

# Updated projections for Nitrogen Dioxide (NO<sub>2</sub>) compliance

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The UK has 43 Zones for assessing air quality and reporting compliance for a number of targets to the EU. These Zones generally include more than one local authority and are shown in Figure 1. In September 2011 Defra published air quality plans for achieving EU air quality limits for NO<sub>2</sub> in the UK as soon as possible (<http://uk-air.defra.gov.uk/library/no2ten/index>). We have recently reviewed and updated our model projections for NO<sub>2</sub> compliance, taking into account a number of important developments.

## What has changed?

The emission factors for nitrogen oxides (NO and NO<sub>2</sub>) from road traffic have been updated to reflect more accurate assumptions on the performance of modern diesel vehicles and older petrol cars. These projections do not take into account any additional measures to tackle NO<sub>2</sub> beyond those included in the plans published in 2011. The assumptions, however, are more pessimistic than in previous projections. This is largely due to the failure of the European vehicle emission standards for diesel cars to deliver the expected emission reductions of NO<sub>x</sub>.

**Table 1** summarises compliance in the reference year for the projections of 2011 and compliance in 2012. **Table 2** summarises projected data for 2015, 2020, 2025 and 2030, and estimated compliance dates for each zone. These projections show that 5 of 43 zones will be compliant by 2015, 15 zones by 2020, 38 by 2025 and 40 out of 43 by 2030.

## Assumptions and uncertainties

Key uncertainties in the modelled projections of future compliance include:

- The weather can impact on the magnitude of emissions from domestic and commercial heating and the dispersion of air pollutants. The weather may not be the same as in the reference year for the projections, which is 2011.
- The economic and energy forecasts used to derive emission projections.
- The expected levels of future traffic activity.
- The expected rates of turnover in vehicle fleets.
- The assumption regarding the emission factors for road traffic. The projections are particularly sensitive to the assumptions for the emissions performance of Euro 6 diesel cars and vans. Note that the impact of any reduction in emissions from a second stage of Euro 6 emission limits for cars and vans has not been included in the baseline projections.

**July 2014**

Table 1: Compliance in 2011 (reference year for the projections) and 2012

Zone/Agglomeration	Annual mean limit value exceedance						Hourly limit value exceedance	
	2011			2012			2011	2012
	Exceedance	Road exceeding limit value (km)	Maximum annual mean ( $\mu\text{g m}^{-3}$ )	Exceedance	Road exceeding limit value (km)	Maximum annual mean ( $\mu\text{g m}^{-3}$ )	Exceedance	Exceedance
Greater London Urban Area	Yes	1185.6	136	Yes	1021.3	152	Yes	Yes
West Midlands Urban Area	Yes	243.4	74	Yes	230.4	77	No	No
Greater Manchester Urban Area	Yes	250.7	74	Yes	233.2	75	No	No
West Yorkshire Urban Area	Yes	106.7	75	Yes	107.2	75	No	No
Tyneside	Yes	49.2	72	Yes	50.0	69	No	No
Liverpool Urban Area	Yes	64.5	79	Yes	60.3	80	No	No
Sheffield Urban Area	Yes	56.1	65	Yes	63.7	67	No	No
Nottingham Urban Area	Yes	37.2	63	Yes	36.3	62	No	No
Bristol Urban Area	Yes	25.9	56	Yes	28.2	55	No	No
Brighton/Worthing/Littlehampton	Yes	1.5	48	Yes	1.5	47	No	No
Leicester Urban Area	Yes	18.6	66	Yes	18.5	62	No	No
Portsmouth Urban Area	Yes	20.4	64	Yes	14.6	63	No	No
Teesside Urban Area	Yes	8.3	74	Yes	8.4	74	No	No
The Potteries	Yes	19.1	72	Yes	18.4	76	No	No
Bournemouth Urban Area	Yes	10.9	55	Yes	11.2	52	No	No
Reading/Wokingham Urban Area	Yes	7.5	53	Yes	7.2	53	No	No
Coventry/Bedworth	Yes	20.1	62	Yes	15.8	54	No	No
Kingston upon Hull	Yes	34.3	67	Yes	33.6	62	No	No
Southampton Urban Area	Yes	35.9	72	Yes	25.4	79	No	No
Birkenhead Urban Area	Yes	6.0	48	Yes	7.5	47	No	No
Southend Urban Area	Yes	8.7	57	Yes	8.7	55	No	No

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	2011			2012			2011	2012
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Blackpool Urban Area	No	0.0	34	No	0.0	35	No	No
Preston Urban Area	Yes	1.0	41	No	0.0	40	No	No
Glasgow Urban Area	Yes	75.3	82	Yes	69.6	83	Yes	No
Edinburgh Urban Area	Yes	16.0	55	Yes	15.3	53	No	No
Cardiff Urban Area	Yes	24.3	55	Yes	23.2	69	No	No
Swansea Urban Area	Yes	5.4	47	Yes	2.7	46	No	No
Belfast Metropolitan Urban Area	Yes	36.4	68	Yes	34.3	65	No	No
Eastern	Yes	45.8	66	Yes	45.9	80	No	No
South West	Yes	47.2	65	Yes	39.7	55	No	No
South East	Yes	115.5	64	Yes	111.9	70	Yes	Yes
East Midlands	Yes	65.0	65	Yes	62.4	61	No	No
North West & Merseyside	Yes	72.6	80	Yes	88.6	76	No	No
Yorkshire & Humberside	Yes	49.8	68	Yes	63.9	68	No	No
West Midlands	Yes	47.5	73	Yes	50.7	78	No	No
North East	Yes	48.4	70	Yes	44.0	69	No	No
Central Scotland	Yes	12.3	59	Yes	9.2	57	No	No
North East Scotland	Yes	17.2	57	Yes	15.9	54	No	No
Highland	No	0.0	33	No	0.0	34	No	No
Scottish Borders	No	0.0	27	No	0.0	28	No	No
South Wales	Yes	38.5	70	Yes	32.6	69	No	No
North Wales	Yes	9.7	64	Yes	9.6	62	No	No
Northern Ireland	Yes	3.0	48	No	0.0	40	No	No
<b>Total of exceedances</b>	<b>40 zones</b>	<b>2941.5 km</b>	<b>40 zones</b>	<b>38 zones</b>	<b>2720.9 km</b>	<b>38 zones</b>	<b>3 zones</b>	<b>2 zones</b>

Table 2: Projected concentrations and estimated compliance dates

Zone/Agglomeration	Annual mean limit value exceedance detailed projections								Compliance with NO <sub>2</sub> limit values projected by
	2015		2020		2025		2030		
	Road exceeding limit value (km)	Maximum annual mean ( $\mu\text{g m}^{-3}$ )	Road exceeding limit value (km)	Maximum annual mean ( $\mu\text{g m}^{-3}$ )	Road exceeding limit value (km)	Maximum annual mean ( $\mu\text{g m}^{-3}$ )	Road exceeding limit value (km)	Maximum annual mean ( $\mu\text{g m}^{-3}$ )	
Greater London Urban Area	944.0	107	353.4	79	60.1	56	25.3	49	After 2030
West Midlands Urban Area	166.3	71	23.7	54	4.3	46	4.3	43	After 2030
Greater Manchester Urban Area	164.4	65	9.8	45	0.0	37	0.0	35	2025
West Yorkshire Urban Area	75.1	73	5.7	53	2.3	45	2.1	42	After 2030
Tyneside	45.8	68	7.6	46	0.0	36	0.0	34	2025
Liverpool Urban Area	41.1	68	0.9	45	0.0	37	0.0	34	2025
Sheffield Urban Area	41.9	61	7.1	43	0.0	35	0.0	32	2025
Nottingham Urban Area	35.9	68	4.2	49	0.0	40	0.0	37	2025
Bristol Urban Area	21.1	55	0.9	42	0.0	35	0.0	33	2025
Brighton/Worthing/Littlehampton	1.5	45	0.0	33	0.0	26	0.0	25	2020
Leicester Urban Area	14.2	62	0.9	47	0.0	40	0.0	37	2025
Portsmouth Urban Area	18.3	67	6.3	49	2.1	41	0.0	38	2030
Teesside Urban Area	4.3	69	2.4	47	0.0	38	0.0	35	2025
The Potteries	18.6	69	12.2	48	0.0	39	0.0	37	2025
Bournemouth Urban Area	10.9	53	0.0	39	0.0	34	0.0	32	2020
Reading/Wokingham Urban Area	3.9	52	0.0	39	0.0	34	0.0	33	2020
Coventry/Bedworth	13.3	54	0.9	42	0.0	36	0.0	34	2025
Kingston upon Hull	30.6	61	5.3	41	0.0	35	0.0	33	2025
Southampton Urban Area	32.5	66	5.2	48	0.3	41	0.0	39	2030
Birkenhead Urban Area	4.5	44	0.0	32	0.0	27	0.0	25	2020
Southend Urban Area	8.7	55	0.0	39	0.0	32	0.0	30	2020

Zone/Agglomeration	Annual mean limit value exceedance detailed projections								Compliance with NO <sub>2</sub> limit values projected by
	2015		2020		2025		2030		
	Road exceeding limit value (km)	Maximum annual mean ( $\mu\text{g m}^{-3}$ )	Road exceeding limit value (km)	Maximum annual mean ( $\mu\text{g m}^{-3}$ )	Road exceeding limit value (km)	Maximum annual mean ( $\mu\text{g m}^{-3}$ )	Road exceeding limit value (km)	Maximum annual mean ( $\mu\text{g m}^{-3}$ )	
Blackpool Urban Area	0.0	32	0.0	22	0.0	18	0.0	17	Compliant
Preston Urban Area	0.0	39	0.0	29	0.0	24	0.0	23	Compliant
Glasgow Urban Area	61.2	74	7.7	47	0.0	37	0.0	34	2025
Edinburgh Urban Area	12.1	49	0.0	35	0.0	28	0.0	26	2020
Cardiff Urban Area	22.2	53	3.3	41	0.0	35	0.0	34	2025
Swansea Urban Area	5.4	50	0.0	36	0.0	29	0.0	27	2020
Belfast Metropolitan Urban Area	31.4	58	0.0	39	0.0	33	0.0	30	2020
Eastern	34.7	63	2.6	43	0.0	35	0.0	33	2025
South West	53.0	63	3.1	44	0.0	36	0.0	33	2025
South East	99.6	63	10.3	45	0.0	38	0.0	36	2025
East Midlands	59.7	65	4.7	47	0.0	39	0.0	37	2025
North West & Merseyside	41.8	70	1.1	47	0.0	38	0.0	35	2025
Yorkshire & Humberside	21.0	64	1.6	44	0.0	36	0.0	34	2025
West Midlands	39.5	71	3.1	48	0.0	39	0.0	37	2025
North East	40.2	68	8.2	46	0.0	36	0.0	34	2025
Central Scotland	4.7	53	0.0	36	0.0	30	0.0	27	2020
North East Scotland	10.4	49	0.0	35	0.0	29	0.0	28	2020
Highland	0.0	33	0.0	23	0.0	18	0.0	17	Compliant
Scottish Borders	0.0	26	0.0	19	0.0	15	0.0	14	Compliant
South Wales	26.6	69	4.5	49	0.0	39	0.0	36	2025
North Wales	7.8	66	4.6	46	0.0	36	0.0	33	2025
Northern Ireland	0.0	39	0.0	23	0.0	18	0.0	17	Compliant
<b>Total of exceedances</b>	<b>2268 km</b>	<b>38 zones</b>	<b>501.2 km</b>	<b>28 zones</b>	<b>69.1 km</b>	<b>5 zones</b>	<b>31.7 km</b>	<b>3 zones</b>	

Figure 1. Map of UK zones

## UK Agglomerations (brown) and Non-Agglomeration Zones

