

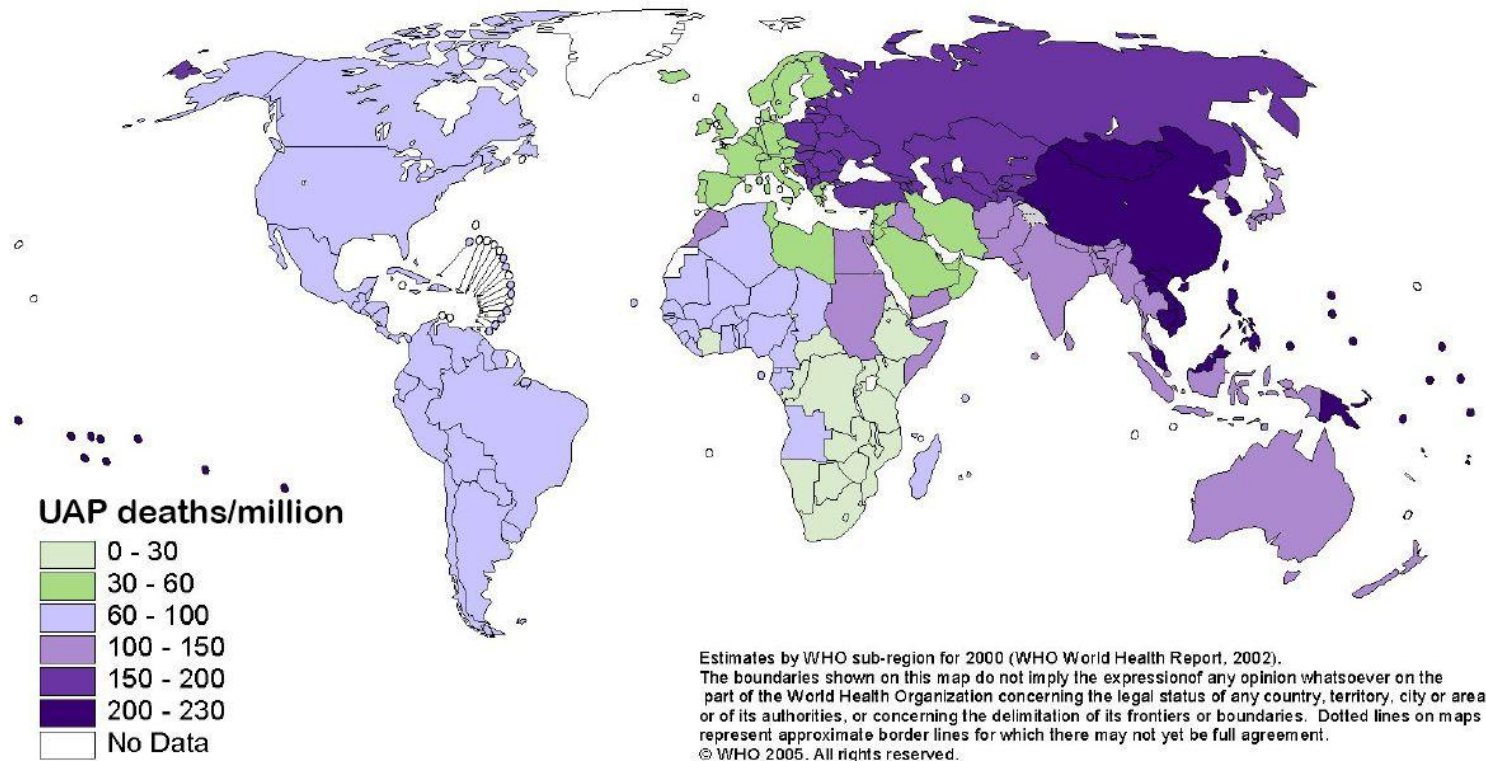
Developing Urban Air Quality Management 开发城市空气质量管理

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Urban Air Pollution deaths

城市空气污染死亡人数

- ▶ Air pollution is a major environmental risk to health
- ▶ 空气污染是影响健康的主要环境风险
- ▶ Approximately 2 million premature deaths worldwide per year
- ▶ 全世界每年约有2百万人早亡



Environmental Burdens Premature Deaths

环境问题导致的早亡

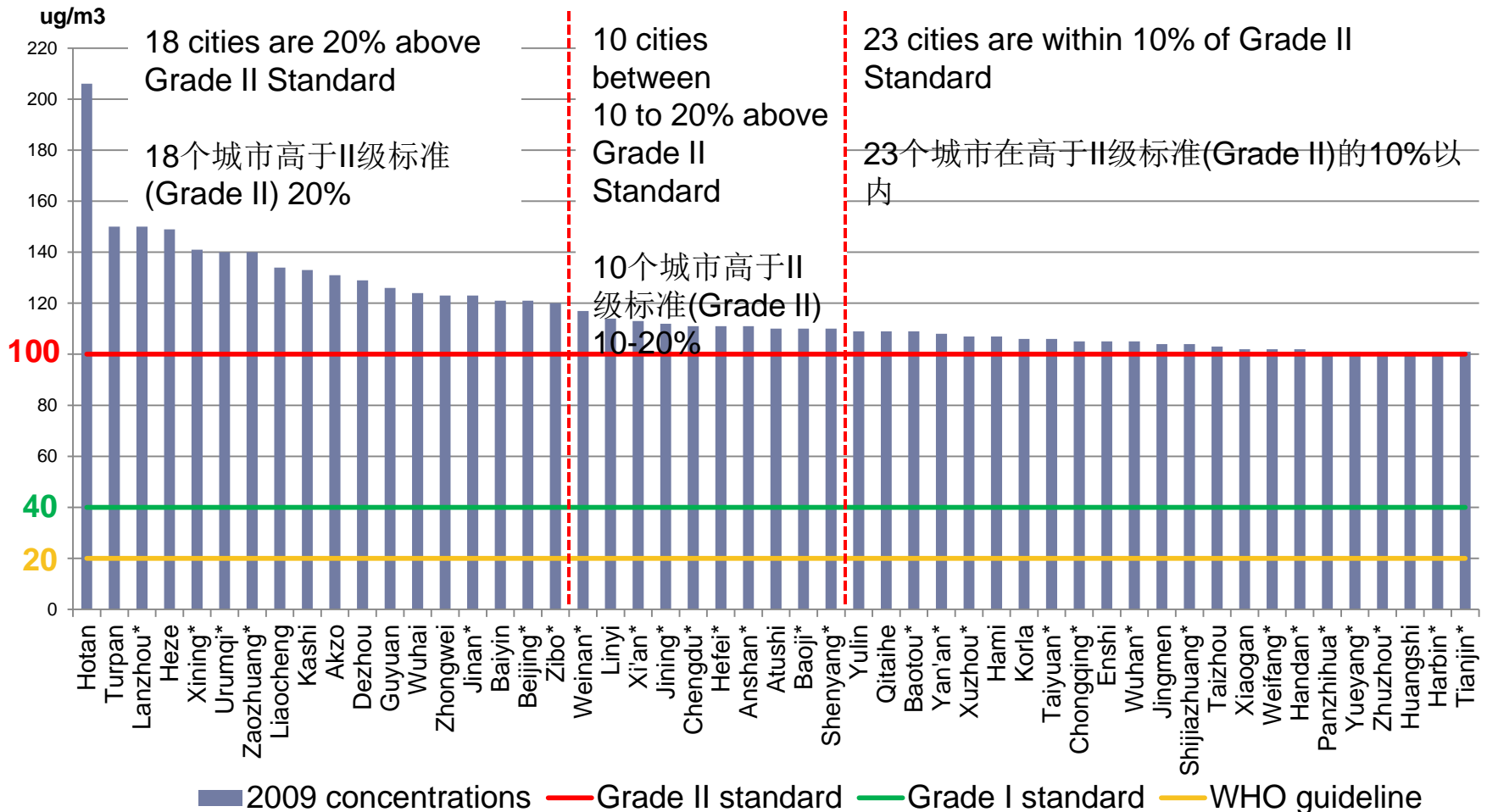
WHO Global Burden of Disease

世卫组织全球疾病分布

Environmental Risks 环境风险	Global Estimate 全球人数	Asian Estimate (SEAR+WPR) 洲人数 (东南亚+西太平洋)	Asia as a percent of Global 亚洲/全球
不安全用水	1,730,000	730,000	42%
城市户外空气	799,000	487,000	61%
室内空气	1,619,000	1,025,000	63%
铅	234,000	88,000	37%

Air Quality Concentrations in Chinese Cities compared to selected standards

中国城市空气质量浓度和选择的一些标准比较

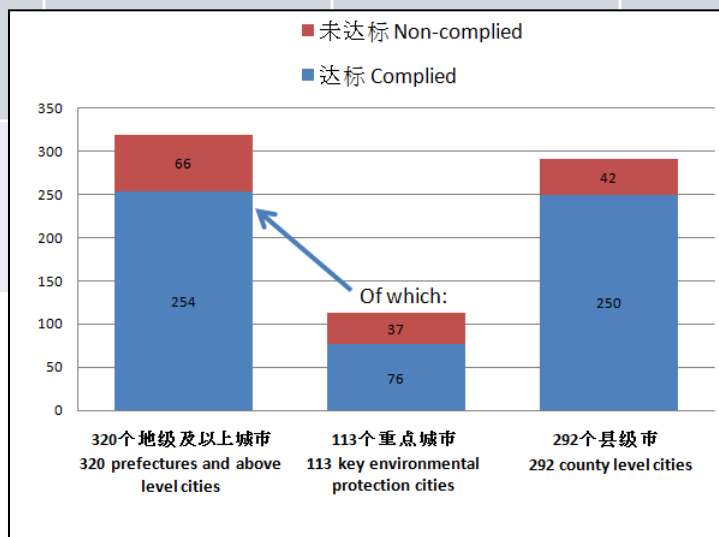


* 表示重点城市

Compliance with Grade II Standards in 2009 and targets for 2015 and 2020

2009年达到II级标准，以及2015年和2020年的目标

		Grade II PM ₁₀ compliance (2009) II级 PM ₁₀ 达标情况 (2009)	Grade II overall compliance (2009) II级 整体达标情况 (2009)	12 th FYP grade II overall compliance target 十二五规划 II级 整体目标	Administrative Measures compliance target 中长期目标
Monitored cities 监控的城市	612	549 (89.7%)	504 (82.4%)		
Prefecture and higher cities 地级或以上城市	320	269 (84.0%)	255 (79.6%)	2015前达到 85个	
County level 县级	292	280 (95.9%)	250 (85.6%)		2015年前达到 263个 (90%) 2020年前达到 292个 (100%)
Key cities 重点城市	113				2015年前达到 90个 (80%) 2020年前达到 113个 (100%)



Main Air Pollutants

主要空气污染物

- ▶ **二氧化硫 (SO₂)**
 - ▶ Burning of fossil fuels with high sulfur (coal and oil), during smelting, or from other industrial processes
 - ▶ 在精炼或其他工业流程中，燃烧高硫含量的化石燃料（煤和石油）。
- ▶ **氮氧化物 (NO_x)**
 - ▶ mobile sources and power plants
 - ▶ 移动源和发电站
- ▶ **一氧化碳 (CO)**
 - ▶ Vehicles and industrial fossil fuel burning
 - ▶ 车辆和工业化石燃料的燃烧
- ▶ **臭氧 Ozone**
 - ▶ Created under certain weather conditions (sunny, still days) by VOCs and nitrogen oxides. Unlike the protective layer of ozone
 - ▶ 由挥发性有机物和氮氧化合物在某种天气下生成（阳光、无风日）。和臭氧保护层有所不同。
 - ▶ Creates a photochemical smog and is highly toxic
 - ▶ 生成光化学烟雾并且毒性很高。
- ▶ **铅 Lead**
 - ▶ Vehicles burning leaded gasoline, or from lead smelting
 - ▶ 车辆燃烧含铅汽油，或通过铅熔炼生成。

- ▶ **挥发性有机物 (VOCs)**
 - ▶ Hydrocarbons, alcohols, aldehydes, and ethers
 - ▶ 碳氢化合物，乙醛和其他
 - ▶ Play role in O₃ formation
 - ▶ 是臭氧的成因
 - ▶ Industrial processes and vehicles
 - ▶ 工业流程和车辆
- ▶ **颗粒物 (PM)**
 - ▶ 车辆、发电厂、工业流程

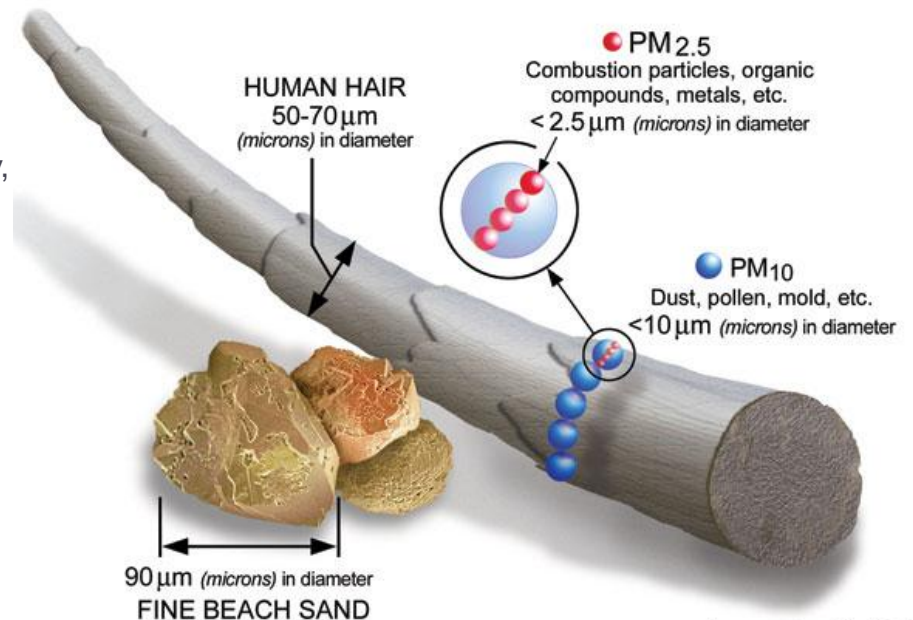


Image courtesy of the U.S. EPA

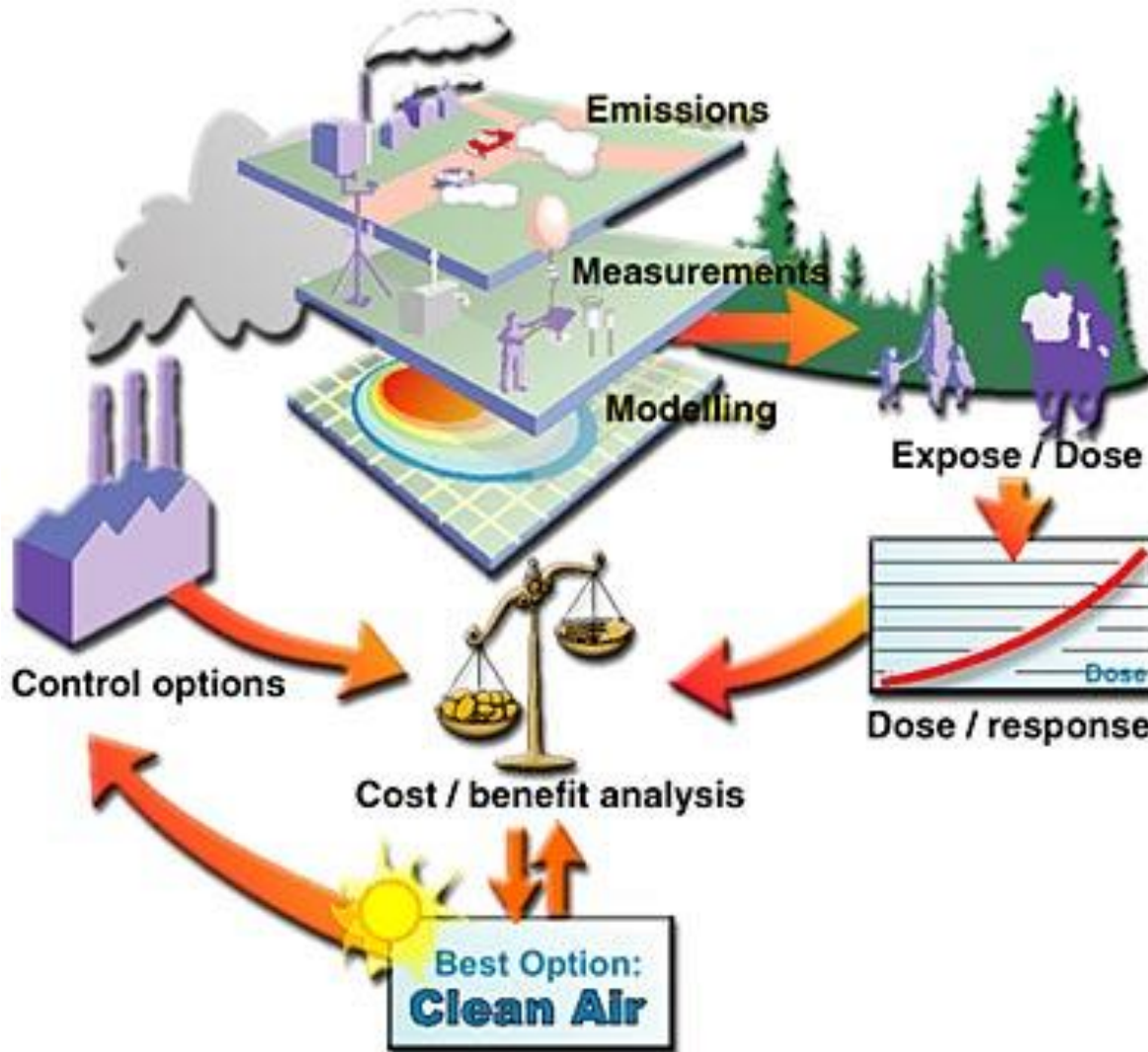
Selection of Cities

城市的选择

- ▶ **Demonstrated air pollution problem**
论证空气污染问题
 - ▶ Not compliant with Grade II Standard for PM
没达到II级标准对PM的要求
- ▶ **Basic monitoring system**
基本监控系统
 - ▶ Existing good data and ability to monitor
现有的数据和监控能力
- ▶ **Political support**
政治支持
 - ▶ Expressed interest by the Mayor
市长表示感兴趣
 - ▶ Create a multi-sector leading group
成立一个多部门的领导小组
- ▶ **Willingness to develop action plan**
愿意开发行动计划
 - ▶ EPB, Academy and other stakeholders
城市环保局、学术机构和其他相关方
 - ▶ Support by the Swiss Government and CAI-Asia
得到瑞士政府和CAI-Asia的支持
- ▶ **Interest and ability to get World Bank Loan**
有兴趣和能力取得世行贷款
 - ▶ Financial capacity and counterpart funding
资金水平和配套资金
- ▶ **Commitment to implement action plan over next 5-years**
承诺在未来5年执行行动计划

Developing AQM Projects in Cities

开发城市空气质量管理工作



Overview of the Session on Air Quality Management 空气质量管理组成部分

▶ Basics of Air Pollution

空气污染的要素

- ▶ Sources of air pollution
污染源
- ▶ Range for air pollutants and their impacts
污染物和影响范围
- ▶ Indoor, outdoor and regional pollution
室内、室外和区域污染
- ▶ Concepts of Air Quality Management
空气质量管理的概念

▶ Emissions

排放

- ▶ Types of pollution sources
污染源种类
- ▶ Emission inventories
排放总量清单
- ▶ Measures to control emission sources
控制排放源的措施

▶ Air Pollution Impacts

空气污染的影响

- ▶ Effects of key air pollutants on health and ecosystems
主要空气污染物对健康和生态的影响
- ▶ Studies and evaluation of health impacts
对健康影响的研究和估算
- ▶ Economic impacts of air pollution
空气污染的经济影响

▶ Policies and strategies

政策和战略

- ▶ Air quality guidelines and standards
空气质量指南和标准
 - ▶ Role of different stakeholders and institutional arrangements
不同相关方的角色
 - ▶ Policy instruments to implement air quality management
空气质量管理的政策工具
-



Important: Improvement Data Collection and Monitoring system 重要：改进数据收集和检测系统

- ▶ Improvement of air quality assessment
改善空气质量评估
 - ▶ Air pollution monitoring data improvements
改善空气污染监测数据
 - ▶ Emission inventory data improvement
改善排放清单数据
 - ▶ Dispersion model/exposure model improvements
改善离差和暴露模型
 - ▶ Improvement of assessment of damage and costs
改善对损害和成本的评估
-



Steps in Developing AQM Strategy

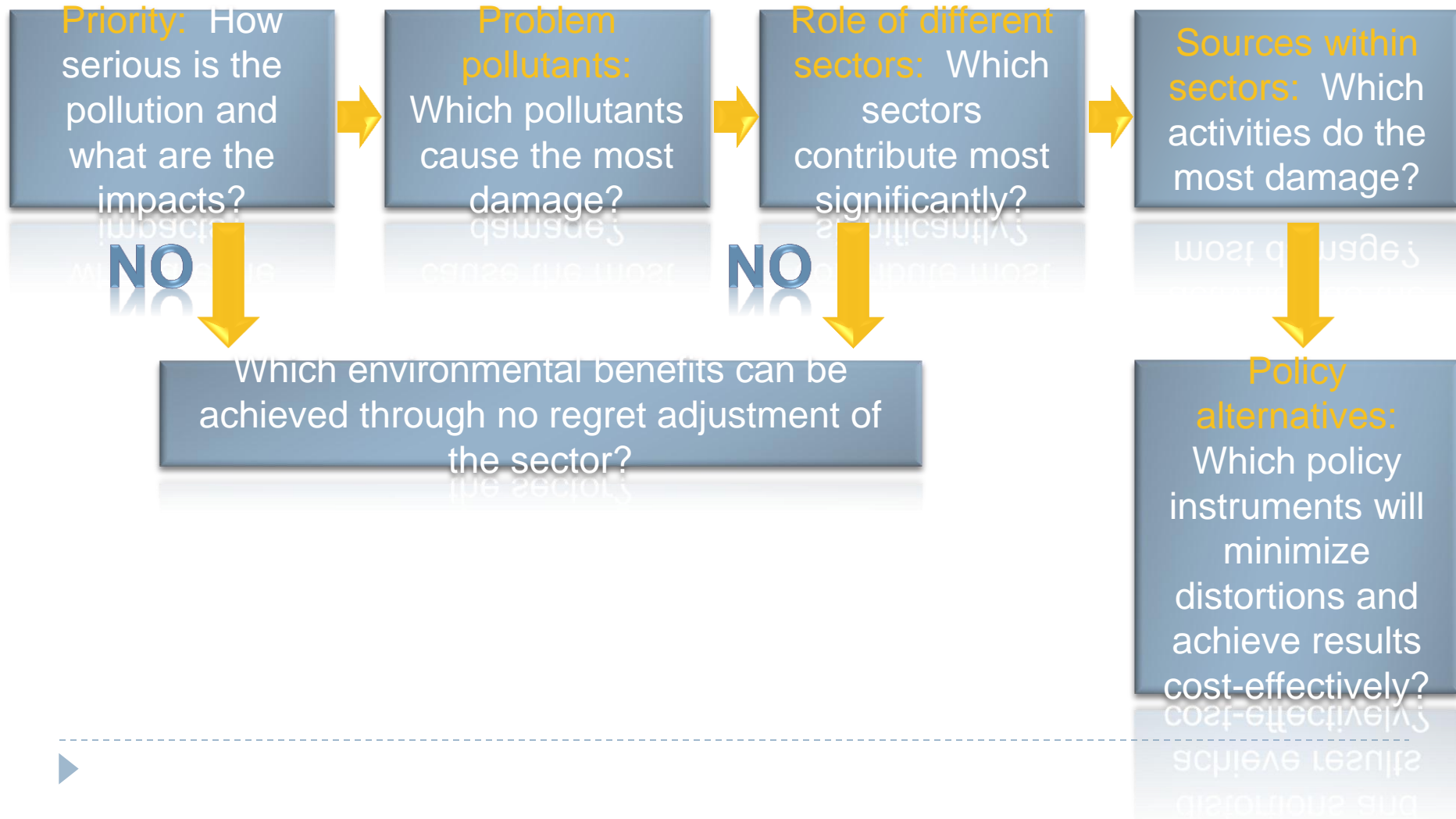
开发空气质量管理战略的步骤

1. Gather data on emissions and sources of pollutants (current and future developments) 收集排放和污染源数据（目前和未来趋势）
 2. Gather information on technical measures and costs to reduce specific emissions of priority pollutants (abatement scenarios) 收集对主要污染物减排的技术措施和成本数据（减排情景）
 3. Specify policy instruments to implement abatement scenarios 明确具体政策工具来实现减排情景
 4. Assess the impact of abatement measures on the priority damage categories identified in Step 1 and the costs and benefits of the abatement methods 对减排情景中的措施进行成本效益分析
 5. Identify major gaps and uncertainties in knowledge of impacts and measures and major deficiencies in the institutional framework, and outline options to reduce uncertainties and to strengthen institutions 识别主要的不足和风险，并列岀减少风险的措施
-



Developing Emission Reduction Strategies

开发减排战略



Summary of PM reduction options

PM减排选择的概要

Demand –side management and Structural measures 供给管理和结构性措施	Demand-side management and Structural measures 需求管理和结构性措施	Cleaner technology and fuel 清洁技术和燃料	End-of-pipe control 尾气后处理
Phasing out inefficient plants, inefficient industrial boilers, and small-scale coal combustion 淘汰无效率的工厂、锅炉和小型煤窑	Increased use of natural gas for energy and heat generation 增加天然气和热电厂的使用	Increased use of technologies such as FDG, SCR and ESP in industrial and power plants 增加FDG, SCR, ESP在工业和发电领域的使用	Measures to reduce dust from natural areas, such as increasing vegetative cover 增加制备覆盖率, 减少烟尘
Expanding coverage of district heating 扩大使用区域供热系统	Increased use of low sulfur and low PM coal, and, where possible, of clean coal and briquettes 增加低硫煤和低PM煤的使用, 尽可能使用清洁煤和煤球	End-of-pipe controls for motor vehicles 机动车尾气后处理系统	Construction site management for dust abatement 建筑工地管理, 以减少烟尘
Greater use of public transportation 广泛使用公共交通	Increased energy-efficiency in industry 增加工业能效		Reducing dust from roads 减少道路烟尘
Moving heavy industry and power generation plants away from city centers 把重工业和发电厂从市中心移走	Improved engine technology for motor vehicles. 提升机动车的引擎技术		

Selection of Policy Measures

政策措施的选择

- ▶ **Cost-benefit analysis (CBA) 成本效益分析**
 - ▶ **Cost-effectiveness analysis (CEA) 成本效果分析**
 - ▶ **Four steps for CBA: 成本效益分析四部曲**
 - ▶ **estimated reduction in emissions at source (from policy)**
估算排放源的减排量（从不同政策）
 - ▶ **estimated reductions in ambient concentrations as a result of reductions in emissions**
估算周围环境集中污染物减排
 - ▶ **estimated reduction in exposure to pollutants**
估算暴露污染物减排
 - ▶ **assessment of increased health benefits**
估算增加的健康获益
-



Cost-Effectiveness Analysis

成本效益分析

▶ Key Steps: 关键步骤

- ▶ What pollutants require priority attention in the city (with consideration of sector contributions)?

对于城市来说那种污染物是优先关注的（考虑对不同行业）？

- ▶ By how much do the ambient concentrations of these pollutants need to be reduced in order to meet specified goals or standards?

为了达到特定的目标和标准，污染物浓度需要减少多少

- ▶ What are the available least cost options to reduce pollutants to these levels?

达到相同效益的最低成本措施是哪项

▶ Restrictions: 限制

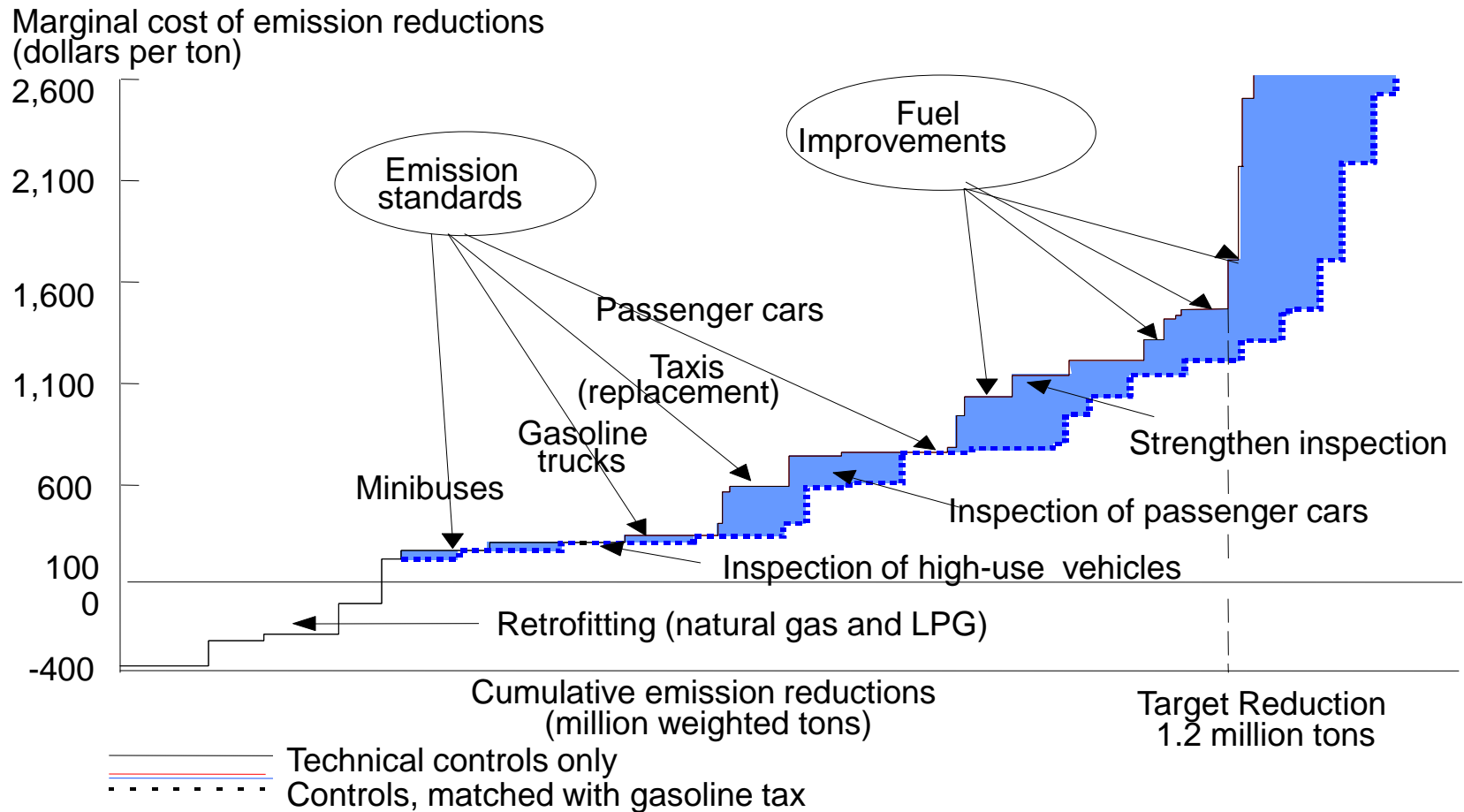
- ▶ Benefits not estimated 不能估算效益

- ▶ Restrictions are set to emissions of critical pollutants 对重点污

▶ 染物排放的限制

Ranking Measures to Reduce Traffic Emissions in Mexico City

墨西哥城交通减排的排名



Conclusions

结论

- ▶ Built on World Bank's experience and expertise working with MEP and other stakeholders on AQM

基于世行的经验，并和环保部及其它相关方一起推动空气质量管理

- ▶ Prepare AND Implement a comprehensive strategy to reduce air pollution, focusing on particulate matter

准备并实施一个综合战略，从而减少空气污染物排放，特别是对PM的排放

- ▶ Long-term commitment by cities and sectors to reduce emissions and improve air quality

城市和行业的长期减排义务

- ▶ Improve monitoring of air quality and benefits of the strategy

提高空气质量监控和战略效益

- ▶ Evaluate cost-effectiveness of selected mitigation options

对所选的减排措施进行成本效益分析

- ▶ Disseminate lessons learned to other cities in China and worldwide

向中国和其他国家的城市推广经验





Thank You!
谢谢!



Paul Procee