 p18). The Report itself states that to determine how much aircrafts contribute to the measured amount of NO<sub>2</sub>, would be next to impossible. At present, levels are calculated in relation to a general background level, and the only individual contributor which is measured is at the road side in terms of traffic emissions.

(The Air Quality NI website states that the data provided in the NI Environmental Statistics Report includes air pollution measurements at a range of different locations; some at the roadside, whilst others are at background locations or in rural areas. The

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<sup>1</sup>DOE, NI Environmental Statistics Report (2010)

[http://www.doeni.gov.uk/northern\\_ireland\\_environmental\\_statistics\\_report\\_2010-2.pdf](http://www.doeni.gov.uk/northern_ireland_environmental_statistics_report_2010-2.pdf)

website reiterates the point that while the measurements at each site are made on a comparable basis and are factually correct - it would not be scientifically sound to make simplistic conclusions based on them to derive a ranking order indicating which towns are the most polluted in the UK. This needs to be considered when drawing up conclusions based on the data provided from the Belfast City Airport Watch. For instance, the Air Quality website explains that any results taken from a single measurement point, needs to be supplemented by modelling to describe fully the overall levels and resulting population exposure in a given town or city.<sup>2</sup> It is unclear from the report provided by the Belfast City Airport Watch, whether their data was supplemented by such modelling)

## OMEGA Report

A report entitled 'Final Report Aviation Emissions and their Impact on Air Quality' (2009)<sup>3</sup>, produced by OMEGA<sup>4</sup>, states that the impact of a major airport development on air quality as well as noise levels needs to be assessed, so as to satisfy statutory planning procedures and national and international directives. The overall aim of the report was to develop and demonstrate techniques to measure the chemical evolution of aircraft exhausts, so that monitoring at airports may be improved, and air-quality models tested and made more accurate. The report also explains a number of difficulties associated with measuring NO<sub>2</sub> emissions from aircraft, which may explain the lack of data/information on the subject to date. These include:

- Aircraft in ground-run and flight constitute an unavoidable, strong, intermittent, and mobile source of emissions, with a speed and direction that can change rapidly. It is hard to identify their impact on mean concentrations in comparison with other transport source categories.
- Most particulates are emitted at ultrafine scales, and the NO<sub>2</sub> released at high emission rates during takeoff derives from NO (nitrogen oxide), making the primary emission relatively benign.
- The intermittent nature of release, practical difficulties in working near taxiways and runways, and commercial sensitivities in general hinder acquisition of accurate data on the times, locations, and rates of release of emissions at a busy civil airport. Data from standard engine tests are freely available from the ICAO (International Civil

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<sup>2</sup> [http://www.airqualityni.co.uk/data.php?n\\_action=data](http://www.airqualityni.co.uk/data.php?n_action=data)

<sup>3</sup> OMEGA, Final Report Aviation Emissions and their Impact on Air Quality (2009)

<http://www.omega.mmu.ac.uk/Downloads/Final-Reports/Final%20Report%20Aviation%20Emissions%20and%20their%20Impact%20on%20Air%20Quality.pdf>

<sup>4</sup> Omega provides impartial academic expertise on the environmental issues facing aviation to the wider aviation sector, Government, NGO's and society as a whole. Its aim is independent knowledge transfer work and innovative solutions for a greener aviation future. Omega's areas of expertise include climate change, local air quality, noise, aircraft systems, aircraft operations, alternative fuels, demand and mitigation policies.

Aviation Organisation), but leave large questions unanswered as to the form and composition of particulate matter and the speciation of NO<sub>2</sub> at the engine exit.

- There are also important uncertainties in how emissions disperse, before they are taken up within the ambient atmosphere.
- Exhausts are, moreover, subject not only to the transport processes of the surrounding atmosphere, but also to those stimulated by each individual aircraft, creating a range of variation making it difficult to monitor.
- There is limited knowledge on the dynamics of exhausts and how they may impact on the concentration of exhaust plumes from aircrafts.

## The Civil Aviation Authority

The following data is taken from the Civil Aviation Authority (CAA) annual figures:

Year	Terminal Passengers <sup>5</sup>	Air Traffic Movements <sup>6</sup>
2005	2,237	37,000
2006	2,106	37,000
2007	2,187	40,000
2008	2,570,741 (up 17.5% from 2007)	40,211 (up 0.7% from 2007)
2009	2,621,996 (up 2% from 2008)	37,676 (down 6.3% on 2008)

In data presented in the Airport Watch Report Appendix 5 (presented to the Committee 15<sup>th</sup> October 2010), the level of NO<sub>2</sub> shot from 22µgm<sup>3</sup> in 2007 to 42µgm<sup>3</sup> in 2008. In the same period, terminal passenger numbers to Belfast City Airport increased by 17.5% between 2007 and 2008(as presented in the table above), while at the same time air traffic movements(number of flights) only increased 0.7%(see table above)- indicating that any rise in NO<sub>2</sub> between 2007 and 2008 had to come from somewhere else other than flights. This also suggests that the number of passengers to the airport may have contributed to the increase in NO<sub>2</sub>, as more passengers would result in increased traffic to the airport.

<sup>5</sup> CAA- Terminal Passengers 1999-2009 (annual figures, table 10.3)

[http://www.caa.co.uk/docs/80/airport\\_data/2009Annual/Table\\_10\\_3\\_Terminal\\_Pax\\_1999\\_2009.pdf](http://www.caa.co.uk/docs/80/airport_data/2009Annual/Table_10_3_Terminal_Pax_1999_2009.pdf)

<sup>6</sup> CAA ATM statistics 1999-2009 (annual figures, table 4.2)

[http://www.caa.co.uk/docs/80/airport\\_data/2009Annual/Table\\_10\\_3\\_Terminal\\_Pax\\_1999\\_2009.pdf](http://www.caa.co.uk/docs/80/airport_data/2009Annual/Table_10_3_Terminal_Pax_1999_2009.pdf)