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Air Quality Plan for the achievement of EU air quality limit values for nitrogen dioxide (NO_2) in Swansea Urban Area (UK0027)

September 2011

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This document is also available on the Defra website at:

http://uk-air.defra.gov.uk/library/no2ten/

Published by the Department for Environment, Food and Rural Affairs

Contents

1. Introduction

1.1. This document

This document is the Swansea Urban Area (UK0027) air quality plan for the achievement of the EU air quality limit values for nitrogen dioxide (NO_2).

This plan presents the following information:

• General information regarding the Swansea Urban Area agglomeration zone
• Details of NO_2 exceedence situation(s) within the Swansea Urban Area agglomeration zone
• Details of local air quality measures that have been implemented, will be implemented or are being considered for implementation in this agglomeration zone.

This air quality plan for Swansea Urban Area should be read in conjunction with the separate UK overview document and the list of UK and national measures that are available on the Defra website (http://www.defra.gov.uk/environment/quality/air/air-quality/eu/). The UK overview document sets out, amongst other things, the authorities responsible for delivering air quality improvements and the national measures that are applied in some or all UK zones. The measures presented in this plan and the accompanying UK overview and list of UK measures show how the UK will ensure that compliance with the NO_2 limit values is achieved as soon as possible.

This plan should also be read in conjunction with the supporting UK technical report (http://www.defra.gov.uk/environment/quality/air/air-quality/eu/), which presents information on assessment methods, input data and emissions inventories used in the analysis presented in this plan.

1.2. Context

Two NO_2 limit values for the protection of human health have been set in the Air Quality Directive (2008/50/EC). These are:

• The annual limit value: an annual mean concentration of no more than 40 μgm^{-3}
• The hourly limit value: no more than 18 hourly exceedances of 200 μgm^{-3} in a calendar year

The Air Quality Directive stipulates that compliance with the NO_2 limit values will be achieved by 01/01/2010. However, where the limit values cannot be achieved by then, the Directive also allows Member States to postpone this attainment date until 01/01/2015 provided air quality plans are established demonstrating how the limit values will be met by this extended deadline.

1.3. Zone status

The assessment undertaken for the Swansea Urban Area agglomeration zone indicates that the annual limit value is likely to be exceeded in 2010. This is on the basis that there is uncertainty in the projections from the 2008 baseline and the 2009 assessment indicated that non-compliance was likely in this year. Compliance is expected before 2015 through introduction of the measures included in the baseline and the non-quantifiable local measures outlined in this plan. Postponement of the compliance date to 2015 is sought for this limit value for this zone.

The assessment undertaken for the Swansea Urban Area agglomeration zone indicates that the hourly limit value not exceeded in this agglomeration zone in 2008.

1.4. Plan structure

General administrative information regarding this agglomeration zone is presented in section 2.

Section 3 then presents the overall picture with respect to NO_2 levels in this agglomeration zone for the 2008 reference year of this air quality plan. This includes the declaration of exceedance situations

within the agglomeration zone and presentation of a detailed source apportionment for each exceedance situation.

An overview of the measures already taken and to be taken within the agglomeration zone both before and after 2010 is given in section 4.

Baseline modelled projections for 2010, 2015 and 2020 for each exceedance situation are presented in section 5. The baseline projections presented here include, where possible, the impact of measures that have already been taken and measures for which the relevant authority has made a firm commitment to take the measure(s). However, it has not been possible to quantify the impact of all measures. This section therefore also explains which measures have been quantified, and hence included in the model projections, and which measures have not been quantified.

2. General Information about the Zone

2.1. Administrative information

Zone name: Swansea Urban Area
Zone code: UK0027
Type of zone: agglomeration zone
Reference year: 2008
Extent of zone: Figure 1 shows the area covered by the Swansea Urban Area agglomeration zone

Local Authorities within the agglomeration zone: Figure 2 shows the location of Local Authorities within the agglomeration zone. A list of these Local Authorities is also given below. The numbers in this list correspond to the numbers in Figure 2.

1. Neath Port Talbot County Borough Council
2. Swansea City and Borough Council

(Note: Local Authority boundaries do not necessarily coincide with zone boundaries. Hence Local Authorities may be listed within more than one zone plan.)

Figure 1. Map showing the extent of the Swansea Urban Area agglomeration zone (UK0027).

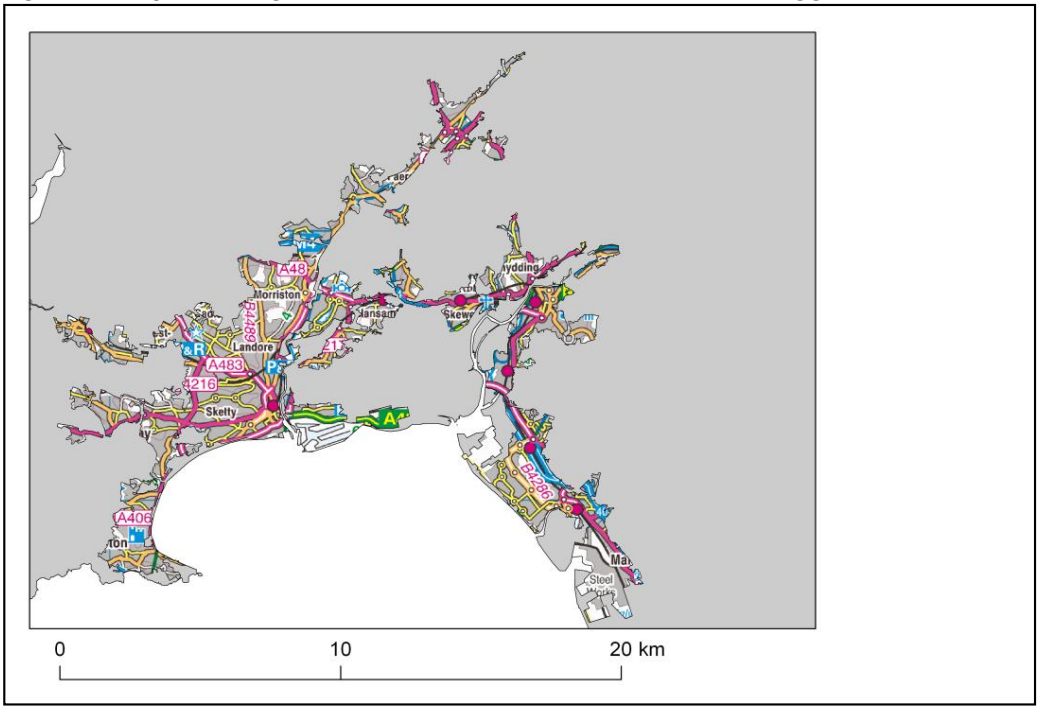
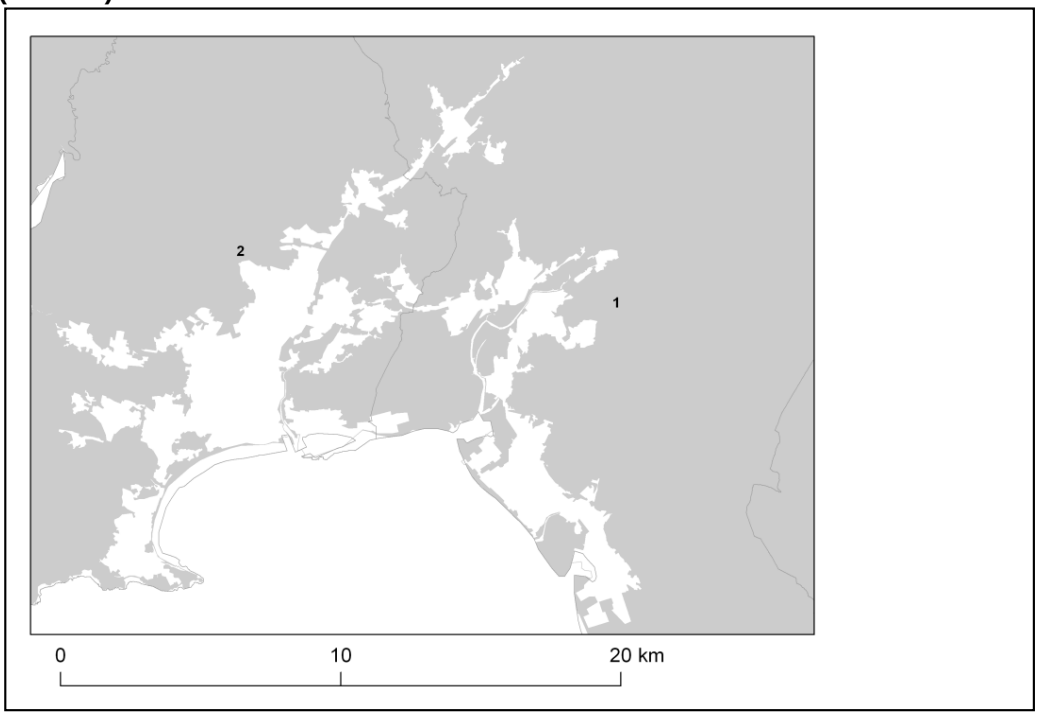


Figure 2. Map showing Local Authorities within the Swansea Urban Area agglomeration zone (UK0027).



2.2. Assessment details

Measurements
NO_2 measurements in this zone were available in 2008 from the following national network monitoring stations (NO_2 data capture for each station in 2008 shown in brackets):

• Port Talbot Margam GB0906A (95.2%)
• Swansea Roadside GB0896A (98.7%)

Full details of monitoring stations within the Swansea Urban Area agglomeration zone are available from http://uk-air.defra.gov.uk/networks/network-info?view=aurn.

Modelling
Modelling for the 2008 reference year has been carried out for the whole of the UK (see the UK technical report). This modelling covers the following extent within this zone:

• Total background area within zone (approx): 88 km^2
• Total population within zone (approx): 191717 people
• Total road length where an assessment of NO_2 concentrations have been made: 65.1 km in 2008 (and similar lengths in previous years).

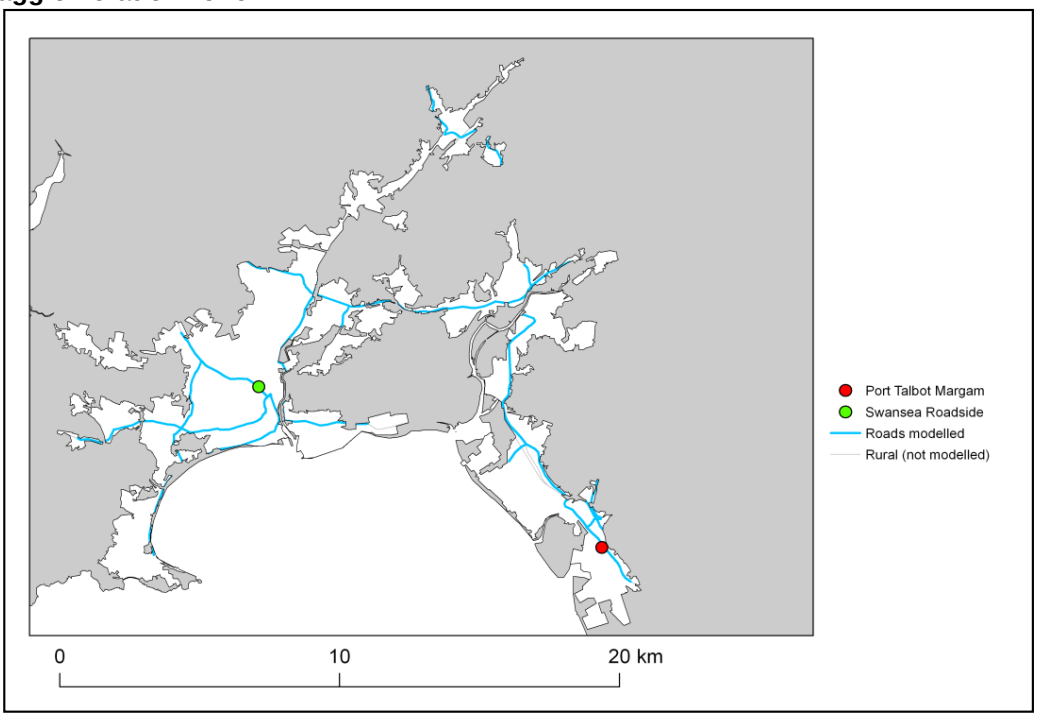
Zone maps
Figure 3 presents the location of the NO_2 monitoring stations within this zone for 2008 and the roads for which NO_2 concentrations have been modelled. NO_2 concentrations at background locations have been modelled across the entire zone at a 1 x 1 km^2 resolution.

2.3. Reporting Under European Directives

Since 2001 the UK has reported annually on air quality concentrations using a standard excel questionnaire (Decision 2004/461/EC). These questionnaires are available online from http://cdr.eionet.europa.eu/gb/eu/annualair

In addition, the UK has reported on air quality plans and programmes (Decision 2004/224/EC) on an annual basis depending on the reported concentrations in the previous year. Plans and programmes were first reported in this zone in 2005. Plans and programmes for 2005 and all other years for which they have been required are available from http://cdr.eionet.europa.eu/gb/eu/aqpp.

Figure 3. Map showing the location of the NO_2 monitoring sites with valid data in 2008 and roads where concentrations have been modelled within the Swansea Urban Area (UK0027) agglomeration zone.



3. Overall Picture for 2008 reference year

3.1. Introduction

There are two limit values for the protection of health for NO_2. These are:

• The annual limit value (annual mean concentration of no more than 40 μgm^{-3})
• The hourly limit value (no more than 18 hourly exceedances of 200 μgm^{-3} in a calendar year)

Within the Swansea Urban Area agglomeration zone only the annual limit value was exceeded in 2008. Hence, one exceedance situation for this zone has been defined, NO_2_UK0027_Annual_1, which covers the exceedance of the annual limit value. This exceedance situation is described below.

For both NO_2 limit values, a margin of tolerance for 2008 and other years has been defined in the Air Quality Directive (2008/50/EC). Data comparing assessed concentrations at locations within this agglomeration zone with the 2008 margin of tolerance are presented in the annual reporting questionnaire for 2008 (http://cdr.eionet.europa.eu/gb/eu/annualair).

3.2. Reference year: NO_2_UK0027_Annual_1

The NO_2_UK0027_Annual_1 exceedance situation covers all exceedances of the annual mean limit value in the Swansea Urban Area agglomeration zone in 2008.

Compliance with the annual limit value in this exceedance situation has been assessed using a combination of air quality measurements and modelling. Table 1 presents measured annual mean concentrations at national network stations in this exceedance situation since the 1st Daughter Directive (1999/30/EC) came into force in 2001. This shows that there were no measured exceedances of the annual limit value in this zone in 2008. Table 2 summarises modelled annual mean NO_2 results in this exceedance situation for the same time period. This table shows that, in 2008, 2.5 km of road length was modelled to exceed the annual limit value. There were no modelled background exceedances of this limit value. Table 2 also shows that the maximum modelled annual mean NO_2 concentration in 2008 was 44.2 μgm^{-3}. Maps showing the modelled annual mean NO_2 concentrations for 2008 at background and at roadside locations are presented in Figures 4 and 5 respectively. All modelled exceedances of the annual limit value are coloured orange or red in these maps.

The maximum measured concentration in the zone varies due to changes emissions and varying meteorology in different years. However, the models are also updated each year to take into account the most up-to-date science, so the modelled results for different years may not be directly comparable.The increase in the maximum modelled annual mean NO_2 concentration between 2008 and 2009 (44.2 μgm^{-3} to 56.5 μgm^{-3}) occurred because the location with the highest modelled concentration in this agglomeration zone moved between 2008 and 2009. This is because the location with highest concentration in 2009 was included in the assessment for the first time in 2009.

The modelling carried out for this exceedance situation has also been used to determine the annual mean NO_X source apportionment for all modelled locations, along with an indicative annual mean NO_2 source apportionment. Table 3 presents summary source apportionment information in this exceedance situation for 2008, including:

• The modelled NO_X and indicative NO_2 source apportionment for the section of road with the highest modelled NO_2 concentration in this exceedance situation in 2008. This is important information because it shows which sources need to be tackled at the point with the largest compliance gap in the exceedance situation. It is not possible to calculate an unambiguous source apportionment for annual mean NO_2 concentrations for the reasons discussed in the UK Technical Report. We have, however, developed a method to provide an indicative source apportionment for annual mean NO_2 concentrations for these air quality plans. This method involves calculating the maximum and minimum possible contribution from each source to the NO_2 concentration. The final source apportionment has been calculated as the average of the minimum and maximum contributions for each source, with the results normalised so that the contributions sum to the total modelled NO_2

concentration. Further information on the methods used for source apportionment are provided in the UK Technical Report.

• The maximum NO_X contribution from each source from across all the roads included in this exceedance situation in 2008. This is important information because it highlights all the key sources that need to be tackled within the exceedance situation in order to achieve compliance across the entire area of the exceedance situation.

Figure A1.1 in Annex 1 presents the annual mean NO_X source apportionment for each section of road within the NO_2_UK0027_Annual_1 exceedance situation (i.e. the source apportionment for all exceeding roads only) in 2008. Roads have been grouped into motorways, trunk roads and primary road in this figure.

Table 1. Measured annual mean concentrations at national network stations in NO_2_UK0027_Annual_1 for 2001 onwards, µgm^{-3}. (Data capture shown in brackets) (a)

Site name (EOI code)	2001	2002	2003	2004	2005	2006	2007	2008	2009
Port Talbot (GB0651A)	22 (96%)	19 (97%)	22 (97%)	21 (84%)	19 (97%)	18 (97%)	18 (55%)		
Port Talbot Margam (GB0906A)							19 (42%)	18 (95%)	17 (95%)
Swansea (GB0609A)	36 (95%)	31 (98%)	34 (98%)	37 (92%)	34 (95%)	31 (55%)			
Swansea Roadside (GB0896A)						36 (28%)	31 (98%)	32 (99%)	33 (99%)

(a) Annual Mean Limit Value = 40 µgm^{-3}

Table 2. Annual mean NO_2 model results in NO_2_UK0027_Annual_1 for 2001 onwards

	2001	2002	2003	2004	2005	2006	2007	2008	2009
Road length exceeding (km)	0.0	3.4	11.3	0.0	0.0	0.0	2.5	2.5	5.4
Background area exceeding (km^2)	0	0	0	0	0	0	0	0	0
Maximum modelled concentration (µgm^{-3}) (a)	38.4	49.9	72.6	39.5	37.2	38.5	41.8	44.2	56.5

(a) Annual Mean Limit Value = 40 µgm^{-3}

Table 3. Source apportionment summary information for 2008 in NO_2_UK0027_Annual_1 (μgm^{-3}).

Spatial scale	Component	Highest road link (a)		Maximum (b)
		NOx	NO2 (d)	NOx
Regional background sources (i.e. contributions from distant sources of > 30 km from the receptor)	Total	6.1	(c)	
	From within the UK	2.4	(c)	2.4
	From transboundary sources (includes shipping and other EU Member States)	3.7	(c)	3.7
Urban background sources (i.e. sources located within 0.3 - 30 km from the receptor)	Total	14.1	9.2	-
	From road traffic sources	7.6	5.6	7.6
	From industry (including heat and power generation)	1.5	(c)	1.5
	From agriculture	0.0	(c)	0.0
	From commercial/residential sources	3.2	(c)	3.2
	From shipping	0.4	(c)	0.4
	From off road mobile machinery	1.0	(c)	1.0
	From natural sources	0.0	(c)	0.0
	From transboundary sources	0.0	(c)	0.0
	From other urban background sources	0.3	(c)	0.3
Local sources (i.e. contributions from sources < 0.3 km from the receptor)	Total	76.4	35	-
	From cars	26.7	12	26.7
	From HGV rigid	20.3	9.2	20.3
	From HGV articulated	14.5	6.6	14.5
	From Buses	8.6	3.9	8.6
	From LGVs	6.3	3.2	6.3
	From motorcycles	0.1	0	0.1
Total (i.e. regional background + urban background + local components)		96.6	44.2	-

(a) The road with the highest modelled annual mean NO_2 concentration in this exceedance situation in 2008 is a section of the A483, traffic count point id 74086 (OS grid (m): 267830, 193080).
(b) This column gives the maximum contribution for each component from all the roads included in the exceedence situation.
(c) The combined modelled annual mean NO_2 concentration contribution for these components is 3.6 μgm^{-3}. A more detailed NO_2 source apportionment is currently unavailable for these sectors.
(d) Source apportionment for NO_2 is indicative, see UK Technical Report.

Figure 4. Map of modelled background annual mean NO_2 concentrations 2008. Modelled exceedances of the annual limit value are shown in orange and red.

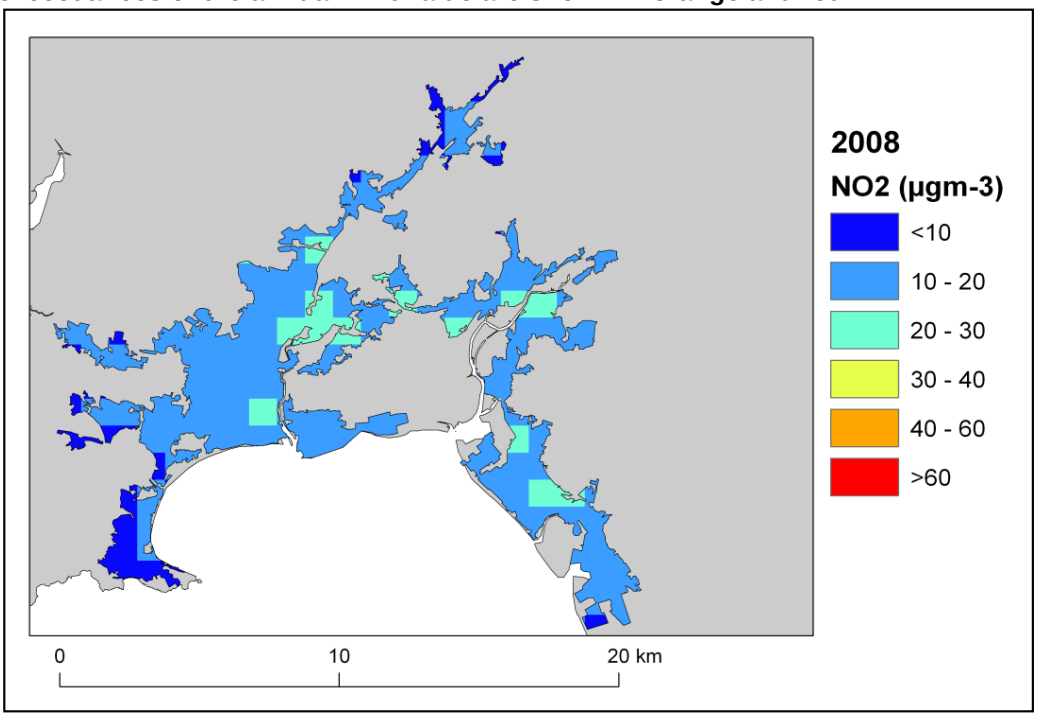
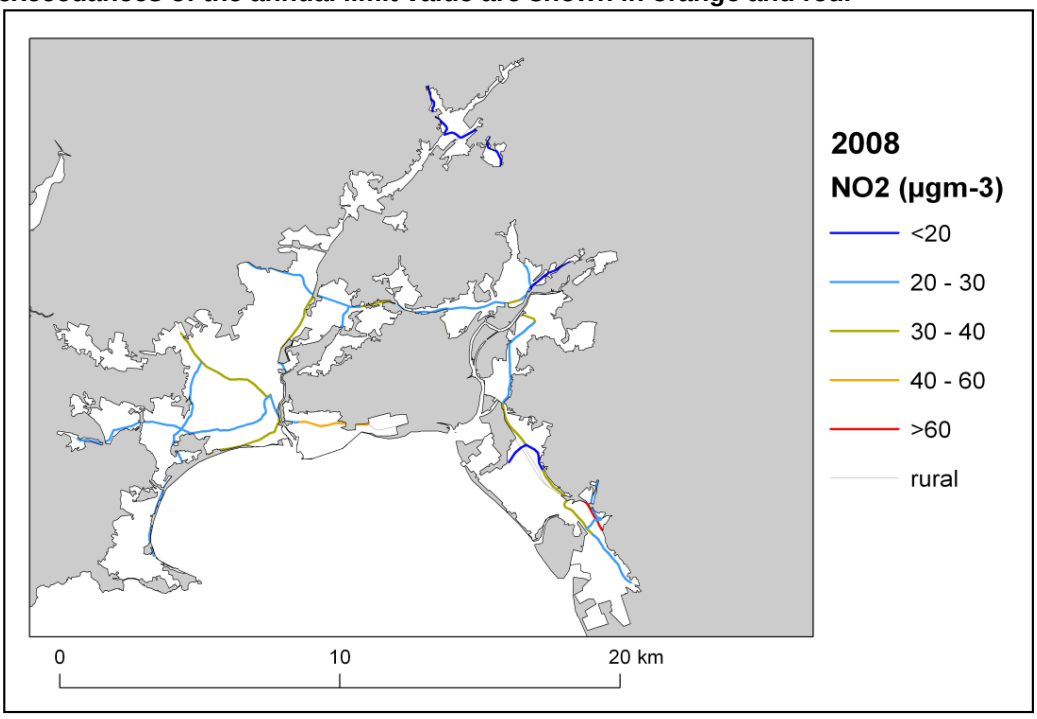


Figure 5. Map of modelled roadside annual mean NO_2 concentrations 2008. Modelled exceedances of the annual limit value are shown in orange and red.



4. Measures

4.1. Introduction

This section (section 4) gives details of measures that address exceedances of the NO_2 limit values within Swansea Urban Area agglomeration zone. This includes both measures that have already been taken and measures for which there is a firm commitment that they will be taken.

Section 5 then explains the extent to which it has been possible to incorporate the impacts of these measures into the baseline modelling carried out for this assessment.

4.2. Source apportionment

It is important to understand which sources are responsible for causing the exceedance in order to most effectively tailor measures to address the NO_2 exceedance situation(s) described in section 3 above. This can be achieved by considering the source apportionment for the exceedance situation, also presented in section 3. A summary of what the source apportionment shows and the implications for which measures would therefore be appropriate is given here.

Local road traffic was the dominant source in this exceedance location in the reference year. The largest contribution was from cars at the location of maximum exceedance with a contribution of 26.7 ugm^{-3} of NO_X out of a total of 96.6 ugm^{-3} of NO_X. All vehicle types were important sources on the primary roads with the highest concentrations.

This indicates that appropriate measures should impact on local road traffic sources in this zone. Other measures may also be beneficial depending on the source apportionment for the urban background.

4.3. Measures

Measures potentially affecting NO_2 in this agglomeration zone have been taken and/or are planned at a range of administrative levels. These are:

- European Union
- National (i.e. England, Scotland, Wales, Northern Ireland or whole UK)
- Local (i.e. UK Local Authorities)

Details of European Union measures (e.g. euro standards, fuel quality directives, integrated pollution prevention and control) can be found on the European Commission's website (http://ec.europa.eu/environment/air/index_en.htm). Details of national measures are given in the UK overview document and list of UK and National measures.

Relevant Local Authority measures within this exceedance situation are listed in Table A2.1 (see Annex 2). Relevant Local Authority measures are considered to be those measures which directly target, or are in close geographical proximity to roads and/or background grid squares in exceedance of one or other of the NO_2 limit values. Other Local Authority measures may also have been taken in this zone, but they are not listed in this table. All the measures listed in Table A2.1 have been carried out, are in the process of being carried out or a firm commitment had been made to carry them out on the timetables listed at the point at which information on local measures was collected.

4.4. Measures timescales

Timescales for national measures are given in the UK overview document and list of UK and National measures.

Information on local measures was collected in autumn 2009. Hence, any Local Authority action plans and measures adopted by Local Authorities after this time have not been included in this air quality plan. Many of the measures listed in Annex 2 will either have happened before autumn 2009 or have been planned for implementation before or during 2010. Others will be planned for after 2010. It

should be noted that many of the measures taken before or during 2010 will continue to have a beneficial impact on air quality after the end of 2010.

Local Authorities report on progress with the implementation of their action plans annually and review action plan measures regularly. Where future Local Authority measures to improve air quality are under consideration these would be included in future local authority action plans and published by the local authority.

5. Baseline Model Projections

5.1. Overview of model projections

Baseline projections for 2010
Model projections for 2010, starting from the 2008 reference year described in section 3, have been calculated in order to determine whether compliance with the NO_2 limit values is likely to be achieved for each exceedance situation by the original deadline for compliance of 01/01/2010. Details of the methods used for the baseline emissions and concentration projections modelling are provided in the the UK technical report.

For national measures, it has not been possible to quantify the impact of all measures on emissions and ambient concentrations. The impact for all quantifiable measures has been included in the baseline projections.

The impacts of the individual Local Authority measures have not been explicitly included in the baseline model projections. However, measures may have been included implicitly if they have influenced the traffic counts for 2007 (used as a basis for the compilation of the emission inventory) or in the traffic activity projections to 2010 and beyond (used to calculate the emission projections). It should be recognised that these measures will have a beneficial impact on air quality, even if it has not been possible to quantify this impact here.

A number of the local measures in Table A2.1 can be considered to be 'smarter choices' measures (see http://www.dft.gov.uk/pgr/sustainable/smarterchoices/ctwwt/ for a detailed description of this type of measure). We have quantified the impact of this group of measures on a national scale within the projections. Details of how this has been done can be found in the UK technical report. Table A2.1 indicates which local measures we have considered to be 'smarter choices'.

Baseline projections for 2015
Model projections for 2015, starting from the 2008 reference year described above, have been calculated in order to determine whether compliance with the NO_2 limit values is likely to be achieved for each exceedance situation by the revised deadline for compliance of 01/01/2015 on the basis of EU-wide measures and the measures currently planned. This modelling is described in detail in the UK technical report. Many of the measures listed in annex 2 of this document and the supporting list of UK and national measures will continue or will continue to have an impact beyond the original deadline for compliance of 01/01/2010.

5.2. Baseline projections: NO_2_UK0027_Annual_1

Table 4 presents summary results for the baseline model projections for 2010, 2015 and 2020 for the NO_2_UK0027_Annual_1 exceedance situation. These results show that compliance with the annual limit value may be achieved in 2010, when the maximum annual mean NO_2 concentration in the exceedance situation is predicted to be 37.5 μgm^{-3}. However, uncertainty in the projections combined with the results of the 2009 assessment indicate that non-compliance is still the most likely outcome in 2010. Regardless of whether compliance can be achieved by 2010, the results suggest that compliance will be achieved by 2015 under baseline conditions, when the maximum annual mean NO_2 is predicted to be 25.4 μgm^{-3}. Postponement of the compliance date to 2015 is sought for this limit value in this zone.

The projected modelled NO_X and indicative NO_2 annual mean source apportionments for 2010, 2015 and 2020 at the location with the biggest compliance gap in 2008 are presented in Table 5. In 2010 and 2015, the model results suggest that this location will continue to have the highest annual mean NO_2 concentration within this exceedance situation. However, in 2020 the model indicates that the location with the highest annual mean NO_2 concentration within this exceedance situation will be elsewhere. Information regarding the new location with the highest NO_2 concentration, including the source apportionment is given in Table 6. The locations of maximum concentration in each year are given in the footnote to this table. This source apportionment information is useful because it shows which sources need to be tackled at the point with the largest compliance gap in the exceedance situation.

Table 7 shows the maximum NO_X contribution from each source apportionment component from any road across the whole exceedance situation. This source apportionment information is useful because it highlights all the key sources that need to be tackled within the exceedance situation in order to achieve compliance across the entire area of the exceedance situation. It should be noted that this table only includes roads which continue to be in exceedance in the relevant year. Hence, for example, the road with the largest contribution from cars in 2010 may no longer be included in the table in 2015 if the road is predicted to be compliant in 2015.

Figures 6 and 7 show maps of projected annual mean NO_2 concentrations in 2010, 2015 and 2020 at background and roadside locations respectively. Maps for 2008 are also presented here for reference.

It should be noted that the baseline projections presented here include the impacts of measures, where they can be quantified, that have already been or will be implemented.

Table 4. Annual mean NO_2 model results in NO_2_UK0027_Annual_1

	2008	2010	2015	2020
Road length exceeding (km)	2.5	0.0	0.0	0.0
Background area exceeding (km^2)	0	0	0	0
Maximum modelled concentration (μgm^{-3}) (a)	44.2	37.5	25.4	15.9

(a) Annual Mean Limit Value = 40 μgm^{-3}

Table 5. Modelled source apportionment for 2010, 2015 and 2020 under baseline conditions for traffic count point 74086 on the A483 (the road section with the maximum modelled annual mean NO_2 concentration in 2008 in NO_2_UK0027_Annual_1. OS grid (m): 267830, 193080). 2008 results are also presented here for reference (units: μgm^{-3}).

Spatial scale	Component	NOx				NO2 (indicative)			
		2008	2010	2015	2020	2008	2010	2015	2020
Regional background sources (i.e. contributions from distant sources of > 30 km from the receptor)	Total	6.1	5.3	4.7	3.9	(a)	(b)	(c)	(d)
	From within the UK	2.4	2.1	1.9	1.5	(a)	(b)	(c)	(d)
	From transboundary sources (includes shipping and other EU Member States)	3.7	3.2	2.8	2.3	(a)	(b)	(c)	(d)
Urban background sources (i.e. sources located within 0.3 - 30 km from the receptor)	Total	14.1	11.5	8.9	7.0	9.2	7.9	6.9	5.8
	From road traffic sources	7.6	5.4	3.6	2.2	5.6	5.3	5.0	4.6
	From industry (including heat and power generation)	1.5	1.4	1.3	1.2	(a)	(b)	(c)	(d)
	From agriculture	0.0	0.0	0.0	0.0	(a)	(b)	(c)	(d)
	From commercial/residential sources	3.2	3.2	2.9	2.6	(a)	(b)	(c)	(d)
	From shipping	0.4	0.4	0.4	0.4	(a)	(b)	(c)	(d)
	From off road mobile machinery	1.0	1.0	0.5	0.4	(a)	(b)	(c)	(d)
	From natural sources	0.0	0.0	0.0	0.0	(a)	(b)	(c)	(d)
	From transboundary sources	0.0	0.0	0.0	0.0	(a)	(b)	(c)	(d)
	From other urban background sources	0.3	0.3	0.3	0.3	(a)	(b)	(c)	(d)
Local sources (i.e. contributions from sources < 0.3 km from the receptor)	Total	76.4	61.7	36.0	17.6	35.0	29.5	18.5	9.5
	From cars	26.7	17.9	12.4	8.2	12.0	8.5	6.4	4.5
	From HGV rigid	20.3	18.0	9.3	3.3	9.2	8.5	4.7	1.8
	From HGV articulated	14.5	12.6	6.4	2.1	6.6	6.0	3.2	1.1
	From Buses	8.6	7.7	4.5	2.1	3.9	3.6	2.3	1.1
	From LGVs	6.3	5.4	3.4	1.9	3.2	2.8	1.9	1.1
	From motorcycles	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Total (i.e. regional background + urban background + local components)		96.6	78.6	49.6	28.5	44.2	37.5	25.4	15.4

(a) The total annual mean NO_2 contribution for all components labelled (a) in 2008 was modelled to be 3.6 μgm^{-3}.
(b) The total annual mean NO_2 contribution for all components labelled (b) in 2010 is predicted to be 2.6 μgm^{-3}.
(c) The total annual mean NO_2 contribution for all components labelled (c) in 2015 is predicted to be 1.9 μgm^{-3}.
(d) The total annual mean NO_2 contribution for all components labelled (d) in 2020 is predicted to be 1.2 μgm^{-3}.

Table 6. Modelled source apportionment for 2010, 2015 and 2020 under baseline conditions for traffic count point with the highest concentration in these years in NO_2_UK0027_Annual_1 (a). 2008 results are also presented here for reference (units: μgm^{-3}).

Spatial scale	Component	NOx				NO2 (indicative)			
		2008	2010	2015	2020	2008	2010	2015	2020
Regional background sources (i.e. contributions from distant sources of > 30 km from the receptor)	Total	6.1	5.3	4.7	3.9	(b)	(c)	(d)	(e)
	From within the UK	2.4	2.1	1.9	1.5	(b)	(c)	(d)	(e)
	From transboundary sources (includes shipping and other EU Member States)	3.7	3.2	2.8	2.3	(b)	(c)	(d)	(e)
Urban background sources (i.e. sources located within 0.3 - 30 km from the receptor)	Total	14.1	11.5	8.9	12.1	9.2	7.9	6.9	8.5
	From road traffic sources	7.6	5.4	3.6	2.8	5.6	5.3	5.0	7.0
	From industry (including heat and power generation)	1.5	1.4	1.3	4.0	(b)	(c)	(d)	(e)
	From agriculture	0.0	0.0	0.0	0.0	(b)	(c)	(d)	(e)
	From commercial/residential sources	3.2	3.2	2.9	3.3	(b)	(c)	(d)	(e)
	From shipping	0.4	0.4	0.4	0.1	(b)	(c)	(d)	(e)
	From off road mobile machinery	1.0	1.0	0.5	1.5	(b)	(c)	(d)	(e)
	From natural sources	0.0	0.0	0.0	0.0	(b)	(c)	(d)	(e)
	From transboundary sources	0.0	0.0	0.0	0.0	(b)	(c)	(d)	(e)
	From other urban background sources	0.3	0.3	0.3	0.4	(b)	(c)	(d)	(e)
Local sources (i.e. contributions from sources < 0.3 km from the receptor)	Total	76.4	61.7	36.0	13.5	35.0	29.5	18.5	7.4
	From cars	26.7	17.9	12.4	8.6	12.0	8.5	6.4	4.7
	From HGV rigid	20.3	18.0	9.3	1.6	9.2	8.5	4.7	0.8
	From HGV articulated	14.5	12.6	6.4	0.4	6.6	6.0	3.2	0.2
	From Buses	8.6	7.7	4.5	0.7	3.9	3.6	2.3	0.4
	From LGVs	6.3	5.4	3.4	2.3	3.2	2.8	1.9	1.3
	From motorcycles	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Total (i.e. regional background + urban background + local components)		96.6	78.6	49.6	29.5	44.2	37.5	25.4	15.9

(a) The road with the maximum annual mean NO_2 concentration in different years is as follows. 2008: A section of the A483 (count point id 74086). 2010: A section of the A483 (count point id 74086). 2015: A section of the A483 (count point id 74086). 2020: A section of the A4067 (count point id 50625). (OS grid (m): 267830, 193080; 267830, 193080; 267830, 193080; 267830, 193080).
(b) The total annual mean NO_2 contribution for all components labelled (b) in 2008 was modelled to be 3.6 μgm^{-3}.
(c) The total annual mean NO_2 contribution for all components labelled (c) in 2010 is predicted to be 2.6 μgm^{-3}.
(d) The total annual mean NO_2 contribution for all components labelled (d) in 2015 is predicted to be 1.9 μgm^{-3}.
(e) The total annual mean NO_2 contribution for all components labelled (e) in 2020 is predicted to be 1.5 μgm^{-3}.

Table 7. The maximum NO_X contribution from each source from across all the roads included in the exceedance situation on which exceedances remain in 2010, 2015 and 2020 under baseline conditions. Zeros indicate that there are no exceedances in the relevant year.

Spatial scale	Component	NOx			
		2008	2010	2015	2020
Regional background sources (i.e. contributions from distant sources of > 30 km from the receptor)	From within the UK	2.4	0.0	0.0	0.0
	From transboundary sources (includes shipping and other EU Member States)	3.7	0.0	0.0	0.0
Urban background sources (i.e. sources located within 0.3 - 30 km from the receptor)	From road traffic sources	7.6	0.0	0.0	0.0
	From industry (including heat and power generation)	1.5	0.0	0.0	0.0
	From agriculture	0.0	0.0	0.0	0.0
	From commercial/residential sources	3.2	0.0	0.0	0.0
	From shipping	0.4	0.0	0.0	0.0
	From off road mobile machinery	1.0	0.0	0.0	0.0
	From natural sources	0.0	0.0	0.0	0.0
	From transboundary sources	0.0	0.0	0.0	0.0
	From other urban background sources	0.3	0.0	0.0	0.0
Local sources (i.e. contributions from sources < 0.3 km from the receptor)	From cars	26.7	0.0	0.0	0.0
	From HGV rigid	20.3	0.0	0.0	0.0
	From HGV articulated	14.5	0.0	0.0	0.0
	From Buses	8.6	0.0	0.0	0.0
	From LGVs	6.3	0.0	0.0	0.0
	From motorcycles	0.1	0.0	0.0	0.0

Figure 6. Background baseline projections of annual mean NO_2 concentrations in 2010, 2015 and 2020. 2008 is also included here for reference. Modelled exceedances of the annual limit value are shown in orange and red.

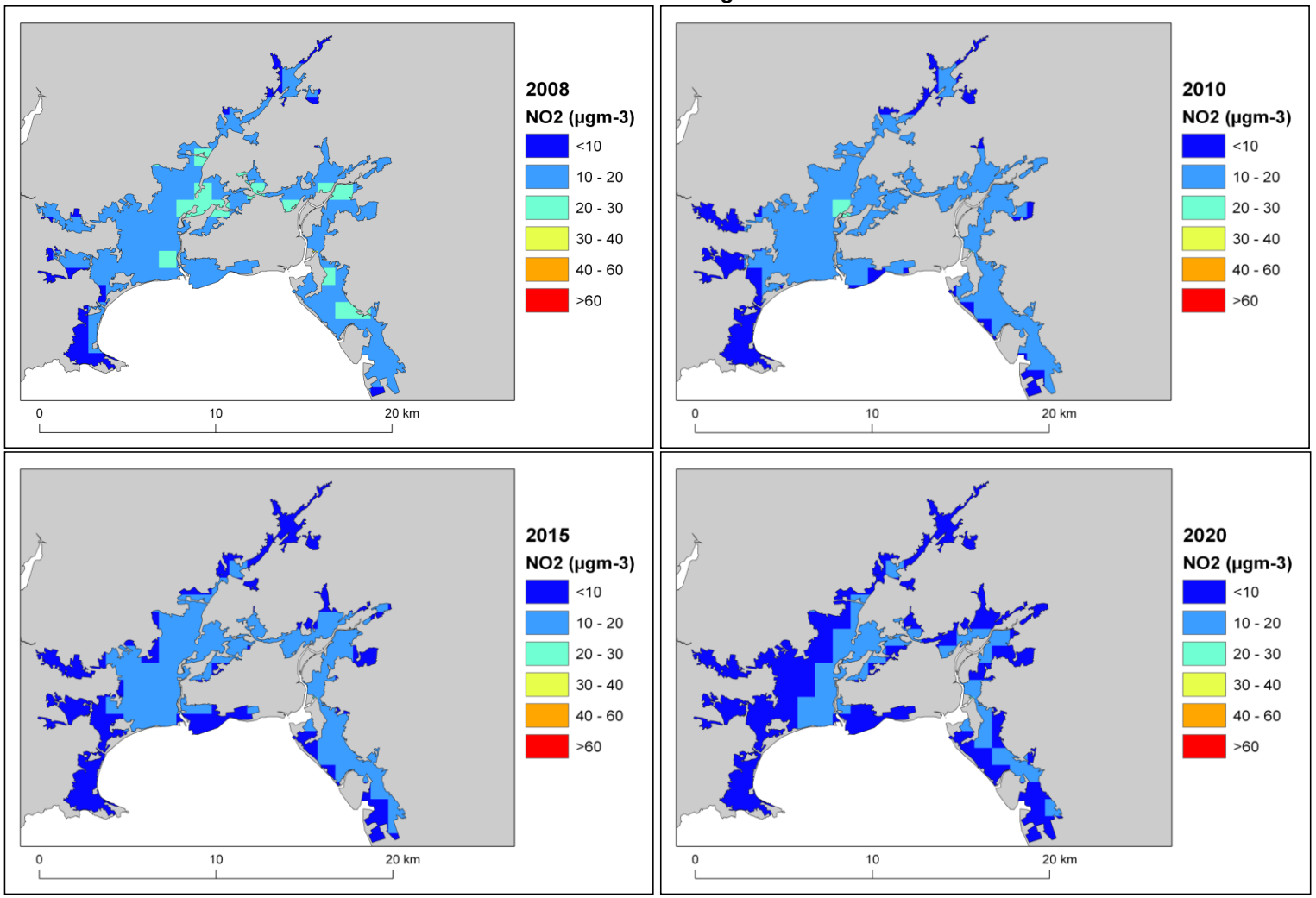
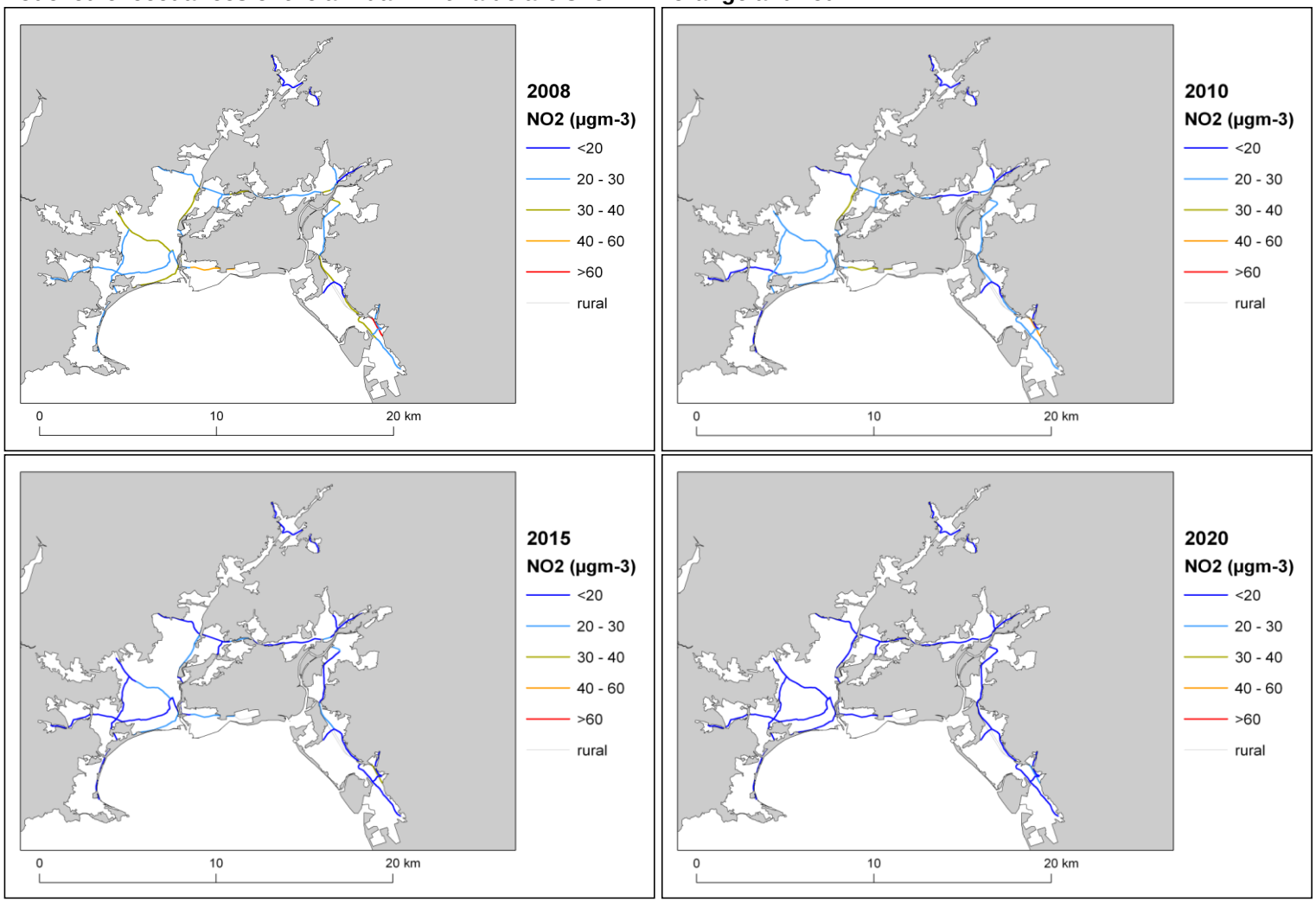


Figure 7. Roadside baseline projections of annual mean NO_2 concentrations in 2010, 2015 and 2020. 2008 is also included here for reference. Modelled exceedances of the annual limit value are shown in orange and red.



References

Air Quality Expert Group (AQEG, 2004). Nitrogen Dioxide in the United Kingdom. http://www.defra.gov.uk/environment/quality/air/airquality/publications/nitrogen-dioxide/index.htm

Decision 2004/224/EC. Commission Decision of 20 February 2004 laying down arrangements for the submission of information on plans or programmes required under Council Directive 96/62/EC in relation to limit values for certain pollutants in ambient air. From the Official Journal of the European Union, 6.3.2004, En series, L68/27

Decision 2004/461/EC. Commission Decision of 29 April 2004 laying down a questionnaire to be used for annual reporting on ambient air quality assessment under Council Directives 96/62/EC and 1999/30/EC and under Directives 2000/69/EC and 2002/3/EC of the European Parliament and of the Council. From the Official Journal of the European Union, 30.4.2004, En series, L 156/78

UK technical report, UK overview document and List of UK and National measures are available at http://www.defra.gov.uk/environment/quality/air/air-quality/eu/

CDR Central Data Repository. http://cdr.eionet.europa.eu/

Air Quality Directive 2008/50/EC. Council Directive 2008/50/EC, of 21 May 2008. On ambient air quality and cleaner air for Europe. From the Official Journal of the European Union, 11.6.2008, En series, L152/1

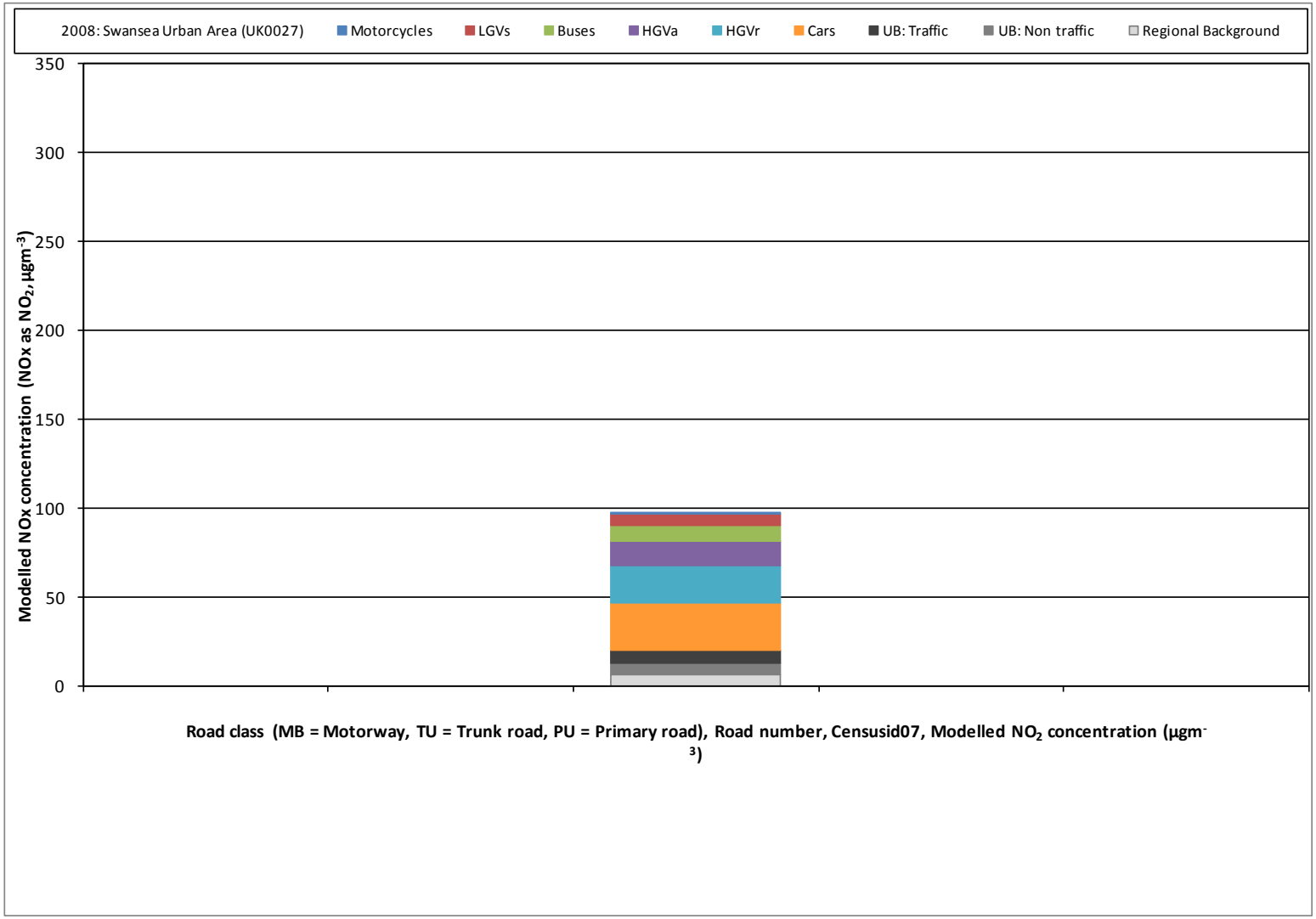
1st Daughter Directive 1999/30/EC. Council Directive 1999/30/EC, of 22 April 1999 relating to limit values for sulphur dioxide, nitrogen dioxide and oxides of nitrogen, particulate matter and lead in ambient air (The First Daughter Directive). From the Official Journal of the European Communities, 29.6.1999, En Series, L163/41.

List of Annexes

Annex 1: Source apportionment graphs
Annex 2: Tables of measures

Annex 1: Source apportionment graphs

Figure A1.1 Annual mean roadside NO_X source apportionment plots for all roads exceeding the annual mean NO_2 limit value in 2008



Annex 2: Tables of measures

Table A2.1 Relevant Local Authority measures taken before or during 2010 within Swansea Urban Area (UK0027)

LA (a)	Measure code (b)	Title	Description	Other information
Swansea	Local_Swansea_E1	Traffic management measures on Neath Road	Provision of some bus stops and shelters Gateway treatment to entrance to Neath Road from the Normandy Road roundabout Creation of traffic control point	• Type: Technical • Sources affected: Transport • Spatial scale: local • Implementation date: 2008 • Reduction timescale: Long term • Regulatory: No • Smarter Choices (c) : No • Reference (d): Local_zone27_Swansea_AQActionplan_1
Swansea	Local_Swansea_E2	Park and Ride provision	Landore and Port Tennant Park and Ride sites are now fully operational. Fforestfach Park & Ride was opened during November/December 2006 and works are now complete with the site becoming fully operational during February 2008. Phase 1 of the dedicated express bus route serving the Landore Park and Ride site has been completed. Phase 2 was due to commence during September 2005 but did not commence until April 2008. □ The construction of a new dedicated express bus route into the city centre from the Fabian Way Park and Ride site has been completed during 2007/early 2008.	• Type: Technical • Sources affected: Transport • Spatial scale: local • Implementation date: 2008 • Reduction timescale: Long term • Regulatory: No • Smarter Choices (c) : No • Reference (d): Local_zone27_Swansea_AQActionplan_1
Swansea	Local_Swansea_G1	Improved Bus Provision	Promote bus priority routes Fund a local concessionary bus fares scheme for certain categories of people Provide free unlimited bus travel within the authorities area for elderly people	• Type: Technical • Sources affected: Transport • Spatial scale: local • Implementation date: 2008 • Reduction timescale: Long term • Regulatory: No • Smarter Choices (c) : Yes • Reference (d): Local_zone27_Swansea_AQActionplan_1
Swansea	Local_Swansea_G2	Bus Corridor Enhancements	Transport Grant funded improvements to A48 Bus priority Demonstration Corridor completed during early 2005. Bus priority proposals for Neath Road being reviewed.	• Type: Technical • Sources affected: Transport • Spatial scale: local • Implementation date: 2008

LA (a)	Measure code (b)	Title	Description	Other information
			Works have commenced for a new concept Metro service linking Morriston Hospital with the city centre and Singleton Hospital (see 6.7.4 above) . The aim is to provide advantages of modern tram at modest costs. Envisaged that the service will use the Landore express bus route, thereby avoiding much of Neath Road and that bus priority will be introduced at key junctions along the route. Variable Message displays installed along a number of trial routes to improve dissemination of travel information to passengers. Bus shelters upgraded on a number of routes	• Reduction timescale: Long term • Regulatory: No • Smarter Choices (c) : No • Reference (d): Local_zone27_Swansea_AQActionplan_1
Swansea	Local_Swansea_G3	Enhancements of Bus and Rail Stations	Swansea High Street Transport Interchange was completed during March 2004. Funded through a combination of Transport Grant and Objective 1 funding, this scheme has provided improved access to the railway station by bus, taxi, and on foot, together with a new public realm, improved security and improved parking facilities. Discussion ongoing with network rail and Arriva Trains Wales on how to improve passenger facilities at the station itself.	• Type: Technical • Sources affected: Transport • Spatial scale: local • Implementation date: 2008 • Reduction timescale: Long term • Regulatory: No • Smarter Choices (c) : No • Reference (d): Local_zone27_Swansea_AQActionplan_1
Swansea	Local_Swansea_G4	Safe Routes to School	Safe Routes to School has been delivered in Swansea for the last 6 years with numerous schemes undertaken. • Currently, Safe Routes to school schemes have been developed at: □ Clydach, □ Brynhyfryd, □ Pennard, □ Birchgrove. □ Gowerton Comprehensive and its Primary feeder schools Penllergaer □ Whitestone Primary	• Type: Technical; Education/information • Sources affected: Transport • Spatial scale: local • Implementation date: 2008 • Reduction timescale: Long term • Regulatory: No • Smarter Choices (c) : Yes • Reference (d): Local_zone27_Swansea_AQActionplan_1

LA (a)	Measure code (b)	Title	Description	Other information
Swansea	Local_Swansea_A1	City & County of Swansea Vehicle Fleet	Improvements are ongoing within the fleet of vehicles operated by the authority. With 40% of the potential green fleet vehicles converted to L.P.G., other bespoke solutions have been implemented to assist in managing down the environmental impact of a 750 vehicle fleet operation within the Council's area.	• Type: Technical • Sources affected: Transport • Spatial scale: local • Implementation date: 2008 • Reduction timescale: Long term • Regulatory: No • Smarter Choices (c) : No • Reference (d): Local_zone27_Swansea_AQActionplan_1
Swansea	Local_Swansea_E3	Traffic Management Systems with Air Quality Monitoring Feedback	Considerable efforts are being made to ensure that all data feeds into the system under development operate reliably. The major data feeds are: ♦ Vehicle by Vehicle Traffic flow ♦ Ambient Air Quality Monitoring data ♦ Meteorological forecast	• Type: Technical • Sources affected: Transport • Spatial scale: local • Implementation date: 2008 • Reduction timescale: Long term • Regulatory: No • Smarter Choices (c) : No • Reference (d): Local_zone27_Swansea_AQActionplan_1
Neath Port Talbot	Local_Neath_Port_Talbot(HA)_E1	New Peripheral Distributor Road to relieve traffic from A48.	Two sections completed and remaining part expected finished by 2012.	• Type: Technical • Sources affected: Transport • Spatial scale: local • Implementation date: 2008 • Reduction timescale: Medium term • Regulatory: No • Smarter Choices (c) : No • Reference (d): Local_zone27_Swansea_AQActionplan_1
Neath Port Talbot	Local_Neath_Port_Talbot_G1	Green Transport Plans	Ongoing through South West Wales Integrated Transport Consortium and planning system. Plans intended to promote the use of alternative forms of transport, reduce traffic flow volume and congestion.	• Type: Education/information • Sources affected: Transport • Spatial scale: local • Implementation date: 2008 • Reduction timescale: Medium term • Regulatory: No • Smarter Choices (c) : Yes • Reference (d): Local_zone27_Swansea_AQActionplan_1
Neath Port Talbot	Local_Neath_Port_Talbot_G2	School Travel Plans	Implemented in 15 schools. Plans intended to promote the use of alternative forms of transport, reduce traffic flow volume and congestion.	• Type: Education/information • Sources affected: Transport • Spatial scale: local • Implementation date: 2008 • Reduction timescale: Medium term • Regulatory: No

LA (a)	Measure code (b)	Title	Description	Other information
				• Smarter Choices (c) : Yes • Reference (d): Local_zone27_Swansea_AQActionplan_1
Neath Port Talbot	Local_Neath_Port_Talbot_A1	Reducing Council fleet vehicle emissions	Council fleet management promotes the replacement of older fleet vehicles with greener alternatives. All vehicles now at least Euro IV. Also one hybrid vehicle.	• Type: Technical • Sources affected: Transport • Spatial scale: local • Implementation date: 2008 • Reduction timescale: Short term • Regulatory: No • Smarter Choices (c) : No • Reference (d): Local_zone27_Swansea_AQActionplan_1
Neath Port Talbot	Local_Neath_Port_Talbot_A2	Transport in the community	Currently being piloted outside the AQMA.	• Type: Other • Sources affected: Transport • Spatial scale: local • Implementation date: 2008 • Reduction timescale: Short term • Regulatory: No • Smarter Choices (c) : No • Reference (d): Local_zone27_Swansea_AQActionplan_1
Neath Port Talbot	Local_Neath_Port_Talbot_F1	New air quality website to be launched shortly with more information that will be useful for interested parties and those sensitive to pollution.	New air quality website to be launched shortly with more information that will be useful for interested parties and those sensitive to pollution.	• Type: Education/information • Sources affected: Transport • Spatial scale: local • Implementation date: 2008 • Reduction timescale: Short term • Regulatory: No • Smarter Choices (c) : No • Reference (d): Local_zone27_Swansea_AQActionplan_1
Neath Port Talbot	Local_Neath_Port_Talbot(Environment_Agency)_B2	Commercial/ Industrial Permits	Reduce pollution through permit systems and economic instruments. to reduce the risk that a relevant air quality limit value or alert threshold will be exceeded; or where it is not possible to prevent the occurrence, to limit its duration or severity.	• Type: Technical • Sources affected: Industry including heating and power production • Spatial scale: local • Implementation date: 2008 • Reduction timescale: Long term • Regulatory: Yes • Smarter Choices (c) : No • Reference (d):

(a) Name of responsible Local Authority.

(b) The Letter in the measure code indicates the main source sector that will be affected by the measure. Letters are assigned as follows: A - measures to reduce emissions from mobile sources, B - measures to reduce emissions from stationary sources, C - fuels and petrol stations, D - Economic incentives to reduce emissions (e.g. congestion charging, controlled parking zones), E - measures related to traffic planning/redesigning infrastructure, F - information/educational measures, G - change of transport mode (e.g. scheme to encourage people out of cars and onto bikes), H - Other.
(c) Measures have been classified as 'smarter choices' or not based on expert judgement
(d) References available for download from: http://uk-air.defra.gov.uk/library/NO_2ten/