

Opportunities for regional collaboration on air quality management in China

中国区域空气质量管理合作的契机

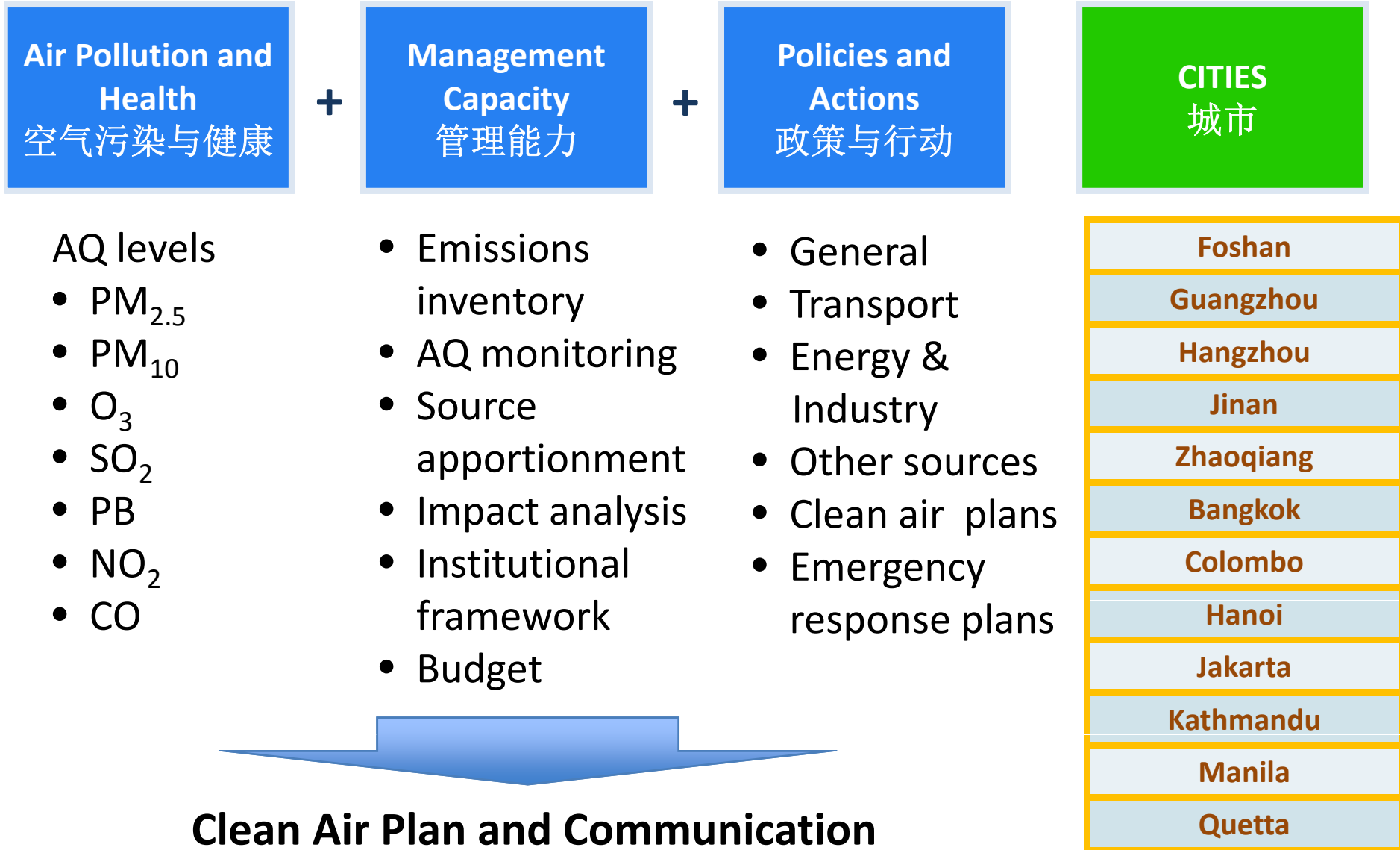
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Clean Air Asia 亚洲清洁空气中心

9th China City Air Quality Management Workshop
19 March 2013
Nanjing, PR China



Clean Air Management Framework for Cities

城市清洁空气管理框架



Key areas suitable for regional collaboration

区域合作的关键领域



1. Air quality monitoring

2. Emergency response plans

3. Communication

4. Clean air action plans

5. Knowledge sharing and
capacity building

1. 空气质量监测

2. 空气污染应急预案

3. 沟通

4. 清洁空气行动计划

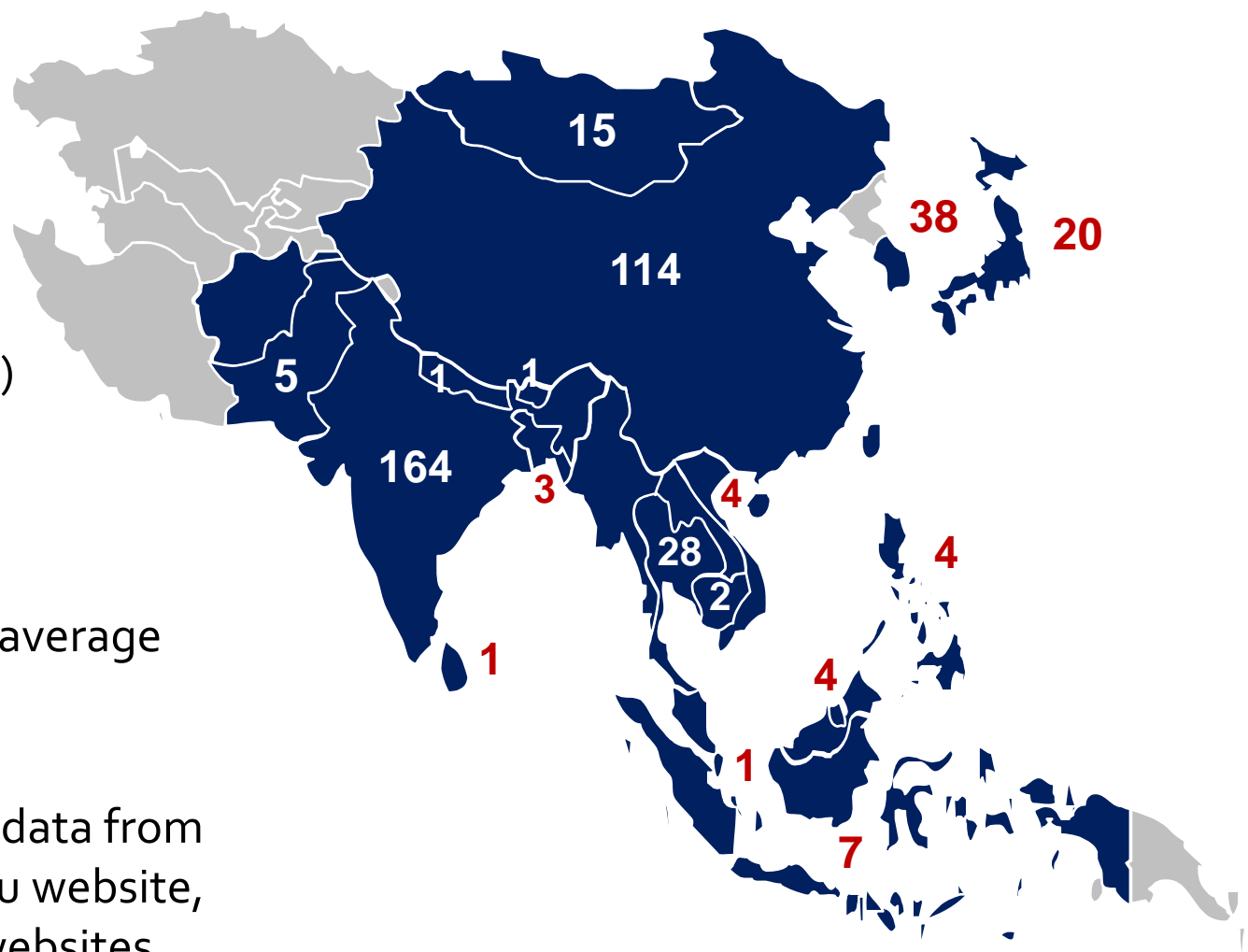
5. 知识分享与能力建设

Air quality monitoring 空气质量监测数据可得性

Data availability



- **Pollutants :**
PM₁₀, SO₂, NO₂
(PM_{2.5} for few cities)
- **Geographic scope:**
22 Asian countries
(over 400 cities)
- **Frequency:** annual average
ambient air levels,
1993 to 2011
- **Source:** Secondary data from
environment bureau website,
national statistics websites,
request from city contacts



Air quality monitoring 空气质量监测面临挑战

Challenges



- **Limited Scope**
范围有限
 - Cities, pollutants, monitoring stations
- **Issues with data quality**
数据质量问题
 - Unclear guidance on equipment selection, methodology, siting
 - infrequent monitoring
 - QA/QC procedures
- **Use of Data**
数据使用
 - lack of linkages with standards review and revisions
 - Data management, analysis and reporting
- **Other issues**
其它问题
 - Technical issues – power fluctuation, outages, security
- **Sustainability of monitoring**
可持续性
 - Technical capacity
 - Monitoring equipment after sales service
 - Budget for capital investment and operations

Air quality monitoring 空气质量监测区域合作的案例

Examples of regional collaboration in China and Asia



- **Pearl River Delta Regional Air Quality Monitoring**
珠三角空气质量监测
- **EANET – Acid Deposition Monitoring Network in East Asia**
东亚酸沉降监测网
 - **Countries covered:** Russia, Mongolia, China, ROK, Japan, Philippines, Lao, Thailand, Vietnam, Cambodia, Myanmar, Malaysia, Indonesia
 - **Pollutants monitored:**
 - Dry Deposition: Gases: concentrations of SO_2 , NO_2 , O_3 and others; Particulate components
 - Wet Deposition: Precipitation analysis: pH, EC, concentrations of SO_4^{2-} , NO_3^- and other ions
- **Regional Cooperative Agreement under International Atomic Agency**
国际原子能机构的区域合作协议
 - **Countries covered:** Australia, Bangladesh, China, India, Indonesia, Korea, Malaysia, Mongolia, New Zealand, Pakistan, Philippines, Sri Lanka, Thailand and Vietnam
 - **Pollutants monitored:** $\text{PM}_{2.5}$, PM_{10} , BC/OC
- **ASEAN Transboundary haze monitoring**
东盟跨界灰霾监测
 - **Countries covered:** Brunei, Cambodia, Lao, Malaysia, Myanmar, Philippines, Singapore, Thailand and Vietnam
 - **Pollutants monitored:** hotspots

Emergency Response Plans 应急预案近况

Recent developments



- Jan 2013 pollution episode: only 1/3 of cities which reached heavy pollution level (of AQI: 200) implemented emergency response plans

2013年1月份，在33个重污染城市（AQI201以上）中，仅有1/3实施了应急预案（法制晚报，16Jan2013）

- As of Mar 2013: 12 additional capital cities issued emergency response plans

截至近日，已有至少12个省会城市通过或已实施了应急预案

- Other cities/countries in Asia with interest to develop:

日本等其他亚洲国家有意于编制应急预案

- Japan

Emergency Response Plans 应急预案

Lack of harmonization – A



Country 国家	When active 采取措施时间
Bangladesh, Brunei, Malaysia, Thailand	When AQI/API/ is above 100 (Unhealthy)
South Korea (based on forecast)	Advisory: when hourly averaged PM10 is expected to exceed 400 $\mu\text{m}/\text{m}^2$ for over 2 hours due to Yellow dust
	Warning: when hourly averaged PM10 is expected to exceed 800 $\mu\text{m}/\text{m}^2$ for over 2 hours due to Yellow dust
Singapore (based on PSI or PM2.5)	Advisory based on PSI: when PSI above 100
	Advisory based on PM2.5: when PM2.5 exceeds 15 $\mu\text{g}/\text{m}^3$

Emergency Response Plans 应急预案

Lack of harmonization – B



Country 国家	Communicated through/ frequency 沟通渠道与频率
Bangladesh Brunei	Website, TV, radio, newspapers
South Korea	<u>SMS</u> , fax, website, TV, radio, twitter
Singapore	<u>Apps</u> , twitter, website, <u>RSS feeds</u> , telephone hotline, TV, radio, <u>Automated Dial-a-Weather</u>
	<u>Hourly updates</u> during haze episodes
Malaysia	Telephone hotline, website, TV, radio
Thailand	Telephone hotline, email updates/alert, website, TV, radio

Emergency Response Plans 应急预案

Lack of harmonization – C



Country 国家	Information relayed 信息传播
Malaysia, Singapore, Thailand	<p>General FAQ for pollution episode</p> <ul style="list-style-type: none">• Problem definition and extent• AQI, hotspots• Cause/s of air pollution episode (e.g. haze)• Health effects• What public can do to reduce emissions• Advice to public to reduce exposure
Thailand	<ul style="list-style-type: none">• Instructions to read/understand air quality data• Access/ link for data of Malaysia's AQ stations near Thailand
Singapore	<ul style="list-style-type: none">• Provides details on when to use a mask, what kind of mask to use and where to purchase a mask

Emergency Response Plans 应急预案

Lack of harmonization – D



Country	Reducing population exposure	Country	Reducing population exposure
Singapore (Specific depending on episode severity)	<p><u>Good</u> PSI: None</p> <p><u>Moderate</u> PSI: None</p> <p><u>Unhealthy</u>: Persons with existing heart or respiratory ailments should reduce physical exertion and outdoor activity. General population should reduce vigorous outdoor activity.</p> <p>Very unhealthy: ..</p> <p>Hazardous: ..</p> <p>Very hazardous: ..</p>	Malaysia, Thailand (general set)	<ul style="list-style-type: none"> • Drink plenty of water • Use cloth dampened with water to cover nose and mouth • Wash the face and body parts exposed to haze • Advised to stay indoors • Reduce outdoor activities • Wear protective masks • Seek advice and medical treatment from health center if there is prolonged health problem
	* Same for PM2.5 – becomes applicable at earlier phase		

http://app2.nea.gov.sg/psi_hazeplan.aspx

http://www.pcd.go.th/info_serv/air_haze49.htm#h2

<http://www.doe.gov.my/portal/wp-content/uploads/What-to-do-when-API-reach-certain-levels.pdf>

Singapore Haze Action 新加坡 应对灰霾

PSI value	Communication	Actions
Up to 50	<ul style="list-style-type: none"> PSI updates to other ministries and agencies so that they can get ready to implement their Standard Operating Procedures (SOPs). 	<ul style="list-style-type: none"> Liaise with industries with fuel-burning equipment on the need to cut down emissions. Liaise with major vehicle fleet owners on measures to minimise emissions.
50 to 100	<ul style="list-style-type: none"> Same as above 	<ul style="list-style-type: none"> Same as above
101 to 200	<ul style="list-style-type: none"> Provide hourly PSI updates and health advisories Activate Haze Info-line (1800-7319222) Haze Task Force to hold press briefings 	<ul style="list-style-type: none"> When 24-hour PSI stays above 100 for more than 48 hours, Haze Task Force to meet as often as required to co-ordinate implementation of the SOPs of individual ministries and agencies.
203 to 300	<ul style="list-style-type: none"> Same as above 	<ul style="list-style-type: none"> Same as above
301 to 400	<ul style="list-style-type: none"> Provide regular updates on the haze situation to the public. Haze Task Force to hold press briefings 	<ul style="list-style-type: none"> Inform industries and major vehicle fleet owners to cut down emissions Advise reducing use of private motor vehicles When 24-hour PSI>250, Haze Task Force to meet to reaffirm measures advising industries, construction sites, etc., on outdoor work, closure of schools, stoppage of outdoor functions and sports activities.
Over 400	<ul style="list-style-type: none"> When 24-hour PSI>350, deliberate need to declare a haze emergency if PSI exceeds 400 Haze Task Force to hold press briefings 	<ul style="list-style-type: none"> Convene urgent meeting to decide: <ul style="list-style-type: none"> ➤ closure of schools; childcare centres; sports facilities ➤ Cancelling outdoor work by industries, construction sites, etc., and/or use of respirators by workers doing outdoor work

Emergency Response Plans 应急预案的改进建议

Recommendations for improvement



- Strong communication or alert system
 - Earlier introduction of mandatory measures
 - Supplement with seasonal measures
 - Priority to measures that reduce exposure
 - Integrated in clean air action plans
 - Harmonization across regions, countries and Asia
- 强有力的沟通与预警系统
 - 更早引入强制性减排措施
 - 辅以季节性措施
 - 减少暴露措施优先
 - 纳入清洁空气行动计划
 - 区域保持基本一致性

Communication 与公众沟通的各种渠道

Several ways to communicate to public

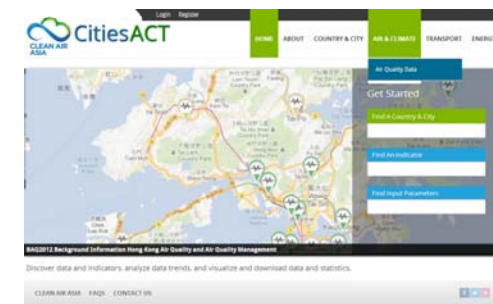
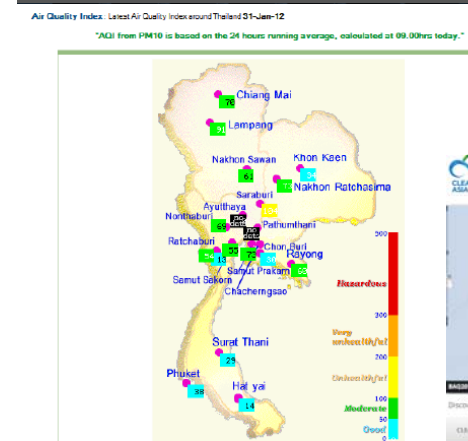
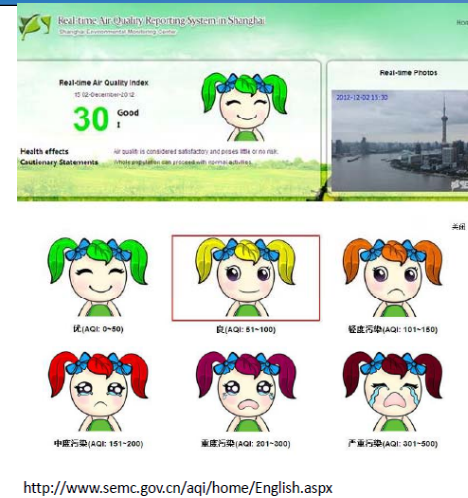


Real-time: 实时

- Micro-blogs; Apps
微博、应用
- Print media – newspapers
纸媒 – 报纸
- Broadcast media – TV and radio
电视与广播
- Email or mobile alerts
邮件或手机提醒
- Public display screens or boards
城市信息公告栏

Post/Annual: 年度

- Published (printed) reports
印刷 报告
- Website – online database
网站 – 在线数据库



<http://www.pcd.go.th/AirQuality/Regional/Graph/CreateAQI2.cfm> Last accessed JAN 27 2013 11:48:11



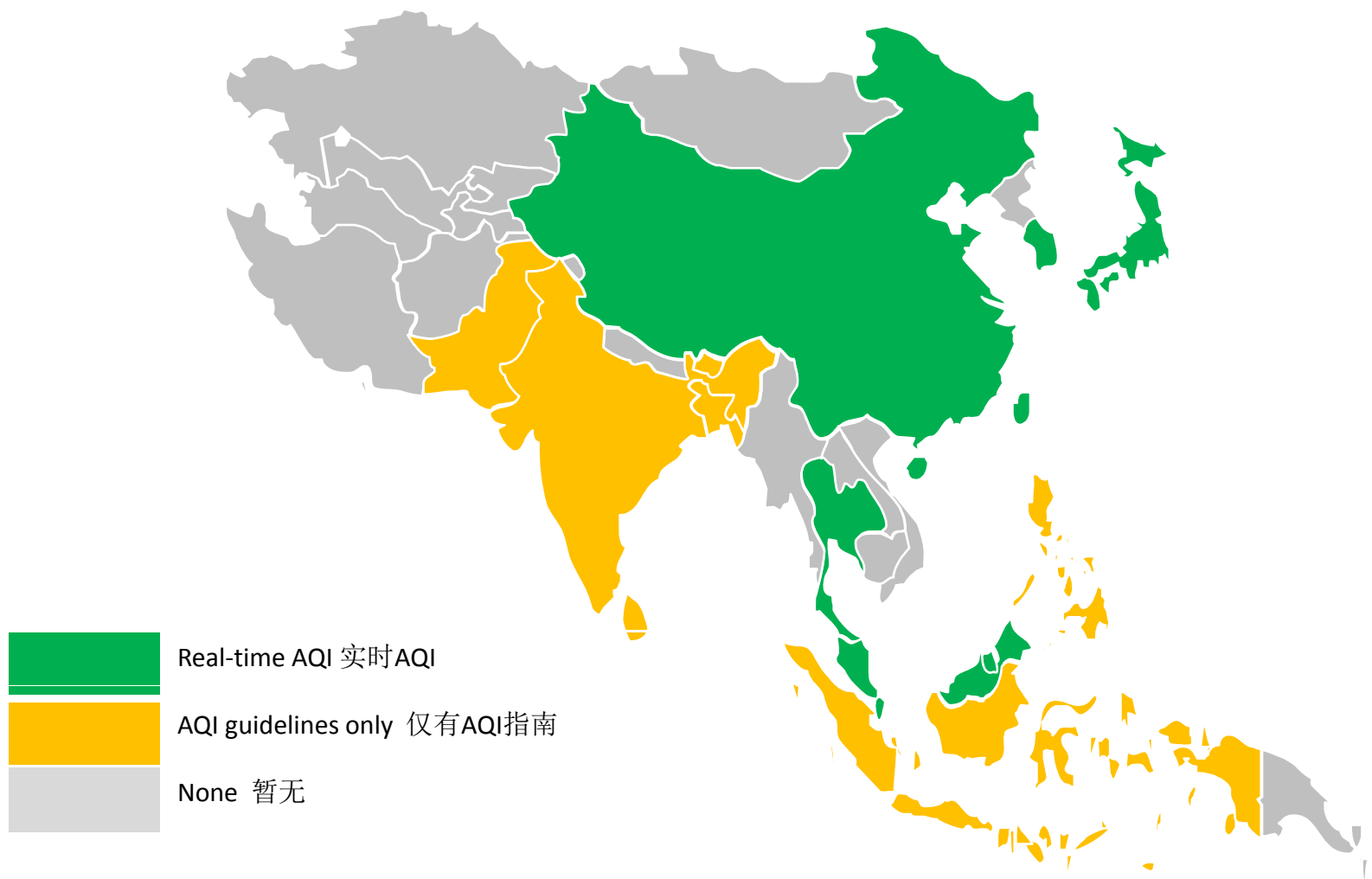
GuangzhouAir @Guangzhou_Air 21m

07-19-2012 08:00; PM2.5; 28.0; 82; Moderate (at 24-hour exposure at this level)

Expand Reply Retweet Favorite

Communication 空气质量指数发布

Index systems to convey AQI information to public



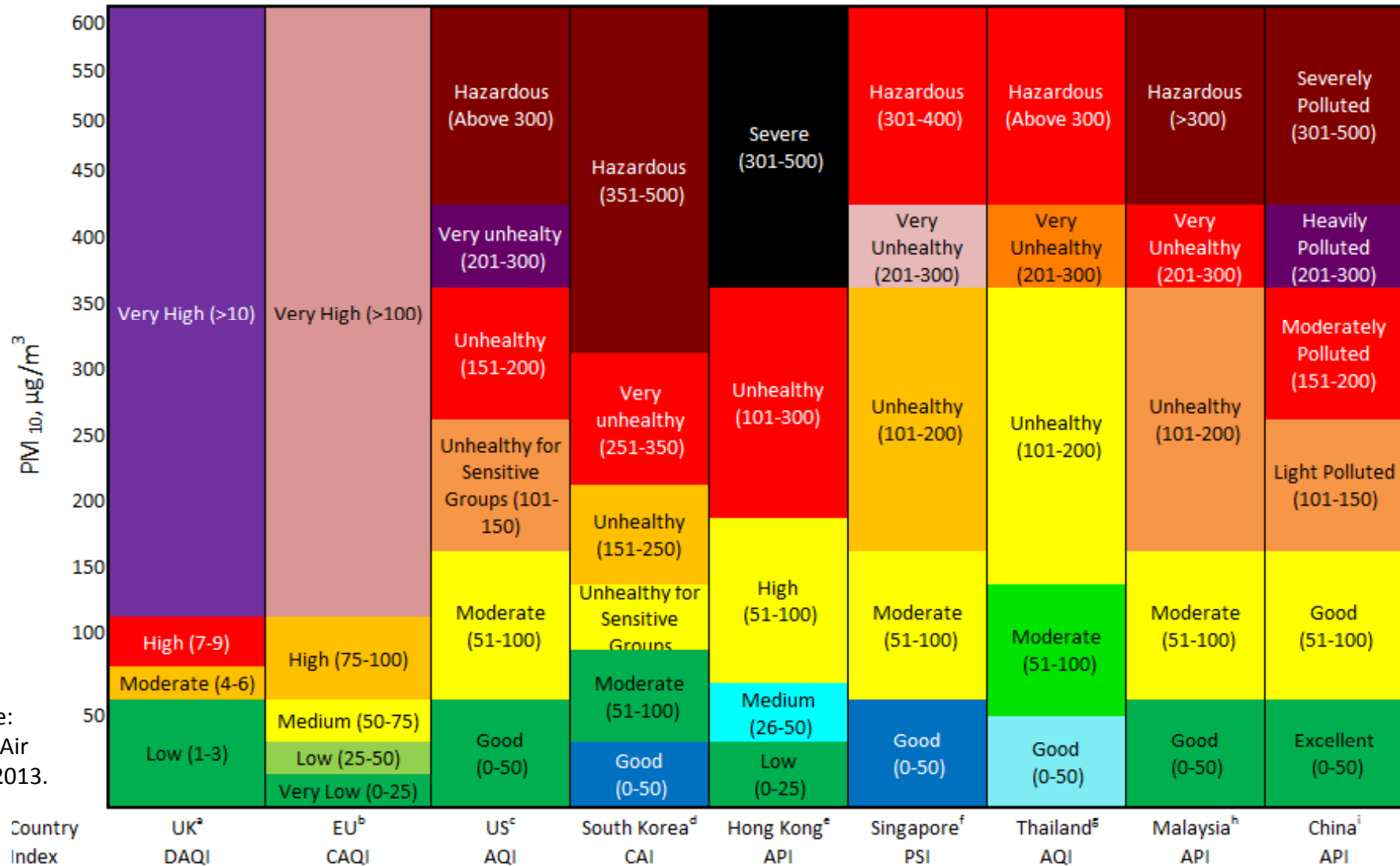
Clean Air Asia, 2013

Communication 不同国家的空气质量指数

Clean air = clean air?



Air Quality Index for PM10 for different countries



Source: Clean Air Asia, 2013.

Communication 向公众传达一致的信息

Consistent messaging to public: From API to AQI



中国空气质量指数变化，以及与美国对比
Change in China's Air Quality Standard and API/AQI System, and Comparison with US

Existing API (since 2000)	Revised AQI (2011) ¹	AQI from US ²	空气质量指数 China & US API/AQI	污染物浓度值 (微克/立方米) Pollutant Concentrations (µg/m ³)													
				SO ₂ 日均 (daily average)		NO ₂ 日均 (daily average)		PM ₁₀ 日均 (daily average)		CO 日均 毫克/立方米 (daily average, mg/m ³)		O ₃ 1小时 浓度最大值 (1hr max)		O ₃ 8小时 浓度最大值 (8hr max)		PM _{2.5} 日均 (daily average)	
优 (Excellent)	优 (Excellent)	Good	0-50	50	89	40		50	50	2.0	5.1	160		100	116	35	15
良 (Good)	良 (Good)	Moderate	51-100	150	377	80		150	150	4.0	10.8	200		160	147	75	35
轻微污染 (Slightly Polluted)	轻度污染 (Light Polluted)	Unhealthy for Sensitive Groups	101-150	475	587	180		250	250	14.0	14.3	300	321	215	186	115	65
轻度污染 (Light Polluted)	中度污染 (Moderately Polluted)	Unhealthy	151-200	800	797	280		350	350	24.0	17.7	400	400	265	225	150	150
中度污染 (Moderately Polluted)	重度污染 (Heavily Polluted)	Very unhealthy	201-300	1600	1583	565	2260	420	420	36.0	35.0	800	792	800	733	250	250
重污染 (Heavily Polluted)	严重污染 (Severely Polluted)	Hazardous	301-500	2620	2631	940	3760	600	600	60.0	58.0	1200	1184			500	500

Source: Clean Air Asia, 2013.

Communication 向公众传达易懂的信息

User friendly: Shanghai example



Real-time Air Quality Reporting System in Shanghai
Shanghai Environmental Monitoring Center

Real-time Air Quality Index
15 02-December-2012
30 Good I

Health effects
Cautionary Statements

Air quality is considered satisfactory and poses little or no risk.
Whole population can proceed with normal activities.

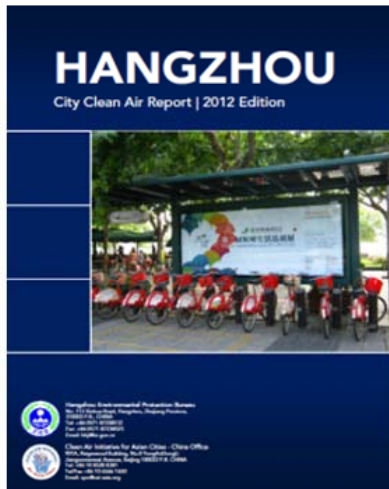
Real-time Photos
2013-12-02 15:30



<http://www.semc.gov.cn/aqi/home/English.aspx>

Communication 清洁空气报告

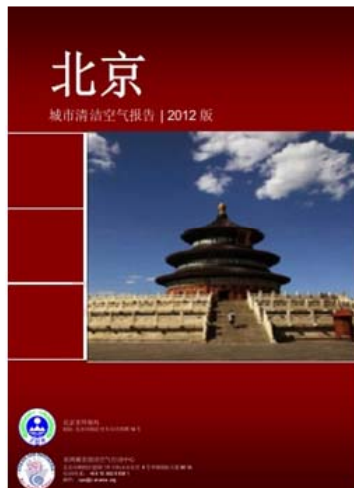
Clean air reports



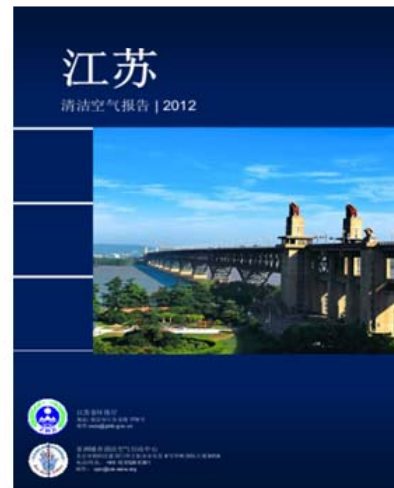
Hangzhou Clean Air Report (2012)



Jinan Clean Air Report (2012)



Beijing Clean Air Report (2012)



Jiangsu Provincial Clean Air Report (2012)

清洁空气报告编制指南



Source: Clean Air Asia, 2011.

Clean Air Action Plans (CAAP) 清洁空气行动计划近况

Recent developments



- PR China: Beijing, Pearl River Delta Phase 2 (2013-2015)
- Cambodia: Phnom Penh
- Indonesia: Palembang, Solo
- Lao PDR: Vientiane
- Philippines: Iloilo, Cagayan de Oro
- Thailand: Chiang Mai, Korat
- Vietnam: Bac Ninh

Clean Air Action Plans (CAAP) 清洁空气行动计划主要内容

General components



- Where are we now? 识别现状
 - AQ levels
 - Management
 - Existing policies and actions
- Where do we want to go? 制定目标
 - Goals and targets
- How do we get there? 如何实现
 - Policies and actions
 - Roles + responsibilities
 - Budget + timeline
 - Progress monitoring and evaluation
- **7th and 8th AQM Workshops:**
 - <http://cleanairinitiative.org/portal/node/7391>
 - <http://cleanairinitiative.org/portal/node/8357>

Knowledge sharing and capacity building

知识分享与能力建设



1. Ambient air quality standards and monitoring, forecasting systems
 2. Emissions inventories, source apportionment modelling
 3. Health, economic and other impacts
 4. Clean air plans, policies and measures, including compliance and enforcement
 5. Communicating on air quality, health and co-benefits
1. 环境空气质量标准与监测、预测系统
 2. 源清单、源解析模型
 3. 健康、经济及其它影响
 4. 清洁空气规划、政策、措施，及其达标/执行
 5. 空气质量、健康与协同效益的沟通

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Clean Air Asia Country Networks

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