

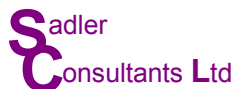
LEZs in Europe & thoughts for LEZs in Sweden

Stockholm 14th February 2013



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LEEZEN



Specialists in air quality policy



Low Emission Zones in Europe

Europe-wide information on LEZs

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Home Countries How to comply Retrofitting Cities A-Z LEZ Quick Guide Overview of LEZs What are LEZs?

Welcome

To the single source of information on Low Emission Zones across Europe. Use the Menu or Click on a text label to go to a City or Region; on Country or highlighted zone for more detailed maps.

Automatic translation is provided to help you. We **accept no responsibility** for the accuracy of translations. The site is written in English.



LEZs in Europe

~200 LEZs

~1720 auths

11 countries

+Japan
(Beijing)

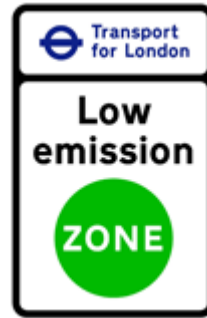


LEZ Overview

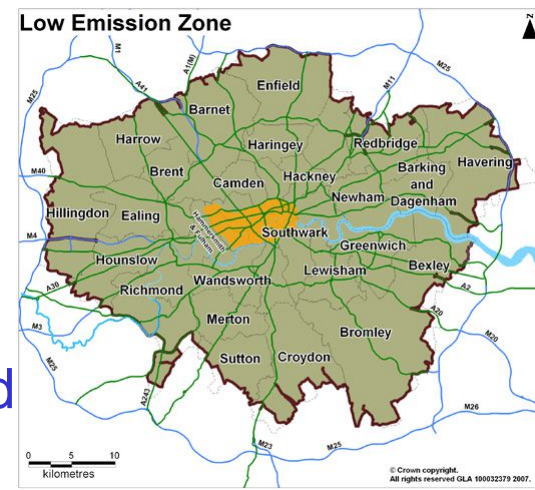
- A wide range of LEZs
 - variations on a theme
- First LEZs in Sweden
 - then followed in Italy, Germany, Netherlands, London...
- All part of an Air Quality Management Plan
- Most have 2+ phases
 - Later phases often having greater effect
- Most based on Euro standards, few with age aspects
- Most PM focused - eg Euro 3(PM), allowing retrofit
- Retrofits are certified, related to Euro standards
- Most bans, with 2 charges
- NO₂-focused schemes under consideration / investigation
- Let's take a trip around Europe



London











- 1600km², lorries, buses, coaches, vans, minibuses
 - February 2008: Euro 3(PM) for heavy goods vehicles over 12T
 - July 2008: Euro 3(PM) for HGV 3.5T - 12T, buses, coaches
 - January 2012: Euro IV(PM) for HGVs, buses & coaches
 - January 2012: Euro 3(PM) for vans >1.205T & minibuses
 - 2014: NOx aspect for TfL Buses only. Met by new Euro VI & hybrid buses, SCR retrofit
- Camera enforced, £200 a day penalty
- DPF certification requires full filters, max 20% increase in primary NO₂
- Public TfL buses tighter and separately regulated
- No financial assistance to comply
- London Congestion Charge also has exemptions for cleanest vehicles
- Zero & Ultra 2020 low emissions zone announced
see <http://www.tfl.gov.uk/corporate/media/newscentre/metro/27204.aspx>





Germany



- National framework, local decision and implementation
- All vehicles except 2 & 3 wheelers
 - Class 2: All diesel vehicles Euro 2(PM); petrol Euro 1 
 - Class 3: All diesel vehicles Euro 3(PM); petrol Euro 1 
 - Class 4: All diesel vehicles Euro 4(PM); petrol Euro 1 
 - eg Berlin  from 1.1.2008,  from 2010
 - Freiburg  from 2010,  from 2012,  from 2013
 - Baden-Württemberg co-ordinating 20+ towns - those with PM₁₀ problem start March 2008; NO₂ problem 2010.
- Manually enforced with sticker, fines & points on your driving licence
- Tax incentives for retrofits & cheaper loans for new vehicle purchase to help compliance



The Netherlands

- 12 LEZs with national framework
 - Local schemes, together with national grants
 - Scheme negotiated with vehicle operators
 - Gradual enforcement until all cameras in place
- Lorries >3.5T
 - Until 2010
 - Euro 1 and less banned
 - Euros 2 & 3 require filter
 - Euro 4, 5, 6, EEV, gas, hydrogen, E85 allowed in
 - 2010 - July 2013
 - Euro 2 and less banned
 - Euro 3 require filter & must be <8 years
 - Euro 4, 5, 6, EEV, gas, hydrogen, E85 allowed in
 - After July 2013
 - Only Euro 4, 5, 6, EEV, gas, hydrogen, E85 allowed in
 - From Summer 2013 potentially also including Vans



Italy

- Many regional frameworks & individual LEZs
 - Many under an agreement of North Italian regions
- Cover all vehicles, including motorcycles
- Some time limited and/or only in winter
- E.g: Lombardy
 - Whole region: 2-stroke m/cycles & mopeds Euro 1, Buses Euro 3, permanent
 - In urban areas, Petrol Euro 1, Diesel Euro 3, Winter Mon-Fri 7:30-19:30
- Time dependence allows those on lower incomes to still access the city, but adds complexity
- Funding to assist retrofit & those on low incomes



‘Motorway LEZs’



- Austria on 89km of the A12 from Kufstein to Zirl
 - Trailer lorries >7.5T banned Euro 0 & Euro 1 since 1.1.2007, Euro 2 from 1.11.2008.
 - Lorries without trailer >7.5T banned for Euro 0 & Euro 1 from 1.11.2009
- Enabled sectoral bans to be legal (EU law)

Low Emission (Planning) Strategies

- Emissions standards on construction & use of new developments through planning system
- Allow tighter standards than ‘general’ LEZ
- Include cleaner construction schemes
- Also enabled holistic approach to planning and air quality

Air Quality Impacts of LEZs

Depend on many factors

- Local situation
 - Severity air quality problem, geography
 - Significance of pollution from local transport
 - Vehicle fleet age and types
 - Political and economic situation
- What LEZ implemented
 - Emissions standards, vehicles, area, exemptions, enforcement
- How vehicles comply
 - Buy new, buy second hand, retrofit, avoid journey
- Vehicle issues
 - ‘Cycle beating’ in urban areas
 - Increased primary NO₂ for diesel vehicles

Impact of London LEZ

NO₂

Average concs reduced by 0.12 µg/m³,
Peak reductions up to 0.16 µg/m³

PM₁₀

Average concs reduced 0.03 µg/m³
Peak reductions up to 0.5 µg/m³

Black Carbon

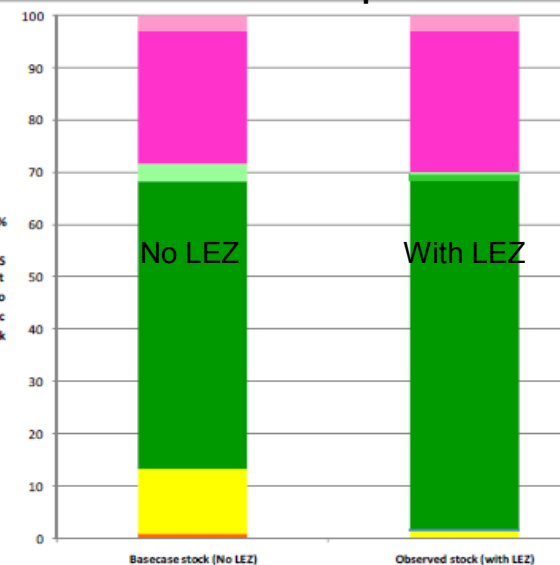
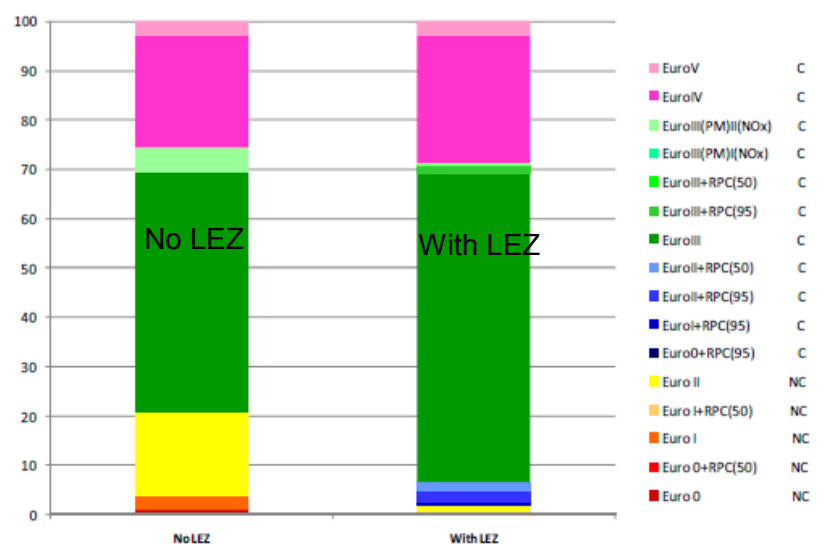
Reduced by 40-50%

Pollutant	Emissions Impact
NO _x	-2% (529T)
NO ₂	+2.6% (+116T)
CO ₂	+0.06% (4243T)
PM ₁₀	-1.9% (28T)
PM _{2.5}	-2.4% (-26T)

Of total emissions

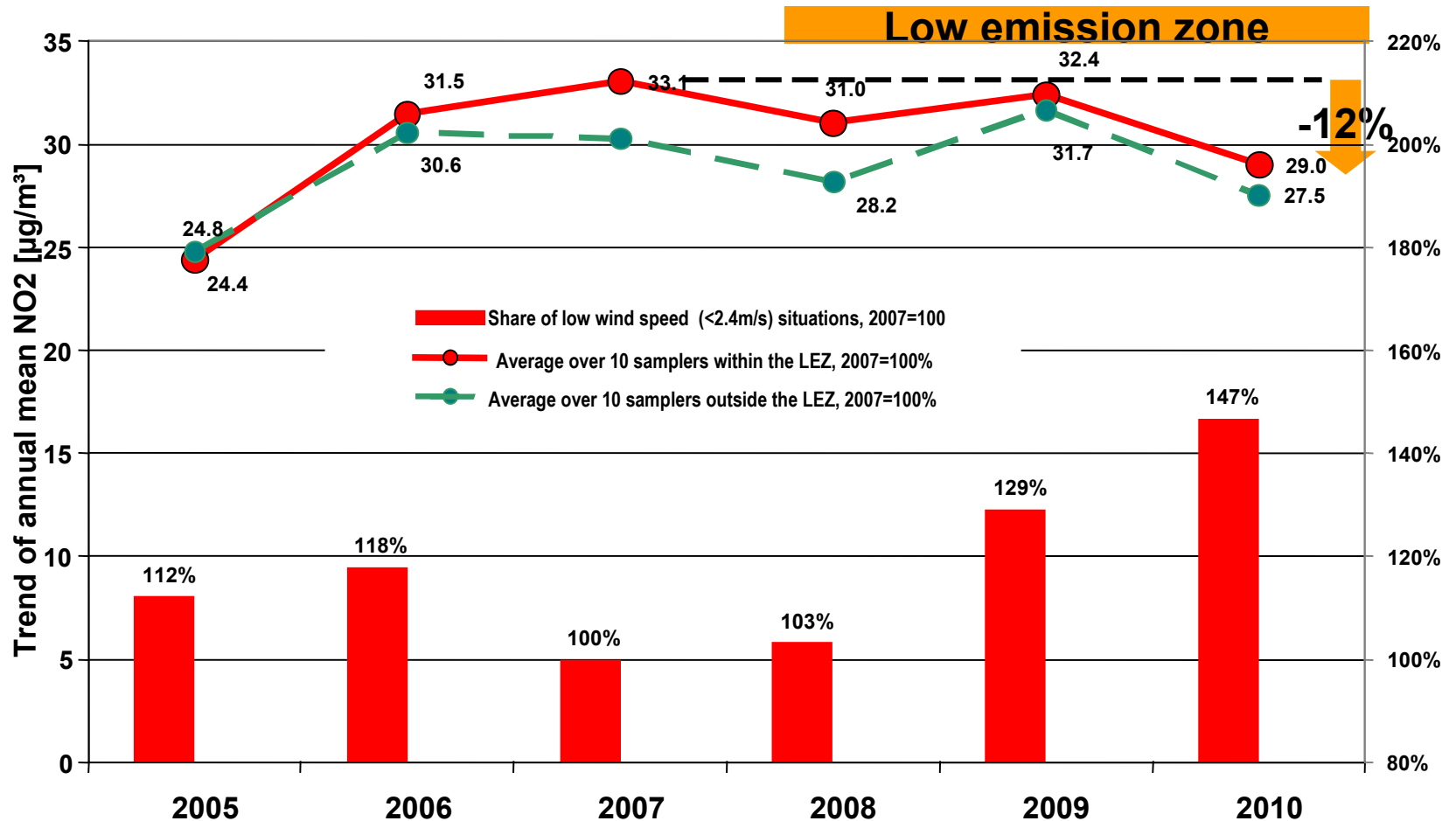
Rigid HGVs phase 1 Euro 3(PM)

Artic HGVs phase 1



97% compliance:

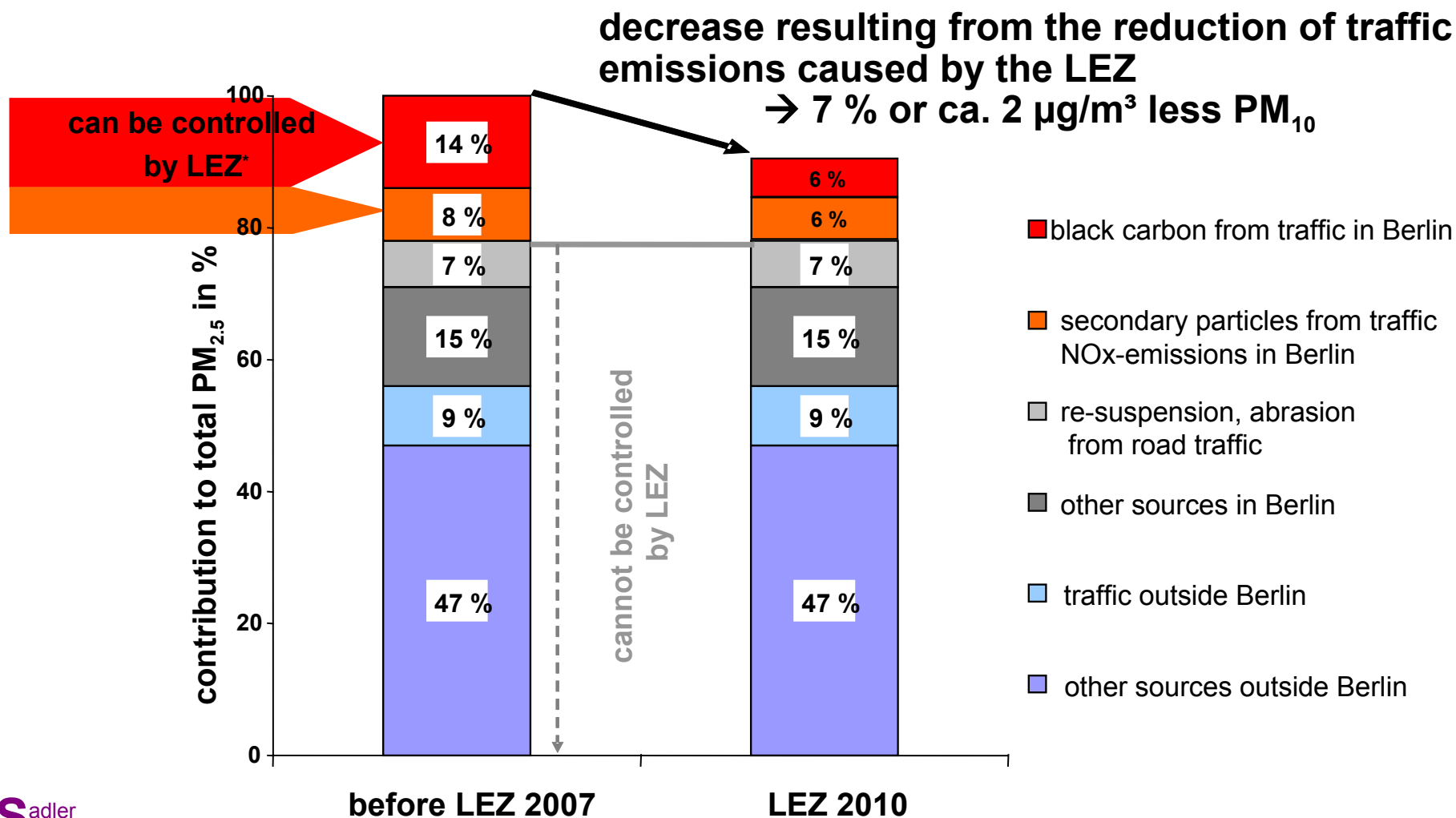
Impact of Berlin's LEZ NO₂



Estimated using traffic-adjusted trend of the traffic contribution to total NO₂-concentrations in main roads in Berlin

Impact of Berlin's LEZ on particulates

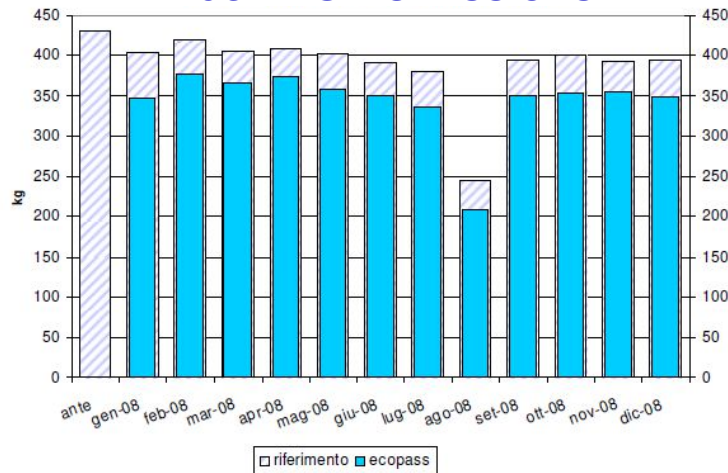
58% reduction in diesel PM



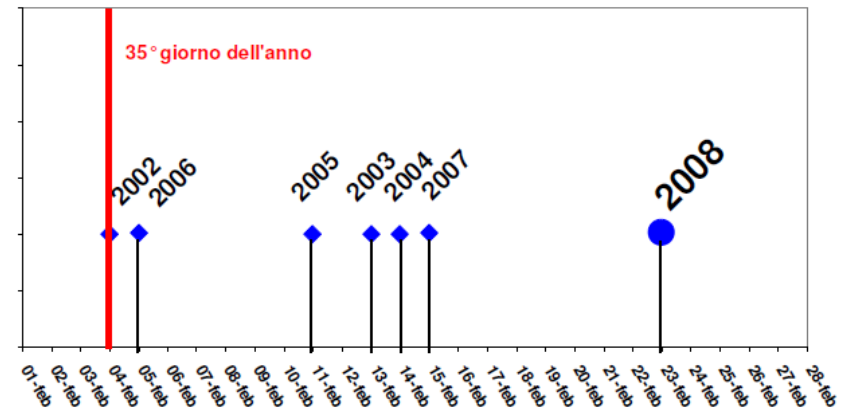
Impacts of Milan's Ecopass

- Primarily aimed at PM – Po valley
- Concentration reduced
 - PM₁₀ annual average 4%, exceedences 13%
- Emissions from traffic (as well as traffic) reduced
 - NOx 11%, PM₁₀ 19%, CO₂ 9%

Annual NOx emissions



Date at which 35 exceedences reached...



- During Area C operation 7:30-19:30 traffic emissions reduced
 - PM₁₀ exhaust 19%, total PM₁₀ 18%, NOx 10%, CO₂ 22%

Other impacts

- Traffic flows have remained fairly constant
 - Exception is the Milan Ecopass
- Little negative business impacts reported
 - Many forecast, including job losses
 - DE & NL have 'hardship' exemptions, few been taken
- Gothenburg haulier & supplier LEZ survey found positive
 - 21% very good 'overall rating', 28% fairly good, only 20% negative
- LEZs do cost both to run and comply with
 - Again, exemption is Milan Ecopass in terms of running cost
- Health and financial benefits
 - Copenhagen's 1st phase estimated to reduce 90 premature deaths and save the community 80m DKK.
 - 2nd phase estimated to reduce 150 deaths, 150 relevant hospital admissions, 750 bronchitis attacks, 8,000 asthma attacks & 90,000 days of restricted activity

NO₂-focused LEZs being considered

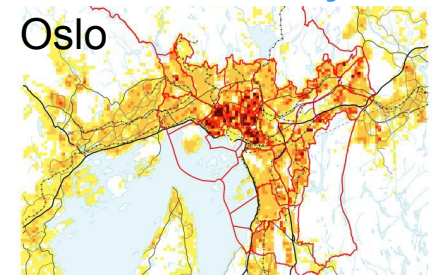
• Norway

- Considering charge-based for pre-Euro VI vehicles
- For Oslo, Trondheim & Bergen
- Camera and transponder enforced, building on motorway tolls and studded tyre charges



• UK

- To tighten London & for many cities outside London
- Many feasibility studies; realistically national lead needed
- NOx retrofitting to be included if possible
 - To make it cheaper
 - To enable tighter standards earlier
 - To achieve urban emissions reduction



NOx retrofit certification

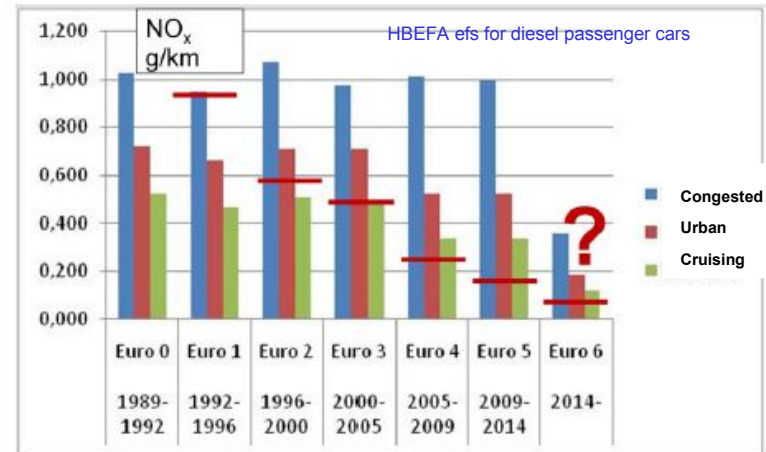
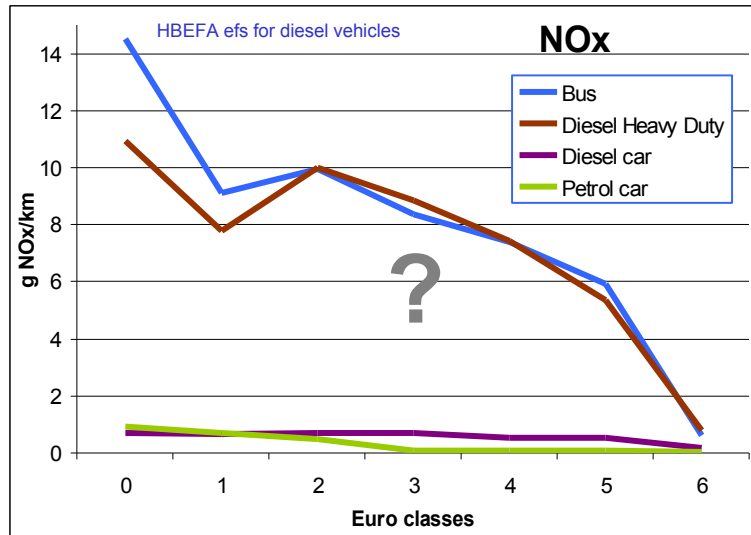
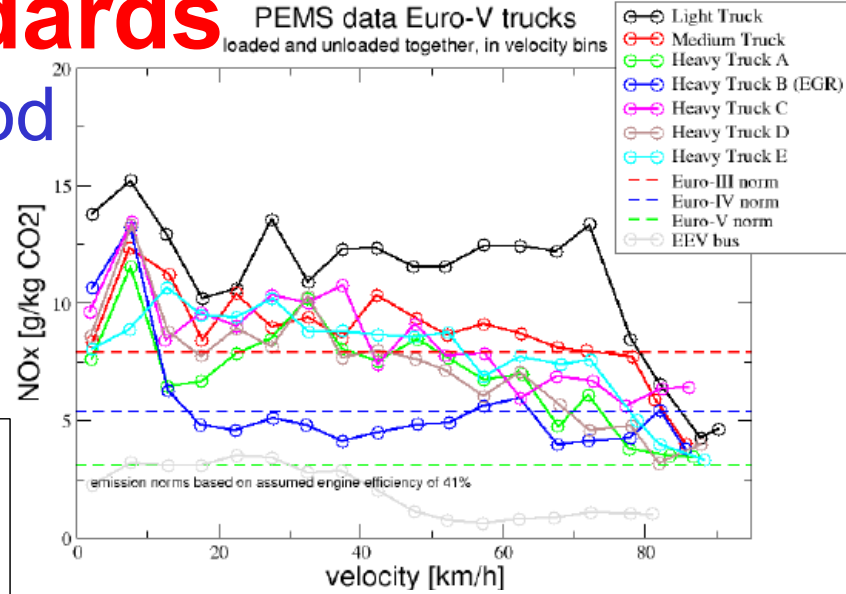
- UNECE
 - PM & NOx retrofitting certification
 - Timescales ~ end 2014
- VERT
 - First system certified, at least 2 more to come this year
 - Not valid for LEZs (EU law)
- UK
 - Being considered and discussed
 - May well be overtaken by UNECE certification
- Certifications to ensure reductions, especially in urban areas

Vehicles issues, esp. for NO₂

- Urban emissions
 - Emissions of newer Euro vehicles are significantly higher than the Euro standards, especially in urban areas
- Increased primary NO₂ emissions
 - Modern diesel vehicles and some retrofit DPFs
 - Most places where NO₂ limit values exceeded, NO₂ is O₃-limited
 - Emissions of NO₂ translate directly into higher NO₂ concentrations, NO often 'waits' for enough O₃ to become NO₂
- These issues
 - Have reduced the impact from that expected
 - Valid for any measure that encourages newer vehicles
 - Impact still positive, but less than it should have been

Euro standards

PEMS data Euro-V trucks loaded and unloaded together, in velocity bins



- Euro 5 in particular not as good as planned in urban areas.
- Some vehicles better than others

Testing of vehicles so far indicates that Euro VI should do what hoped.....

Primary NO₂ from diesel vehicles

Until Euro 3,

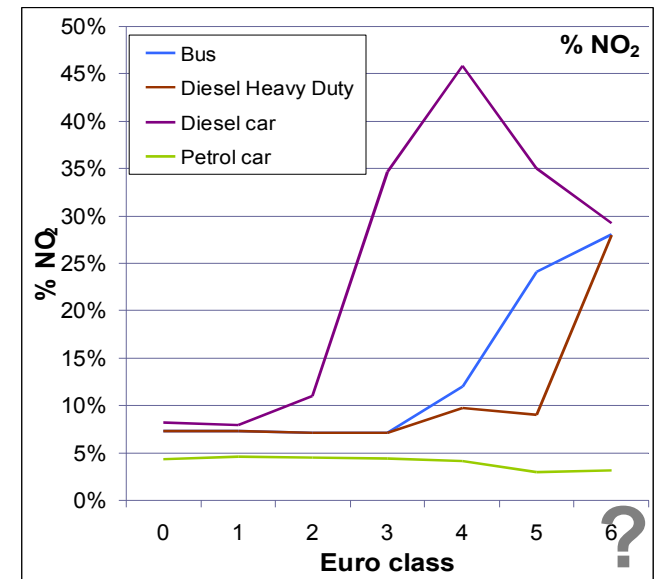
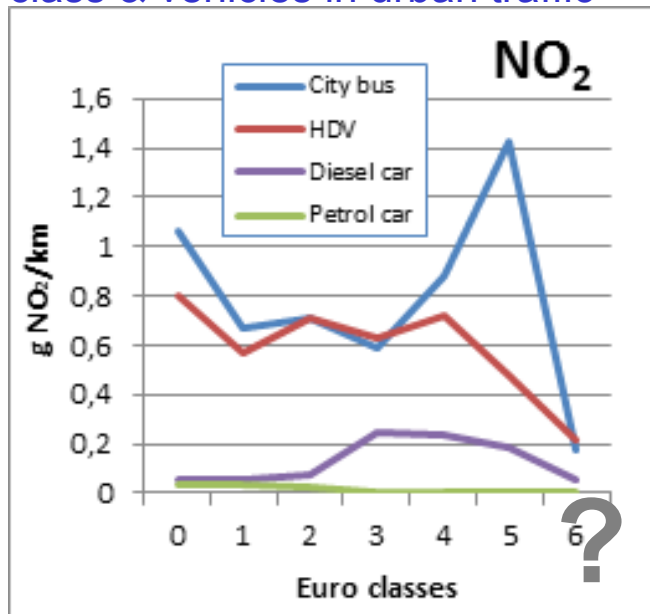
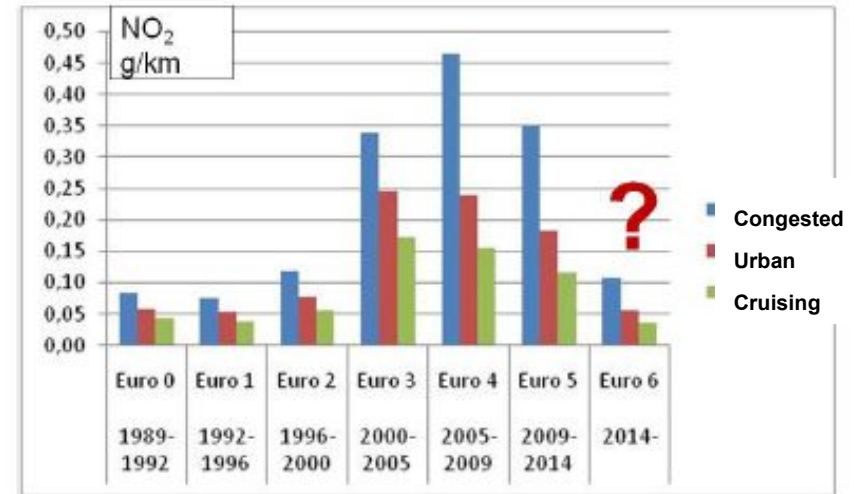
NO₂ was ~7% for diesel vehicles

Since Euro 3

Up to 25% for buses, 45% for cars

NO₂ emissions from different Euro class & vehicles in urban traffic

NO₂ emissions from diesel cars



Euro 6 should have much lower NO₂

Thoughts on Swedish LEZs ...

- Their impacts, needs, air quality in Sweden etc
 - Not given here
- Swedish were the first LEZs
 - Standards now Euro 3-4
- Many current LEZs Euro 4 or Euro 4(PM)
 - one bus LEZ Euro 5 for 1.1.14

First year of registration, regardless of country	According to the general rule	Euro 2 (MK 3)	Euro 3 (MK 2000)	Euro 4 (MK 2005)	Euro 5 + EEV (MK 2008)
2002	2008	2010	2010		
2003	2009		2011		
2004	2010		2012	2016	
2005	2011		2013	2016	2020
2006	2012		2014	2016	2020
2007	2013		2015	2016	2020
2008	2014			2016	2020
2009	2015			2016	2020
2010	2016			2016	2020
2011	2017				2020
2012	2018				2020
2013	2019				2020
2014	2020				2020

Why are LEZs implemented?

- When air quality standards / EU Limit Values are not met
- When they can be effective in reducing emissions and improving air quality
- When other actions are not enough
- Should be both effective and proportional

Do Swedish LEZs do the job needed?

- If yes – great.
- If no – look at a few options

Some options for tightened Swedish LEZs

- Ensure 100% enforcement of current LEZs
- Extend the area
- Cover more vehicles
- Follow progression of 6 or 8 years with Euro VI
 - Any impact would take significant time
- Tighten to ban Euro 3 & 4 earlier than planned
 - Need to give enough notice to vehicle operators
- **However for NO_x, Euro VI *should* be more effective, Euro V not as effective**
- **Go to Euro VI LEZ standard when this becomes feasible**
 - Allowing retrofit could make this feasible earlier than without retrofit
- Tighter LEZ in a central area
- Emissions-related Congestion Charge
 - Especially in Stockholm CC already exists
 - Motorway tolls could also help clean general fleet

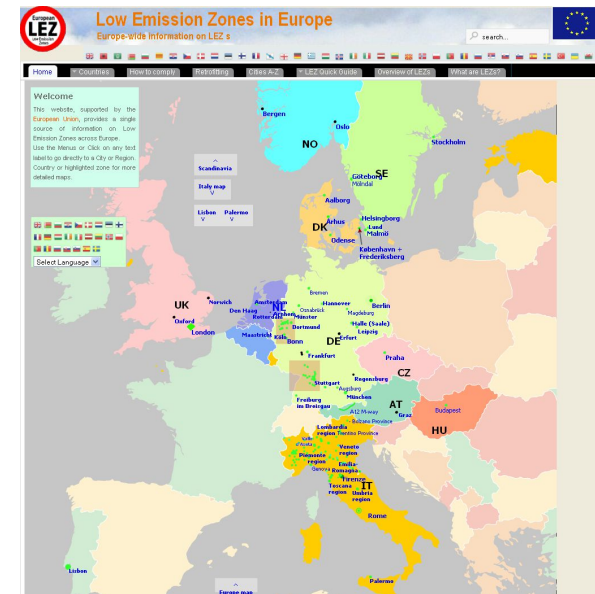
Focused on NO₂ concentrations

- Most action will also help reduce diesel PM
- Diesel PM understood to be the most dangerous
- There is no 'safe limit' for PM₁₀, PM_{2.5}, diesel PM
- PM reductions beyond Limit Values will be health & cost effective

Thank you for your attention

And thank you again for understanding English!

- More information on existing LEZs:
See www.lowemissionzones.eu,
for single source of information



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