亚洲城市清洁空气评价工具 第二部分

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第五届中国城市质量管理研讨会

CAI-Asia 中国网络: 空气质量和协同效益

中国 北京

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感谢能源基金会的支持

大纲

- 清洁空气评价工具
  - 空气质量和健康指数
  - 清洁空气管理能力指数
  - 清洁空气政策和行动指数
- 协同效益的措施
- 清洁空气评价工具
  - 案例
  - 在线资源

清洁空气评价工具
Clean Air Assessment Tool

清洁空气评价工具 （版本**1.0**）

空气质量和健康指数	+	清洁空气管理能力指数	+	政策和行动指数	=	综合指数

- *空气质量 和健康指数*—以WHO指导值衡量分析城市的空气污染水平

- *能力指数*—排列城市确定污染来源、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

- *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）

空气质量和健康指数 (1)

- 评价城市空气污染水平，基于WHO指南和中期目标

- 基于空气污染指标(API)

- 指标包括 PM_{10}, $PM_{2.5}$, SO_2, CO, NO_2, Pb 和 O_3

- 监测数据至少包括: **PM_{10} 的数据**

- 非监控和非报告的数据: "黑匣子"- 未知的空气质量

分类	分数	集中度	基于
		年平均 **PM$_{10}$ (μg/m^3)**	
优秀	81-100	≤ 30	**WHO** 年度空气质量指南**& IT-3**
良好	61-80	31 to 50	**IT-2**
一般	41-60	51 to 70	**IT-1**
差	21-40	71 to 100	目前**185**个城市的数据 （平均水平: 101.23 μg/m^3）
非常差	11-20	101 to 150	标准差 **50 μg/m3**
危险	0-10	150 以上	

*WHO 年度指南： PM$_{10}$: 20 μg/m^3

空气质量和健康指数(2)

分类	分数	集中度 (μg/m^3)						
		年均PM$_{10}$,	年均 PM$_{2.5}$,	年均 SO$_2$,	年均CO (一天最多8小时)	年均 NO$_2$,	年均 Pb,	年均 O$_3$, (一天最多8小时)
优秀	81-100	≤ 30	≤ 15	≤ 10	≤10,000	≤ 40	≤0.15	≤ 100
良好	61-80	31 to 50	16 to 25	11 to 20	10,001 to 12,000	41 to 50	0.15 to 0.3	101 to 125
一般	41-60	51 to 70	26 to 35	21 to 30	12001 to 14,000	51 to 60	0.31 to 0.45	126 to 150
差	21-40	71 to 100	36 to 50	31 to 40	14,001 to 16,000	61 to 70	0.45 to 0.6	151 to 195
非常差	11-20	101 to 150	51 to 75	41 to 50	16,001 to 18,000	71 to 80	0.61 to 0.75	196 to 240
危险	0-10	150 以上	76 以上	51 以上	18,001 以上	81 以上	0.76 以上	241 以上

黑匣子 **- PM$_{10}$** 是核心污染物. 没有**PM$_{10}$** 数据的城市应放到此分类中

- 评价城市的如下能力：
  (1) 决定排放源及其**"贡献"**

  (2) 评价空气质量状况

  (3) 影响评估

  (4) 通过制度和政策框架**/**金融手段来减排

- 基于**DPSIR** 框架:
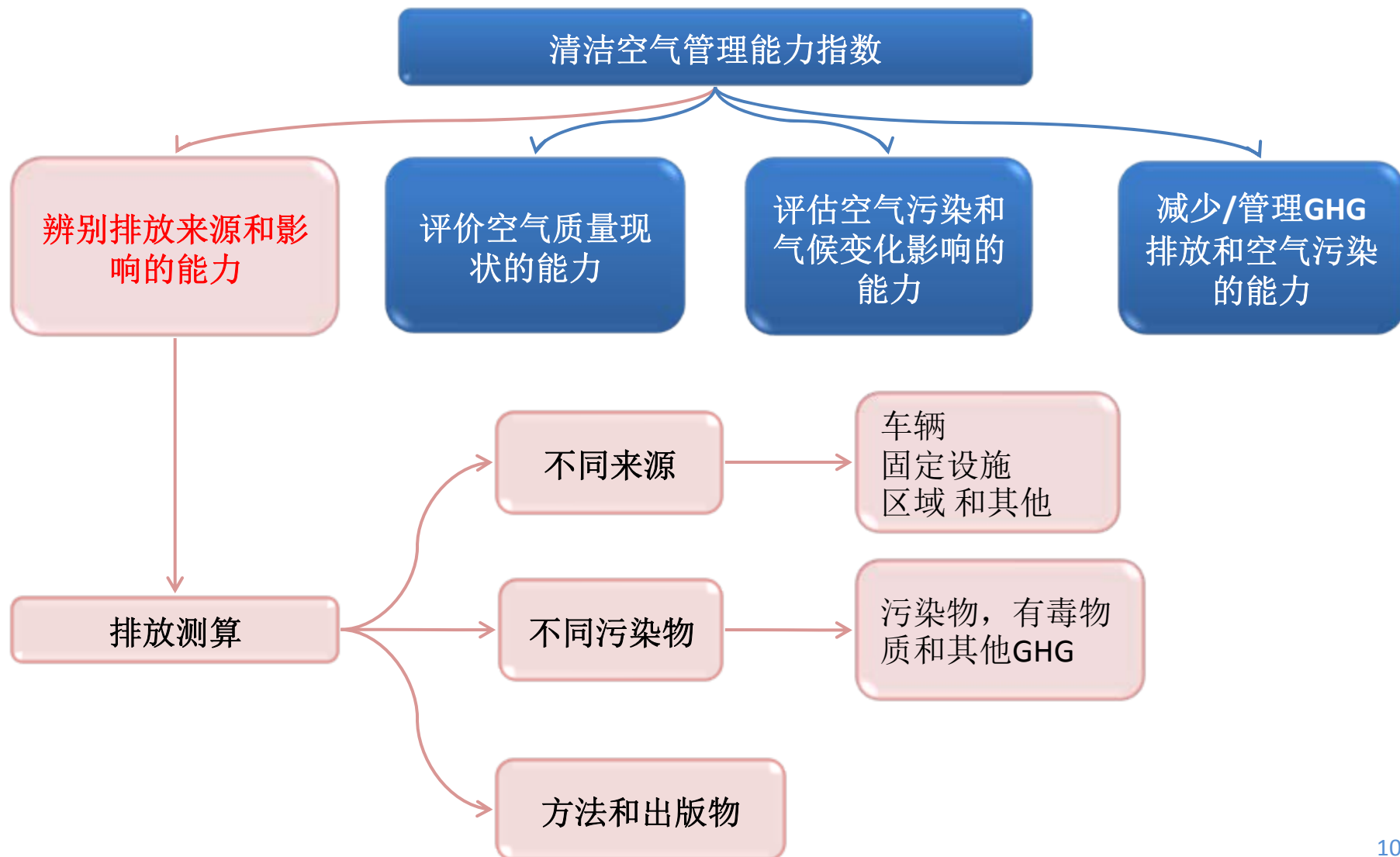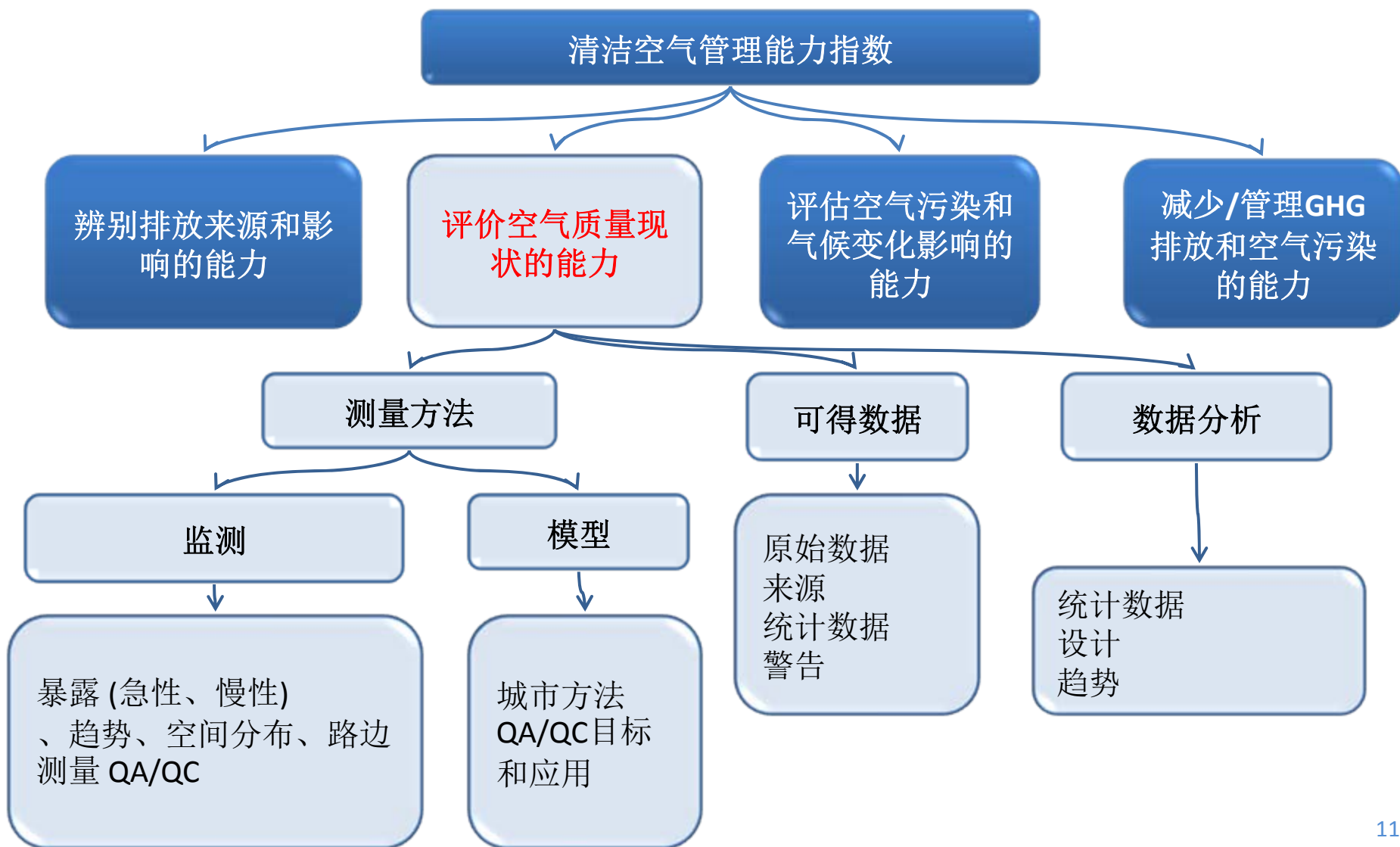 **D**rivers-**P**ressures-**S**tate-**I**mpacts-**R**esponse（因素-压力-现状-影响-反应）

清洁空气管理能力指数 (2)


```
                    ┌─────────────────────────┐
                    │   清洁空气管理能力指数   │
                    └─────────────────────────┘
```

辨别排放来源和影响的能力	评价空气质量现状的能力	评估空气污染和气候变化影响的能力	减少/管理GHG排放和空气污染的能力
因素-压力	现状	影响	反应力
25%	**25%**	**25%**	**25%**
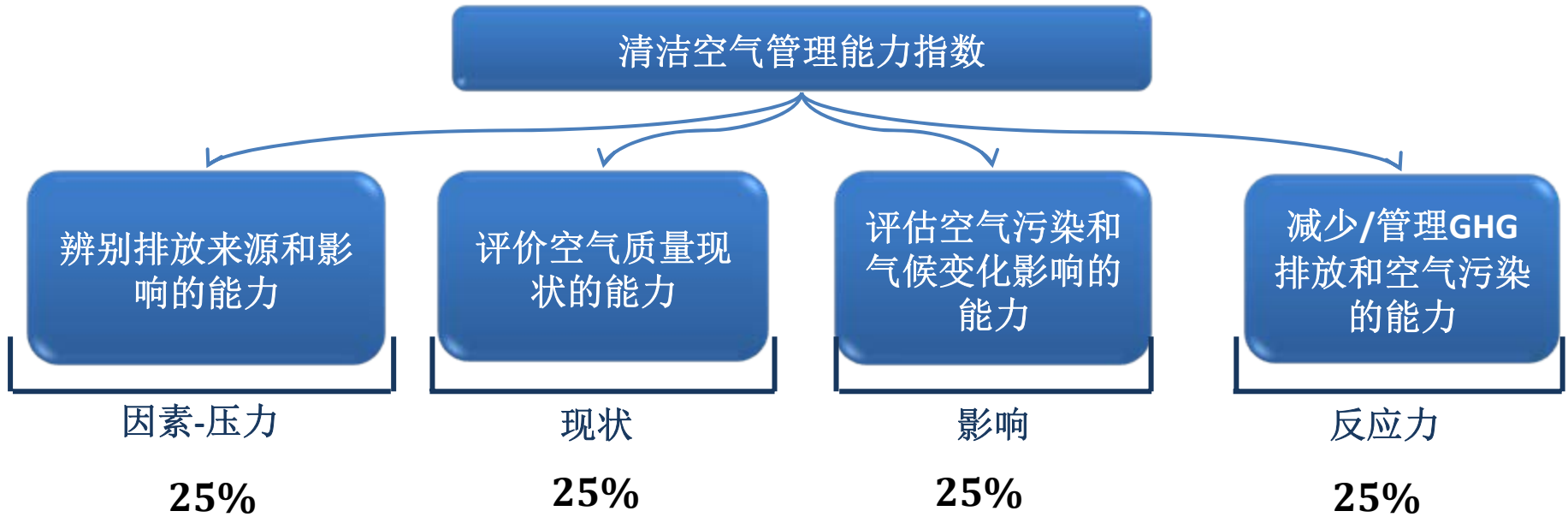
分类	分数
优秀	81-100
良好	61-80
一般	41-60
有限	21-40
差	1-20

清洁空气管理能力指数 (3)

清洁空气管理能力指数

辨别排放来源和影响的能力

评价空气质量现状的能力

评估空气污染和气候变化影响的能力

减少/管理GHG排放和空气污染的能力

排放测算

不同来源

车辆
固定设施
区域 和其他

不同污染物

污染物，有毒物质和其他GHG

方法和出版物

清洁空气管理能力指数 (4)

清洁空气管理能力指数 (5)

清洁空气管理能力指数

辨别排放来源和影响的能力

评价空气质量现状的能力

评估空气污染和气候变化影响的能力

减少/管理GHG排放和空气污染的能力

健康

健康暴露
评价
流行病学
健康成本
QA/QC

气候
农业
材料
旅游
植被
可见度
经济
其他
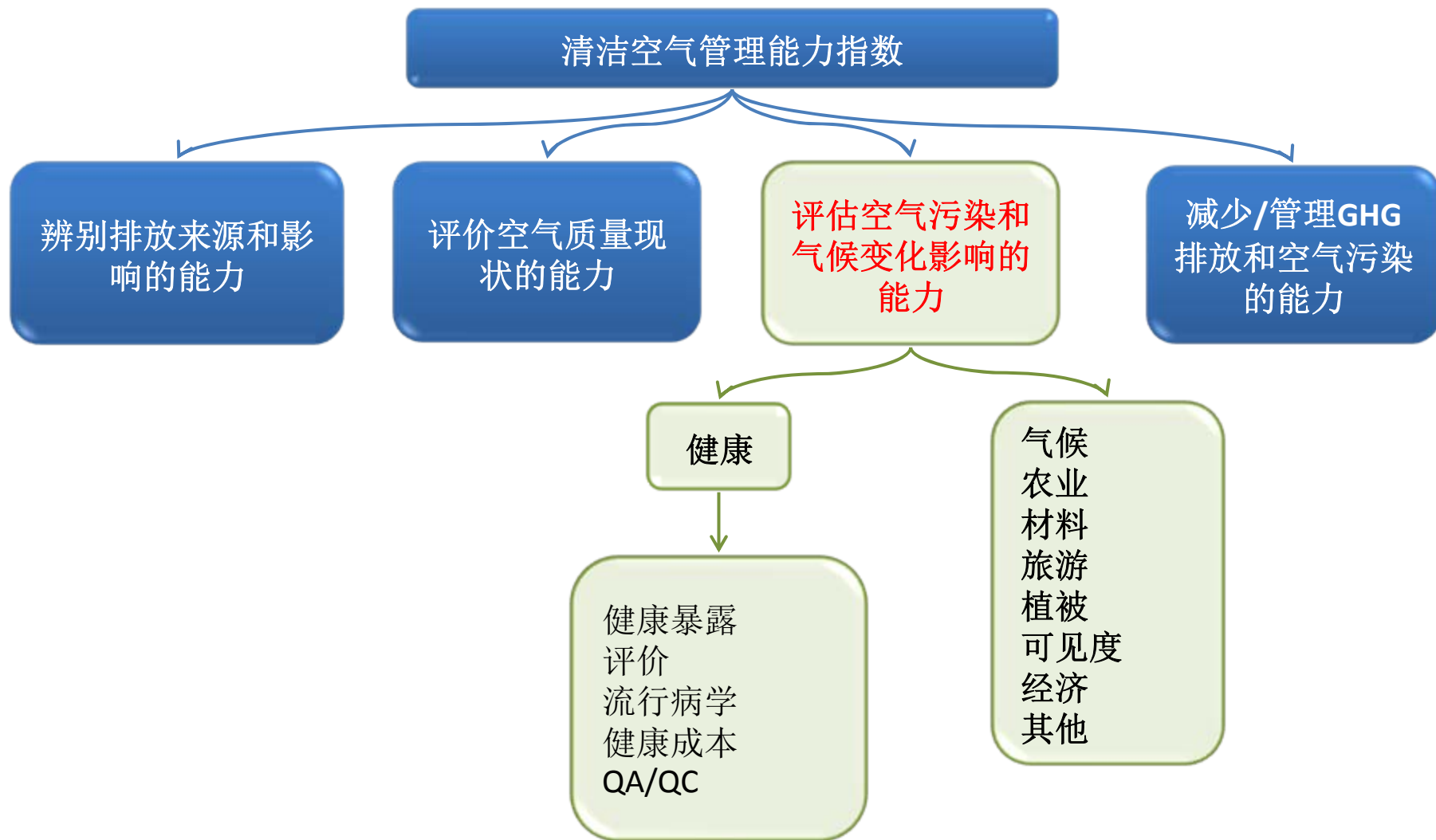
清洁空气管理能力指数 (6)
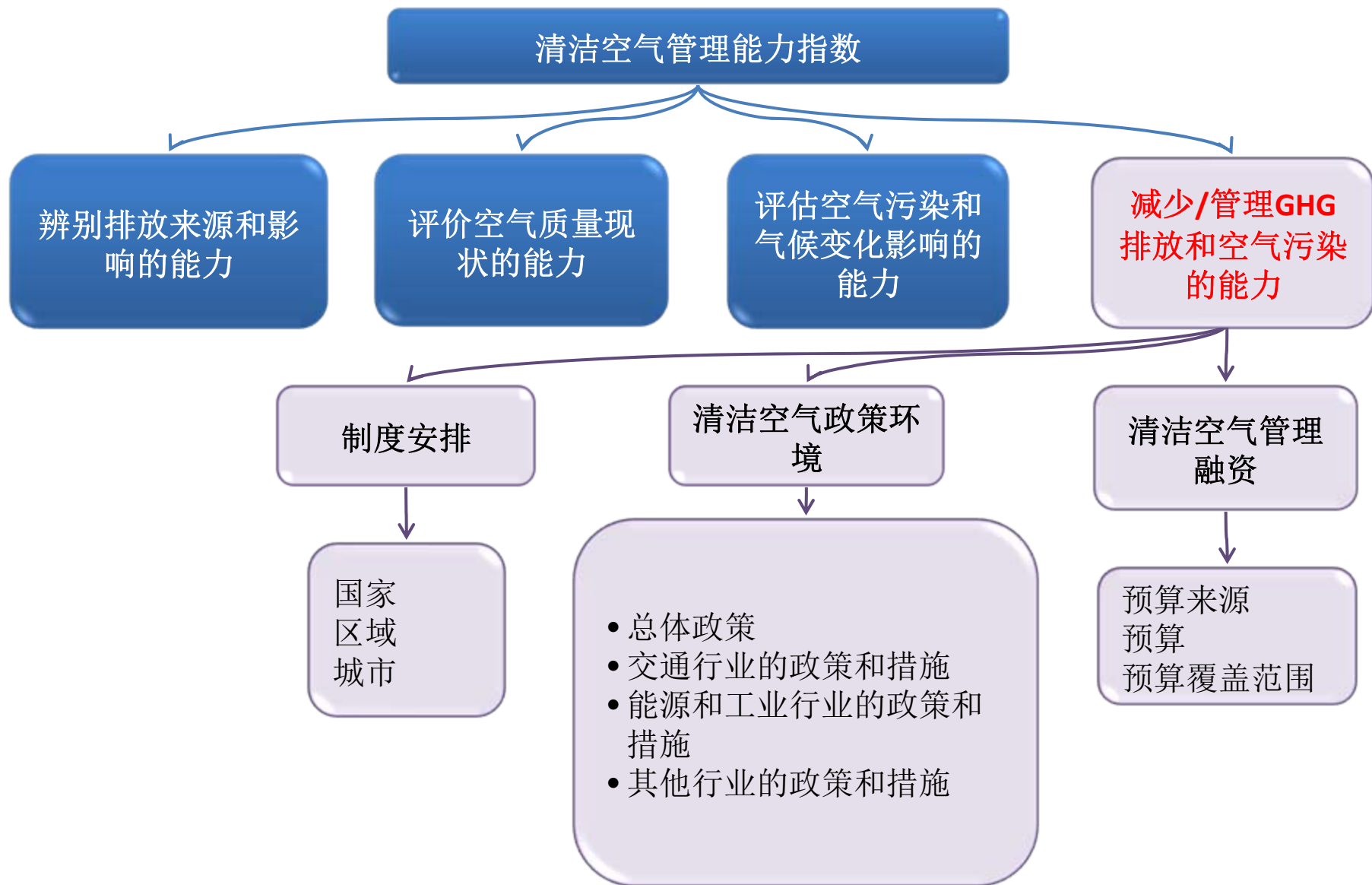
政策和行动指数 (1)

- 评价现有的国家/地方的空气污染/GHG排放的政策和行动:

  车辆, 固定源, 区域和其他来源.

政策和行动指数 (2)

```
                    清洁空气政策和行动指数
   ┌─────────────┬──────────────┬──────────────┬──────────────┐

  总体政策和行动   交通行业政策和行动   能源和工业行业政策   其他方面的政策行
                                      行动              动

    30%             30%            25%            15%
```
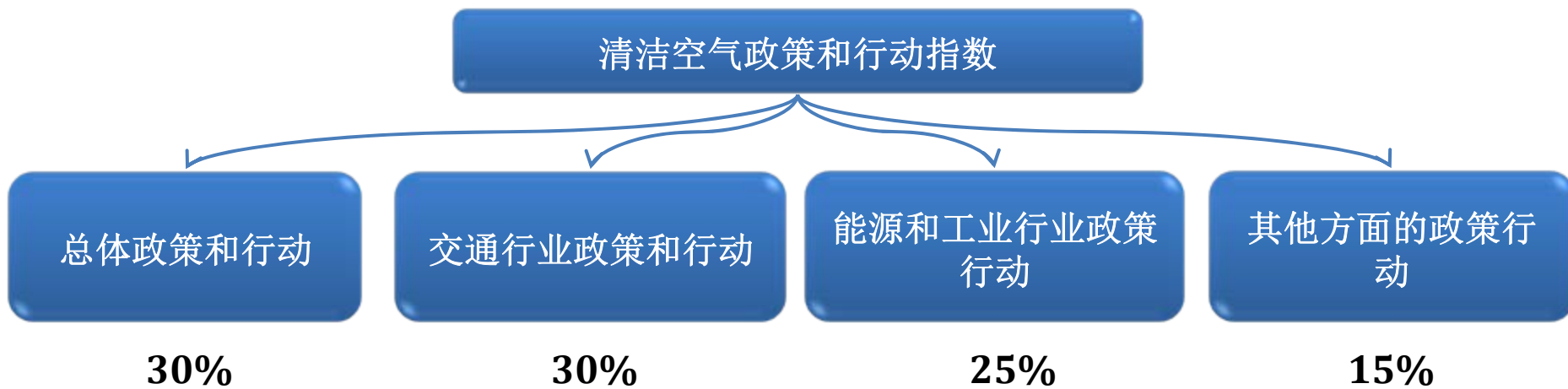
分类	分数
优秀	81-100
良好	61-80
一般	41-60
有限	21-40
差	1-20

政策和行动指数 (3)

清洁空气政策和行动指数

总体政策和行动

交通行业政策和行动

能源和工业行业政策行动

其他方面的政策行动

法律框架

清洁空气立法
立法信息的可得性
环境保护立法
空气质量立法
协同效益

相关方的参与

评价空气质量的可接受性

空气质量标准

急性的
慢性的
发展基础

地方措施

清洁空气政策和行动指数

总体政策和行动

交通行业政策和行动

能源和工业行业政策行动

其他方面的政策行动

城市规划中的可持续交通成分 (SUT)

标准

可持续交通项目的指标和措施

交通需求管理
公共交通
自行车
步行
车辆交通体系管理
货运和物流
检测和维护
可替代燃油/NRE燃油
燃油效率

燃油经济性

燃油质量

车辆排放

轻型车辆
重型车辆
2-3 轮车辆

路运
航运

再用车辆
新车

轻型车辆
重型车辆
2-3 轮车辆

政策和行动指数(5)

清洁空气政策和行动指数

总体政策和行动

交通行业政策和行动

能源和工业行业政策行动

其他方面的政策行动

城市规划中的固定设施排放管理 (SSEM)

排放标准

SSEM项目中的指标和措施

许可
监督
能效/ 节约
技术转移
工业优先度

清洁空气政策和行动指数

总体政策和行动

交通行业政策和行动

能源和工业行业政策行动

其他方面的政策行动

城市规划中的排放管理

标准

其他排放管理措施

开放燃烧 (家庭垃圾)
开放垃圾 (农业废物)
建筑
火葬
沙尘暴

协同效益的措施

交通运输

	空气污染	CO_2	交通拥堵
避免 – 减少出行量			
土地使用 – 改变行为	+++	+++	++
交通需求管理/公交导向	++	+++	++
转变 – 减少单位运输量排放			
客运			
改变出行方式	+++	++	+++
使用大运量工具	+	+	++
提高乘坐率	++	++	++
货运	++	++	++
改进 – 减少单位km排放			
技术/车辆的改进	+++	++	?
驾驶习惯的改进	++	+	+
使用其他燃油 (CNG, LPG, 生物燃油)	++	?	?

CAI-Asia, 2008.

能源和工业

	空气污染	CO_2	其他环境问题 (废物、表面和地下水、其他)
许可 [建设、改造和运营许可]	++	?	++
设置空气污染控制技术	+++	?	+++
排放限制	++	?	++
监督和报告	+++	?	+++
能效	++	++	++
技术转移	++	+	++
工业选址(更多暴露)	++	?	+
工业优先度(优先发展某种工业，例如可再生能源)	+++	?	++

CAI-Asia, 2010.

详述清洁空气评价工具
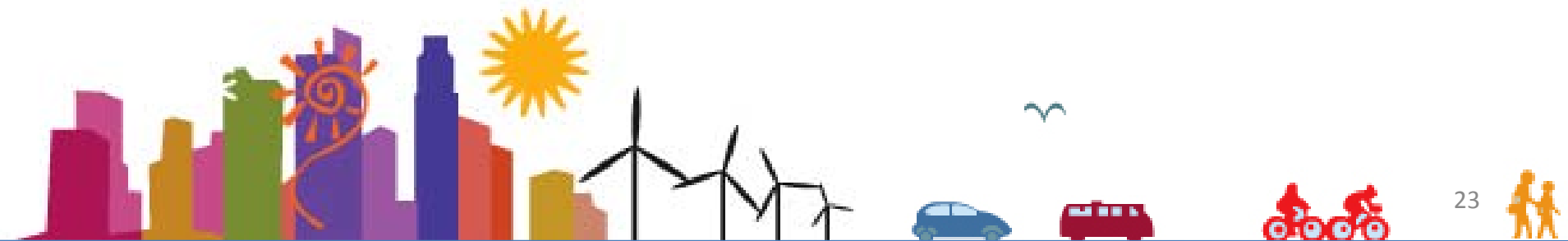
Clean Air Scorecard Version 1.0

Photo © CAI-Asia, 2010.

Click to Enter

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 emissio 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 ar 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

Nex

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).

Clean Air Scorecard Version 1.0

General Information for Beijing, P.R. China

Instructions

Please encode the data needed in the gray boxes.

* City		Beijing
* Region/Province		
* Country		P.R. China
Total Land Area of Beijing (km)		

Economy

GDP for Beijing in ($) (billion)	

Demograhics

* Population in Beijing (millions) in	
Annual Population Growth Rate in Beijing in	
Population Density in Beijing in (people/km2)	

Transport

Total Vehicle Population in Beijing in (vehicles/year)	

* Year of Assessment	

Energy

Electricity Consumption for Beijing in (kMh/person/year)	

Industry

* Major sources of stationary air pollution in Beijing

#	Stationary source	Notes
1		
2		
3		
4		
5		

Basic metal industries
Manufacture of chemicals and of chemical, coal, rubber and plastic products
Manufacture of food, beverages and tobacco
Manufacture of miscellaneous products of petroleum and coal
Manufacture of non-metallic mineral products except petroleum and coke
Manufacture of paper and paper products, printing and publishing
Manufacture of wood and wood products, including furniture
Mining and quarrying

Note: If there are other major stationary sources in Beijing that not included in the list, select 'Other' and specify the source under 'Notes' column.

Next Page

* Required Fields

Ask us! For questions, comments or suggestions, send us an email at: scorecard@cai-asia.org

Home

1. Instructions

2. City Details

3. Demographic Data

4. Index 1 - APHI

5. Index 2 - CAMC

6. Index 3 - CAPA

7. Glossary

8. Results

9. CA Scorecard Report

Clean Air Scorecard Version 1.0

Index 1 - Air Quality and Health Index (APHI)

Instructions

Please encode the data needed in the gray boxes. Use the most recent set of data available.

Year	

Pollutant	Averaging Time	* Concentration $\mu g/m^3$ (average)	Concentration $\mu g/m^3$ (minimum)	Concentration $\mu g/m^3$ (maximum)
$PM_{2.5}$	annual average			
PM_{10}	annual average			
O_3	annual average of maximum daily 8-hr			
SO_2	annual average			
Pb	annual average			
NO_2	annual average			
CO	annual average of maximum daily 8-hr			

* Required Fields

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Ask us! For questions, comments or suggestions, send us an email at: scorecard@cai-asia.org

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Clean Air Scorecard Version 1.0

Index 2 - Clean Air Management Capacity (CAMC)

User Input

Please enter **a** for YES (✔), **r** for NO (✗) and **x** for not applicable (⊘). Please answer all items.

Sub-Index A Capacity to Determine Sources of Air Pollution and Their Contribution

| a = ✔ |
| r = ✗ |
| x = ⊘ |

Please enter source/ reference here:

1 Indicators of the Capacity to Estimate Emissions by Source

1.A *Indicators of the Capacity to Estimate Emissions from* **Mobile Sources**

- In Beijing: Are data collected on the following:

Land transport emissions

Vehicle type

Fuel type

Year of manufacture

Average trip length for each of the vehicle categories

Occupancy ratios (number of passengers per vehicle per trip)

Emission factors

Railway statistics (passenger-km, fuel consumption, etc). If there are no railways in Beijing, enter 'x' for not applicable.

Total gasoline consumption

Total diesel consumption

Total (other fuel) consumption

Water transport emissions

If there is no water transport in Beijing, enter 'x' for not applicable.

Ship type

Ship age

Frequency of port arrivals and departures

[Please enter your source/ reference here. Can be a document, report, interview, etc.]

Clean Air Scorecard Version 1.0

Index 3 - Clean Air Policies and Actions (CAPA)

User Input

Please enter **a** for YES (✔), **r** for NO (✘) and **x** for not applicable (⊘). Please answer all items.

Sub-Index A Indicators of General Policies and Actions in Air Quality

a = ✔	
r = ✘	
x = ⊘	

Enter name of law/policy /measure/action and/or link he

1 Indicators of Framework Legislation on Air Quality

- Is the right to clean air formulated in the Constitution?
- Is the right to access information formulated in the Consitution?
- Is there a national legislation on environmental protection?
- Is there a specific national legislation on clean air /air quality?
- Is there a national legislation/strategy/plan on mitigating GHG emissions?
- Are the co-benefits of air quality and mitigating GHG emissions explicitly recognized in of the following

  If there is no such policy, please enter "x" for not applicable.

  National legislation on environmental protection

  National legislation/strategy/plan on mitigating GHG emissions

  National clean air/air quality legislation

- Mandatory conduct of environmental impact analysis (which includes air quality impact assessment and provision for mitigation measures) for new major projects/modifications of existing industries is a requirement for an operation license/permit
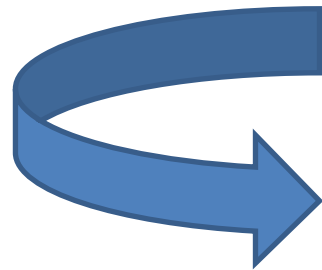
2 Indicators to Assess Air Quality Acceptability

2-A *Air quality standards for short-term and long-term exposure*

- Have air quality standards been established for the following?

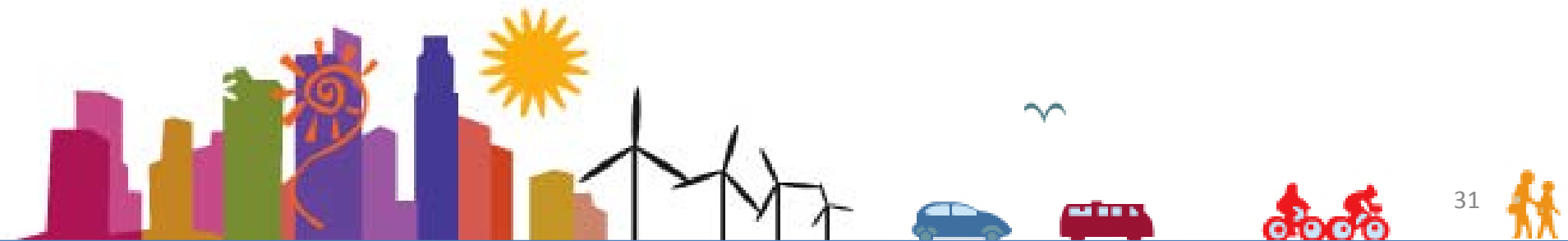 **Air quality standards for short-term exposure (one day or less)**

  $PM_{2.5}$

转到
清洁空气评价工具

清洁空气评价工具:
案例分析

注: 仅仅是案例

Clean Air Scorecard Version 1.0

General Information for Beijing, P.R. China

Instructions
Please encode the data needed in the gray boxes.

* City	Beijing	
* Region/Province		
* Country	P.R. China	
Total Land Area of Beijing (km)		

Economy

GDP for Beijing in 2009 ($) (billion)	

Demograhics

* Population in Beijing (millions) in 2009	11.8	
Annual Population Growth Rate in Beijing in 2009		
Population Density in Beijing in 2009 (people/km2)		

Transport

Total Vehicle Population in Beijing in 2009 (vehicles/year)	

* Year of Assessment		2009

Energy

Electricity Consumption for Beijing in 2009 (kMh/person/year)	

Industry

* Major sources of stationary air pollution in Beijing		
#	Stationary source	Notes
1	Power-generating facilities	
2	Manufacture of wood and wood products, including furniture	
3	Manufacture of non-metallic mineral products except petroleum and coke	
4	None	
5	None	

Note: If there are other major stationary sources in Beijing that not included in the list, select 'Other' and specify the source under 'Notes' column.
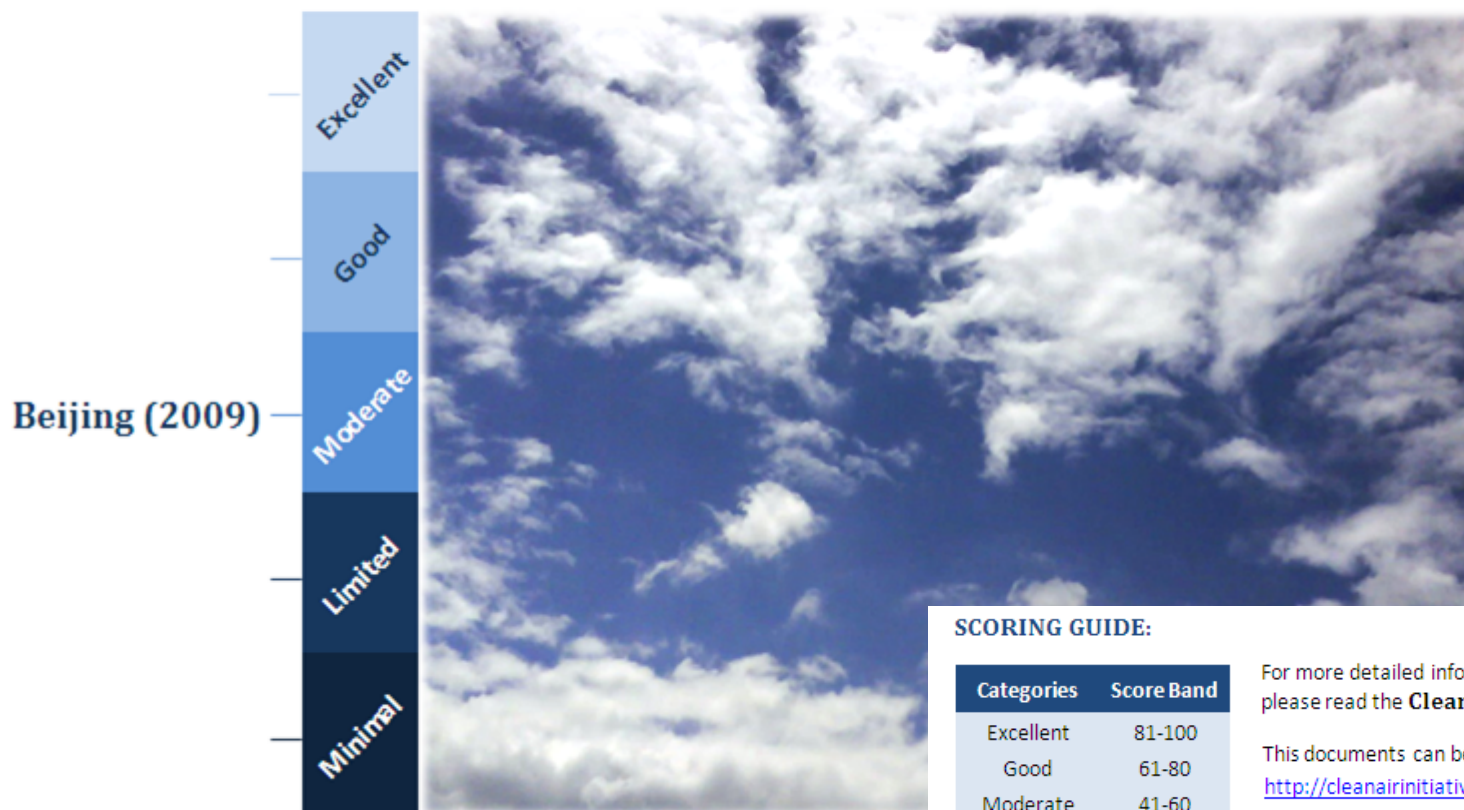
Next Page

* Required Fields

Ask us! For questions, comments or suggestions , send us an email at: scorecard@cai-asia.org

注: 仅仅是案例

Clean Air Scorecard Report

Beijing, P.R. China Year 2009

General Information

City	Beijing	Total Land Area of Beijing (km)	
Region/Province		GDP for Beijing in 2009 ($) (billion)	
Country	P.R. China	Population in Beijing in 2009 (millions)	11.8

Clean Air Scorecard Results

Clean Air Score for Beijing in 2009: 50.5 | Moderate

	Final Score	Band Category
Index 1 - Air Quality and Health Index	11.9	Poor
Index 2 - Clean Air Management Capacity	20.1	Limited
Index 3 - Clean Air Policies and Actions	18.6	Minimal

Overall Clean Air Score per Index

- Clean Air Policies and Actions
- Clean Air Management Capacity
- Air Quality and Health Index

Clean Air Score

Beijing
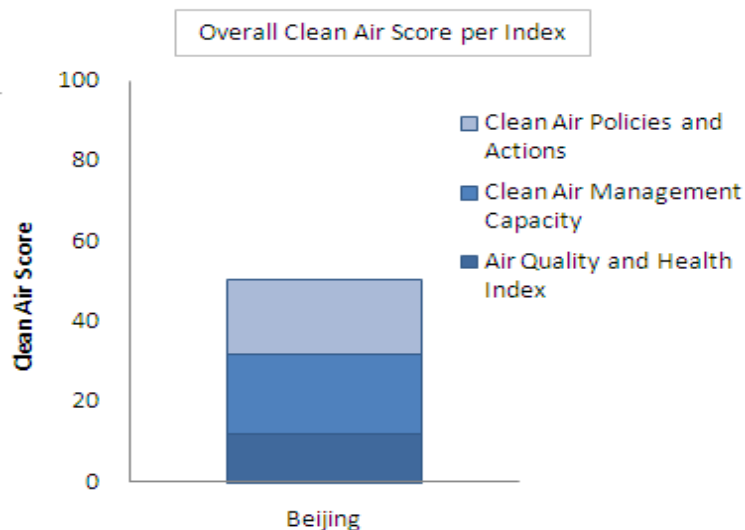
Index 1 - Air Pollution and Health Index

Final Score	35.6
Pollutant of Concern	O3
Band Category	Poor
Pollutants Considered	PM10, PM2.5, SO2, NO2, CO, O3

注: 仅仅是案例

Index 1 - APHI Result Details

Index 2 - Clean Air Management Capacity Index

	Final Score
Capacity to Determine Sources of Air Pollution and Their Contribution	6.3
Capacity to Assess the Status of Air Quality	3.4
Capacity to Estimate Impacts of Air Pollution	3.7
Capacity to Respond to Air Pollution	6.7
Total	**20.1**

Index 2 - CAMC Result Details

Distribution of Scores under Clean Air Management Capacity

- 31% Capacity to Determine Sources of Air Pollution and Their Contribution
- 17% Capacity to Assess the Status of Air Quality
- 19% Capacity to Estimate Impacts of Air Pollution
- 33% Capacity to Respond to Air Pollution

Index 3 - Clean Air Policies and Actions Index

	Final Score
Indicators of General Policies and Actions in Air Quality	6.0
Indicators of Clean Air Policies and Actions in Transport Sector	5.3
Indicators of Clean Air Policies and Actions in Energy and Industry	6.1
Indicators of Clean Air Policies and Actions for Other Sources	1.3
Total	**18.7**

Index 3 - CAPA Result Details

Distribution of Scores under Clean Air Policies and Actions Index

- 32% Indicators of General Policies and Actions in Air Quality
- 28% Indicators of Clean Air Policies and Actions in Transport Sector
- 33% Indicators of Clean Air Policies and Actions in Energy and Industry
- 7% Indicators of Clean Air Policies and Actions for Other Sources

SCORING GUIDE:

Index 1 - APHI

Categories	Score Band
Excellent	81-100
Good	61-80
Moderate	41-60

Index 2 - CAMC

Categories	Score Band
Excellent	81-100
Good	61-80
Moderate	41-60

Index 3 - CAPA

Categories	Score Band
Excellent	81-100
Good	61-80
Moderate	41-60

For more detailed information on Clean Air Scoring scoring, please read the **Clean Air Scorecard Scoring Guide.**

This documents can be downloaded from:
http://cleanairinitiative.org/portal/node/2206

注: 仅仅是案例

Clean Air Scorecard Report

Beijing, P.R. China Year 2009

Index 1 - Air Pollution and Health Index

Pollutant	Score	Category
PM2.5	50.0	Moderate
PM10	45.0	Moderate
O3	35.6	Poor
SO2	60.0	Good
Pb	60.0	Good
NO2	70.0	Good
CO	70.0	Good

Final Score   35.6

Pollutant of Concern   O3

Band Category   Poor

Pollutants Considered PM10, PM2.5, SO2, CO, NO2, Pb, O3
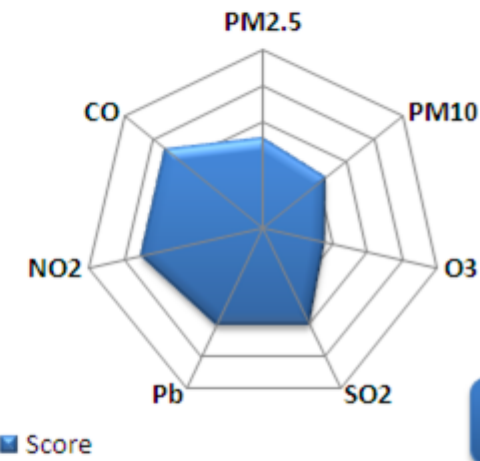
■ Score

Return to Clean Air Scorecard Report

SCORING GUIDE:

Index 1 - APHI

Categories	Score Band
Excellent	81-100
Good	61-80
Moderate	41-60
Poor	21-40
Very Poor	11-20
Critical	0-10

Index 2 - CAMC

Categories	Score Band
Excellent	81-100
Good	61-80
Moderate	41-60
Limited	21-40
Minimal	0-20

Index 3 - CAPA

Categories	Score Band
Excellent	81-100
Good	61-80
Moderate	41-60
Limited	21-40
Minimal	0-20

For more detailed information on Clean Air Scoring scoring, please read the **Clean Air Scorecard Scoring Guide**.

This documents can be downloaded from:
http://cleanairinitiative.org/portal/node/2206

注: 仅仅是案例

清洁空气评价工具报告

- 清洁空气评价结果 (针对每个指数/次级指数，以及整体的评价)
- 城市空气质量管理和GHG排放管理的优势和不足
- 协同效益政策和措施提议
- 附加信息:
  - 城市简介
  - 有关 能力提升，以及政策措施的建议(长期，短期)
  - 协调效益、经验和建议的壁垒.

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