Annex 4: Guidelines of How to Develop CCAR (English)

Clean Air Reporting by Cities:
Guidelines and China Case Studies

Clean Air Initiative for Asian Cities (CAI-Asia) Center

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About CAI-Asia

The Clean Air Initiative for Asian Cities (CAI-Asia) promotes better air quality and livable cities by translating knowledge to policies and actions that reduce air pollution and greenhouse gas emissions from transport, energy and other sectors. CAI-Asia was established in 2001 by the Asian Development Bank, the World Bank and USAID, and is part of a global initiative that includes CAI-LAC (Latin American Cities) and CAI-SSA (Sub-Saharan Africa).

Since 2007, this multi-stakeholder initiative is a registered UN Type II Partnership with more than 200 organizational members and eight Country Networks (China, India, Indonesia, Nepal, Pakistan, Philippines, Sri Lanka, and Vietnam). The CAI-Asia Center is its secretariat, a non-profit organization headquartered in Manila, Philippines with offices in China and India. Individuals can join CAI-Asia by registering at the Clean Air Portal: www.cleanairinitiative.org. Its flagship event, the Better Air Quality conference, brings together over 500 air quality stakeholders.

FOREWORD

to be inserted before final publication

LIST OF ABBREVIATIONS

ADB	Asian Development Bank
API	Air Pollution Index
AQM	Air Quality Management
CAI-Asia	Clean Air Initiative for Asian Cities
CITEAIR	Common Information to European Air
DOE	Department of Environment
CPCB	Central Pollution Control Board
EF	Energy Foundation
EMB	Environmental Management Bureau
EPB	Environmental Protection Bureau
EPD	Environmental Protection Department
FTI	Fu Tak Iam Foundation
GHG	Greenhouse gas emissions
HEI	Hedley Environmental Index
MEP	Ministry of Environmental Protection
MOE	Ministry of Environment
NEA	National Environment Agency
NDRC	National Development and Reform Commission
NO_2	Nitrogen dioxide
PCD	Pollution Control Department
PM_{10}	Particulate matter with diameter ≤ 10 microns
$PM_{2.5}$	Particulate matter with diameter ≤ 2.5 microns
PSI	Pollutant Standards Index
SO_2	Sulfur dioxide

CONTENTS

1. Introduction

Reporting and communication are integral in the overall air quality management framework. Effective air quality communication is critical to build trust and gain support from various stakeholders who are needed to implement air quality management (AQM) measures. Most environment agencies/departments in Asia are mandated to provide good quality and timely air quality information to the public and other stakeholders. However, the type of information shared is limited and the frequency of dissemination is inconsistent.

Recently, there has been a strong demand for more comprehensive and reliable air quality information in Asian cities. In late 2011, there was much discussion on whether $PM_{2.5}$ monitoring data in Beijing and other cities should be released.[1] Following this strong public demand, China State Government released a four-step schedule to monitor $PM_{2.5}$ in the next five years.[2] There are also promising developments at the city-level. In 21 January 2012, Beijing began releasing official $PM_{2.5}$ data.[3] Nanjing is also expected to release $PM_{2.5}$ data by June 2012[4] and Guangdong province released $PM_{2.5}$ data of past six years (from 2006).[5] This recent clamor for air quality information was observed even in Singapore. In the last couple of months, the National Environment Agency (NEA) was also requested to include $PM_{2.5}$ in the Pollutant Standards Index (PSI) to provide better information on current air quality situation.[6]

This increased interest for more air quality information is an excellent opportunity for Asian cities to review and improve their current air quality communication strategies. The challenge is to ensure (1) that the information shared by Asian cities is comprehensive and provides a complete picture of AQM situation in their area, (2) that the communication strategies used effectively conveys the information the stakeholders (including public, policymakers and research institutions) need and incorporates a feedback mechanism between the environment authorities at national and local levels and stakeholders.

Defining communication

Before going further, it is necessary to differentiate some related terminologies dealing with creating and sharing information: reporting, informing and communicating. The Common Information to European Air (CITEAIR) project[7] provided definitions to distinguish these terms. These are summarized below:

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[1] Shaozhong, D., 2012. "Air measurement alone won't fix Beijing's pollution." 17 January 2012. Global Times.URL: http://www.globaltimes.cn/NEWS/tabid/99/ID/692559/Air-measurement-alone-wont-fix-Beijings-pollution.aspx

[2] Kai, G., 2011. "China decides to accept PM2.5." 23 December 2011. Global Times. URL: http://www.globaltimes.cn/NEWS/tabid/99/ID/689657/China-decides-to-accept-PM25.aspx

[3] Access the PM2.5 data here: Beijing Municipal Environmental Monitoring Center: http://zx.bjmemc.com.cn/

[4] Nanjing EBP website, 2011. "Nanjing announced PM2.5 data over the past four years." 28 December 2011. Nanjing EPB. URL: http://www.njhb.gov.cn/art/2011/12/28/art_36_27407.html

[5] Li, H., 2011. "Guangdong announced PM2.5 data over the past six years for three monitoring stations." 29 December 2011. Ifeng News. URL: http://news.ifeng.com/mainland/detail_2011_12/29/11639762_0.shtml

[6] Fang, N. and Tsjeng, H., 2012. "Harder to breathe easy in Asia?." 8 February 2012. Singapore Institute of International Affairs. URL: http://www.siiaonline.org/?q=programmes/commentary/harder-breathe-easy-asia

[7] CITEAIR and INTERREG IIIC, 2007. "Communicating air quality: A guidebook on communication with the public about air quality."

- REPORTING: Submission of a pre-determined or specific set of data and information to authorities (either at provincial, national or regional level) in a prescribed format and frequency. The target readers/audience of the report is also pre-defined.

- INFORMING: Primarily a one-way process which ensures that data and information available to whoever is interested in them. This can be done through passive (*e.g.,* through request) and/or active (*e.g.,* through websites, having printed copies in libraries, offices) avenues.

- COMMUNICATING: This is a two-way process where data and information is actively used to inform target groups with the goal of engaging them in a dialogue and/or to influence their knowledge, attitudes and behavior.

Clean air reports can be used to inform the public but the format and contents should be prepared in a manner that the general public will understand and is also accessible to the public. To encourage dialogue (two-way communication) between the public and the city authorities, a feedback mechanism can be established as part of the clean air reporting process.

Clean air reporting: from national to local

Generally, it is the national (and sometimes regional) air quality status reports which have a prescribed format, content and reporting frequency. However, as air quality management is primarily a local issue, city residents are also interested to know what the quality of the air they are breathing is and what is the progress of implementation of air quality management measures and plans. Unfortunately, national reports have a broad scope and cannot provide detailed information per locality. Current national air quality status reports usually focus on compliance with targets and presented in a format not very accessible to the public. With increasing demand for local air quality information, cities need guidance on how to prepare a city clean air report which provides the complete air quality management story and effectively shares information to its residents.

About this publication

This publication discusses the current state of clean air reporting and communication in Chinese cities and presents a proposed template for a city clean air report which may be mainstreamed to Chinese cities initially, and eventually, for Asia. It also provides background information on air quality communication techniques based on international guidelines on environmental communication and general communication theories. It documents international best practices and existing challenges in clean air reporting.

2. Communicating Air Quality through Clean Air Reports

2.1 Getting Started

In most national environmental legislations, there are provisions which mandate authorities to disclose air quality information to the public, especially if local standards are exceeded or there are pollution episodes. At the national level, this is usually the Ministry of Environment, while at the city level this is the local Environmental Protection Bureau (EPB). This publication will focus on clean air reporting by city environmental authorities. But it is noted that air quality communication may also be initiated by other stakeholders within a city. The general process for developing a clean air report is provided in Figure 1. The succeeding sections will discuss each step in greater detail.

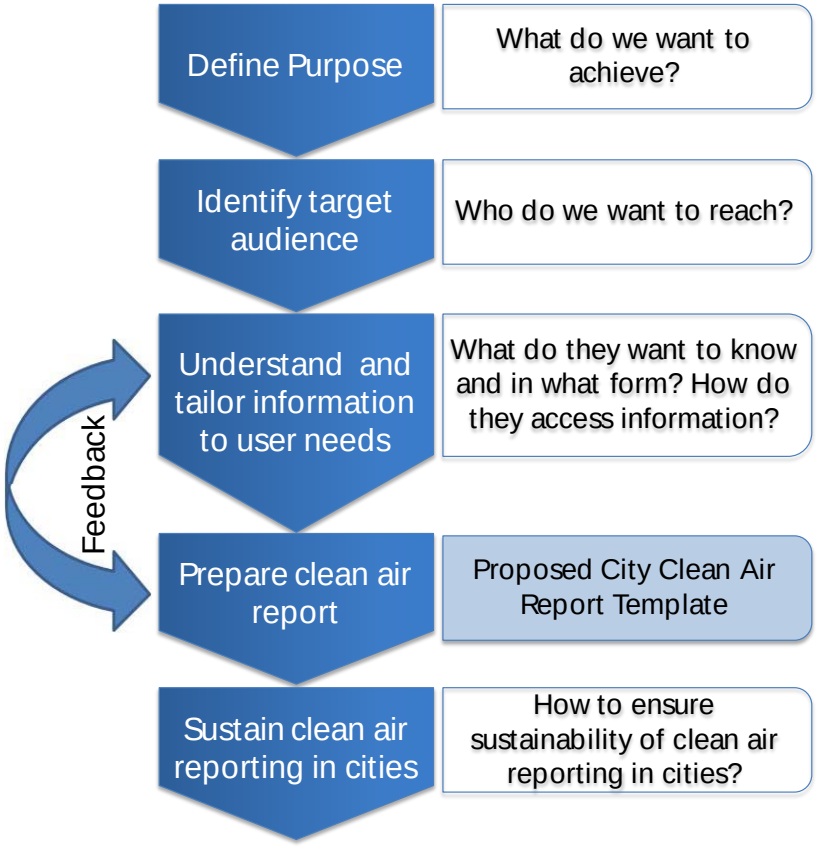


Figure 1. Steps in Developing Clean Air Reporting in Cities

Source: Authors, 2012.

2.2 Define the purpose of clean air reporting

While city EPBs are mandated to report air quality information to the public and other stakeholders, there are other compelling reasons which can motivate them to further improve on their communication strategies. The table below lists some of these reasons depending on their target audience.

Table 1: Why report?

Target audience	Possible reasons why to report
General Public	• To inform residents of the quality of air they are breathing and its corresponding risks • To warn residents of high air pollution episodes • To encourage residents to participate in reducing emissions
Researchers/ Scientists	• To engage further air quality research, which supports local clean air quality management
Policymakers	• To motivate action and help make informed decisions by providing clear and understandable information and knowledge on air pollution issues

Source: CAI-Asia, 2011. Presented by Patdu, K. 2011. "Clean Air Reporting in Chinese Cities and Internationally." At the 7th AQM City Workshop of CAI-Asia China Network. Dalian, China.
URL: http://cleanairinitiative.org/portal/node/7391

They may also use this mechanism to initiate a more proactive dialogue with city stakeholders. Their communication goals may also be developed by what they want to achieve. These may be classified as—[8]

- To provide information, "knowledge" level
- To create understanding, "attitude" level
- To change behavior, "behavior" level

2.3 Identify the target audience

It is important to determine the target audience because this allows EPB to tailor the information to specific needs of target audience. Depending on end-user needs, the data transferred may include annual raw datasets, validated datasets, processed summary and average statistics, or analytical results, graphs and maps. Data formats should be appropriate to the requirements and capabilities of the data recipients. This report focuses on three possible target audiences: the general public, policymakers and researchers.

2.4 Understand their needs

It is important for effective communication to tailor the information reported depending on a specific target audience. Table 2 presents an overview of the type of information to be reported depending on the target audience. A good way to understand the needs of the target audience is to conduct baseline needs assessment survey and/or targeted interviews. This allows the data providers (city EPBs) to know, among others:

- What information do their target audience wants to know and in what form;
- For what purpose do they need the information?
- Whether their current air quality reporting techniques reaches their target audience; and
- What improvements can they implement to communicate more effectively.

[8] CITEAIR and INTERREG IIIC, 2007. "Communicating air quality: A guidebook on communication with the public about air quality."

Table 2: Information to be reported depending on target audience

	General Public	Researchers	Policymakers
GENERAL CITY INFORMATION			
General city information (population, GDP)	X	X	X
City planning developments in industry, energy, transportation		X	X
STATUS OF AIR QUALITY			
Real-time air quality levels, daily API	X	X	X
Air quality forecast	X	X	
Number of days where standard is exceeded	X	X	X
Air quality trend and tendency analysis		X	X
Air quality warnings	X	X	
SOURCES OF AIR POLLUTION			
Emissions inventory	X	X	X
Source Apportionment		X	X
IMPACTS OF AIR POLLUTION			
Health impacts	X	X	X
Costs of air pollution (health, economic, etc)		X	X
Other impacts (visibility, tourism, others)	X	X	X
AIR QUALITY MANAGEMENT			
Legislation and regulations on air quality	X	X	
Achievements on clean air management	X	X	X
Status of implementation on control measures			X
Planned air pollution control measures	X	X	X
Yearly budget for clean air management			X

Source: CAI-Asia, 2011. Presented by Patdu, K. 2011. "Clean Air Reporting in Chinese Cities and Internationally." At the 7th AQM City Workshop of CAI-Asia China Network. Dalian, China.
URL: http://cleanairinitiative.org/portal/node/7391

2.5 Tailor the information to suit target audience

2.5.1 Linking Frequency, Format and Type of information

With the abundance of information available and different avenues to communicate air quality, it is important to define the format and communication frequency depending on the type of information to be shared and the target audience. For instance, air quality monitoring data (status of air quality) can be shared real-time, hourly, daily through information boards, television, radio, websites, email/mobile alerts and annually through printed reports. The status of implementation on control measures can be shared annually through printed reports and websites. Table 3 and Table 4 present some guidance on frequency of reporting depending on media form and type of information.

Table 3: Media form to share information and frequency of use

	Real-time	Hourly/Daily	Weekly	Monthly	Annual	As needed
Print newspapers		X				
Email / Mobile Alerts	X					X
Social Networking sites and Micro-blogs (e.g., twitter)	X					
Website	X		X			
On television and radio	X	X				
On information boards in the city	X					
Published (printed) reports				X	X	X
Internal communication						X
Upon request by external stakeholders						X

Source: Authors, 2012.

Table 4: Type of information and frequency of sharing this information

	Real-time	Hourly/ Daily	Weekly	Monthly	Annual	As Needed
GENERAL CITY INFORMATION						
General information (population, GDP)					X	
City planning developments in industry, energy, transportation					X	
STATUS OF AIR QUALITY						
Real-time air quality levels, daily API	X	X				
Air quality forecast		X	X			
Number of days where standard is exceeded				X	X*	
Air quality trend and tendency analysis					X	
Air quality warnings	X					X
Sources of Air Pollution					X	
Emissions inventory					X**	
Source Apportionment					X	X
IMPACTS OF AIR POLLUTION						
Health impacts					X	X
Costs of air pollution (health, economic)					X	X
Other impacts (visibility, tourism, others)					X	X
AIR QUALITY MANAGEMENT						
Legislation and regulations on air quality						X***
Achievements on clean air management					X	X
Status of implementation on control measures				X	X	X
Planned air pollution control measures					X	X
Yearly budget for clean air management					X	

*Can also be quarterly; **Can also be for every two years

***Usually when there is new legislation or revisions in existing legislation

Source: Authors, 2012.

The format to use in sharing information largely depends on the target audience. The subsequent sections recommend what kind of format to use to communicate depending on target audience.

2.5.2 General Public

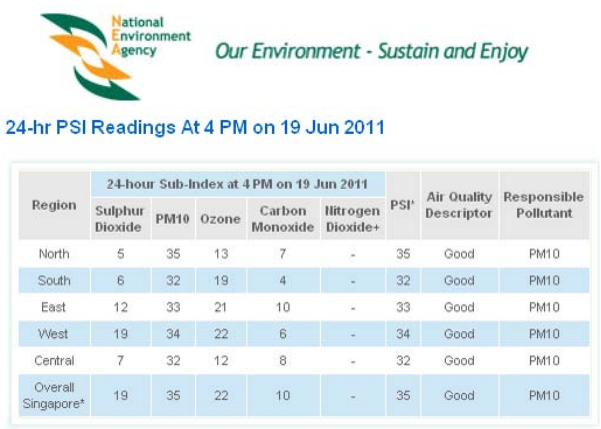
In communicating air quality to the general public, it is important that the information is translated in a form that is practical, simple and easy to understand. The information should also be shared in a timely manner. There are a lot of available avenues to communicate air quality to the public. Some of the different forms of communicating information are listed below:

- Published (printed) report – reports, brochures, papers
- Print media – newspapers
- Broadcast media – television and radio
- Website – online database
- Email or mobile alerts
- Public display screens or booths / information boards
- Internal communication
- Upon request
- Others: Social networking sites; Micro-blogs

A commonly used way of interpreting air quality for public is through an air quality index with a set of sub-indices for different components/pollutants which is usually provided daily and as 1-day forecast. There is generally an index per component and the lowest among sub-indices determines the overall index for a day. Table 3 provides examples of air pollution indexes in selected Asian countries. The methodology for calculation of air pollution index varies per country, where index categories are derived using national legislation (air quality standards).

It is also important to note that with the continuously advancing technology, the manner in which the public access information is also constantly changing. City EPBs also need to progress and continuously develop more efficient ways to communicate air quality information to the public. A number of cities have developed innovative ways of communicating air quality to the public. The cities of Paris (France), Helsinki (Finland), Seoul (South Korea) and Beijing (China) have developed creative ways to make air pollution more visible. Hong Kong has developed an index which makes air pollution costs easier to understand. Some examples are provided in Box 1 to Box 4.

Table 5: Air Pollution Indexes in Selected Asian Countries

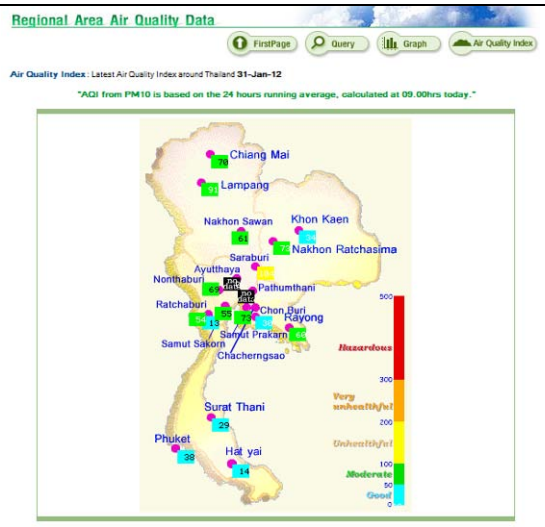


Region	24-hour Sub-Index at 4 PM on 19 Jun 2011					PSI*	Air Quality Descriptor	Responsible Pollutant
	Sulphur Dioxide	PM10	Ozone	Carbon Monoxide	Nitrogen Dioxide+			
North	5	35	13	7	-	35	Good	PM10
South	6	32	19	4	-	32	Good	PM10
East	12	33	21	10	-	33	Good	PM10
West	19	34	22	6	-	34	Good	PM10
Central	7	32	12	8	-	32	Good	PM10
Overall Singapore*	19	35	22	10	-	35	Good	PM10

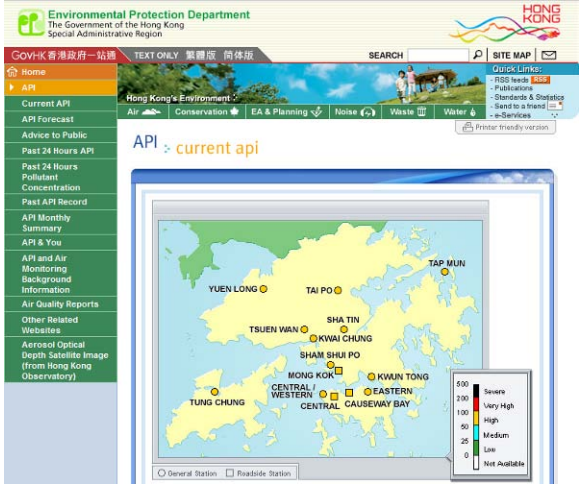
Singapore NEA: Pollutant Standards Index (PSI)

PR China MEP: Air Pollution Index (API)

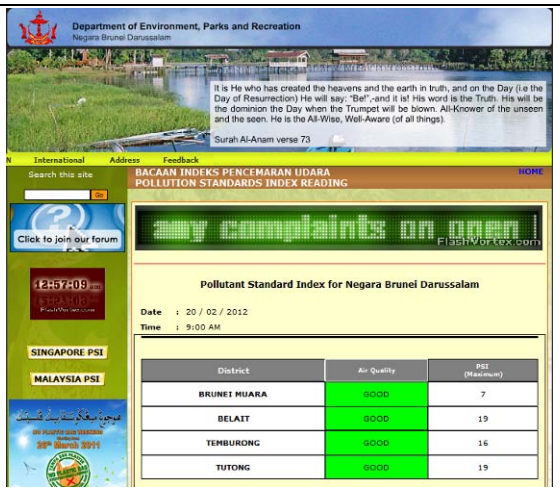
Malaysia DOE: Air Pollutant Index (API)



Thailand PCD: Air Quality Index (AQI)



Hong Kong EPD: Air Pollution Index (API)



Brunei Darussalam DoEPR:
Pollutant Standard Index (PSI)

Source: Compiled by Authors, 2012.

Box 1. Paris, France: "Air de Paris" balloon

Developed in partnership with AIRPARIF®, the balloon's color represents two air quality indexes (1- for urban sites; 2-for traffic stations) in Paris every hour.

The indexes illustrate the levels of nitrogen dioxide, ozone and particulates, air pollutants which are most problematic in large European cities. The color of the balloons is based on the color palette of the Index CITEAIR.

Source: http://www.ballondeparis.com/fr/ballondeparis/i12-la-couleur

Box 2. Helsinki, Finland: Green lasers showing industrial air pollution

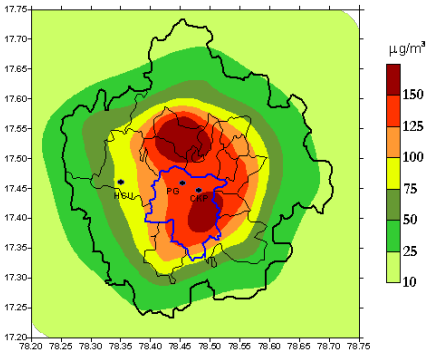
In Helsinki, Finland, a green colored laser illuminated the emissions from the stack of a coal-fired power plant. This was an installation called "Nuage Vert" by duo of French artists, HeHe.

Every night from 22-29 February 2008, the emissions from the Salmisaari coal burning power plant were illuminated with a high power green laser animation. The laser drew an outline of the moving cloud onto the cloud itself, coloring it green, turning it into a city scale neon sign, which grows bigger as local residents take control and consume less electricity. During the unplug event, on Friday 29th February between 7-8pm, 4,000 local residents reduced their energy consumption by 800 kVA.

Source: http://www.coolpicturegallery.net/2009/03/mysterious-green-haze-over-helsinki.html, http://hehe.org.free.fr/hehe/texte/nv/index.html

Box 3. Seoul, South Korea: Living light sculptures of air quality

In Seoul's Peace Park lies an art installation which provides the public real-time information on air quality in the city. It was created by Soo-in Yang and David Benjamin of The Living and was commissioned by the Ministry of Environment.

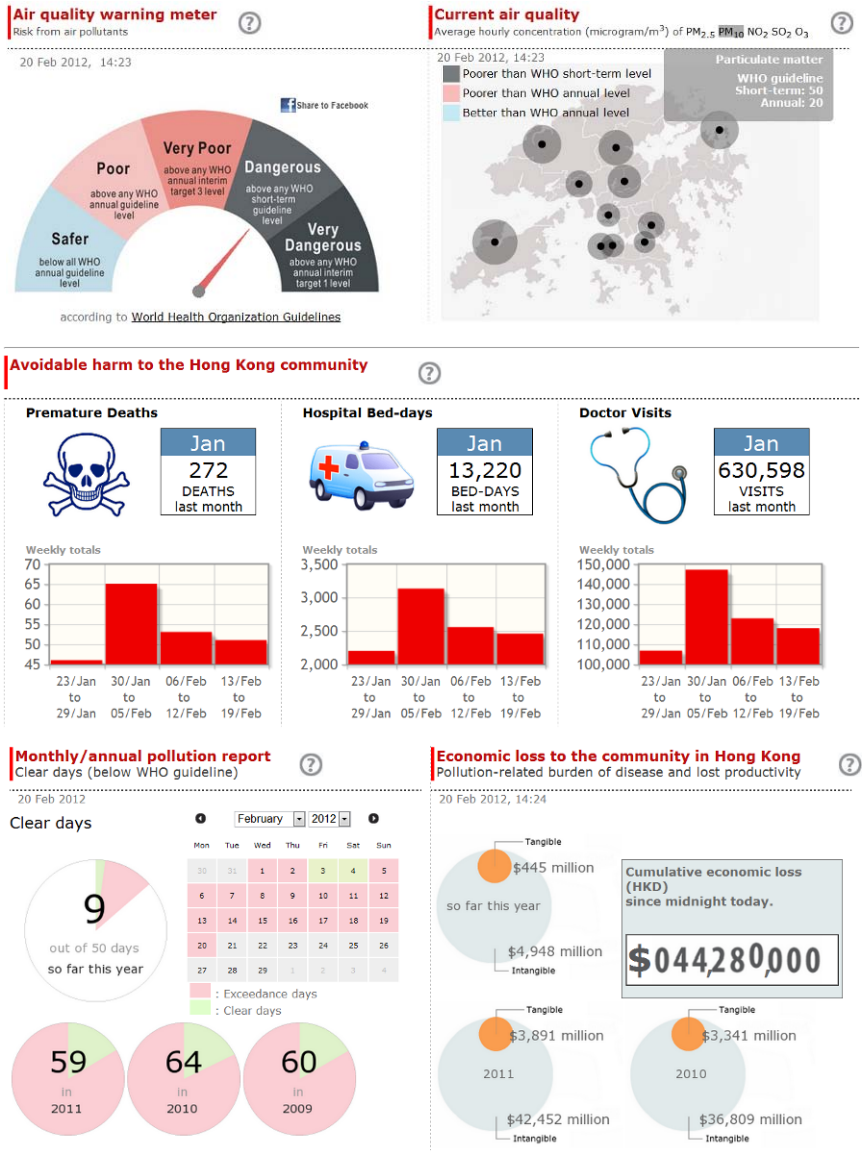


The structure is made of 27 transparent, luminescent segments each representing different areas in the city where there are monitoring stations. Every 15 minutes, the map goes dark and then the segments light up in order of the neighborhood with the best air quality through to the worst air quality at that time. It can also show the year-on-year improvement (only segments with improvement remain lit).

Source: http://www.wired.co.uk/news/archive/2011-01/25/seoul-living-light-air-quality

Box 4. Hong Kong: Hedley Environmental Index (HEI)

Hedley Environmental Index, first launched in 2008, monitors and publishes in real-time the economic costs of Hong Kong's air pollution in terms of public health impacts (premature deaths, hospital bed-days and doctor visits) and their monetary value. With support from the Fu Tak Iam (FTI) Foundation, the University of Hong Kong together with Civic Exchange revised the Hedley Environmental Index and launched a new version in January 2012 based on an updated methodology and a more user-friendly design for easy understanding and sharing.



Some of the new features include a

- A real-time health risk warning meter with five risk categories based on World Health Organization guidelines which can be instantly distributed through Facebook and
- A real-time pollution map using colors and numbers shows pollution levels at 14 monitoring stations across Hong Kong.

Source: http://www.civic-exchange.org/wp/120117hedleyindex/,

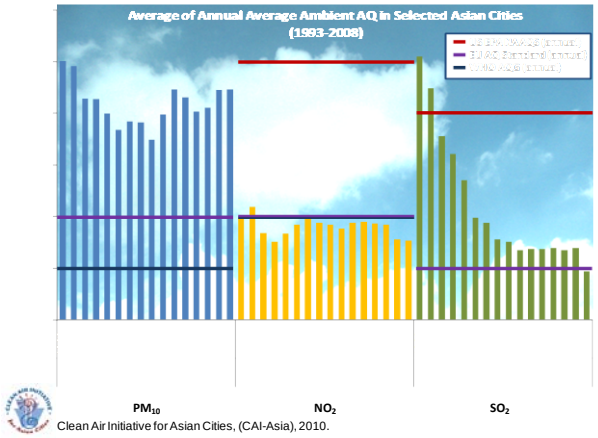
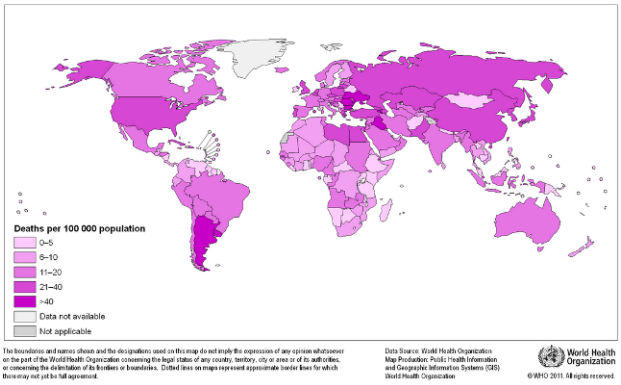
2.5.3 Policy makers

In order to encourage policymakers to address air pollution, it is important that they are given clear and understandable information on air pollution issues. Raw data, information on and identification of emission inventories, air pollutant concentrations, potential health impacts, and source control measures is not particularly useful unless it is translated into judgments on comparative advantage (e.g. costs of pollution controls versus benefits of avoided health impacts), or raises these issues in the context of socio-political trends (e.g. climate change, increased energy use, urban sprawl, growth of vehicle fleets).[9]

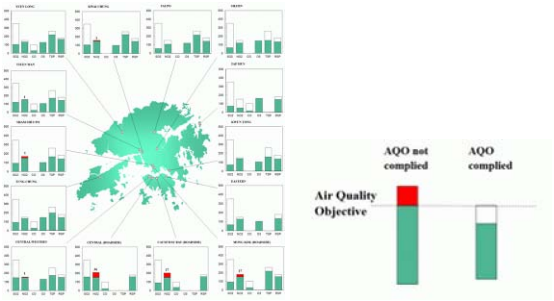
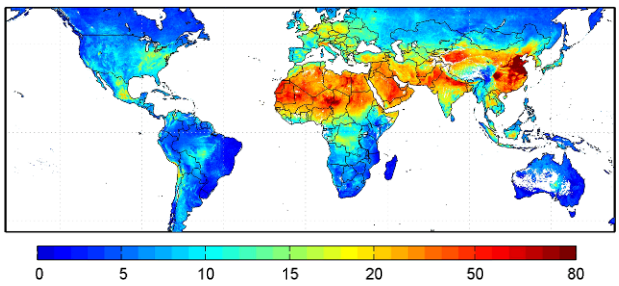
The information also needs to be brief and concise and presented in a manner that will be easily understandable for policymakers. Further, recommendations on actions/ control measures should be clear. Some of the different options of communicating information to policymakers are listed below. Table 4 also provides some examples of these options.

- Policy briefs
- Written reports
- Summary tables
- Visual presentations
- Interpretation of information
- Pie chart and map chart
- Satellite imagery

Table 6: Air Pollution Indexes in Selected Asian Countries

 CAI-Asia, 2010	 Deaths attributable to outdoor air pollution (2004) WHO, 2004
Interpreted Data	Visual Presentations

[9] Personal communication with Dieter Schwela 2010.

 Hong Kong: Maximum Daily Pollutant Concentrations and Objectives in 2008 HK EPD, 2008	 Global satellite-derived map of $PM_{2.5}$ averaged over 2001-2006 ($\mu g/m^3$) NASA, 2010
Maps and Pie Charts	Satellite Imagery

Source: Compiled by Authors, 2012.

Air quality status reports provide an excellent avenue to provide policymakers on document which summarizes the current status of air quality in their city/country and also provide recommended actions to address different air pollution-related issues. Several countries in Asia prepare national air quality status reports as mandated in their legislation. Box 5 lists the type of information to be included in the national air quality status report of the Philippines as stipulated in the Philippine Clean Air Act. There are also some countries which include air quality status in their national state of environment reports. Table 7 provides more information about national air quality status reports from select Asian countries.

Box 5. Contents of the Philippine National Air Status Report

The Bureau (Environmental Management Bureau) shall prepare the Annual National Air Quality Status Report which shall contain:

a) A summary of the extent of air pollution in the country, per type of pollutant and per type of source;
b) An analysis and evaluation of the current state, trends and projections of air pollution;
c) An identification of critical areas, activities or projects which will need closer monitoring or regulation;
d) Recommendations for necessary executive and legislative action; and
e) Other pertinent qualitative and quantitative information concerning the extent of air pollution and the air quality performance rating of industries in the country.

Source: DENR Administrative Order No. 2000-81: Implementing rules and regulations for R.A. 8749 (Philippine Clean Air Act of 1999), Part V (Air Quality Management System), Rule XIV (Air Quality Management Information Systems).

Unfortunately, national air quality status reports are sometimes a missed opportunity for Asian countries. One of the common limitations is that it usually only focuses on air quality monitoring data analysis. It rarely includes local studies/ information on air pollution impacts to health, economy, visibility and others. There is also limited information on the air quality management policies and measures, or air quality management achievements and planned activities. Also, while most reports are intended for policymakers, they usually do not provide specific recommendations or priority areas to improve air quality. Another common issue is the late releases or discontinuity of the reports. The limitations of existing national air quality status reports should be considered to be able to prepare effective and comprehensive city clean air reports.

Table 7: National Air Quality Status Reports in Asia

Country/ City	Title	Lead Organization	Frequency	Most recent version*	Contents	Status/Remarks	Link
India	National Ambient Air Quality Status Report	CPCB	Annual	2008	• Air quality monitoring system information • Air quality assessment (for one year): General and pollutant specific (SO_2, NO_2, SPM, PM_{10} and others) • Air quality trends • Initiatives for air pollution control	Only 2007 and 2008 versions found in CPCB website. No information for 2009 - 2011 reports	http://www.cpcb.nic.in/upload/NewItems/NewItem_147_report-2008.pdf
Hong Kong	Air Quality in Hong Kong	EPD	Annual	2010	• Air quality monitoring results for current year for gaseous pollutants, suspended particulates and toxic air pollutants • Variation of air pollution levels over time (diurnal, seasonal, long-term)	Regularly prepared and published	http://www.epd-asg.gov.hk/english/report/aqr.html
Philippines	National Air Quality Status Report	EMB	Every two years	2005-2007	• Sources of air pollution • Status of ambient air quality • Air quality management (by source and by organization) • Best practices and lessons learned • Challenges and recommendations	Report for 2010-2011 under preparation	http://emb.gov.ph/eeid/publications.htm
Republic of Korea	Annual Report of Air Quality in Korea (*in Korean*)	MOE	Annual	2010		Regularly prepared and published but only available in Korean	http://stat.me.go.kr/nesis/mesp/knowledge/MorgueStatistical.do?task=I&leftMenu=knowledge&page_code=P3_05
Thailand	Thailand's Air & Noise Status and Management *(in Thai)*	PCD	Annual	2010	• Air quality status and volume of emissions • Measures on prevention and control of air & noise pollution with focus chapters on key sources (industry/ vehicles)	Regularly prepared and published but only available in Thai	http://www.pcd.go.th/download/en_air.cfm

Country/ City	Title	Lead Organization	Frequency	Most recent version*	Contents	Status/Remarks	Link
					• Public awareness campaigns		
PR China	As part of: State of the Environment in China	MEP	Annual	2010	• Reduction of total discharge of major pollutants • Atmospheric environment: status of air quality (by pollutant), acid rain frequency and distribution, emissions estimates and measures and actions • State of water, marine, acoustic, solid waste, radiation, nature and ecology, land and rural environment, forest, grassland, climate and natural disasters, • Environmental management	Regularly prepared and published (in Chinese and English)	http://english.mep.gov.cn/standards_reports/soe/
Malaysia	As part of: Malaysia Environmental Quality Report	DOE	Annual		• Air Quality: monitoring, current status and trends • River, ground and marine water quality • Pollution sources inventory	Regularly prepared and published	http://www.doe.gov.my/portal/publication-2/browse/Publication%20-%20Penerbitan/
Vietnam	As part of: National Environmental Report	VEA	Annual	2010	• Economic development activities, changes in climate and other environmental pressures • State of environment quality of soil, water and air • Special focus on solid waste and biodiversity • Impacts of environmental pollution • State of environmental management • Proposed measures	Regularly prepared and published but only available in Vietnamese (except for 2007). Each year has a different theme. 2007 focused on urban air environment while 2010 on overview of Vietnam Environment.	http://www.vea.gov.vn/vn/hientrangmoitruong/Pages/trangchu.aspx

*online/ published

Note: CPCB = Central Pollution Control Board; EPD = Environmental Protection Department; EMB = Environmental Management Bureau; MOE = Ministry of Environment; PCD = Pollution Control Department; MEP = Ministry of Environmental Protection; DOE = Department of Environment VEA = Vietnam Environment Administration. Source: Compiled by Authors, 2012.

2.5.4 Researchers

Contrary to policymakers, researchers/scientists, depending on their field of study, will appreciate more detailed information on air quality monitoring data, emissions inventories, source apportionment results, health impacts studies, air pollution control measures (and their results) available in technical reports, studies, presentations and online databases as this can be references for their research. This information can also be shared to researchers through conferences and seminars. City EPBs can encourage researchers to focus on specific air pollution issues where there is limited local information (for instance, local health impacts).

2.6 Proposed city clean air report

The Clean Air Initiative for Asian Cities (CAI-Asia), with support from the Energy Foundation, developed a comprehensive city clean air report template which is aimed to:

- Provide a complete picture of air quality management in a city;
- Compile air quality management information useful for city government, MEP, researchers and the general public;
- Allow the city EPBs to analyze AQM challenges and determine areas for improvement, not only on compliance side, but also in terms of implementation, institutional arrangements and others;
- Allow city residents to appreciate achievements of the city government to improve air quality; and
- Provide guidance (by proposing priority areas/measures) to city government and to MEP.

Detailed information on the proposed content for the city clean air report is provided below.

2.6.1 City Clean Air Report Template

The city clean air report is composed of six chapters:

1. General Information
2. Status of Air Quality
3. Sources of Air Pollution and GHG Emissions
4. Impacts of Air Pollution and Climate Change
5. Achievements and challenges in AQM (includes priority AQM measures)
6. Stakeholders

Chapter 1: General Information

Description: This chapter describes the natural and socio-economic conditions in the city which influence air environment. This may be subdivided into:

- Geography and Climate
- Urbanization and Population
- Economy and Industry
- Energy
- Transportation

Data needed per section	Typical sources	Frequency of update
Geography and Climate • Land area • Geographical characteristics affecting air quality (e.g. landlocked, archipelago, mountainous, others) • Climatological characteristics affecting air quality (e.g. high temperature or seasonal differences that impact energy requirements, monsoons)	• Usually already available in: City Environmental Quality Reports	Once
Urbanization and Population • Total population in city, population density	• Usually already available in: City Environmental Quality Reports, Statistical Yearbooks	Annual
Economy and Industry • Current GDP in the city, and growth from previous year/s; GDP per capita • Major industries affecting pollution in the city • State if these industries are expected to [grow steadily/ decline/ remain stable] in the coming years.	• Usually already available in: City Environmental Quality Reports, Statistical Yearbooks	Annual
Energy • Energy mix in the city • Annual growth in energy consumption	• Usually already available in: City Environmental Quality Reports, Statistical Yearbooks	Annual
Transportation • Vehicle population growth in the city / compare with the province/ other large cities • Mode share in the city, indicate percentage	• Usually already available in: City Environmental Quality Reports, Statistical Yearbooks • Communication with city transport department	Annual

Chapter 2: Status of Air Quality

Description: This chapter discusses the status and trends of the air pollution levels of particulate matter, Sulfur dioxide, Nitrogen dioxide, and other pollutants. It also provides information on current status of air quality monitoring, forecasting and reporting systems for the city. This may be subdivided into:

- Air Quality Monitoring
- Air Quality Modeling
- Air Quality Reporting
- Air Pollution Index Trends
- Urban Ambient Air Quality Levels

Data needed per section	Typical sources	Frequency of update
Air Quality Monitoring • Number of monitoring stations • Pollutants monitored, frequency of monitoring • Type of monitoring stations (ambient, roadside, residential, background)	• Usually already available in: City Environmental Quality Reports • Communication with Environmental Monitoring Centre	Once – to be updated as necessary

Data needed per section	Typical sources	Frequency of update
Air Quality Modeling • Information of air quality modeling activities in the city. If existing, for what purpose is modeling being used in the city (forecasting, others)	• Usually already available in: City Environmental Quality Reports	Once – to be updated as information becomes available
Air Quality Reporting • How is city air quality information reported? – include links of websites, report titles • What information is reported? – API forecasts, number of blue sky days, others		Once – to be updated as necessary
Air Pollution Index Trends • Number of blue sky days (Grade II and Grade I days) for the current year and • Comparison of with previous years (increasing, decreasing, stayed the same)	• Usually already available in: City Environmental Quality Reports • Communication with Environmental Monitoring Centre	Annual
Urban Ambient Air Quality Levels • Annual levels of criteria pollutants (PM10, SO2 and NO2) in the city for current year • Seasonal/ monthly analysis of air pollutants • Trend analysis of air pollutants for past 10 years (increasing, decreasing, stayed the same) • If available, air quality analysis for emerging pollutants of concern for the city (which may not be required by State) (example: PM2.5, ozone, VOCs, toxics, others)	• Usually already available in: City Environmental Quality Reports • Communication with Environmental Monitoring Centre	Annual

Chapter 3: Sources of Air Pollution and GHG Emissions

Description: Chapter 3 will provide information on the sources of urban air pollution and will include results of emission inventories in the city. This may be subdivided into:

- Total emissions of air pollutants
- Emissions of air pollutants from industrial processes
- Source Apportionment
- Emissions of greenhouse gases
- Forecast of future emissions

Data needed per section	Typical sources	Frequency of update
Total emissions of air pollutants • Trend of emissions in the city (can also be compared with Province) • Main sources per type of pollutant (from emissions inventory)	• Usually already available in: City Environmental Quality Reports; Statistical Yearbooks	Linked with frequency of emissions inventory
Emissions of air pollutants by sector (industrial processes) • Emission estimates from major industrial sources in the city (from emissions inventory)	• Usually already available in: City Environmental Quality Reports; Statistical Yearbooks	Linked with frequency of emissions inventory

Data needed per section	Typical sources	Frequency of update
Emissions of air pollutants by sector (transportation) • Emission estimates from different modes of transport (from emissions inventory)	• Usually already available in: City Environmental Quality Reports; Statistical Yearbooks	Linked with frequency of emissions inventory
Source Apportionment • Results of source apportionment studies (main sources of particulate pollution)		Linked with frequency of source apportionment
Emissions of greenhouse gases • GHG emission estimates in the city	• Communication with local DRC	Linked with frequency of emissions inventory
Forecast of future emissions • Forecast of emissions of air pollutants and GHGs in the city in total, by pollutant and also by sector	• Usually already available in: City Environmental Quality Reports	Every # years; may be linked with preparation of clean air action plan

Chapter 4: Impacts of Air Pollution and Climate Change

Description: This chapter discusses the impacts of air pollution in terms of health-, economic-, and environment-related effect, including linkages between air pollution and climate change and its potential impact to the city. It also provides some information on cost-benefit analysis of air pollution. This may be subdivided into:

- Impacts on public health
- Impacts on economic development
- Air pollution and climate change
- Cost-benefit analysis

Data needed per section	Typical sources	Frequency of update
Impacts on public health • Results of local studies on impacts of air pollution on human health	• May be available from university research	Annual/ with new research/ studies
Impacts on economic development • Information on impacts on air pollution on economic development. This may also include cost of air pollution due to impacts on human health (number of attributable deaths in a year, hospital visits, and lost workdays in a year), impacts on crops, impacts on building and material quality, and impacts on tourism and visibility.	• May be available from university research	Annual/ with new research/ studies
Air pollution and climate change • Co-benefits of addressing air pollution and climate change and information on the expected impacts of climate change to the city	• May be available from university research	Annual/ with new research/ studies

Data needed per section	Typical sources	Frequency of update
Cost-benefit analysis • Amount of investment of Jinan in terms of environmental protection, specifically air quality management, using available data • Insights on the benefits received relative to the investment cost for the city		Annual/ every five years

Chapter 5: Achievements and challenges in air quality management

Description: Chapter 5 discusses the city's achievements and challenges in the past (or recent) years in terms of air quality management. This includes highlights of specific successful clean air policies and measures in the city and may also include information on the progress of implementation of the current Five-Year Plan.

- Introduction on Clean Air Action Plan (air quality objectives/targets)
- Achievements
- Challenges
- Priority air quality management measures in the city

Data needed per section	Typical sources	Frequency of update
Clean Air Action Plan • Details of the clean air action plan (or similar plan) for the city • Include air quality objectives/targets/goals	• From FYP on Air Pollution Prevention and Control	Linked with preparation of clean air action plan
Achievements • Information on recent achievements in air quality management in the city • This may also include progress of achieving the air quality objectives as stipulated in the plan	• Usually already available in: City Environmental Quality Reports	Annual/ every two years
Challenges • Information on challenges to achieve air quality objectives	• Usually already available in: City Environmental Quality Reports	Annual/ every two years
Priority air quality management measures in the city • Proposed priority air quality management measures for the city in the next couple of years	• Usually already available in: City Environmental Quality Reports	Every two years

Chapter 6: Stakeholders

Description: Chapter 6 provides information on the different stakeholders which are active in air quality management in the city. This would cover:

- National and Local Government Agencies
- Non-government Organizations
- Academic and Research Agencies
- Development Agencies and Foundations
- Private Sector

Appendices

- Directory of Clean Air Stakeholders
- References
- Clean Air Report Committee Members

2.7 Sustaining City Clean Air Reporting

To be able to sustain clean air reporting in a city, it is necessary to institutionalize a clean air reporting mechanism which includes allocation of resources, including time and budget, for city clean air reporting and assignment of a team who will prepare the report.

There is also a need to assess whether the current communication infrastructure is efficient enough to reach the target stakeholders and to get the message across. For instance, an assessment of the current structure and content of the city environment agency's website can be undertaken, either through public surveys or user consultation.

Generally, it is important to be able to establish – (1) frequency of reporting; (2) form of reporting; (3) content of a city clean air report; and (4) language considerations (depending on resources available and current share of expat population in the city, a bilingual report can also be considered).

2.8 Resources

- CITEAIR and INTERREG IIIC, 2007. "**Communicating air quality: A guidebook on communication with the public about air quality.**"
  URL: http://citeair.rec.org/downloads/Products/CommunicatingAirQuality.pdf
- CAI-Asia, 2011. Presented by Patdu, K. 2011. "**Clean Air Reporting in Chinese Cities and Internationally**." At the 7th AQM City Workshop of CAI-Asia China Network. Dalian, China.
  URL: http://cleanairinitiative.org/portal/node/7391

3. Clean Air Reporting in Chinese Cities

3.1 Current Situation

To gain a better understanding on the status of clean air reporting in Chinese cities, CAI-Asia designed a survey (available in Annex A) which was distributed to its 13 Chinese member cities at the 7th AQM Workshop of the CAI-Asia China City Network in Dalian on 30 June – 1 July 2011.[10] CAI-Asia received responses from 11 cities: Changsha, Chengdu, Chongqing, Guangzhou, Guiyang, Hangzhou, Harbin, Jinan, Qingdao, Shanghai and Tianjin. A summary of the main findings are presented below.

3.1.1 Identifying the Target Audience

The different forms used by city EPBs to communicate air quality information (such as through print newspapers, published reports, websites, etc.) are targeted for different audiences. For instance, among different media forms considered, only newspapers, television, radio and website were targeted to all stakeholders. Generally, most of the clean air reporting activities implemented by city EPBs are for city government and for the general public. It was noted that MEP and researchers was only noted once as a specific target audience for clean air reporting.

3.1.2 Determining Means of Communication

At the city level, there are three kinds of published report which are regularly prepared. These are (1) Annual Environment Quality Bulletin and the (2) Environmental Quality Report for every five years.

The Annual Environment Quality Bulletins are published online through the city EPB websites. Some examples of the Annual Environment Quality Bulletin are provided in Table 8. These annual bulletins usually contain information on the annual status of the following environmental issues: urban ambient air quality, acid rain, surface water quality, and noise quality, as well some information on control measures for each of these issues.

The Environmental Quality Report (EQR), prepared annually and every five years, is used as the basis of the Annual Environment Quality Bulletin and is reported to the Provincial Environmental Protection Department or to MEP. The 2006-2010 Environmental Quality Report for 77 cities in available through the MEP website.[11] These Environmental Quality Reports generally contain the following information: natural and social environment profile, overview of environmental monitoring in the city and status of environmental quality. Under the section on air quality status, information on air pollution sources, air quality monitoring results for major pollutants, temporal and spatial variation during the period considered, annual pollution trends

[10] The 7th AQM City Workshop of CAI-Asia China Network was jointly organized by the Foreign Economic Cooperation Office (FECO) of Ministry of Environment of China (MEP) with CAI-Asia as the partner and with support from Energy Foundation through the Project "Making Co-benefits Work in Chinese Cities: Clean Air Reports and Action Plans." For more information, visit http://cleanairinitiative.org/portal/node/7391

[11] Available here: http://jcs.mep.gov.cn/jcgl/zhxx/201110/t20111018_218421.htm

analysis, causal analysis and recommendations. An outline of the environmental quality report is provided in Annex B.

Some city air quality monitoring data are also provided through statistical communications/yearbooks. These are usually annual pollutant emissions estimates and annual pollutant concentrations. Links to Statistical Yearbooks of selected cities are provided in Table 9.

Table 8: Links to Annual Environment Quality Bulletin of Selected Cities

City	Link
Guangzhou (2009)	http://www.gzepb.gov.cn/zwgk/hjgb/201005/t20100531_63647.htm
Fuzhou (2009)	http://www.fzepb.gov.cn/1733-113/quality_communique/Content.aspx
Chongqing (2005-2010)	http://www.cepb.gov.cn/hbjc/hjzll/hjzlbgs/
Jinan (2005-2010)	http://www.jnepb.gov.cn/moudle/zwgk.aspx
Xiamen (1996-2010)	http://www.xmepb.gov.cn/sj/ContentList.aspx?CmsList=102

Source: Compiled by Authors, 2012.

Table 9: Links to Statistical Yearbooks

City	Link
Guangzhou (2009)	http://www.jntj.gov.cn/E_Type.asp?page=2&E_typeid=28
Fuzhou (2009)	http://www.hangzhou.gov.cn/main/zjhz/tjsj/
Chongqing (2005-2010)	http://www.bjstats.gov.cn/nj/main/2010-tjnj/index.htm

Source: Compiled by Authors, 2012.

Based on the results of the survey, the common means of air quality communication include: through websites, published (printed) reports, print newspapers, television and radio. Only a few cities have started to use emerging media forms to communicate air quality information. Only 3 out of the 11 respondents (Chongqing, Qingdao, Shanghai) have began to use social networking websites. About half of the respondents (5 out of 11: Guangzhou, Jinan, Chongqing, Qingdao, Shanghai) provide regular updates/warnings through email or mobile alerts. However, except for Shanghai, this service is only for city government.

3.1.3 Understanding the scope of information reported

For most cities, the information shared the public is primarily air quality monitoring data. This includes (1) the daily API and forecast in city government/city EPB/MEP websites and (2) through annual environment bulletin: number of blue sky days, number of days where Class II standard is exceeded.

The dissemination of air quality monitoring data from the city monitoring centers is following this process [12]: from automatic monitoring stations, daily reports (concentration and API) are provided to the city EPB and to automatically to the National Environmental monitoring Center. These daily reports are also emailed to the Jinan local media and communicated internally through mobile alerts.

Very few cities (only 4 out of 11) disseminated information on impacts of air pollution. If there are local studies on impacts of air pollution available, it is usually shared only to city government or MEP. It was also noted that reporting to MEP is generally focused on air quality data trends and compliance with standards. Overall, more comprehensive clean air reporting (not only focusing on reporting air quality levels but also on clean air management measures and activities) is primarily communicated to city government

3.2 City Clean Air Reports for Hangzhou and Jinan

There is heightened interest from both local and international audience to learn and understand more about the state of air quality management and climate change mitigation in China and its cities. There has been improvement in recent years in clean air reporting and information dissemination of Chinese cities: a notable example is the start of hourly reporting of PM_{10}, SO_2 and NO_2 concentrations for 113 key Chinese cities (http://58.68.130.147/air/). The results of the 2009-2010 Pollution Information Transparency Index, an annual assessment of environmental transparency in 113 Chinese cities by the Institute of Public & Environmental Affairs in Beijing and the Natural Resources Defense Council (NRDC) also attests to the overall growth in environmental information disclosure of Chinese cities.

Nonetheless, there is still much room for improvement in city clean air reporting. It is observed that the capacity of Chinese cities is not yet harmonized, with a few cities excelling while others lack in clean air reporting. The type of information reported is typically limited to APIs and air quality levels, but the clean air management measures and programs implemented by cities to reduce emissions are not always recognized.

CAI-Asia, with support from the Energy Foundation, worked with Jinan and Hangzhou to develop comprehensive city clean air reports using the report template in Chapter 2, Section 2.6. Most of the information was sourced from various existing documents including the Environmental Quality Reports, local research studies by EPBs and city statistical yearbooks. The table of contents for the proposed Jinan and Hangzhou City Clean Air Reports are provided in Annex C.

3.3 Sustainability of Clean Air Reporting in Chinese Cities

In China, some cities have already laid their foundations for Clean Air Reports, from the previous and current mandates of air quality reporting. The EQR is one example. It is a summarization of the of environmental quality status by the EPBs and regularly submitted to the local government and its counterpart at higher level. Like the Clean Air Reports, the EQR can be used as the basis for decision-making, supervision, management, as well as environmental planning and compliance monitoring. Both reports could also become a critical channel for public communication and enhancing their awareness of environmental protection.

[12] Personal communication with Jinan EPB during city visit (15-16 November 2011).

Based on CAI-Asia's knowledge and experience, we recommend a process (Figure 2) for developing the Clean Air Reports. This recommended process considered the current institutional and operational set-up for environmental protection administrative in China. It can, however, be adapted with local situation and context. In the process, multiple rounds of revision are to be conducted.

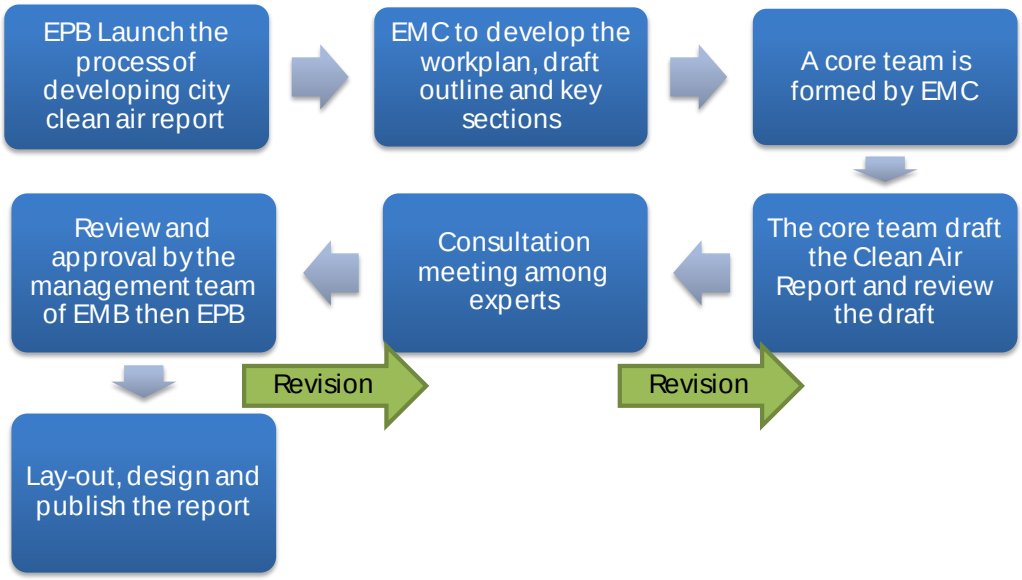


Figure 2. Recommended Process for Developing Clean Air Reports

In the process, two organizations play vital roles to the success of the reports. The commitment and leadership from EPBs will ensure the priority and attentions during the development. Director of the EPBs could be the head of the leading group and the one who sign-off the final report. A personal message from the director of EPBs is also a common way adopted by international cities to communicate with public and wider groups of stakeholders. On the other hand, Environment Monitoring Centers (EMCs), from their daily work, possess the necessary information and data for environmental monitoring, research initiatives, as well as environment statistics in many cases. The EMCs, therefore, can become the core team and authors of the CARs. In other cities, Environmental Protection Information Center and Environmental Education Center under EPBs could also be considered as the leading authors.

In order to comprehensively analyze air quality status, other government agencies should also be involved in the process, including counties' stations, development and reform committee, urban and rural construction committee, bureau of statistics, meteorological center, transport bureau, public utilities board and more. They provide valuable information and data to the CARs.

In terms of format, a designated person or team will be responsible for graphing and layout for a professional and reader-friendly design. The report summary and whole report could be printed in recycled or certified paper. An electronic version should also be online for different target audiences.

To sum up, the Clean Air Report tracks the dynamic changes of the city's air quality and analyzes the trends. By combining monitoring data and statistics, current status and projections against social and economic development, the report presents major air quality issues and reasons behinds, and provides a reliable basis for cities' air quality related plans.

4. ANNEXES

A. Clean air reporting survey for Chinese cities

B. Outline of Environmental Quality Report

C. Table of contents for the proposed Jinan and Hangzhou City Clean Air Reports

Annex A: Clean Air Reporting Survey for Chinese Cities

CITY SURVEY: CLEAN AIR REPORTING

I. Clean Air Reporting

There is heightened interest from both local and international audience to learn and understand more about the state of air quality management and climate change mitigation in China and its cities. There has been improvement in recent years in clean air reporting and information dissemination of Chinese cities: a notable example is the start of hourly reporting of PM_{10}, SO_2 and NO_2 concentrations for 113 key Chinese cities (http://58.68.130.147/air/). The results of the 2009-2010 Pollution Information Transparency Index (PITI), an annual assessment of environmental transparency in 113 Chinese cities by the Institute of Public & Environmental Affairs (IPE) in Beijing and the Natural Resources Defense Council (NRDC) also attests to the overall growth in environmental information disclosure of Chinese cities.

Nonetheless, there is still much room for improvement in city clean air reporting. It is observed that the capacity of Chinese cities is not yet harmonized, with a few cities excelling while others lack in clean air reporting. The type of information reported is typically limited to APIs and air quality levels, but the clean air management measures and programs implemented by cities to reduce emissions are not always recognized. Harmonizing and consolidating channels used to disseminate clean air management information can facilitate city-to-city learning and sharing of best practices.

The Clean Air Initiative for Asian Cities (CAI-Asia) is conducting a clean air reporting survey in its 13 Chinese member cities with the aim of:

1. Knowing which cities do clean air reporting;
2. Understanding the purpose and rationale of clean air reporting;
3. Understanding the scope of clean air reporting, providing a baseline of the type of information reported depending on medium used as well as the frequency of reporting; and
4. Understanding the process of preparing published clean air reports.

The results of this survey will be used:

1. To guide cities in improving their clean air reporting by identifying areas for improvement;
2. To foster city-to-city learning and sharing of best practices in clean air reporting among CAI-Asia's 13 Chinese member cities;
3. To strengthen capacity for clean air reporting in the 13 Chinese member cities; and
4. To recommend a template or guidelines for city clean air reports.

Please email the completed questionnaire to **Zhang Chu** at chu.zhang@cai-asia.org by **17 June 2011**. Please do not hesitate to contact us if you have any questions or need further clarification. Thank you very much for you cooperation!

City Name: _____

Date: _____

I. Clean Air Reporting

Question 1: How does your city share information in air quality and climate change? How often do you update clean air management information though these channels? Please check all applicable.

Do you use this media form to share clean air management information?	**NO**	**IF YES, HOW OFTEN**					
		Real-time	Hourly/Daily	Weekly	Monthly	Annual	Other
Print newspapers							
Email / Mobile Alerts							
Social Networking sites and Micro-blogs (e.g., twitter)							
Website							
On television and radio							
On information boards in the city							
Published (printed) reports							
Internal communication							
Upon request by external stakeholders							

- If newspaper, provide name/s: _____
- If website, please include URL: _____
- If report, identify title: _____
- If social networking sites/blogs, provide URL and username: _____
- If information boards are used, how many: _____

Question 2: When you report clean air management information, who are your target stakeholders? How do you report/ share information to them? Please check all applicable.

Do you use this media form to share clean air management information?	**TO WHOM**					
	City Government	MEP	Municipal/ National Government	City Residents/ Public	Scientists	Others
Print newspapers						
Email / Mobile Alerts						
Social Networking sites and Micro-blogs (e.g., twitter)						

Do you use this media form to share clean air management information?	**TO WHOM**					
	City Government	MEP	Municipal/ National Government	City Residents/ Public	Scientists	Others
Website						
On television and radio						
On information boards in the city						
Published (printed) reports						
Internal communication						
Upon request by external stakeholders						

Question 3: What type of information do you report to your stakeholders? Please check all applicable.

General City Information	**TO WHOM**					
	City Government	MEP	Municipal/ National Government	City Residents/ Public	Scientists	Others
Total population in city						
Urban population in city						
City GDP						
Main industries in the city						
Vehicle population						

Status of Air Quality	**TO WHOM**					
	City Government	MEP	Municipal/ National Government	City Residents/ Public	Scientists	Others
Real-time air quality levels						
Daily API						
Daily PM10, SO2, NO2 levels						
API forecast						
PM10, SO2, NO2 levels forecast						
Number of blue sky days in a year						
Number of days where Class II standard is exceeded						
API comparison with previous year						
Annual PM10, SO2, NO2 levels comparison with previous year						
API trends analysis for at least 5 years						
PM10, SO2, levels trends analysis for at least 5 years						
PM10, SO2 and NO2 levels mapping						
Information on air quality monitoring						

Status of Air Quality	**TO WHOM**					
	City Government	MEP	Municipal/ National Government	City Residents/ Public	Scientists	Others
stations						
Air quality warnings						
Quality control and quality assurance results for a monitoring year						
Emissions inventory						
Source apportionment of PM results						

Information on impacts of air pollution	**TO WHOM**					
	City Government	MEP	Municipal/ National Government	City Residents/ Public	Scientists	Others
Results of local health exposure assessment studies						
Results of local epidemiological studies						
Health costs of air pollution in the city						
Results of local studies on impact of air pollution on agriculture						
Results of local studies on impact of air pollution on visibility						
Results of local studies on impact of air pollution on economy						
Results of local studies on impact of air pollution on materials/buildings						
Results of local studies on impact of air pollution on tourism						

Clean air management activities	**TO WHOM**					
	City Government	MEP	Municipal/ National Government	City Residents/ Public	Scientists	Others
Annual achievements on clean air management for the city						
Status of implementation of clean air management activities to address **transport sources** in the city						
Status of implementation of clean air management activities to address **stationary sources** in the city						

Clean air management activities	**TO WHOM**					
	City Government	MEP	Municipal/ National Government	City Residents/ Public	Scientists	Others
Status of implementation of clean air management activities to address **area sources** in the city						
Planned clean air management activities to address **transport sources** in the city						
Planned clean air management activities to address **stationary sources** in the city						
Planned clean air management activities to address **area sources** in the city						
Yearly budget for clean air management						

Question 4: Which organization takes the lead in preparing clean air reporting?

_____

Question 5: Which organizations and departments are involved in clean air reporting? What are their roles? (Example: as data collector, data provider, report-writing, approval).

Organization Name	Role

Thank you!

Annex B: Outline of Environmental Quality Report (focus on air pollution)

Natural environmental profile
Social environment profile
Environmental monitoring Overview

- Layout of monitoring sites
- Sampling and laboratory analysis
- Data Overview

Status of environmental quality

- Sources of pollution
  - o Ambient air pollution sources

- Ambient air
  - o Ambient air monitoring results and comments
  - o Ambient Air Quality Assessment
  - o Major pollutants
  - o Temporal and spatial variation during the year
  - o Annual comparative analysis
  - o Conclusion on ambient air quality
  - o Cause Analysis
  - o Suggestions

Summary

- Environmental quality conclusions
  - o conclusions of various environmental factors
  - o Environment Quality Conclusion
  - o Future warning

- Recommendation

Annex C: Table of Contents of Jinan and Hangzhou Clean Air Report

Jinan City Clean Air Report

Hangzhou City Clean Air Report