



# Recommendations to City AQM: Beyond the Clean Air Management Assessment Tool

## 对城市空气质量管理的建议： 清洁空气管理评价工具

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# About the Clean Air Initiative for Asian Cities

## 亚洲城市清洁空气行动



**The Clean Air Initiative for Asian Cities** promotes better air quality and livable cities by translating knowledge to policies and actions that reduce air pollution and greenhouse gas emissions in transport, energy and other sectors



**CAI-Asia** began in 2001 as a multi-stakeholder initiative by ADB, World Bank and USAID

Since 2007, CAI-Asia is a **UN Type-II Partnership** with almost 200 organizational members, **8 Country Networks**, and the **CAI-Asia Center** as its secretariat



# 中国网络

hangsha长沙, hengdu成都, hongqing重庆, guangzhou广州, guiyang贵阳,  
hangzhou杭州, harbin哈尔滨, jinan济南, lanzhou兰州, luoyang洛阳,  
qingdao青岛, tianjin天津, urumqi乌鲁木齐

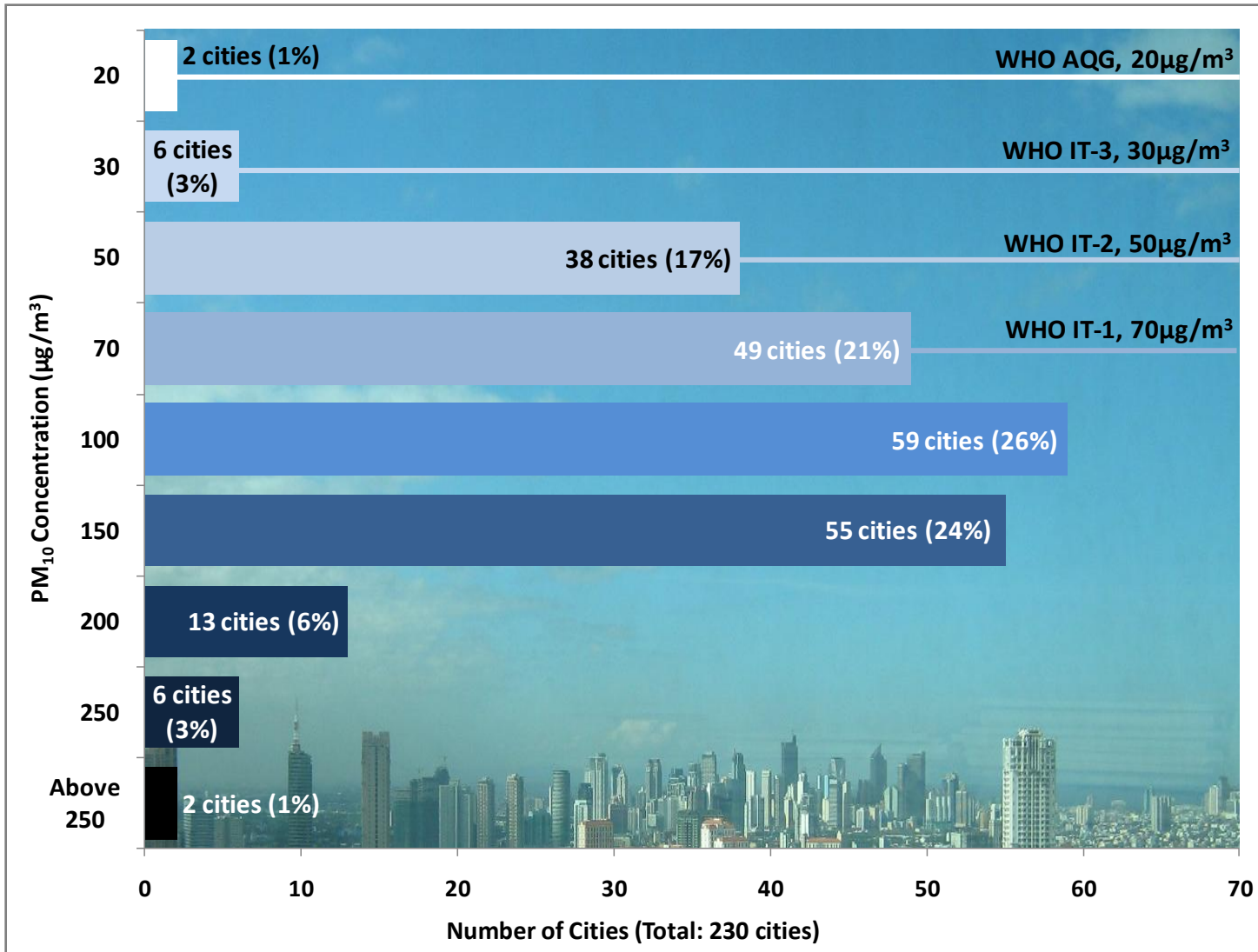
第五届中国城市空气质量管理研讨会：空气质量与协同效益  
5th AQM City Workshop: Air Quality and Co-Benefits



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# Annual Average PM<sub>10</sub> levels in 230 Asian Cities in 2008

## 2008年230个亚洲城市的年均PM10浓度



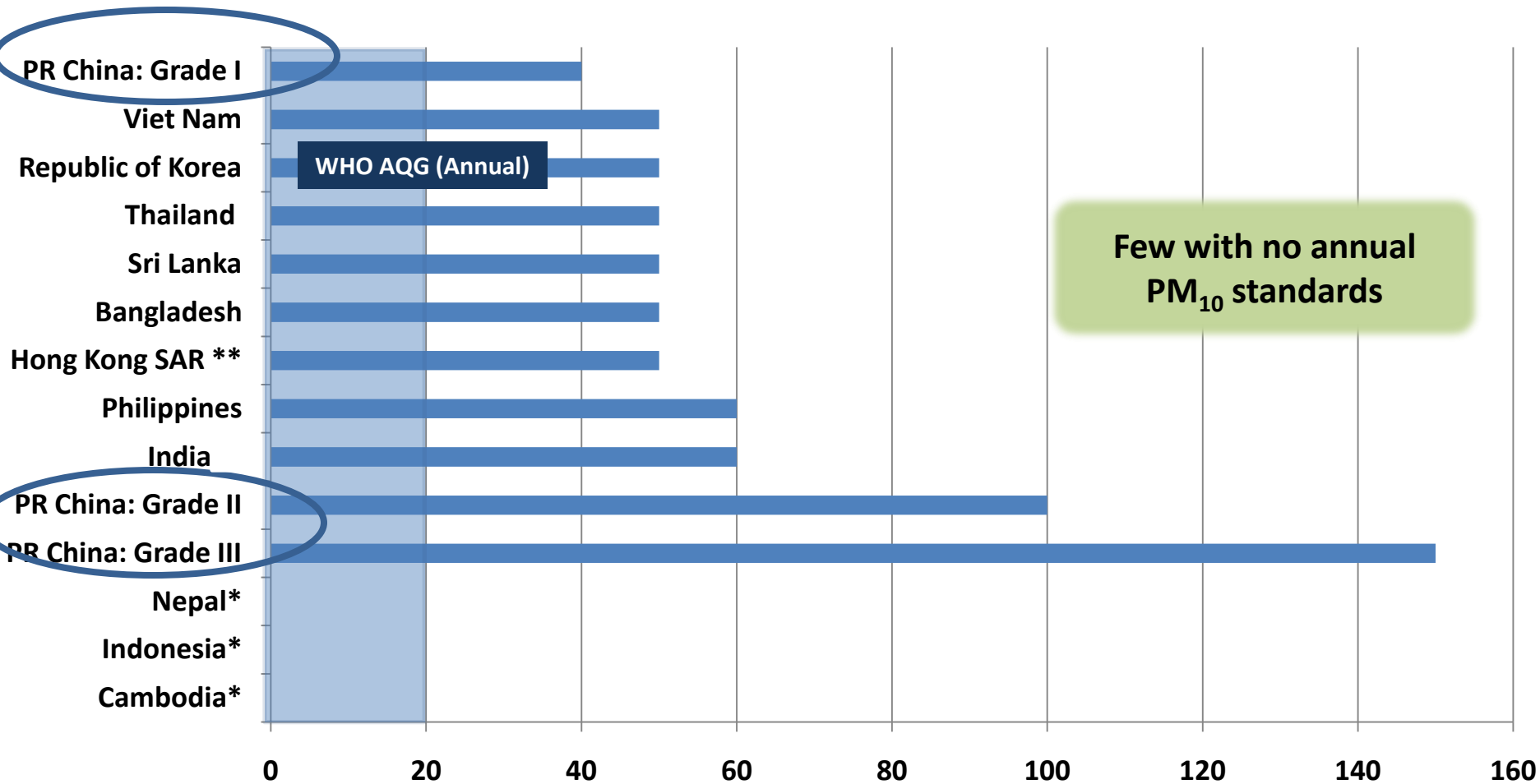
Two were within WHO AQG (20 µg/m<sup>3</sup>) while ~58% had annual PM<sub>10</sub> levels exceeding even WHO Interim Target-1 of 70 µg/m<sup>3</sup>.

Ave of annual ave PM<sub>10</sub> concentrations of 230 cities is 89.5 µg/m<sup>3</sup>— ~4.5 times higher than WHO AQG.

# Annual average PM<sub>10</sub> standards in selected Asian countries vs. WHO

## AQG (µg/m<sup>3</sup>)

### 部分亚洲国家的PM10年标准与WHO AQG的比较



Few with no annual PM<sub>10</sub> standards

\*No annual ambient air quality standards, only 24-hour limits;

\*\*Draft/proposed

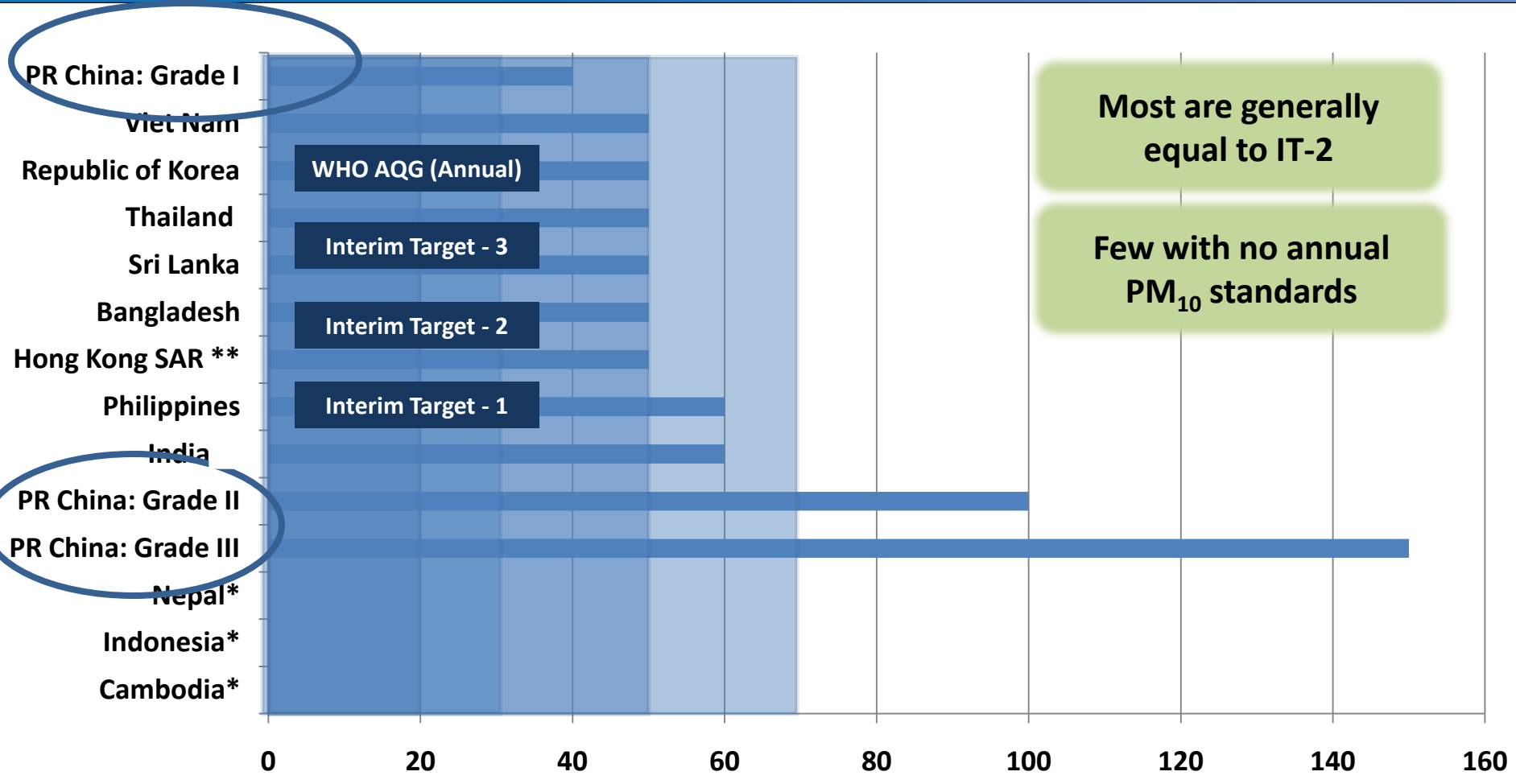
WHO AQG – designed to offer guidance in reducing health impacts of air pollution

Interim Targets (IT) – incremental steps in progressive reduction of air pollution (AP) and intended for use in areas where AP is high

# Annual average PM<sub>10</sub> standards in selected Asian countries vs. WHO AQG (µg/m<sup>3</sup>)



## 部分亚洲国家的PM10年标准与WHO AQG的比较



\*No annual ambient air quality standards, only 24-hour limits;

\*\*Draft/proposed

WHO AQG – designed to offer guidance in reducing health impacts of air pollution

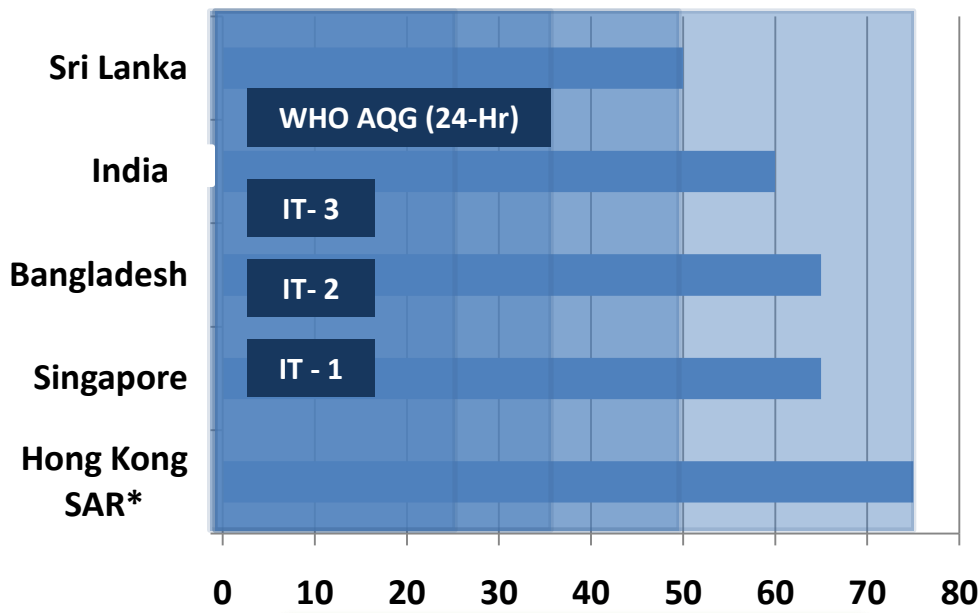
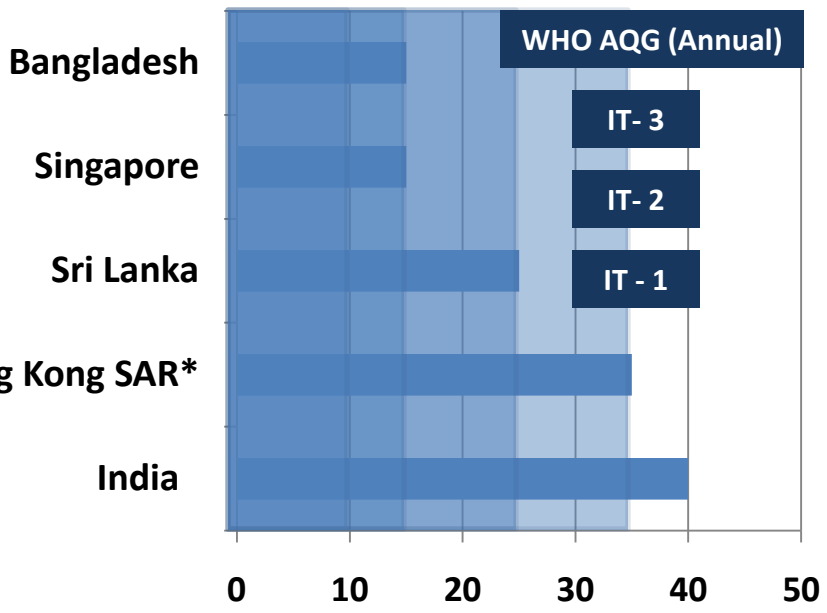
Interim Targets (IT) – incremental steps in progressive reduction of air pollution (AP) and intended for use in areas where AP is high

# PM<sub>2.5</sub> standards in selected Asian countries vs. WHO AQG ( $\mu\text{g}/\text{m}^3$ )

## 部分亚洲国家的PM2.5标准与WHO AQG的比较

**PM<sub>2.5</sub> (Annual)**

**PM<sub>2.5</sub> (24-Hr Ave)**



**Annual: None have standards equal to WHO AQG**

**24-Hr: Standards between IT-2 and IT-1**

**Annual: Few with standards equal to IT-3**

\*Draft/proposed

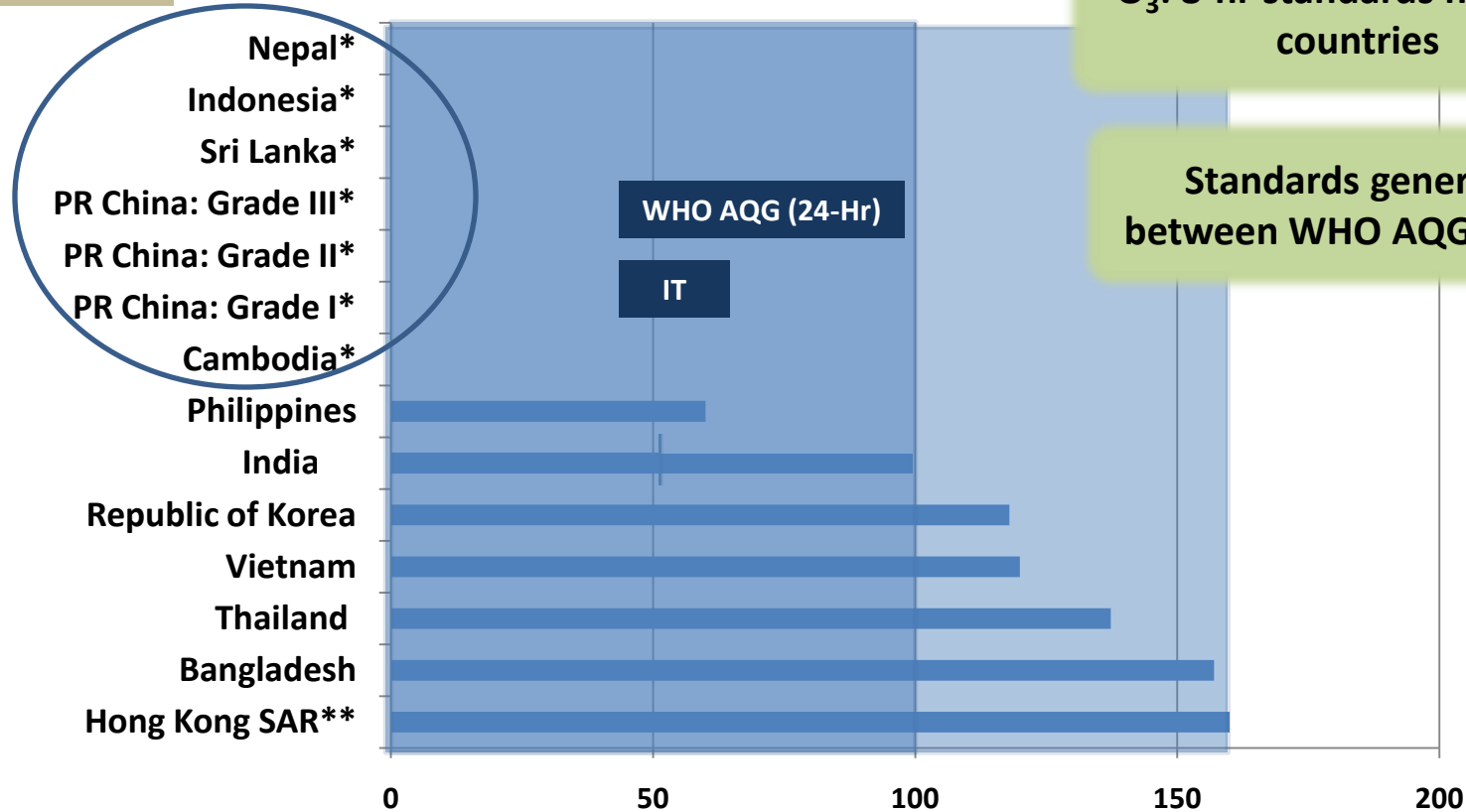


# O<sub>3</sub> standards in selected Asian countries vs. WHO AQG (μg/m<sup>3</sup>)



## 部分亚洲国家的O<sub>3</sub>标准与WHO AQG的比较

O<sub>3</sub> (8-Hr Ave)



O<sub>3</sub>: 8-hr standards not in all countries

Standards generally between WHO AQG and IT

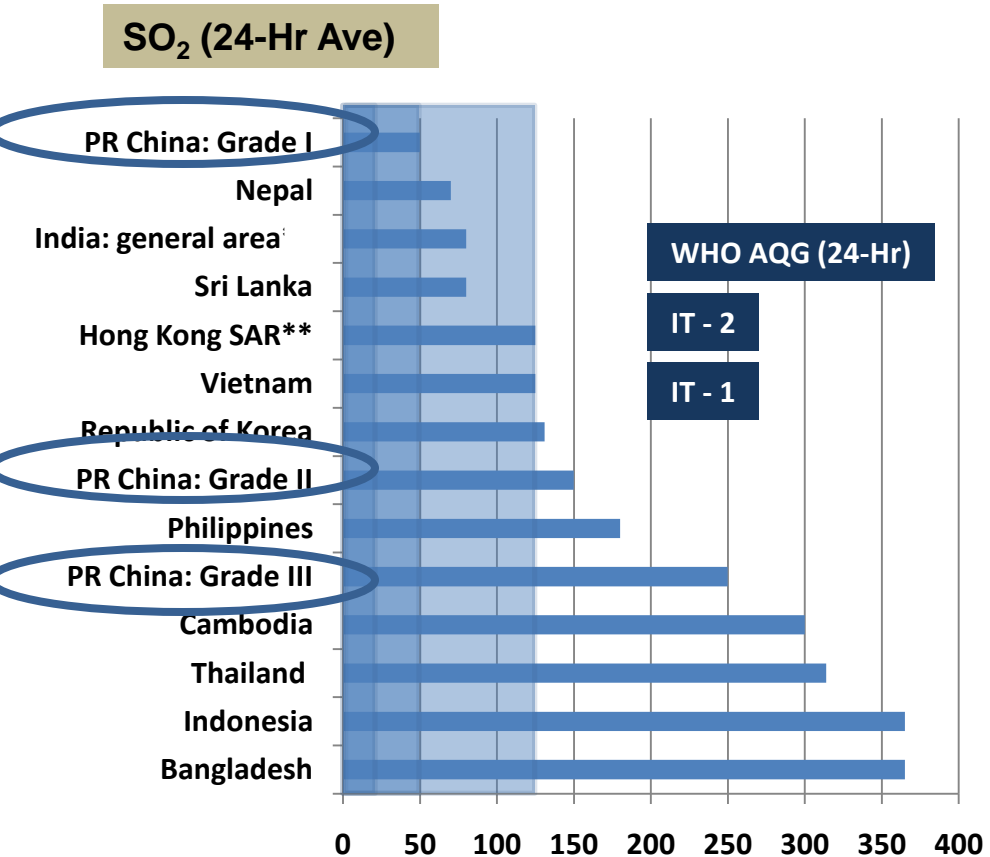
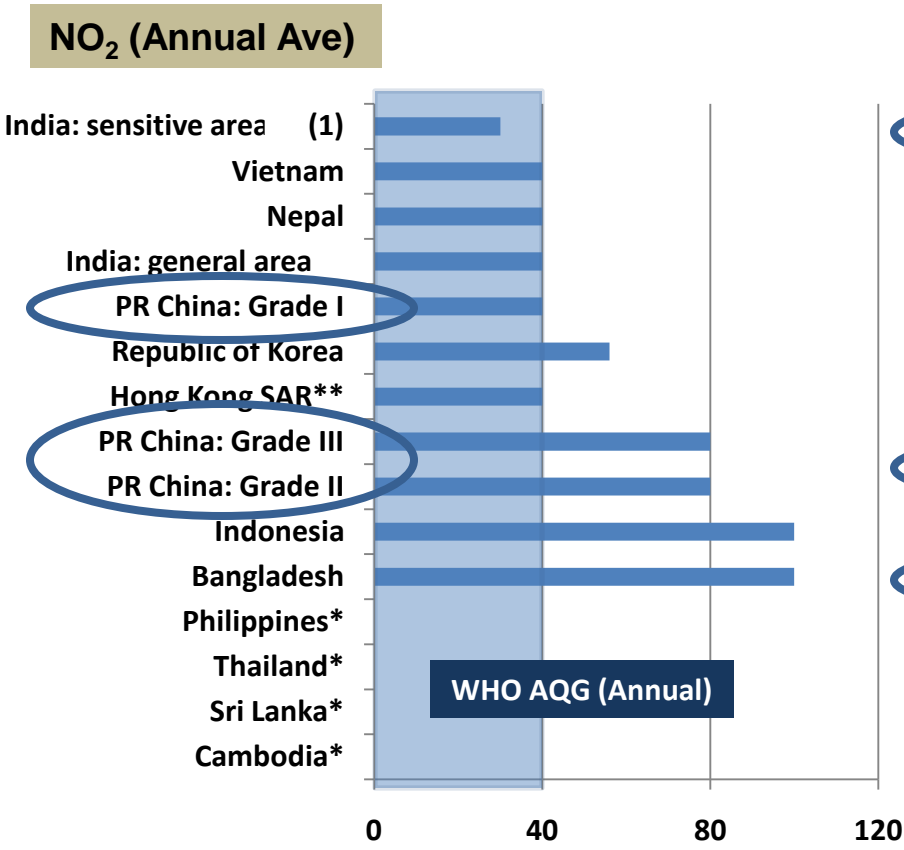
O<sub>3</sub>: \*No 8-Hr O<sub>3</sub> standards, for 1-Hr only

\*\*Draft/proposed



# NO<sub>2</sub>, SO<sub>2</sub> standards in selected Asian countries vs. WHO AQG (µg/m<sup>3</sup>)

## 部分亚洲国家的NO<sub>2</sub>, SO<sub>2</sub>标准与WHO AQG的比较



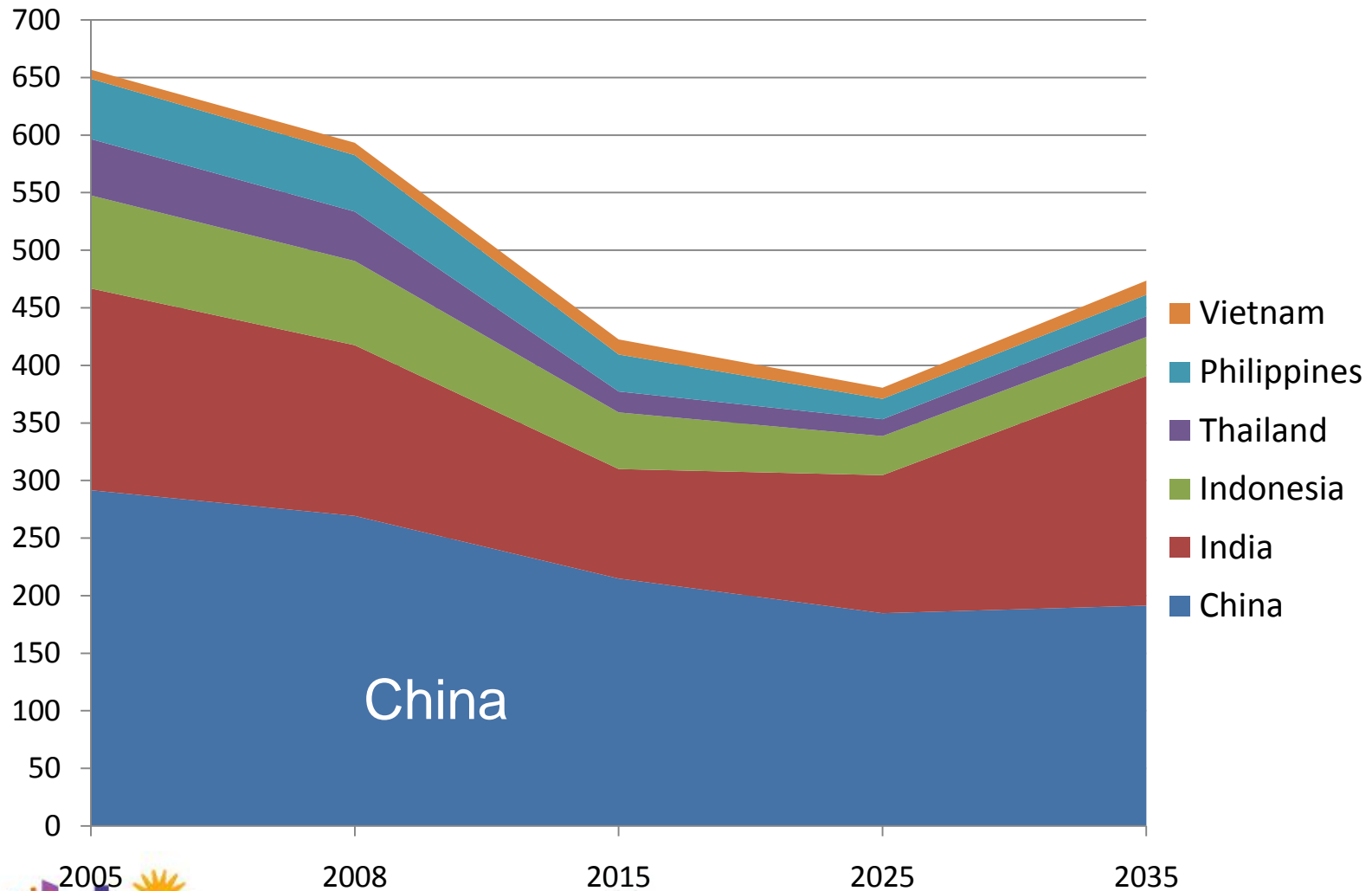
**NO<sub>2</sub>: Most are equal to WHO AQG**  
**Few have no annual standard**

NO<sub>2</sub>: \*No annual NO<sub>2</sub> standard  
 \*\*Draft/proposed  
 (1) - 3-month average

**SO<sub>2</sub>: None are equal to WHO AQG.**  
**Few fall within IT-2 and IT-1**

# Transport particulate matter (PM) emissions decline, then rise

交通排放颗粒物先下降,后上升

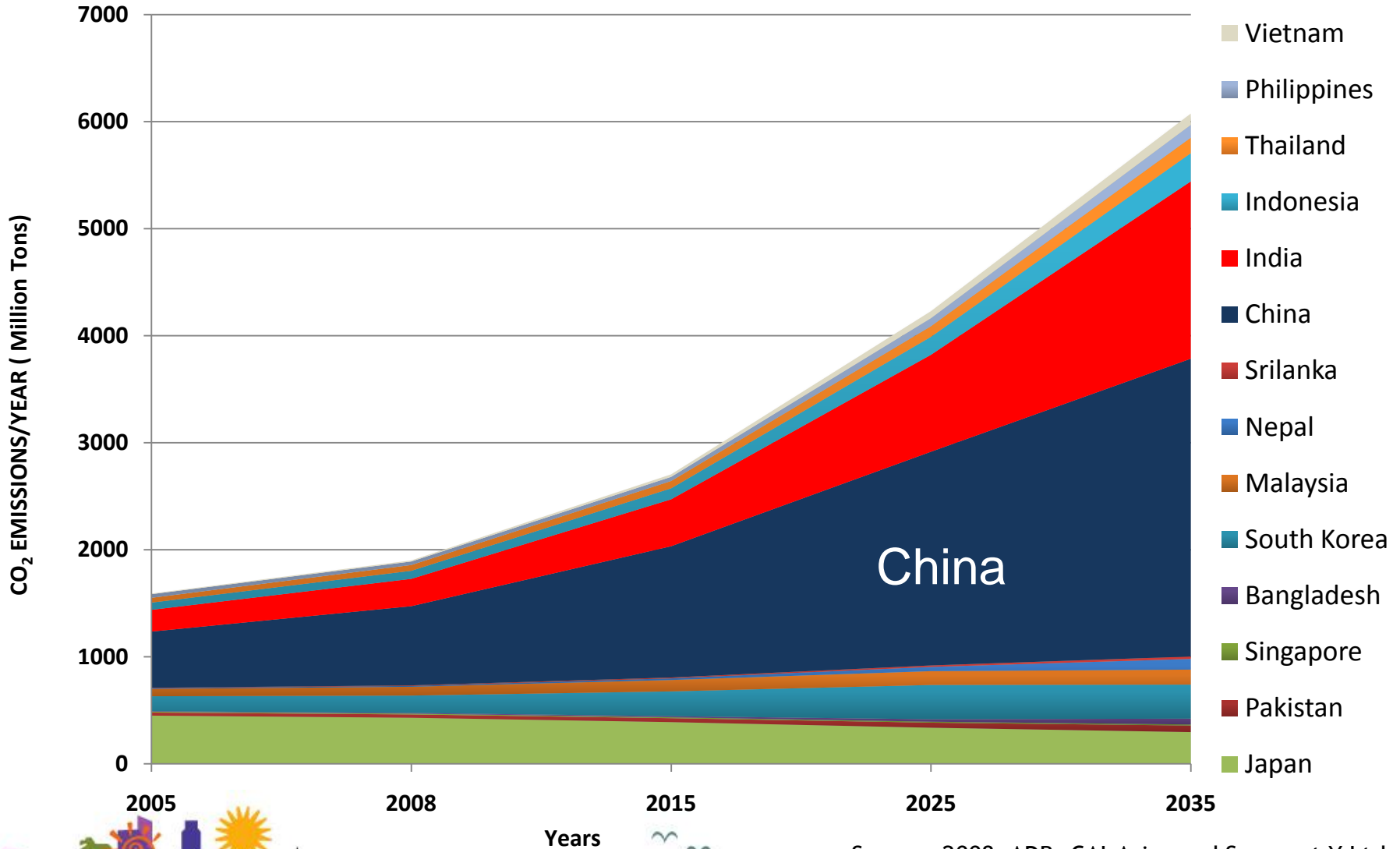


Source: 2008. ADB, CAI-Asia, and Segment Y (based on adoption up to Euro 3 standards)



# Transport CO2 emissions to grow steadily

## 交通行业排放CO2持续稳定增长



Source: 2008. ADB, CAI-Asia, and Segment Y Ltd



# Clean Air Scorecard Management Assessment Tool

## 清洁空气管理评价工具



- **Air Pollution and Health Index** – rating air pollution levels of cities against WHO guideline values and interim targets  
*空气污染和健康指数—以WHO指导值衡量分析城市的空气污染水平*
- **Capacity Index** – rating a city’s capacity to determine sources, levels and impacts and capacity to address air pollution and GHG emissions  
*能力指数—排列城市确定污染源、水平及影响的能力和解决空气污染和温室气体排放的能力*
- **Policies and Actions Index** – rating the presence and enforcement of policies and actions to address emissions from relevant sources (mobile, stationary, area)
- *政策和行动指数—排列解决相关源排放的政策和行动的执行情况（包括流动源、固定源、面源和跨界输送）*



# Pilot Application to Asian Cities

## 在亚洲城市的试点应用



## Clean Air Scorecard Version 1.0

### General Information

The Clean Air Scorecard is an objective and comprehensive assessment tool of a city's management of air pollutants and GHG emission identification of improvement areas which consists of three indexes:

#### Air Pollution and Health

– rating air pollution levels of cities against WHO guideline values and interim targets.

#### Clean Air Management Capacity Index

– rating a city's capacity to determine sources, levels and impacts and capacity to address air pollution and GHG emissions.

#### Clean Air Policies and Actions Index

– rating the presence and enforcement of policies and actions to address emissions from relevant sources (mobile, stationary, area air boundary).

The overall score is determined by the sum of all three indices.

AP and Health Index



Capacity Index



Policies and Actions Index



Overall Clean Air Scorecard



To learn more about the development of Clean Air Scorecard, visit: <http://cleanairinitiative.org/portal/node/4172>  
For questions, suggestions or comments, please send us an email at: [scorecard@cai-asia.org](mailto:scorecard@cai-asia.org)

Next

### About Clean Air Scorecard Tool Version 1.0

Development of the Clean Air Scorecard tool Version 1.0 was supported by the Asian Development Bank (ADB) through RETA 6291: Rolling-out Air Quality in Asia (Sustainable Urban Mobility in Asia [SUMA] Program).

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Bangkok
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JINAN
Kathmandu
Manila



# Results Jinan and Hangzhou: Air Pollution & Health Index (2008)

## 济南和杭州的结果: 空气污染&健康指数(2008年数据)

Jinan gaps  
济南的弱项:

- Pb and PM2.5 data

### Index 1 - Air Pollution and Health Index

Pollutant	Score	Category
PM2.5	no data	no data
PM10	4.9	Very Poor
O3	29.0	Excellent
SO2	3.2	Critical
Pb	no data	no data
NO2	29.7	Excellent
CO	32.5	Excellent

**Final Score** 3.2  
**Pollutant of Concern** SO2  
**Band Category** Critical  
**Pollutants Considered** PM10, SO2, CO, NO2, O3

### Index 1 - Air Pollution and Health Index

Pollutant	Score	Category
PM2.5	no data	no data
PM10	6.1	Very Poor
O3	no data	no data
SO2	4.7	Very Poor
Pb	no data	no data
NO2	20.0	Good
CO	no data	no data

**Final Score** 4.7  
**Pollutant of Concern** SO2  
**Band Category** Very Poor  
**Pollutants Considered** PM10, SO2, NO2

Hangzhou gaps  
杭州的弱项

- PM2.5, CO, Pb and O3



# Results Jinan and Hangzhou: Management Capacity Index

## 济南和杭州的结果:清洁空气管理能力指数



### Jinan 济南

- 有毒有害物的排放清单
- 环境PM2.5监测
- 大多数污染物有路边监测
- 空气污染对健康和其他行业如农业,旅游业及经济的影响

#### Index 2 - Clean Air Management Capacity Index

	Final Score	Perfect Score
Capacity to Determine Sources of Air Pollution and Their Contribution	6.8	8.3
Capacity to Assess the Status of Air Quality	7.3	8.3
Capacity to Estimate Impacts of Air Pollution	4.8	8.3
Capacity to Respond to Air Pollution	7.7	8.3
<b>Total</b>	<b>26.6</b>	<b>33.3</b>

#### Index 2 - Clean Air Management Capacity Index

	Final Score	Perfect Score
Capacity to Determine Sources of Air Pollution and Their Contribution	5.8	8.3
Capacity to Assess the Status of Air Quality	7.3	8.3
Capacity to Estimate Impacts of Air Pollution	6.0	8.3
Capacity to Respond to Air Pollution	7.6	8.3
<b>Total</b>	<b>26.7</b>	<b>33.3</b>

### Hangzhou 杭州:

- PM排放清单
- 包括面源(国内和商用)的排放清单
- 温室气体的排放清单
- 空气污染对健康和其他行业如旅游业的影响



# Results Jinan and Hangzhou: Policies and Actions Index

## 济南和杭州的结果:清洁空气政策和行动指数



### Jinan gaps弱项

- standards for PM<sub>2.5</sub> and other toxics - As, Cd, Cr, Hg, Ni 标准
- transport fuel efficiency and fuel economy standards 交通燃油效率和燃油经济性标准

### Index 3 - Clean Air Policies and Actions Index

	Final Score	Perfect Score
Indicators of General Policies and Actions in Air Quality	8.6	10
Indicators of Clean Air Policies and Actions in Transport Sector	8.5	10
Indicators of Clean Air Policies and Actions in Energy and Industry	7.9	8.3
Indicators of Clean Air Policies and Actions for Other Sources	5.0	5
<b>Total</b>	<b>30.0</b>	<b>33.3</b>

### Index 3 - Clean Air Policies and Actions Index

	Final Score	Perfect Score
Indicators of General Policies and Actions in Air Quality	8.3	10
Indicators of Clean Air Policies and Actions in Transport Sector	7.7	10
Indicators of Clean Air Policies and Actions in Energy and Industry	7.7	8.3
Indicators of Clean Air Policies and Actions for Other Sources	5.0	5
<b>Total</b>	<b>28.8</b>	<b>33.3</b>

### Hangzhou gaps弱项:

- standards for PM<sub>2.5</sub> and other toxics - As, Cd, Cr, Hg, Ni标准
- smog alarm plan 烟雾预警计划
- transport fuel efficiency and fuel economy standards 交通燃油效率和燃油经济性标准
- technology transfer programs and measures for energy and industry sectors 技术推荐项目和能源及工业行业的措施





# Results Jinan and Hangzhou: Overall Scores

## 济南和杭州的结果: 总得分



<b>Jinan Score = 61.5/ Good</b>	<b>Final Score</b>	<b>Band Category</b>
<b>Index 1 - Air Quality and Health Index</b>	3.2	Critical (SO2)
<b>Index 2 - Clean Air Management Capacity</b>	26.6	Excellent
<b>Index 3 - Clean Air Policies and Actions</b>	30.0	Excellent

<b>Hangzhou Score = 61.4/ Good</b>	<b>Final Score</b>	<b>Band Category</b>
<b>Index 1 - Air Quality and Health Index</b>	4.7	Very Poor (SO2)
<b>Index 2 - Clean Air Management Capacity</b>	26.7	Excellent
<b>Index 3 - Clean Air Policies and Actions</b>	28.7	Excellent



# Results Jinan and Hangzhou: What next?

## 济南和杭州的结果:下一步?



- Improve existing management by addressing gaps
  - Existing pollutants (PM<sub>10</sub>, SO<sub>2</sub>) and more pollutants (PM<sub>2.5</sub>)
  - Emissions inventory and monitoring
  - Fuel efficiency and fuel economy
- Scaling up measures to make bigger impact
  - Analysis of impacts of measures on emissions
  - Strengthen existing measures
- Cooperation with other cities
  - Within same region / urban cluster to co-manage emissions
  - Elsewhere to learn from their experience/ best practices
- Low Emissions Urban Development context
- *Indicators for regional air quality management and recommendations for cities will be incorporated in version 2.0 of the Clean Air Management Assessment Tool*



### 1. Visioning Livable Cities

- Problem analysis
- Develop Vision with stakeholders
- Visioning-backcasting for low emissions development

Clean Air  
Management  
Assessment Tool

### 2. Develop Low Emissions Action Plan

- Identify policies and projects for Action Plan
- Stakeholder consultation
- Identify required tools and partners

### 3. Analyze Proposed Action Plan

- Feasibility analysis of selected policies and projects
- Implementation plan
- Support framework for implementation

### 4. Implementation

- Action Plan implementation
  - Monitoring
  - Evaluation

Adapted from: CAI-Asia Center, 2009. Achieving Sustainable Urban Mobility in Asian Cities - Discussion paper (*draft*), funded by ADB/Sida

# Role of Environmental Protection Bureaus

## 环保局的角色



- Monitoring and measurement of air pollution and GHG emissions, management capacity and policies & actions
- Expand city Clean Air Action Plans with CO<sub>2</sub> benefits and additional measures for CO<sub>2</sub> reduction
- Support and collaborate with
  - MDRC in a city-wide approach to low emissions urban development
  - Sector agencies (e.g. Transport Committee) for policies and actions needed at the sector level , and determining impact on emissions



# Thank You!



## CAI-Asia Center

[www.cleanairinitiative.org](http://www.cleanairinitiative.org)

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