



环境保护部机动车排污监控中心

Vehicle Emission Control Center
Ministry of Environmental Protection

Challenges and Countermeasures of Mobile Source Pollution Control in China

Ding Yan

Vehicle Emission Control Center of MEP
September 19, 2014 Beijing



Main Content

- Progress and challenge of on-road vehicle pollution control
- New challenges from non-road mobile source
- Countermeasures and suggestions



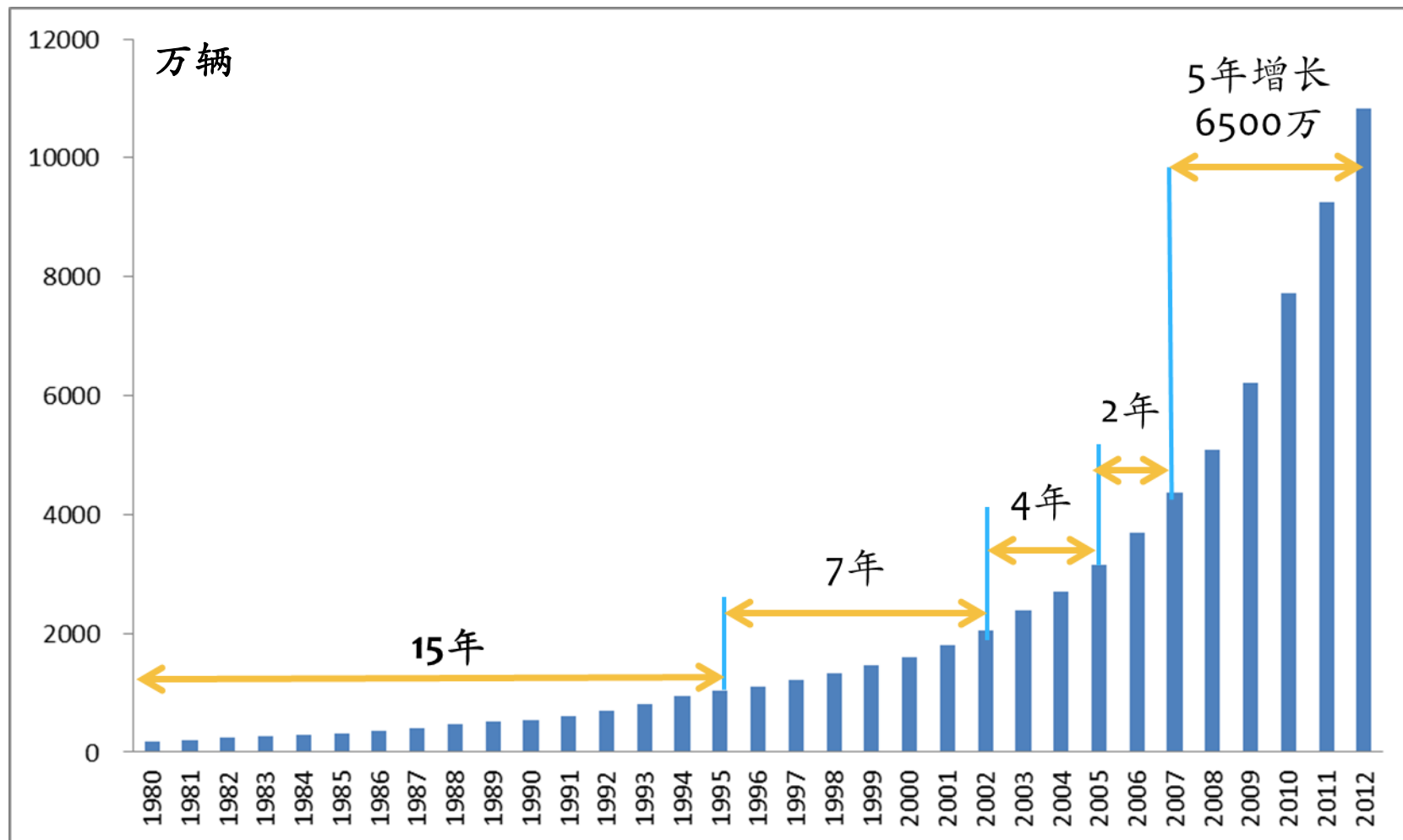
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Progress and challenge of on-road vehicle pollution control

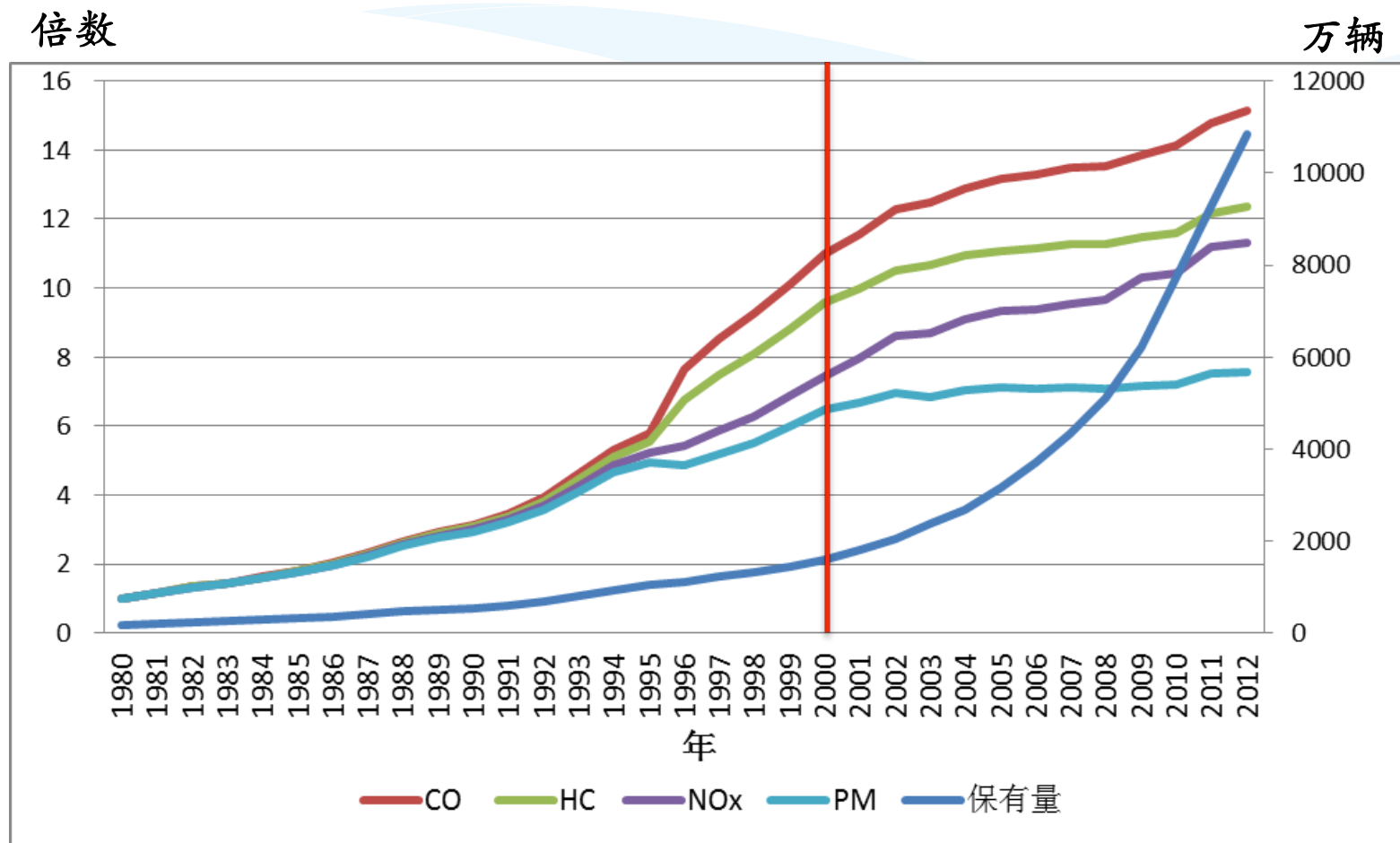


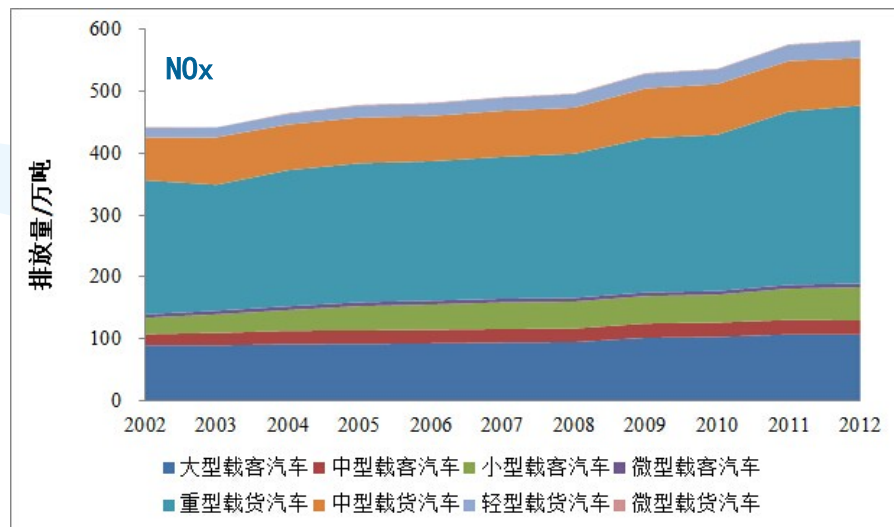
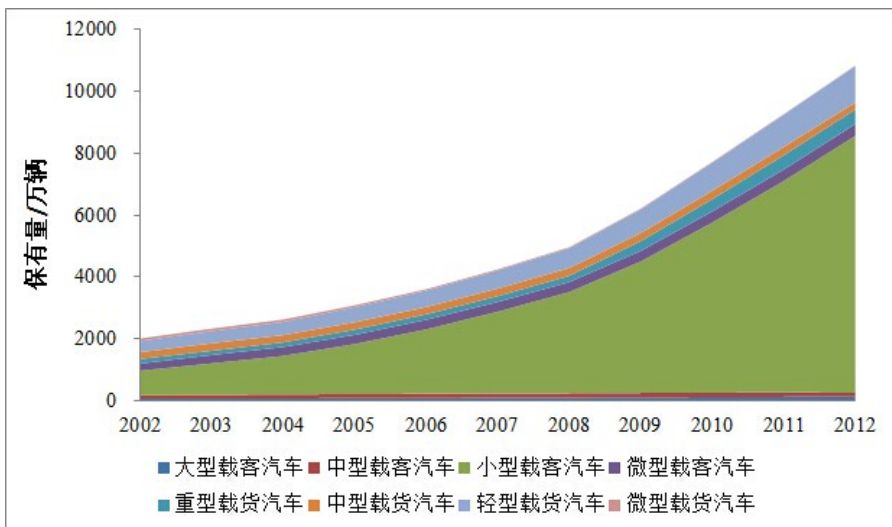
Vehicle population grows rapidly





Total vehicle pollution emissions have been preliminarily brought under control

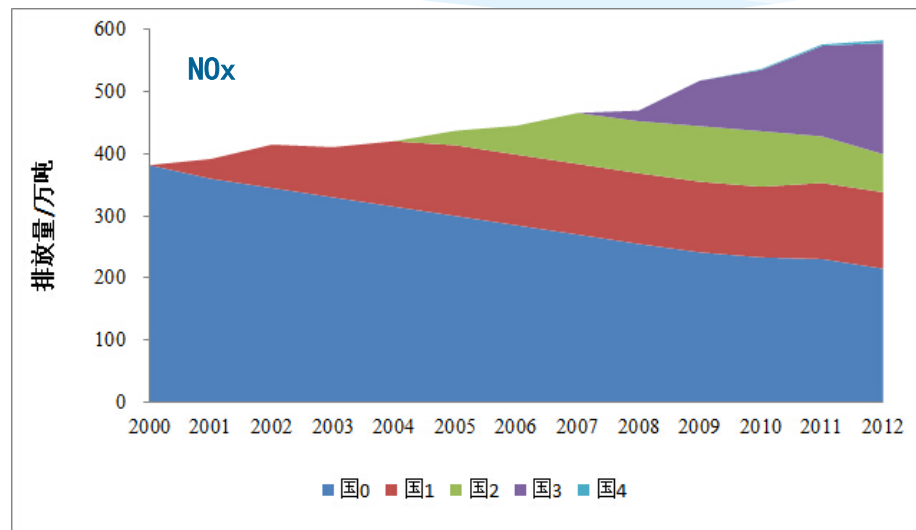
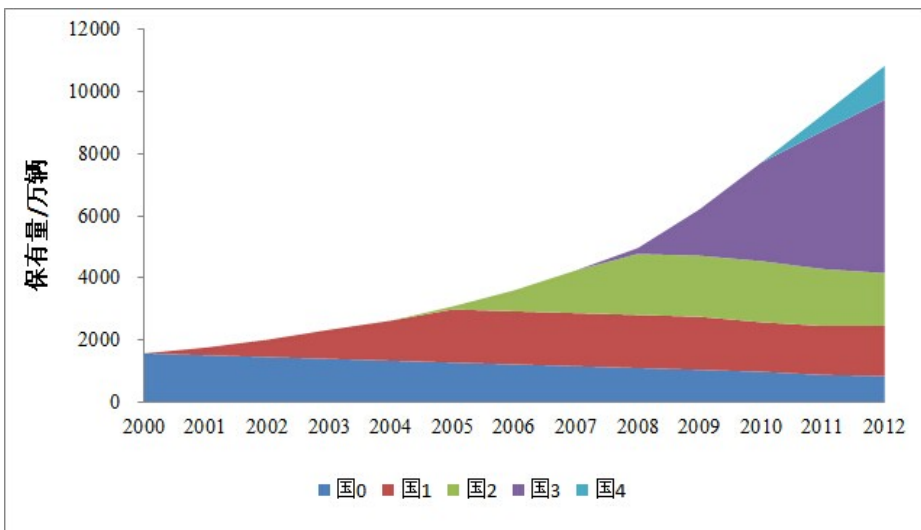




Freight vehicle is No.1 contributor of NOx emission



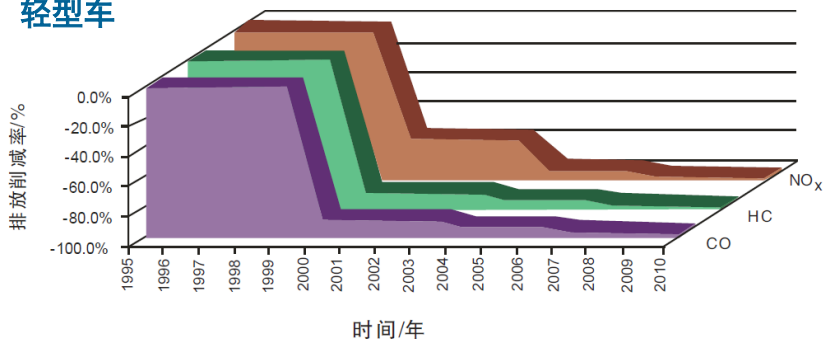
Pre-Euro vehicle is the biggest contributor of NOx emission





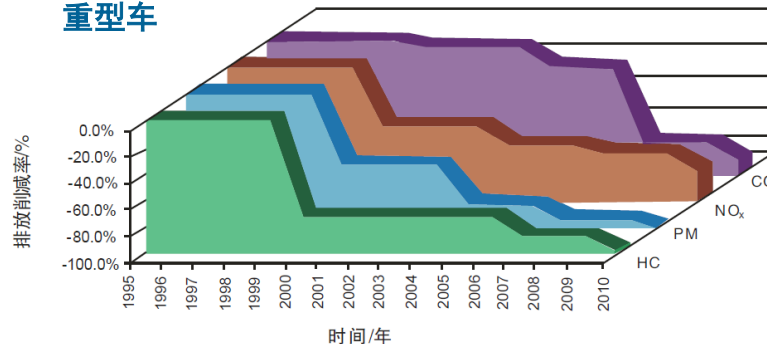
Establishing and enforcing stringent emission standards

轻型车



■ CO ■ HC ■ NO_x

重型车

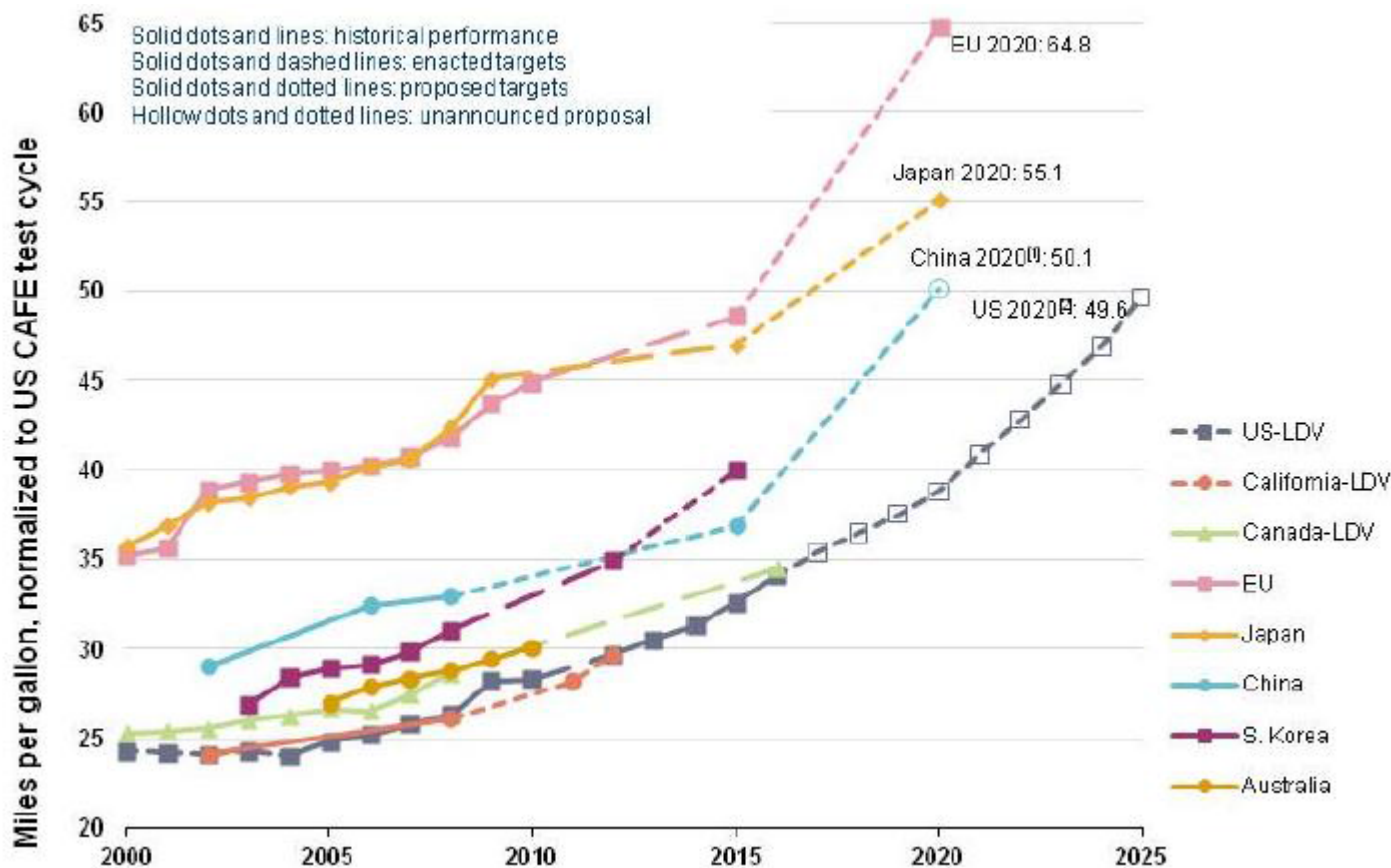


■ HC ■ PM ■ NO_x ■ CO

| 车型 \ 年份 | | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|---------|----------|-------|------|-------|------|-------|-------|------|
| | | 轻型汽车 | 压燃式 | 国 II | | 国 III | | |
| 轻型汽车 | 点燃式 | 国 II | | 国 III | | | 国 IV | |
| 轻型汽车 | 气体点燃式 | 国 II | | 国 III | | | 国 IV | |
| 重型汽车 | 压燃式 | 国 II | | 国 III | | | | |
| 重型汽车 | 点燃式 | 国 II | | | | 国 III | | |
| 重型汽车 | 气体点燃式 | 国 II | | 国 III | | 国 IV | | |
| 摩托车 | 两轮和轻便摩托车 | 国 II | | | | 国 III | | |
| 摩托车 | 三轮摩托车 | 国 II | | | | | 国 III | |
| 低速汽车 | | 无控制要求 | 国 I | 国 II | | | | |
| 非道路 | 柴油机 | 无控制要求 | | | 国 I | | 国 II | |
| 移动机械 | 小型点燃式发动机 | 无控制要求 | | | | | 国 I | |



Establishing and enforcing stringent fuel consumption standards





Promoting vehicle-use fuel Cleaning progress

Sulfur content of gasoline

| | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | |
|----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--|
| 全国 | 1500 | 1000 | | 800 | | 500 | | | 150 | | 50 | | | 10 | | | | | | 10 | |
| 北京 | 1500 | 800 | | 500 | | 150 | | | 50 | | 10 | | | | | | | | | | |
| 上海 | 1500 | 800 | | 500 | | | 50 | | 10 | | | | | | | | | | | | |
| 广州 | 1500 | 800 | | 500 | | | 150 | | 50 | | 10 | | | | | | | | | | |
| 欧洲 | 500 | 150 | | | 50 | | 10 | | | | | | | | | | | | | | |

Sulfur content of diesel

| | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | | | |
|----|-----------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--|--|--|
| 全国 | 2000/5000/10000 | | | 2000 | | | 350 | | 50 | | | 10 | | | | | | | | 10 | | | |
| 北京 | 2000/5000/10000 | | | 2000 | | 500 | | 350 | | 50 | | 10 | | | | | | | | | | | |
| 上海 | 2000/5000/10000 | | | 2000 | | | 500 | | 350 | | 50 | | 10 | | | | | | | | | | |
| 广州 | 2000/5000/10000 | | | 2000 | | 500 | | 350 | | 50 | | 10 | | | | | | | | | | | |
| 欧洲 | 500 | 350 | | | 50 | | 10 | | | | | | | | | | | | | | | | |

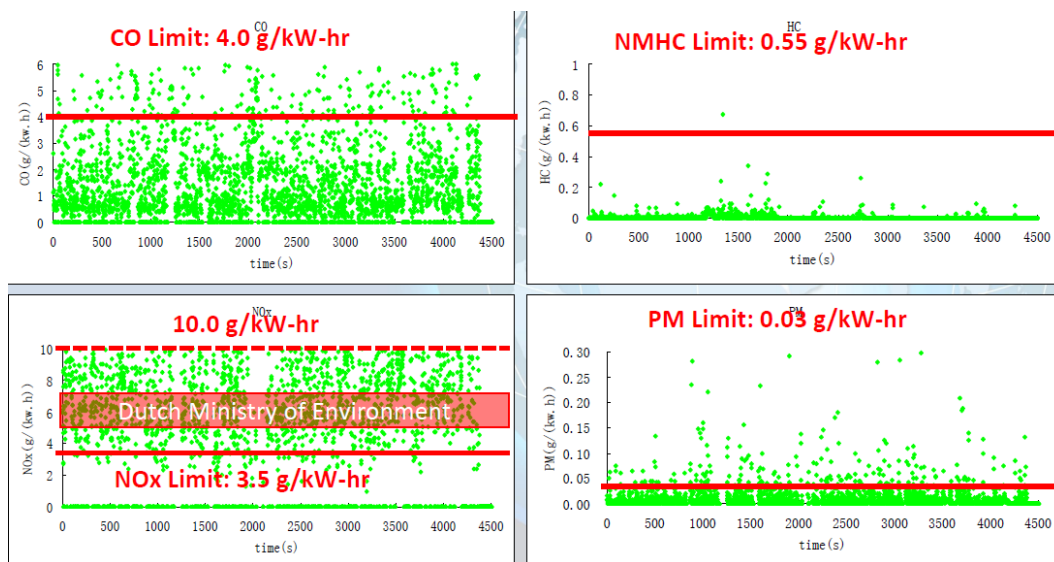


Main challenges we face

- Compliance supervision hasn't been put in place
- Control measure on VOC emission from gasoline vehicles is lagged
- Attention on pollution from alternative fuel is not enough



Challenges from Compliance



Source: Beijing Institute of Technology

表一：同一车型中美官方综合油耗对比

| 车型 | EPA 油耗 | 中国官方油耗 | 差幅 |
|---------------------------|----------|--------|-------|
| 2013 款奥迪 A6 2.0T | 28(8.4) | 6.9 | 17.8% |
| 2013 款奥迪 A4 2.0T | 26(9.1) | 6.6 | 27% |
| 2013 款奥迪 Q5 Hybrid | 26(9.1) | 7.4 | 18.1% |
| 2013 款奥迪 Q5 2.0T | 23(10.2) | 9 | 12% |
| 2014 款奥迪 Q7 3.0 | 18(13.1) | 10.7 | 18.3% |
| 2013 款宝马 320i | 28(8.4) | 6.9 | 17.8% |
| 2014 款宝马 528i | 27(8.7) | 7.9 | 9.2% |
| 2013 款宝马 X1 xDrive28i | 26(9.1) | 7.6 | 16% |
| 2013 款宝马 X3 xDrive28i | 24(9.8) | 7.9 | 19.3% |
| 2013 款宝马 X5 xDrive35i | 19(12.4) | 11.7 | 5.4% |
| 2013 款奔驰 ML350 4matic 3.5 | 20(11.8) | 8.8 | 25.1% |
| 2013 款奔驰 R350 4matic 3.5 | 18(13.1) | 11.7 | 10.4% |
| 2013 款雷克萨斯 ES 300h | 40(5.9) | 5.4 | 8.1% |
| 2013 款别克昂克拉 1.4T | 28(8.4) | 7.6 | 9.4% |
| 2013 款别克君威 1.2.4 | 23(10.2) | 8.3 | 18.8% |
| 2013 款福特福克斯 2.0 | 31(7.6) | 6.8 | 10.3% |
| 2013 款福特翼虎 AWD 1.6 | 25(9.4) | 8 | 14.9% |
| 2013 款福特翼虎 AWD 2.0 | 24(9.8) | 8.8 | 10.1% |
| 2013 款现代伊兰特 1.8 | 32(7.4) | 7 | 4.7% |
| 2013 款现代索纳塔 2.4 | 28(8.4) | 7.9 | 5.9% |
| 2013 款本田歌诗图 2.4 | 25(9.4) | 9.1 | 3.2% |
| 2013 款本田 CR-V 4WD 2.4 | 25(9.4) | 9 | 4.2% |
| 2013 款日产天籁 2.5 | 31(7.6) | 7.3 | 3.7% |
| 2013 款日产楼兰 AWD 3.5 | 20(11.8) | 11.1 | 5.5% |
| 2013 款丰田凯美瑞 2.5 | 28(8.4) | 7.6 | 9.5% |
| 2013 款丰田凯美瑞混合动力 2.5 | 41(5.7) | 5.3 | 8.1% |
| 2013 款丰田汉兰达 2.7 | 22(10.7) | 9.9 | 7.3% |
| 2013 款大众途锐 3.6 | 19(12.4) | 11.6 | 6.2% |
| 2013 款大众途观 2.0 | 23(10.2) | 9.2 | 10% |
| 2013 款大众 CC 2.0 | 25(9.4) | 8 | 14.9% |

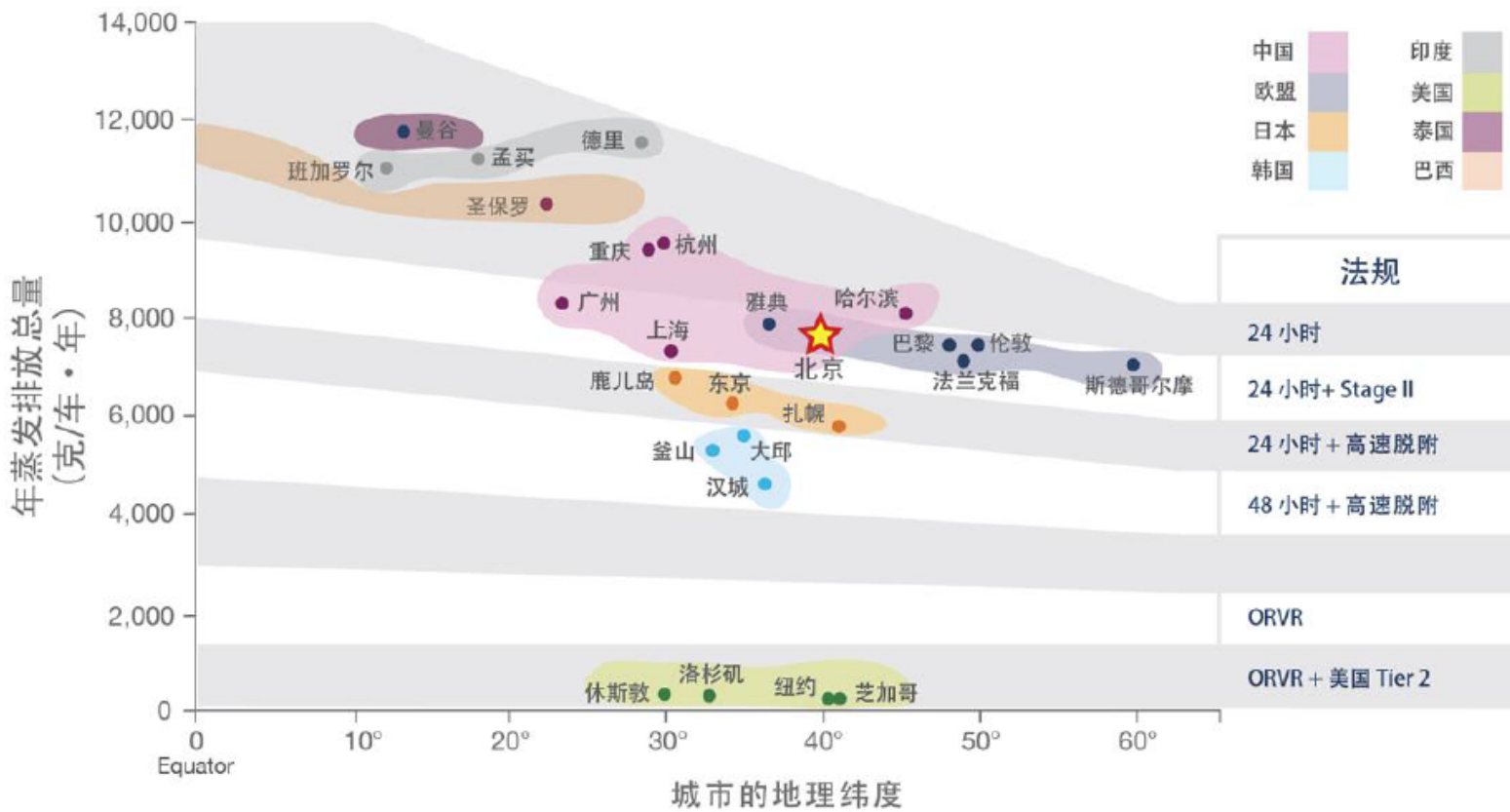
(注: EPA 油耗单位为 MPG, 括号内为折后百公里油耗值, 单位 L/100km)

Source: <http://auto.163.com/13/0805/09/95GN42E0000841JK.html>



Challenges from vapor emission

新车年蒸发排放总量与地理纬度
(昼间排放, 加油排放, 行驶损失排放, 渗漏排放, 和热浸排放)



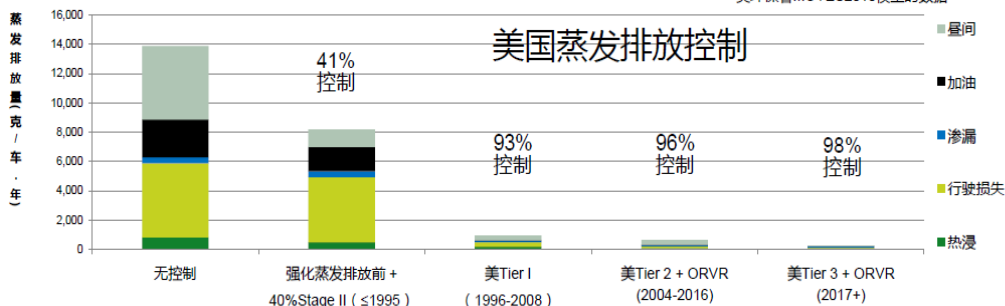
Source: MWV



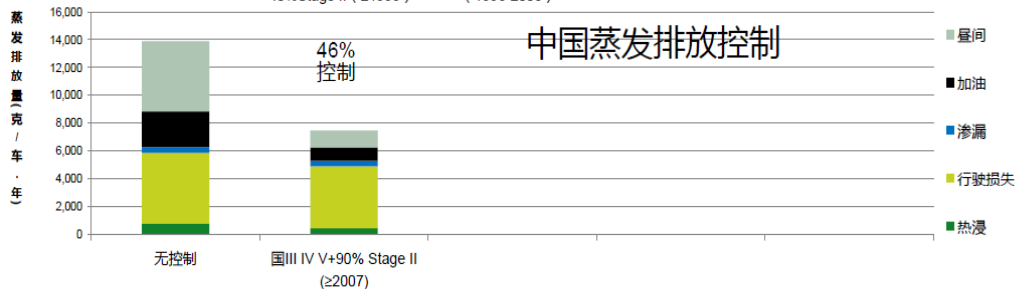
Challenges from vapor emission

美环保署MOVES2010模型的数据

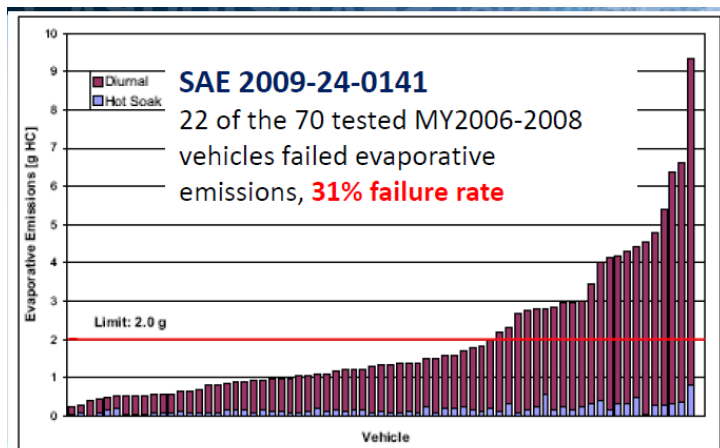
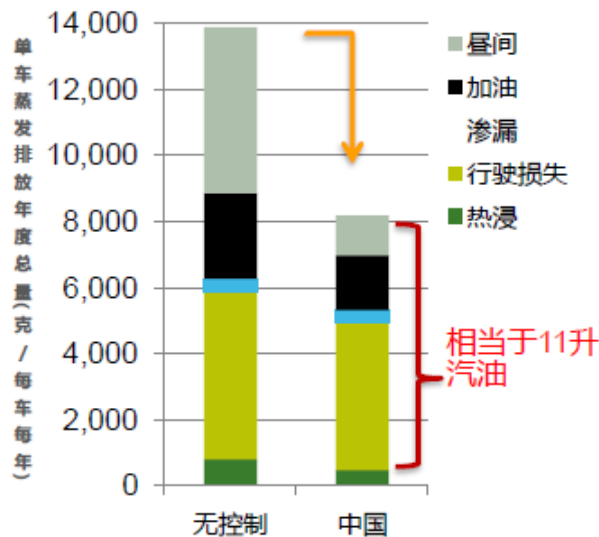
美国



中国



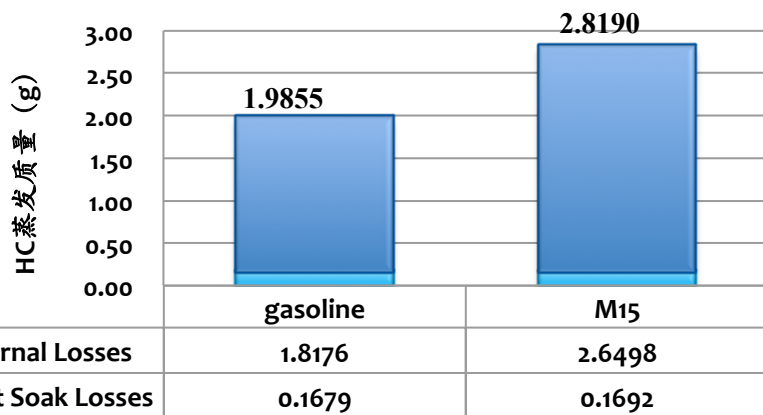
单车蒸发排放总量



Source: MWV

Challenges of from alternative fuels

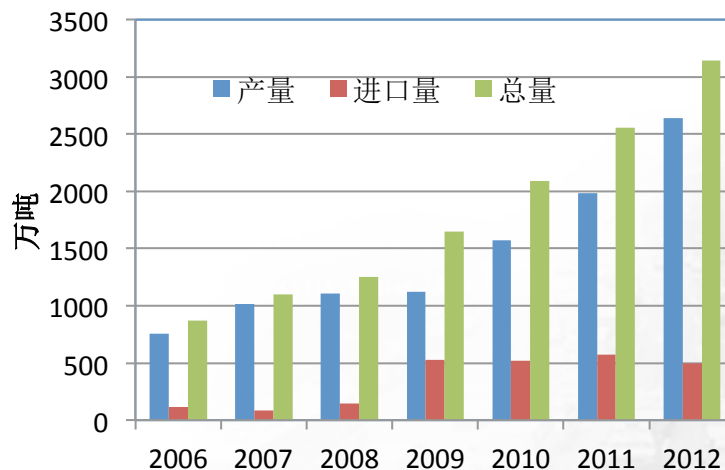
HC from evaporative emission



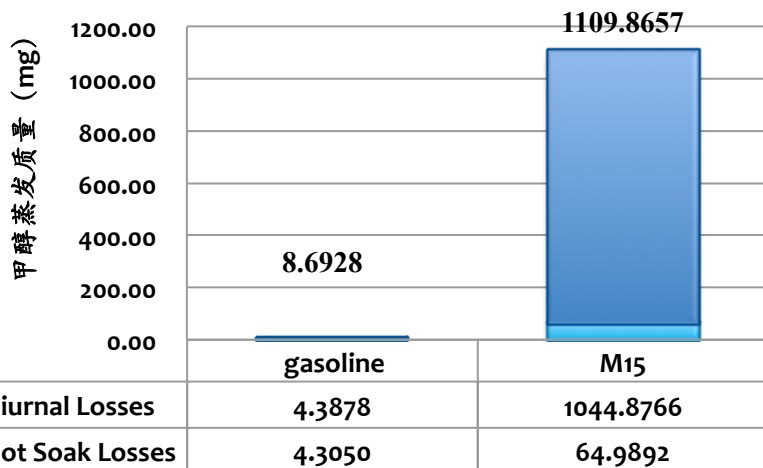
M15: 41.98%



Vapor emission of methanol gasoline



Methanol from evaporative emission



M15: 127倍



雷德蒸汽压 (kPa) gasoline M15

Reid Vapor Pressure 57 69.5

Source: Beijing Institute of Technology



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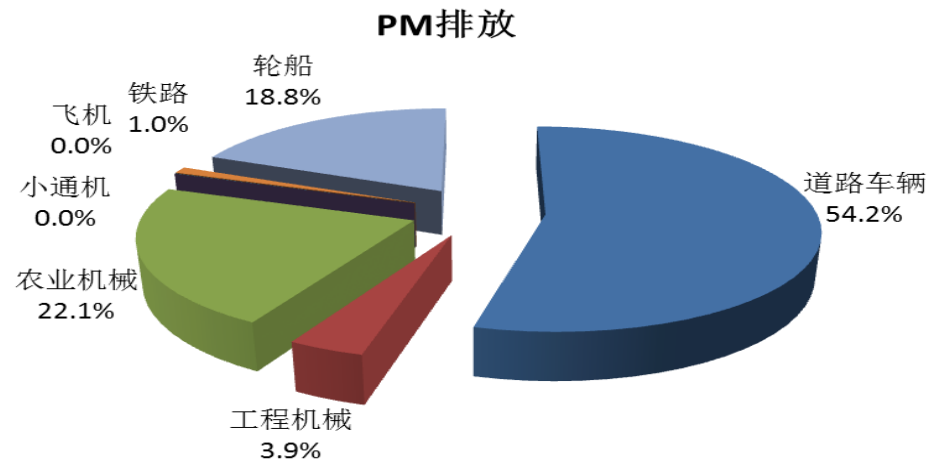
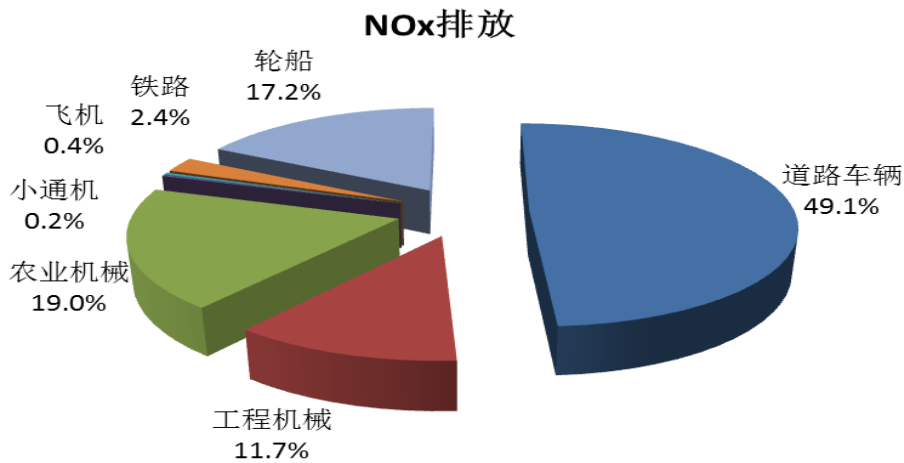
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New challenges from off-road mobile source

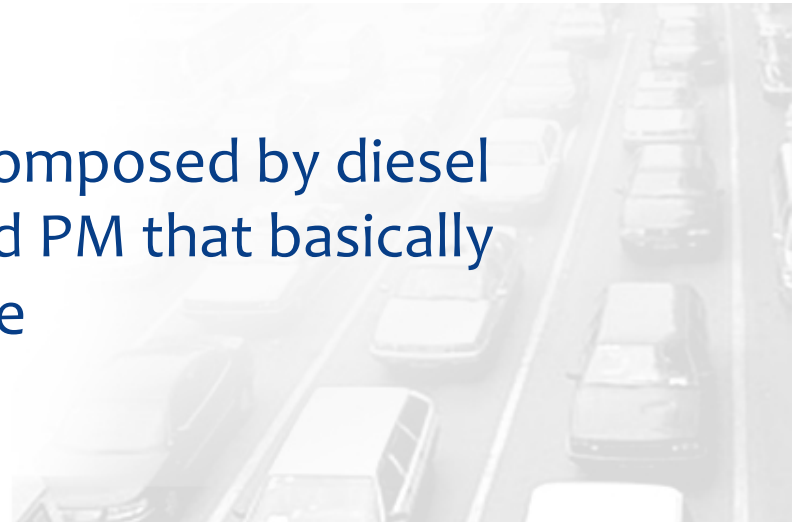




Environmental compliance supervision for off-road mobile source is just starting

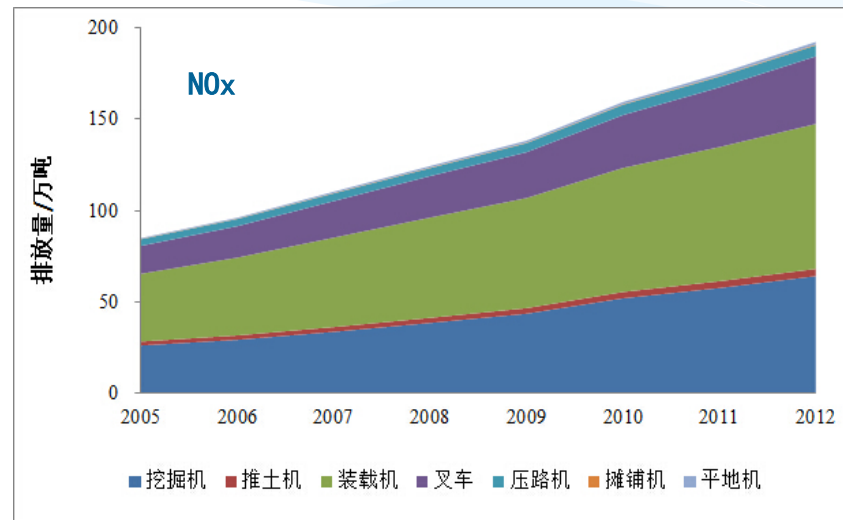
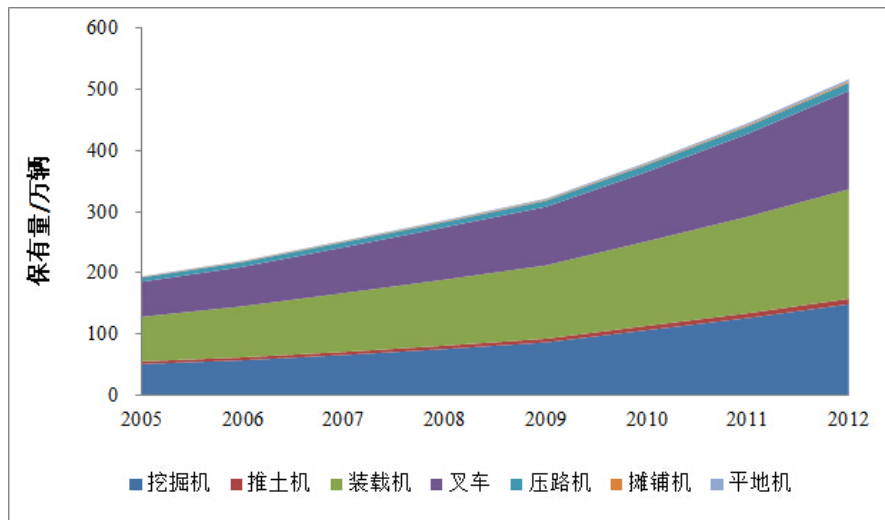


Non-road mobile source is mainly composed by diesel engines, which emit higher NOx and PM that basically equivalent to on-road mobile source

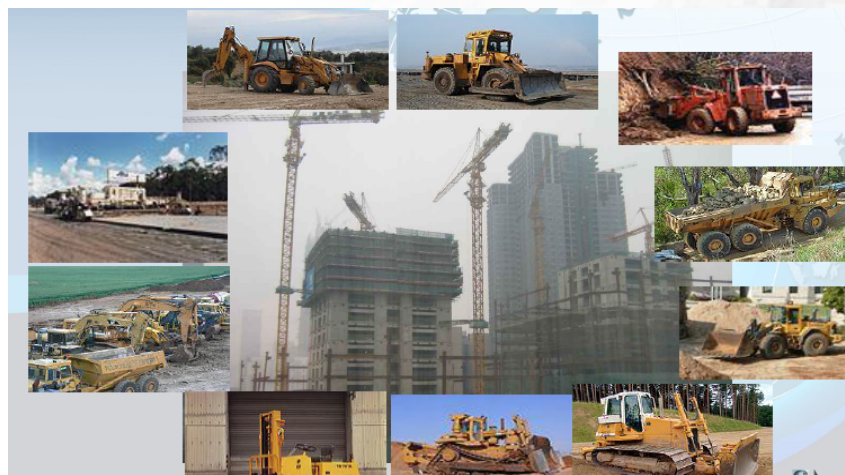




Engineering equipment



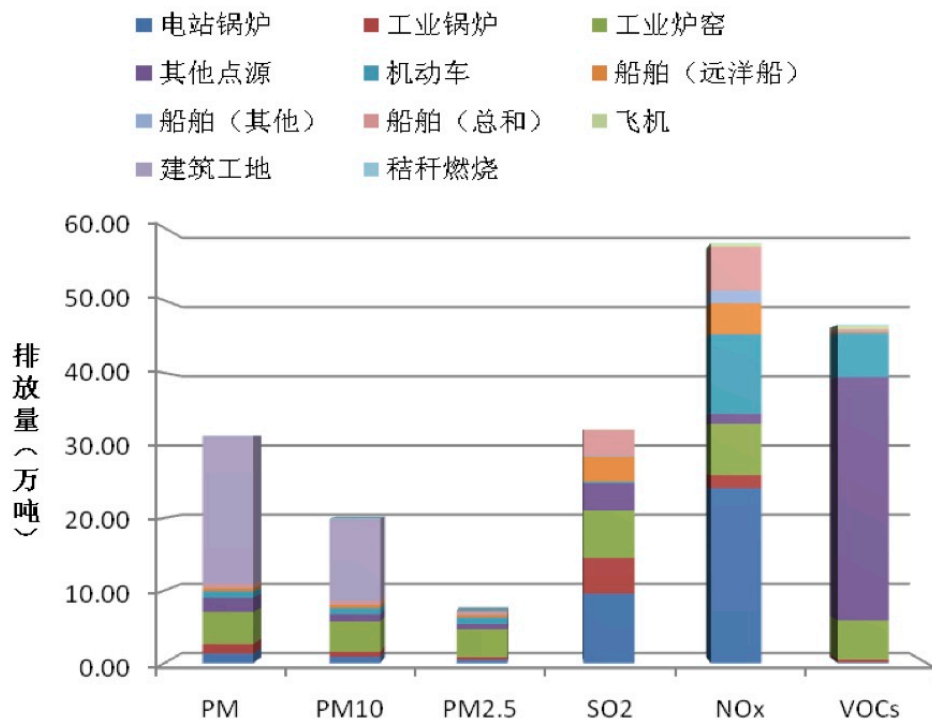
- no registration system
- cross-area operating
- no management system
- responsible department is still unclear





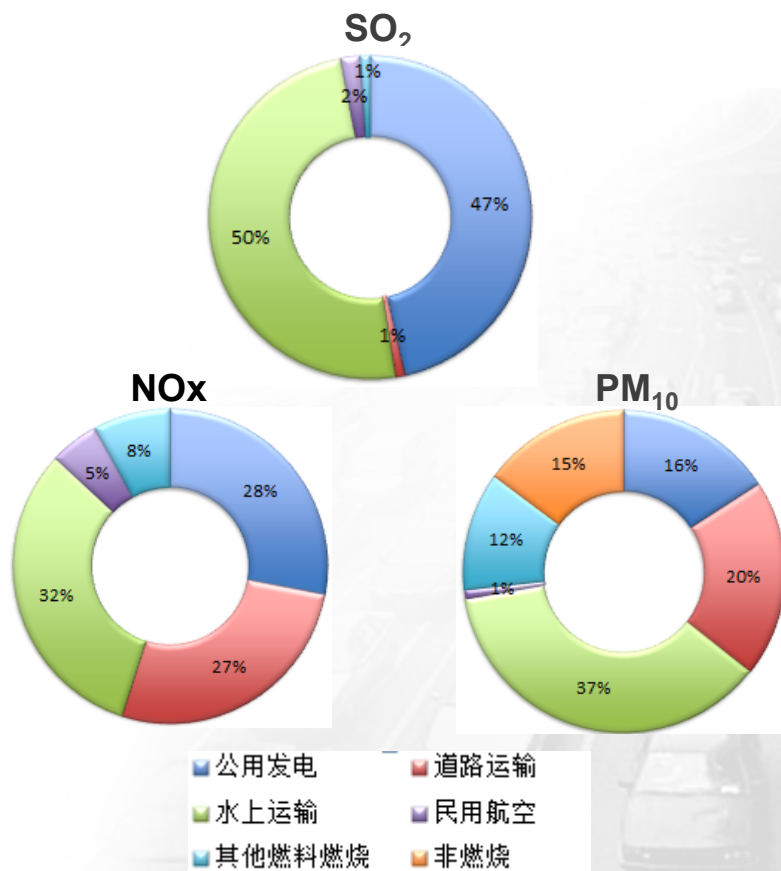
Shanghai

SO₂, NO_x and PM_{2.5} emission from ports and vessels accounted for 12.46%、11.6% and 5.6% of total city emissions



Hong kong

Vessel emission is the top source of SO₂, NO_x and PM₁₀ emission





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Countermeasures and suggestions



To consummate laws and regulations

- To revise “Law on the Prevention and Control of Air Pollution”
 - To clear responsibilities and works of each
 - To cover all mobile sources
 - To intensify responsibilities of manufacturers
 - To manage vehicles and fuels as one system
 - To develop life-cycle environmental supervision and establish recall system

- To establish “Motor Vehicle Pollution Prevention and Control Rules”
 - To develop detailed rules according to “Law on the Prevention and Control of Air Pollution” and make it more practicable



To establish more stringent emission standards

To establish China VI emission standards

—more practicable for Chinese situation

—more stringent requirements on compliance

supervision

—more flexible

—better for technology and industry upgrading





National Action Plan of Clean Diesel Engine

- Implement objective
 - Commercial diesel vehicles
 - Engineering equipments, garden equipments, agricultural equipments and port-use equipments
 - Inner-river and offshore vessels
 - Diesel fuels for vehicle, non-road engine and vessel

- key projects
 - Clean transit vehicle plan
 - Clean equipment plan
 - Clean shipping plan
 - Clean diesel fuel plan



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Thanks for your attention!

