



# Current issues in Local Air Quality

Dr Janet Dixon

Science and Evidence Team

Atmospheric Quality and Industrial Pollution programme

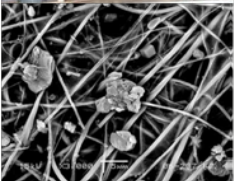
# Latest developments

- Europe:
  - New Directive on ambient air quality
  - Monitoring Network reorganisation
  - Partisol monitoring issues
  - National Emissions Ceilings Directive (NECD)
- Local:
  - Air quality performance indicator
  - Local air quality management



# Europe: new AQ directive

- New directive on ambient air quality (2008/50/EC)
  - Published 11 June 08
  - Extended compliance deadlines for EU limit values
    - UK likely to need to apply for extended compliance deadlines for both  $PM_{10}$  and  $NO_2$ , subject to full public consultation
  - Regulation of  $PM_{2.5}$
  - Implementation date – 11 June 2010



# Europe: New AQ Directive

Limit values **apply** everywhere

Indications of where limit values must be **assessed**

- Not in any locations within areas where members of the public do not have access and there is no fixed habitation
- Not on the carriageway of roads or on central reservations except where normally pedestrian access to central reservation
- On factory premises or industrial installations, where H&S at work apply

Macro & micro-scale siting criteria also apply to modelling



# Europe: New AQ Directive

## PM<sub>2.5</sub>:

- new target value = 25  $\mu\text{g m}^{-3}$  annual mean;
  - from 1 January 2010
  - Applies everywhere
- new Stage 1 limit value = 25  $\mu\text{g m}^{-3}$  annual mean;
  - From 1 January 2015
- new Stage 2 limit value = 20  $\mu\text{g m}^{-3}$  annual mean;
  - from 1 January 2020

## PM<sub>10</sub> and PM<sub>2.5</sub>

- Can subtract natural sources contributing to exceedences – guidance awaited from Cion





# Europe: New AQ Directive

## PM<sub>2.5</sub>:

- **Average Exposure Indicator**
  - 3 calendar year running annual mean - 2009-2011 & 2018-2020
  - Measurements at urban background
- Urban background monitoring where > 100,000 population
- Monitoring in place from 1 January **2009**
- non-mandatory **National Exposure Reduction Target** on a sliding scale (0-20%) dependent on initial concentration in 2010/11 concentrations by 2020 – assessed using AEI
- UK likely to require 15% reduction
- New **Exposure Concentration Obligation** - 20  $\mu\text{g m}^{-3}$  from 1 January 2015 onwards – assessed using AEI for 2013-15



# Europe: Monitoring UK Context – new Network



**defra**

Department for Environment  
Food and Rural Affairs



Pollutant	Current No. of sites (traffic)	Min Required by new Directive (traffic)	Revised Automatic Urban and Rural Network (traffic)
<b>PM<sub>10</sub></b>	70 (64 TEOM; 7 Grav; 11 traffic)	115 (min 47 PM <sub>2.5</sub> ; min 39 traffic; min 39 PM <sub>10</sub> )	65 (24)
<b>PM<sub>2.5</sub></b>	4 (1)		77 (22)
<b>NO<sub>2</sub></b>	96 (23)	83 (27)	120 (36)
<b>CO</b>	79 (10)	6 (2)	26 (5)
<b>SO<sub>2</sub></b>	76	28	45
<b>Benzene</b>	39 (10)	39 (13)	41 (16)



# New sites



**Affiliated** to the AURN since 1  
October 07:

- Horley (NO<sub>2</sub>)
- Stewartby (SO<sub>2</sub>)
- Carlisle Roadside
- Chepstow A48
- Newcastle Cradlewell Kerbside
- Leeds Headingley Kerbside
- Liverpool Queens Drive
- Stanford-le-Hope Roadside
- Oxford St Ebbes
- Chesterfield
- Chesterfield Roadside
- York Bootham
- York Fishergate
- Aberdeen Union St

PM<sub>2.5</sub> sites added to date:

- Bristol St Pauls
- Cardiff Centre
- Hull Freetown
- Newcastle Centre
- Leicester Centre
- Birmingham Centre
- Edinburgh St Leonards\*
- Stoke on Trent Centre\*
- Belfast Centre
- Liverpool Speke\*
- Southampton Centre\*
- Reading New Town

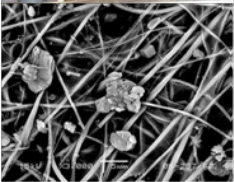


# Europe: Monitoring UK Implementation of PM requirements

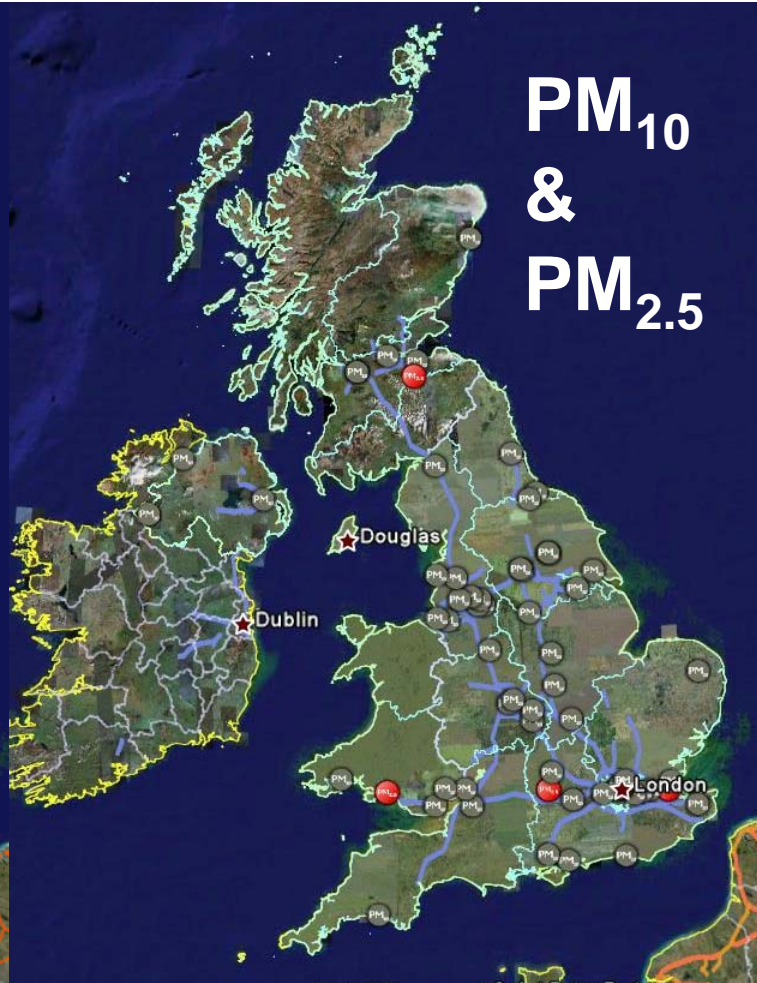


**defra**

Department for Environment  
Food and Rural Affairs



UK Air Quality Automatic Urban and Rural Network

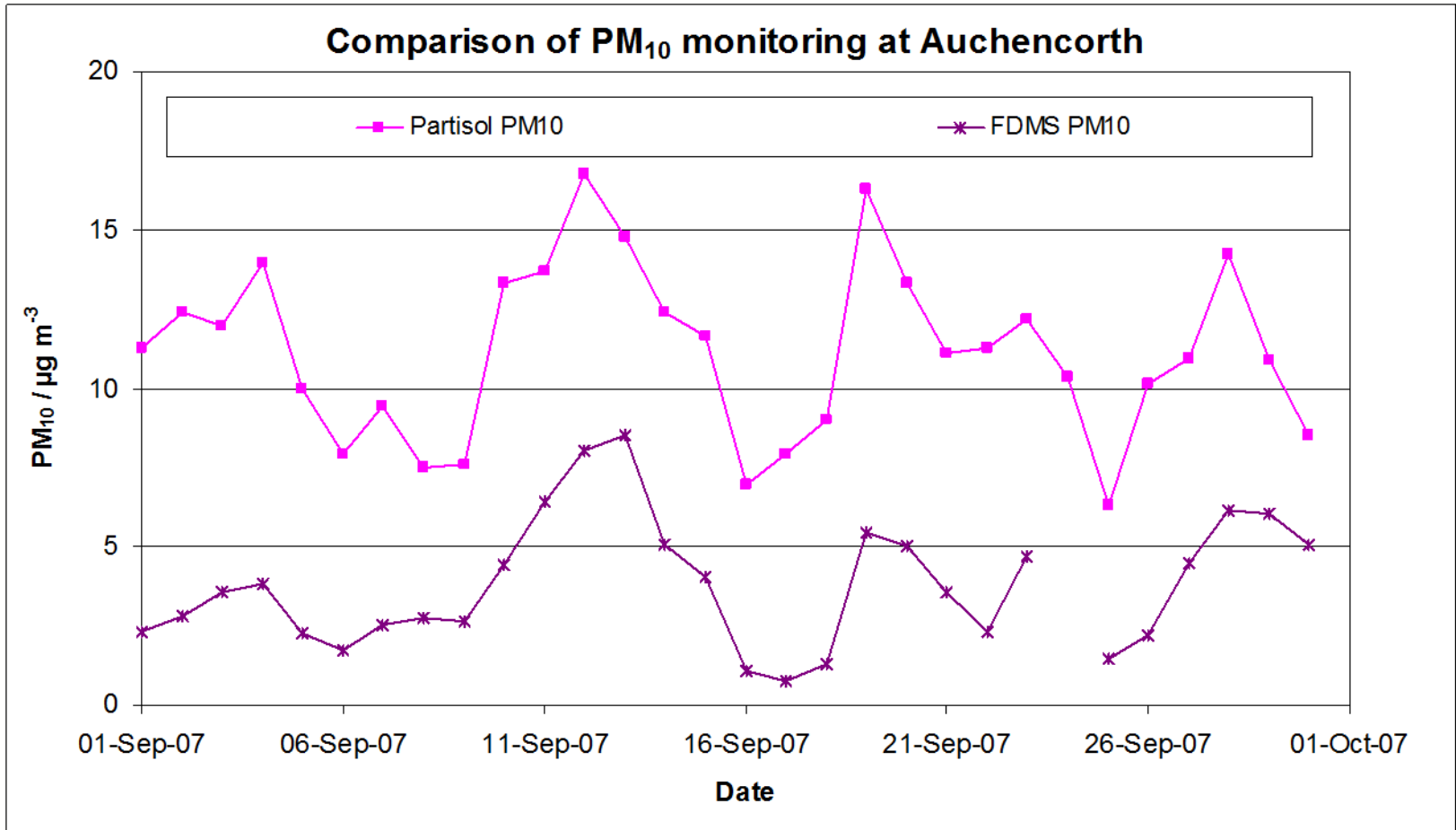


- Pollutant**
- CARBON MONOXIDE
  - NITROGEN DIOXIDE
  - PARTICULATES (PM10)
  - SULPHUR DIOXIDE
  - OZONE
  - HYDRO CARBONS
  - PARTICULATES (PM2.5)

Pointer 54°40'22.62" N 3°03'28.15" W Streaming ||||| 100%



# Measurement issues: Partisols



# Partisol data issues

- Bureau Veritas report sent for “open peer review”
- ‘Analysis of Trends in gravimetric particulate mass measurements in the United Kingdom’ Maggs et al, (2008)  
[www.airquality.co.uk/archive/reports/cat09/0806161031\\_080528\\_Trends\\_in\\_Gravimetric\\_PM\\_Measurements\\_in\\_the\\_UK.pdf](http://www.airquality.co.uk/archive/reports/cat09/0806161031_080528_Trends_in_Gravimetric_PM_Measurements_in_the_UK.pdf)
- Main findings:
  - BV labs give higher results than other labs;
  - Filters used also give higher results;
  - There were no significant non-compliances with the reference methods at BV labs;
  - No single cause of the over-read was identifiable.
  - increase in mass of travel blanks (esp 2006/07) greatest influence between gravimetric and continuous sampling





# Implications: Policy

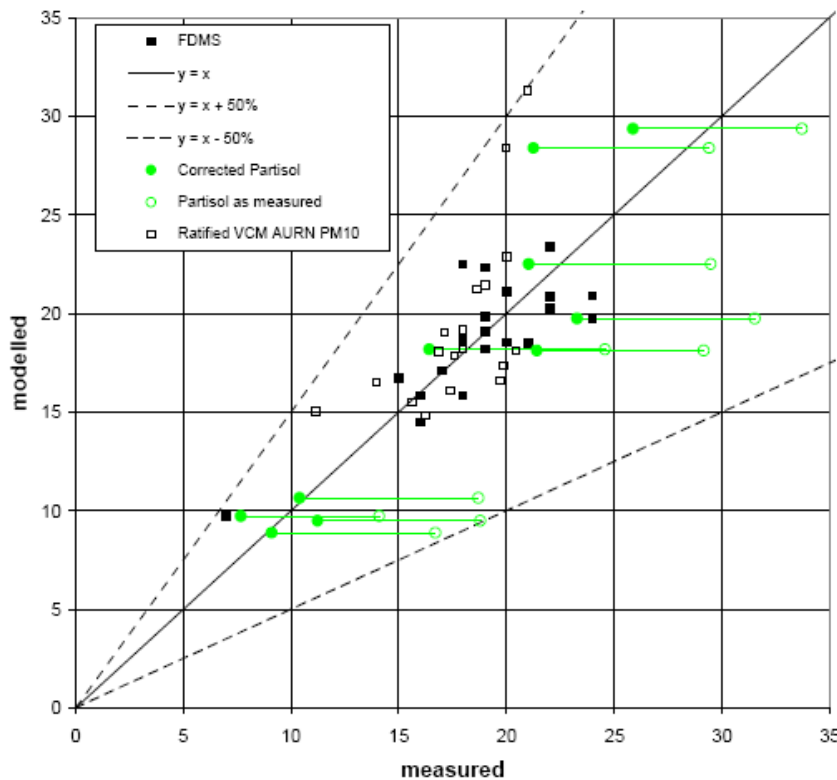


**defra**

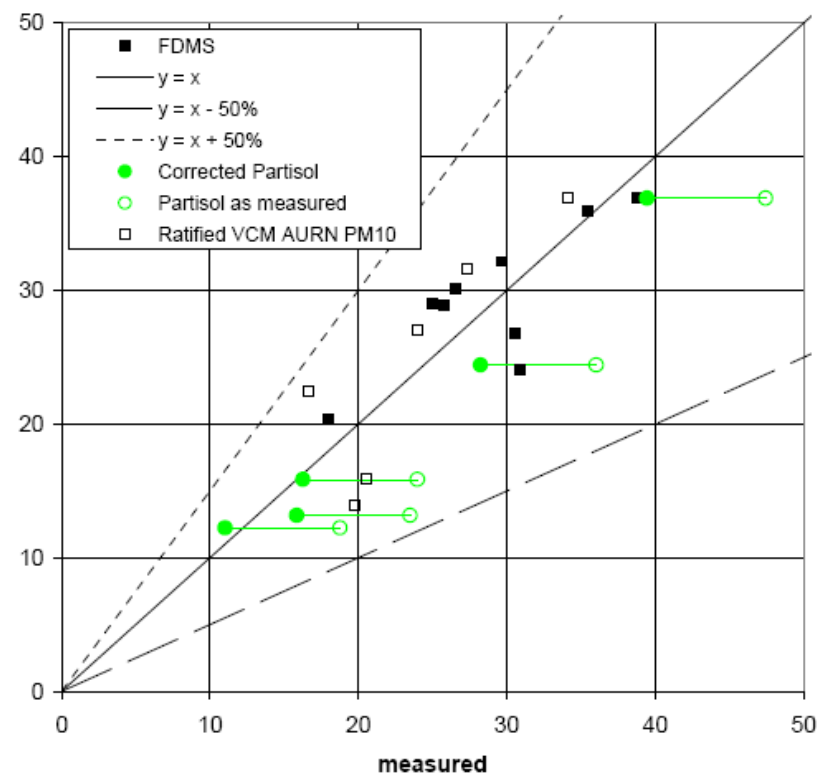
Department for Environment  
Food and Rural Affairs



FDMS PM<sub>10</sub> model background verification 2007 ( $\mu\text{g m}^{-3}$ )



FDMS PM<sub>10</sub> model roadside verification 2007 ( $\mu\text{g m}^{-3}$ )



# Europe: Monitoring 4<sup>th</sup> Daughter Directive

- PAHs, arsenic, cadmium, mercury, nickel
- target values for PAHs (as B[a]P 1 ng/m<sup>3</sup>), Arsenic (6 ng/m<sup>3</sup>), Cadmium (5 ng/m<sup>3</sup>), and Nickel (20 ng/m<sup>3</sup>)
- PAHs - replaced all 19 of the existing samplers with the PM<sub>10</sub> reference method (Digital HiVols) and required 14 new sites
- Heavy metals - 17 old sites – relocating some existing sites and required 11 new sites
- Many of new sites are co-located PAH and heavy metals
- Deposition monitoring – heavy metals and PAH at Auchencorth Moss and Harwell





# PAH network



**defra**

Department for Environment  
Food and Rural Affairs

## Old sites continuing

- Birmingham
- Bolsover
- Brent
- Bromley
- Cardiff 2
- Edinburgh
- Glasgow
- Hove
- Kinlochleven
- Leeds 2
- Lisburn
- Newcastle
- Newport (StJulian's)
- Port Talbot
- Scunthorpe
- Liverpool Speke
- High Muffles
- Hazelrigg
- Stoke Ferry

## New sites

- Auchencorth Moss Site
- Ballymena Site
- Derry Site
- Glasgow Site
- Harwell Site
- London Marylebone Rd
- Lynemouth (Alcan Lynemouth downwind)
- Manchester
- Middlesbrough
- Newport/Rhondda
- Port Talbot upwind
- South Hiendley (Monckton downwind)
- Royston (Monckton upwind)
- Santon (Corus Scunthorpe downwind)



# Heavy Metals Network



defra

Department for Environment  
Food and Rural Affairs

- **Sites closed:**

- Leeds
- Glasgow
- Newcastle
- Brent

- **New sites Opened:**

- Murrinston - INCO upwind
- Coedgwilym Cemetery – INCO downwind
- Belfast Centre
- Port Talbot Margam
- Sheffield Centre
- Scunthorpe Town – Corus upwind
- Santon – Corus downwind

- Redcar ex-AURN - Corus downwind
- Nunthorpe - Corus upwind – investigating site locations
- Cardiff Rumney - CELSA steel works downwind;
- Chadwell St Mary - Britannia Metals downwind
- Bean Primary School - Britannia Metals upwind
- Report on the network expansion will be available shortly on the reports database on [www.airquality.co.uk](http://www.airquality.co.uk)



# National Emission Ceilings Directive - review

- Part of Commission's 2005 Thematic Strategy
- Large amount of preparatory work undertaken
- Similar approach to previous NECD, but:
  - 2020 end date
  - Ambition levels from 2005 Thematic Strategy
  - Includes  $PM_{2.5}$  as driver
  - EU-27 rather than EU-15
- Originally planned for publication in 2007
- But...now linked to CO<sub>2</sub> burden sharing package
- New modelling required using new baseline
- Proposal by late Spring 2009 (June?) (Autumn?)
- Agreement by ??



# Local: Performance Indicator



**defra**  
Department for Environment  
Food and Rural Affairs

## Air quality performance indicator

- New Performance Framework published on 11 October 07-  
[www.communities.gov.uk/publications/localgovernment/nationalindicator](http://www.communities.gov.uk/publications/localgovernment/nationalindicator)
- Each local authority to report against a set of 198 indicators
- Local Area Agreements
- **NI 194 - Level of air quality** – reduction in NO<sub>x</sub> and PM<sub>10</sub> emissions through local authority's estate and operations
- Emissions tool – Excel spreadsheet
- Calculates emissions of CO<sub>2</sub>, NO<sub>x</sub> and PM<sub>10</sub>
- Emissions tool available via  
[www.defra.gov.uk/environment/airquality/index.htm](http://www.defra.gov.uk/environment/airquality/index.htm)
- Should be pulling together the data required now – don't leave it until early 2009!





# Local: Local Air Quality Management (LAQM)



**defra**  
Department for Environment  
Food and Rural Affairs

- LAQM guidance under revision before 4<sup>th</sup> round of review and assessment
- Policy and Technical Guidance updates
  - Consultation closed end September
  - [www.defra.gov.uk/corporate/consult/airqualitymanagementguidance/](http://www.defra.gov.uk/corporate/consult/airqualitymanagementguidance/)
  - Final web version available late 2008
  - Web-based reporting for USAs and Progress Reports
- Evaluations of last round of LAQM process and support available at [www.defra.gov.uk/environment/airquality/local/eval/index.htm](http://www.defra.gov.uk/environment/airquality/local/eval/index.htm)





# Contents of Technical Guidance

- Source based rather than by pollutant
- PM<sub>10</sub>/PM<sub>2.5</sub>; KCL VCM (+ web tool);
- Difficult modelling;
- NO<sub>x</sub>:NO<sub>2</sub>; primary NO<sub>2</sub>;
- Vehicle emission factors;
- Updated background maps split by source;
- biomass;
- exposure reduction;
- congestion; non-exhaust emissions; shipping; rail; near kerbside and height adjustments; nomograms





# Contents of Technical Guidance

- Most of consultation responses on the Practise Guidance
- Measures –
  - LEZs; LEVs; retrofits
- Definitions;
- Worked Examples
- Legal basis
- Assessing schemes
  - AQ assessment
  - Benefits
  - Costs
  - Cost-effectiveness/cost benefit
  - Potential wider effects of schemes