

VEHICLES EMISSIONS POLLUTANT CONTROL IN BEIJING

Beijing EPB Likunsheng

NOV 2008

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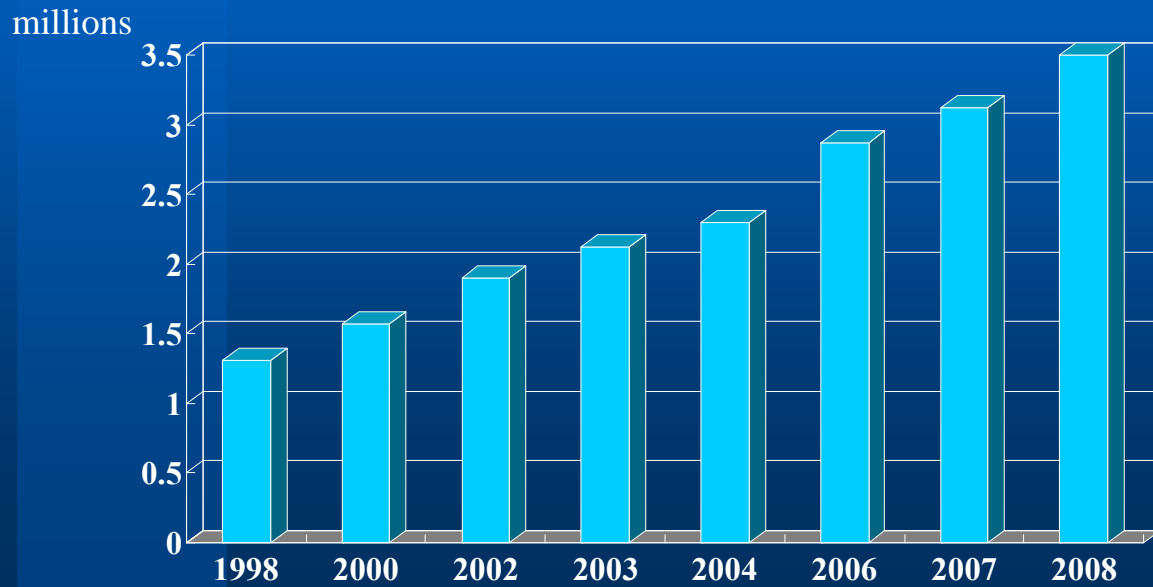
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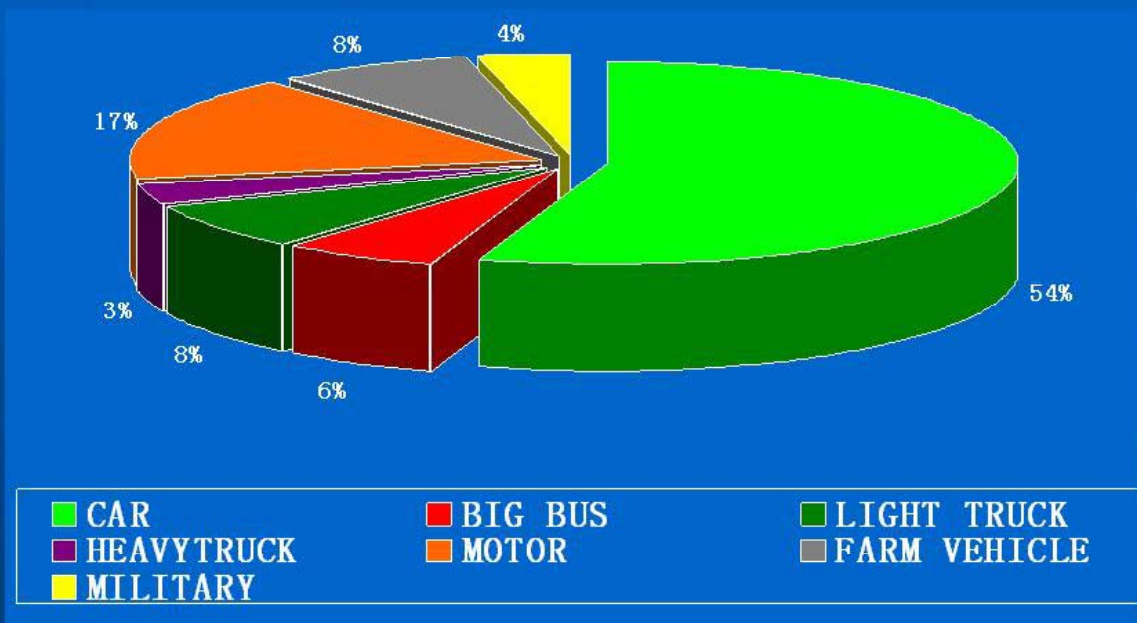
1、 Basic circumstances

Vehicles population in Beijing

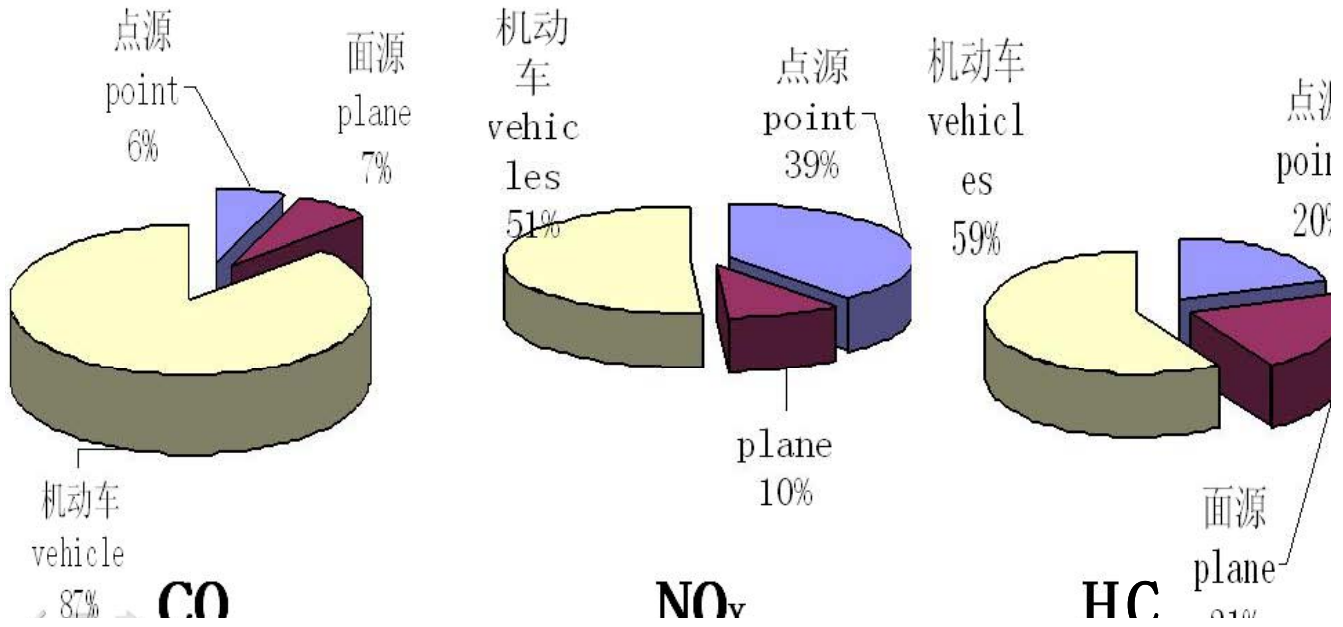


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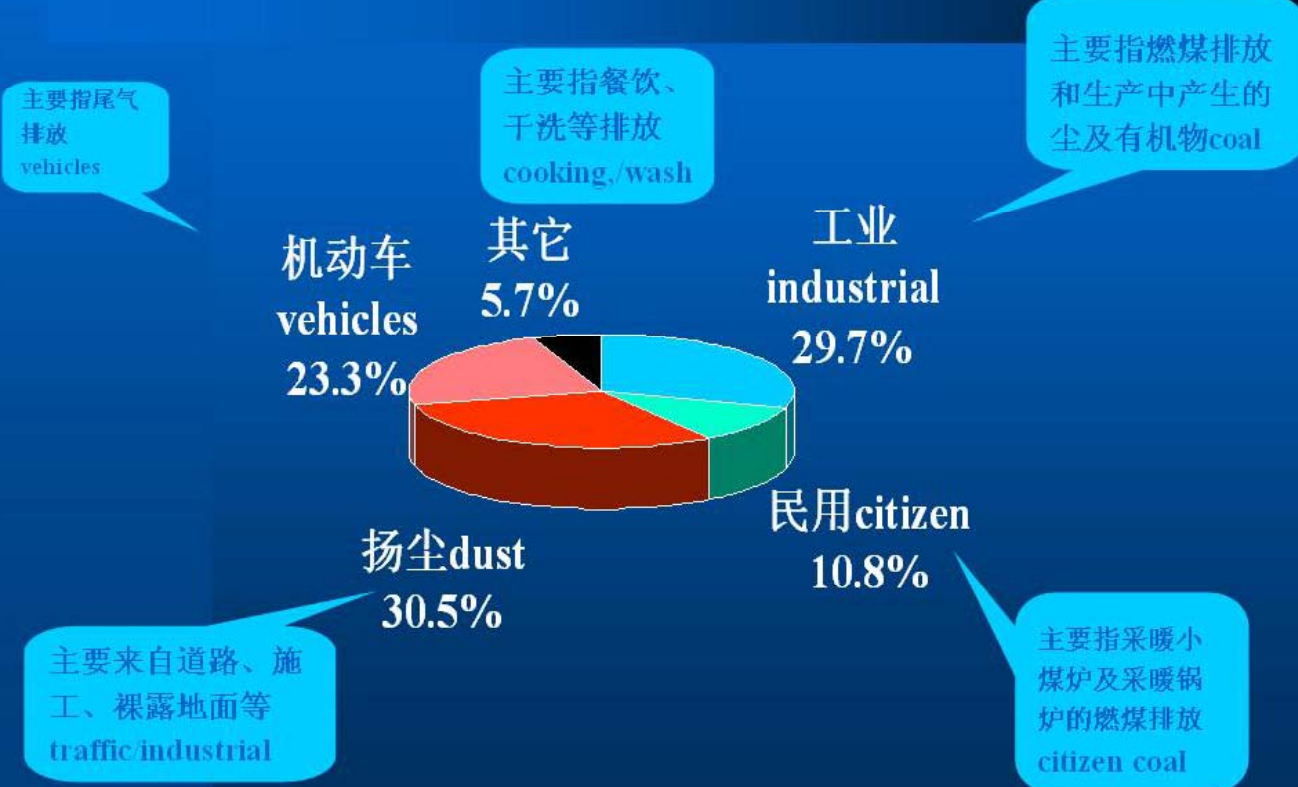
The compose of Beijing vehicles 3.4 million in 2008



vehicles emission CO NO_x HC concentration in Beijing in 2005



Concentration Ratio of Vary pollutant resources PM in Beijing



2、 Review of the vehicles emission control in Beijing

- Make general principals and setup system of standards
- Implement stricter vehicle emission than national step and setup environmental protection sticker system
- Stringent control vehicles in use emission
- Stringent monitory the quality of the fuel and promote quality of fuel gradually
- Speed up retirement of old vehicles

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24 local standards of vehicle emission

- Emission standard for exhaust pollutants from light-duty vehicles
- Emission standard for exhaust pollutants from gasoline engines of vehicles
- Emission standard for exhaust pollutants from diesel engines of vehicles
- Emission standard for exhaust pollutants from gasoline vehicle under steady-state loaded mode

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- Exhaust smoke standard for diesel vehicle under lug-down test
- Emission standard for smoke at full load from diesel engine of vehicle
- Exhaust smoke standard for farm vehicle under lug-down test
- Emission standard for smoke at free acceleration from vehicles with diesel engines
- Emission standard for smoke at free acceleration from farm vehicles and tracker with diesel engines
- Emission standard for exhaust emissions from motorcycles and mopeds

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- Emission standard for pollutants at double idle speed from vehicle with petrol engine
- Emission standard for exhaust pollutants from light-duty gasoline vehicle under short transient driving cycle
- Limits and measurement method for exhaust pollution from vehicle equipped with ignition engines by remote sensing
- Emission standard for exhaust pollutants from motor vehicle under steady-state loaded mode
- Limits and measurement methods for Exhaust Visible Pollutants from non-road Diesel Engines

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- Limits and measurement methods for exhaust pollutants from non-road diesel engines
- Petrol fuels for motor vehicle use
- Diesel fuels for motor vehicle use
- Emission control and limits for oil-gas from gas station
- Emission control and measurement standard for oil-gas from gas station
- Emission control and limits for oil-gas fuel depot
- Aqueous urea solution for motor vehicle

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New vehicles emission management

To implement strict standards gradually before national standard schedule two years every time in Beijing

- Euro 1 in 1999
- Euro 2 in 2002
- Euro 3 in 2005
- Euro 4 in 2008



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New vehicles emission management



- Make catalogue management for sale new vehicles
- Check new vehicle for apply the plate by EPB man
- Inspect conformity of production in market

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Improve the fuel quality

- Used unlead gasoline in 1997
- Implement national gasoline standard in 2000 firstly
- Implement euro2 local fuel standards in 2004
- Implement euro3 local fuel standards in 2005
- Implement euro4 local fuel standards in 2008
- Detergent need to add gasoline since 1999

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Control emission of vehicles in use



Set up environmental protection stickers system
Green stickers and yellow stickers



Regular test for vehicles in use by ASM or LUGDOWN way in 43 test stations



heavy duty diesel vehicle lug-down testing



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Inspect on roadside



Remove plate



Smoking

- 20 teams inspect in roadside with policeman in city
- Focus on heavy duty vehicles and buses
- Inspect unlocal vehicles

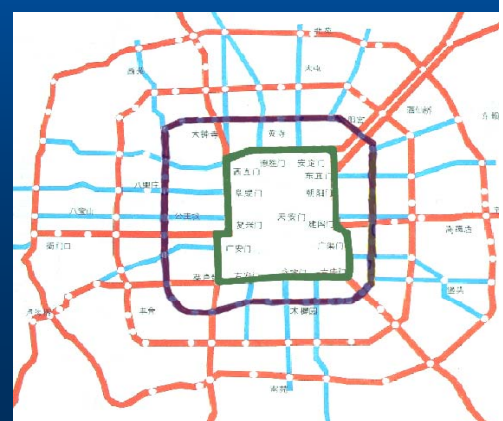
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To inspect on roadside by using remote sensing technology
To dispatch one remote sensing vehicle to every districts or countys



Limit to drive high pollution vehicle begin 2003

- one high pollution car equal to 14 euro3 car
- retire or transfer out of Beijing or retrofit 100 thousand vehicles
- mean to 600 thousand new vehicle emission
- NO_x pollution stop increase in 2003





CNG buses



retrofit car

Control vehicles in use---retrofit

- Retirement 30000 small taxis in 2004
- 4000 CNG buses and 6000 LPG taxis
- Retrofitted 250000 carburetor cars in 2000
- Replaces 5000 buses and 8000 taxis with new euro 3 in 2005-2006
- Using CNG engine and Euro 3 diesel engine in bus
- Replaced taxi must meet Euro 3 and no diesel taxi car



CNG station

- More than 7000 heavy diesel vehicles were retrofitted with DPF



Develop public transit system

- 20,000 buses in Beijing, more than 97% euro 3 or 4 buses
- By buses up to 35%
- Set up only for buses used road 165km



BRT buses used in Beijing

- Set up the first BRT buses line in 2005
- The length of the road is 16km, which is from Qianman to Demao



Developing subway

- The length of urban railway is 200 kilometers
- Include 8 lines



vapor recovery control

We have controlled vapor emission, from more than 37 fuel depots, 1400 fuel stations and 1243 of tank trucks. The retrofitted program is completed before Olympic games.



Stringent control vehicles emission during Beijing Olympic Games

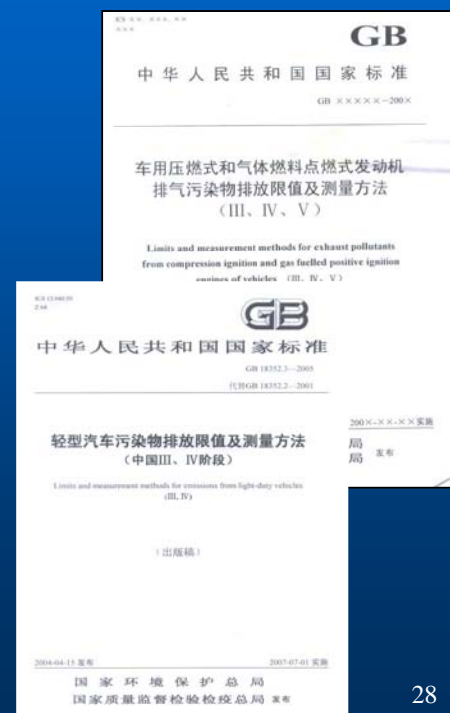
- Forbidden vehicle with yellow stickers to run from Jul. 1st to Sep. 20th 2008
- Even and odd number of vehicle plate to run from Jul 20th to Sep 20th 2008
- euro 2 Gasoline vehicles and euro3 diesel vehicles from other provinces are allowed go into Beijing and even and odd number.

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3、Implement euro4 vehicle emission standard in Beijing

SEPA has published the euro3&4 standard on 2005:

- July of 2008 implement euro3
- July of 2011 implement euro4



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Prepare works

- Issue information in advance. We had declared that euro 4 standard would be carried out 2008 in Beijing on some important official papers and newspapers in 2004.
- There were more than 100 types of light duty vehicles meet euro 4 in market; Main engine manufactory has already developed out the heavy duty diesel engine meet the euro 4 in 2007.

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- Make local fuel standards for euro 4. Beijing EPB set up a working group, include: Tsing Hua University、CATRC、Sino-pec、Petrol China. Besides, domestic and overseas automobile manufactories has participated in group. set up 4 tasks:
 - first: make the gasoline and diesel fuel standard for euro 4
 - second: to study the relationship between composed and emission of gasoline for euro 4
 - third : to study the relationship between composed and emission of diesel fuel for euro 4
 - fourth: to study technologic and economic analyze the fuel for being produced and used

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The group organized one vehicle fleet include : 11 gasoline vehicles 2 from Hyundai, 2 from Honda, 5 from Nissan , 2 from BMW and 6 diesel vehicles 2 from Vokswagon ,2 from BMW, 2 from Benz had 100,000 kilometers of durability test , 3 diesel engines from Cummins and Yuchai have 1000 hours test, to test and verify the key items value of the local standards that experts group suggested in 2005-2006.

To compare Petrol fuel standards

	项目 item	2004北京 Beijing	2005北京 Beijing	2007国标 National standard	1998 Euro	2000 Euro	2008北京 Beijing	2005 Euro
1	硫 sulfur ≤	500ppm	150ppm	500ppm	500ppm	150ppm	50ppm	50ppm
2	烯烃 olefens ≤	30%	18%	35%		18%	25%	18%
3	芳烃 aromatics ≤	40%	42%	40%		42%	35%	42%
4	烯烃+芳烃 olefins+ aromatic ≤		60%				60%	
5	苯 benzene ≤	2.5%	1.0%	2.5%	5%	1.0%	1.0%	1.0%
6	MMT ≤	-	-	18mg/l 16mg/l	-	-	6mg/l	-

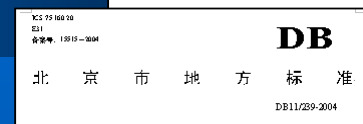
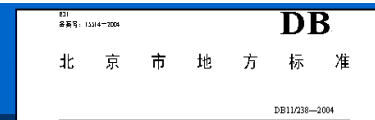
To compare Diesel fuel

序号	项目 Item	北京2008 Beijing	北京2005 Beijing	国家 标准 nation	欧洲 1998 Euro	欧洲 1999 Euro	世界燃油 规范II World	世界燃油 规范III World
1	S ≤	50ppm	350ppm	500 ppm/ 2000 ppm	500 ppm	350 ppm	300 ppm	30 ppm
2	Cetan ≥	51 (5#0#-10#)	51 (5#0#-10#)	45/49	49	51	53	55
		49 (-20#)	49 (-20#)					
		47 (-35#)	47 (-35#)					
3	aromati cs ≤	11	11			11	5	2
4	T95° C ≤	365	365		370	360	355	340
5	Densi ty kg/m ³	820-845 (5#0#-10#)	820-845 (5#0#-10#)		820- 860	820- 845	820-850	820- 840
		800-840 (-20#-35#)	800-840 (-20#-35#)					

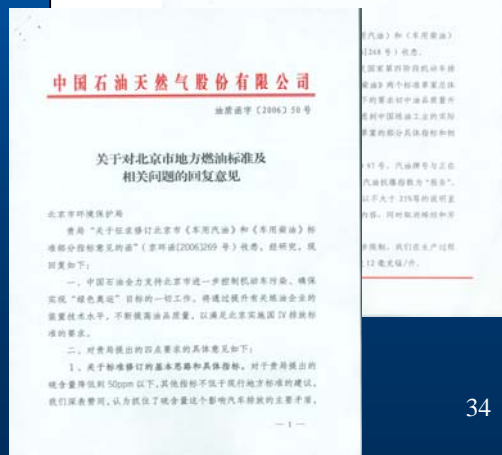
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On July 9, 2007 the euro 4 gasoline and diesel fuel local standards had been published and would implement on January 1, 2008.

Petro China and Sino-Pec promised to supply the fuel and demand high quality high price. They calculated each liter will increase 0.32 yuan. To support Beijing Olympic two Corps sold the euro 4 fuel according to euro 3 price until October 7, 2008 euro 4 fuel price increased 0.17 yuan/liter on gasoline and 0.26 yuan/liter on diesel fuel.



车用柴油
Diesel fuel for motor vehicles

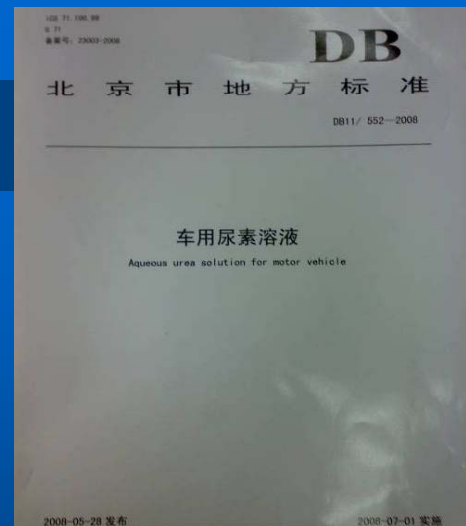


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- research heavy diesel engine OBD manages problem

GB17691-2005 《Limits and measurement methods for exhaust pollutants from compression ignition and gas fuelled positive ignition engines of vehicles(III、IV、V)》 regulate that the new model should install OBD for euro4 ,but have no detail. therefore, we organized CATARC and experts to make OBD checking method and testing rules.

- We had made and published “Aqueous urea solution for motor vehicle ” local standard on May , 2008 and would implement on July 1 , 2008 .
- Begin to build adblue injects stations.

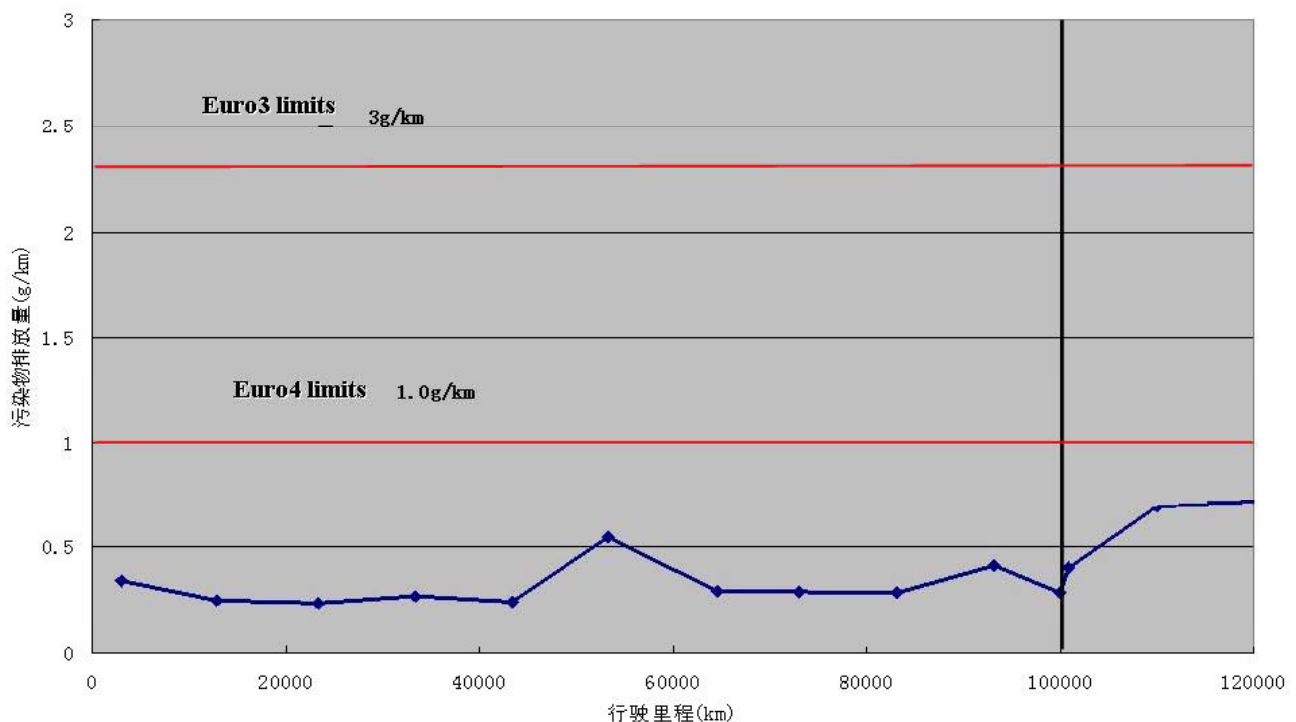


Euro 4 vehicles use euro 2 fuel problem

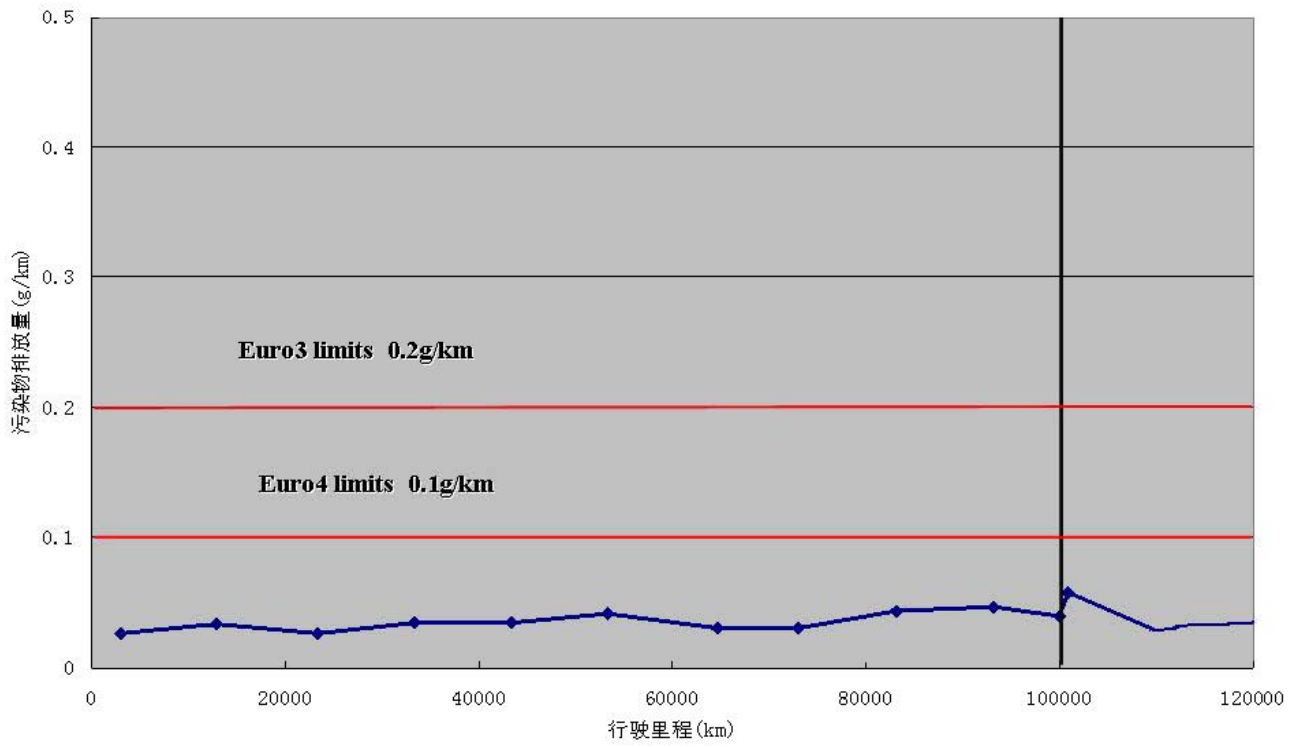
- To verify the vehicle go out of Beijing problem , namely euro 4 vehicles using euro 2 fuel we used 6 vehicles to test.
- The result show that emission system of euro 4 vehicles that using the euro2 gasoline are affected little and emission increase a little after running about 20,000 kilometers.
- To use the euro4 gasoline again, the emission will returns to normal.
- But if the vehicles for long time or long distance using the euro2 gasoline will damage the emission system.

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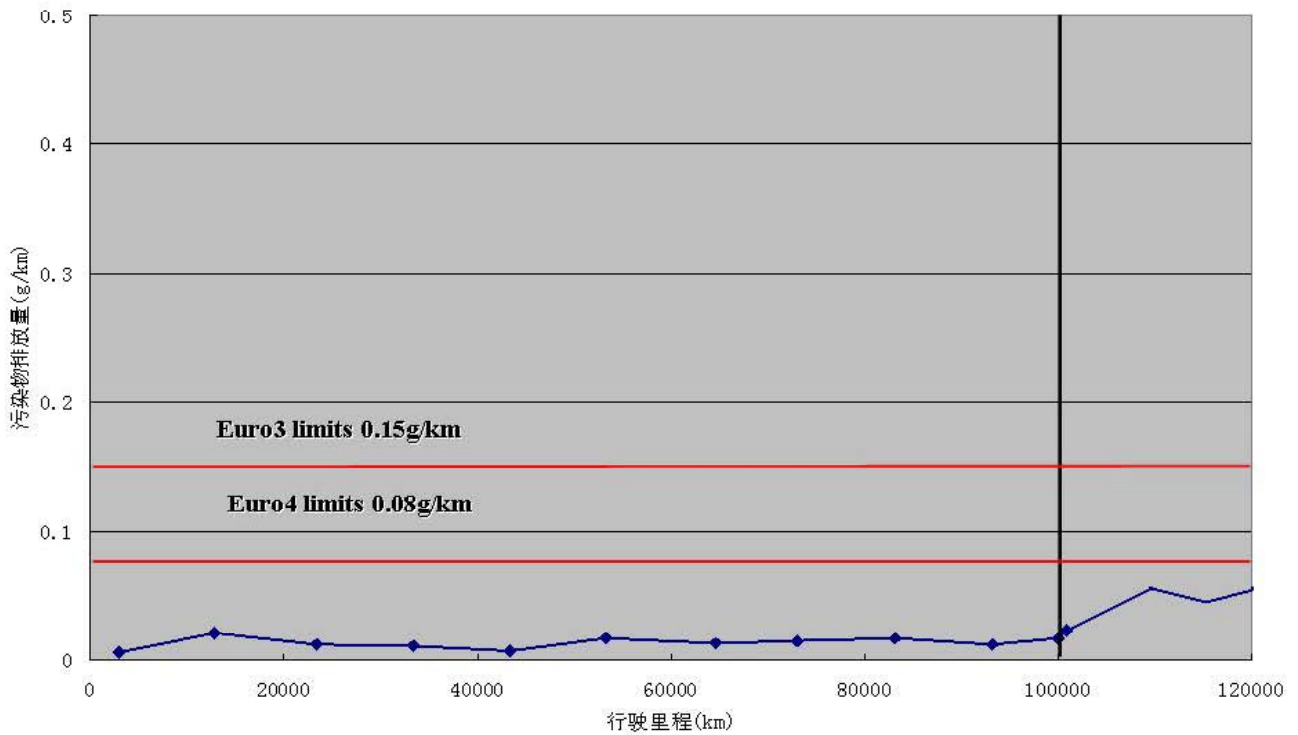
CO emission



THC emission



NOX emission



● We have built laboratory to test euro 3&4 vehicles by June of 2008.



● Communicate with national ministries and commissions and manufactory broadly

We have communicated and negotiate with NDRC、MEPC、Petro China、Sino-pec and automobile manufactories, having exchanged idea. Every department and manufactory express, support implement euro 4 standard in 2008.



Approve euro4 standard

- State Council approve that Beijing implement euro 4 in February .
- Beijing EPB with other relative department issued “the announcement about that Beijing implement euro 4 vehicles pollutant emission standards ” in February 14.
- Light duty vehicles implement 《Limits and measurement methods for emission for light duty vehicles (III IV)》 (GB18352.3-2005) about euro 4 standard from March 1 , 2008. Don't allow to sell and register inconformity the standard.



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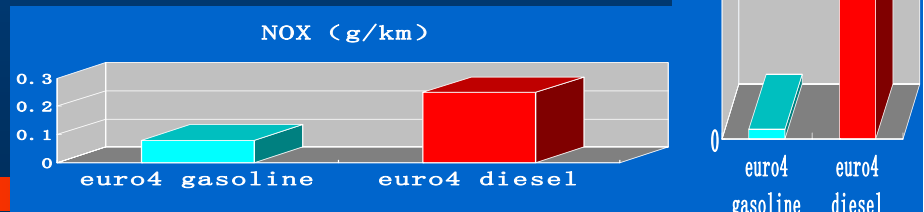
- Beijing EPB required buses、 vehicles for environmental sanitation and for postal service to implement GB17691-2005 《Limits and measurement methods for exhaust pollutants from compression ignition and gas fuelled positive ignition engines of vehicles(Ⅲ、Ⅳ、Ⅴ)》 euro 4 standard which installed the OBD system to control NO_x emission from July 1 2008.
- Other kinds of heavy duty diesel vehicles still carrying out the euro3 standard.

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About light duty diesel vehicle problem

light duty diesel vehicle don't allow to register in Beijing

- Fuel quality can't meet euro 4 standard out of Beijing
- The PM pollution is the biggest problem in Beijing
- Light duty diesel vehicle can be replaced by light duty gasoline vehicle completely
- PM and NOx limits of light duty diesel vehicle in standards are higher than gasoline vehicle's before euro 6



Implement work

- We have a news conference that announced to main medium about implementing new standard on February 15.
- We have conference that inform to more than 80 automobile manufactories about implementing euro4 standard on February 16 ,
- We check OBD of euro 4 vehicles in test stations.
- Manufactories have applied the 880 kinds of light gasoline vehicles and we make catalogue management for sale new vehicles
- The euro 4 standard about COP and in using conformability are required.
- We plan check COP and in using conformability to euro 4 vehicles at the end of this year.

Other city's plan in China

- For implement the euro 4 standard, cities such as Shanghai , Guangzhou , Shenzhen have come Beijing to study our experience.
- They plans to implement euro 4 in 2009
- The key problem they are being confronted with is that the euro 4 fuel supplies.
- Petro China and SinoPec have to promise supplying the fuel and demand high quality high price

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4、 The ideas of vehicle emission control in further

The goal

With growing vehicle population in Beijing the emission control face a bigger challenge. We must cut total emission sharply by stricter measures. Finally to meet national air quality standards and people demand.

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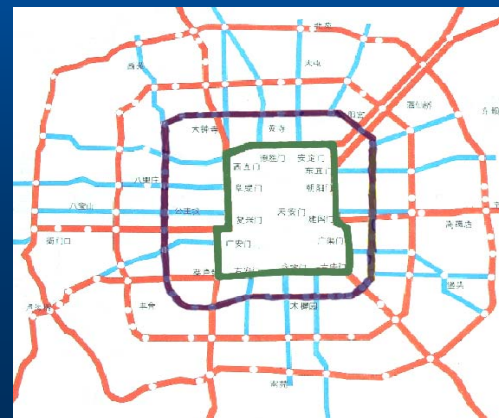
Strict new vehicle emission and fuel standard

- plan implement euro 5 standard in 2012
- Sulfur in fuel will descend to 10PPM as soon as possible
- continue to pay attention to MMT problem
- Encourage developing and using hybrid vehicle in buses and taxis and electric vehicles
- Maybe we will limit register number of vehicles in the next few years for control the total vehicle population.

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Retirement yellow sticker vehicles

- Limit to go into ring 5th from Jan 1st 2009
- Limit to go into ring 6th from Oct 1st 2009
- Make the economic policy



vehicle in use management and improve I/M program

- Check smoke on roadside and implement the remote sensing standard
- Strictly administrate to test stations, Monitor control to test stations with internet for digital and video
- Seriously punish the illegal test in test stations
- improve system of marks for vehicles
- Set up two grades management : city and district
- Increase 800 staffs to inspect the vehicle emission



Thanks for your attention!