

# Clean Air Initiative for Asian Cities (CAI-Asia) Strategy 2009 - 2012



Clean Air Initiative for Asian Cities (CAI-Asia) Center  
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## LIST OF ABBREVIATIONS

ABC	Atmospheric Brown Cloud
ADB	Asian Development Bank
AQM	air quality management
AQMA	Air Quality Management in Asia
BAQ	Better Air Quality
BoT	Board of Trustees
BTU	British thermal unit
CAI-Asia	Clean Air Initiative for Asian Cities
CAI-LAC	Clean Air Initiative Latin American Cities
CAI-SSA	Clean Air Initiative Sub-Saharan Africa
CDM	Clean Development Mechanism
CH <sub>4</sub>	Methane
CitiesACT	Asian cities on Air quality, Climate change and energy, and Transport
CNG	Compressed Natural Gas
CO	Carbon monoxide
CO <sub>2</sub>	Carbon dioxide
EANET	East Asia Network for Acid Deposition
EIA	Energy Information Administration
GDP	gross domestic product
GHG	greenhouse gas
HTAP	Hemispheric Transport of Air Pollution
ICLEI	Local Governments for Sustainability
IPCC	Intergovernmental Panel on Climate Change
NGOs	non-governmental organizations
NO <sub>x</sub>	Nitrogen oxides
O <sub>3</sub>	Ozone
OECD	Organisation for Economic Co-operation and Development
Pb	Lead
PM	particulate matter
SO <sub>2</sub>	Sulfur dioxide
SUMA	Sustainable Urban Mobility in Asia
SUT	Sustainable Urban Transport
TSP	total suspended particulates
UCLG	United Cities and Local Governments
UNEP	United Nations Environment Programme
USAID	United States Agency for International Development
VOCs	volatile organic compounds
WB	World Bank
WHO	World Health Organization

# 1. INTRODUCTION

## 1.1 About the Clean Air Initiative for Asian Cities

The Clean Air Initiative for Asian Cities (CAI-Asia) was established in 2001 as a joint initiative by the Asian Development Bank, World Bank, and the United States – Asia Environmental Partnership (US-AEP, a project of USAID). It is part of a global Clean Air Initiative, which also includes sister initiatives for Latin American Cities (CAI-LAC) and in Sub-Saharan Africa (CAI-SSA). CAI-Asia’s **vision** is to realize clean air for Asian cities. CAI-Asia’s **mission** is to promote and demonstrate innovative ways to improve air quality of Asian cities through partnerships and sharing experiences.

Since 2007, this multi-stakeholder initiative consists of three parts as shown in Figure 1:

- The CAI-Asia Center, a regional, Manila-based non-profit organization as the coordinator of CAI-Asia, and acts as the secretariat to the CAI-Asia Partnership. It is governed by its Articles of Incorporation, By-laws and Operations Manual approved by its Board of Trustees (BoT).<sup>1</sup>
- The CAI-Asia Partnership, a United Nations Type II partnership, with over 120 member organizations, and supervised by a Partnership Council.<sup>2</sup>
- CAI-Asia Country Networks in China, Indonesia, Nepal, Pakistan, Philippines, Sri Lanka, and Viet Nam. A secretariat of the Country Network in India will formally start in 2009.

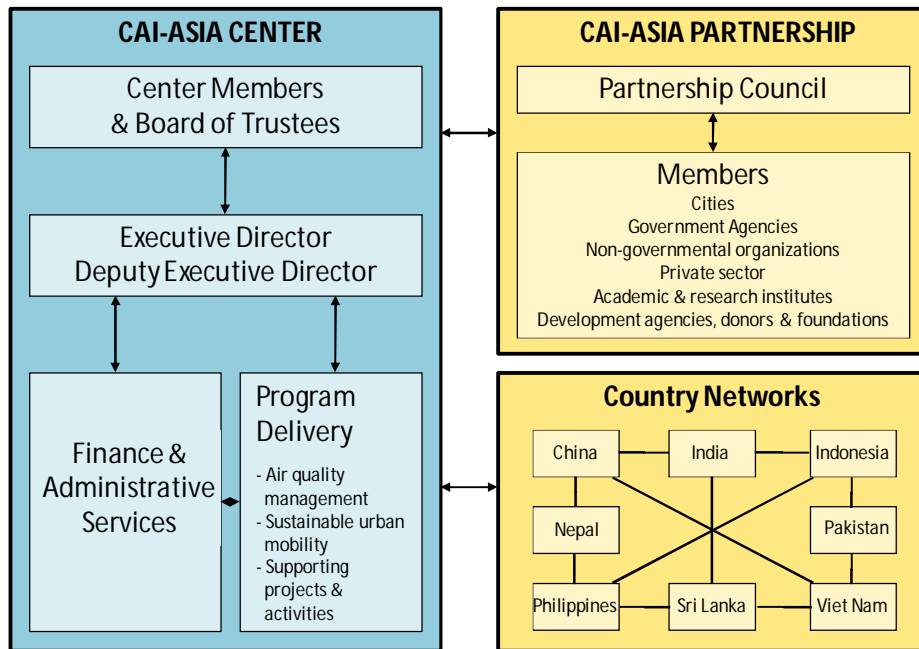


Figure 1: CAI-Asia Structure as per 1 January 2009

<sup>1</sup> See [http://www.cleanairnet.org/caiasia/1412/articles-71258\\_incorp.pdf](http://www.cleanairnet.org/caiasia/1412/articles-71258_incorp.pdf) for the Articles of Incorporation. See [http://www.cleanairnet.org/caiasia/1412/articles-71258\\_bylaws.pdf](http://www.cleanairnet.org/caiasia/1412/articles-71258_bylaws.pdf) for the By-laws of the CAI-Asia Center. See [www.cleanairnet.org/caiasia/annualreport](http://www.cleanairnet.org/caiasia/annualreport) for the 2007 annual report.

<sup>2</sup> See [http://www.cleanairnet.org/caiasia/1412/articles-71193\\_guidelines.pdf](http://www.cleanairnet.org/caiasia/1412/articles-71193_guidelines.pdf) for an overview of the current operating guidelines. See <http://www.cleanairnet.org/caiasia/1412/propertyvalue-13574.html> for a list of current members.

Since its establishment in 2001, CAI-Asia has grown to become the main regional initiative on urban air quality management. CAI-Asia has demonstrated that it has been able to collect and document knowledge, convene stakeholders and shape and influence standards and policies on urban air quality management. The evolution of CAI-Asia into the CAI-Asia Partnership, formalized as a Type II partnership under the UN provides CAI-Asia with a more clear identity which allows governments, civil society and private sector to continue to engage with each other in discussions and other activities in pursuit of the common goal of cleaner air in Asian cities. The CAI-Asia Center, established in 2007, is the continuation of the old CAI-Asia Secretariat and is increasingly acting as the institutional memory of the air quality community in Asia.

## 1.2 Why a CAI-Asia Strategy?

The Operating Guidelines of the CAI-Asia Partnership call for the development of a CAI-Asia strategy spanning a four-year period. This document presents the draft strategy of the CAI-Asia Partnership and the CAI-Asia Center and Country Networks. The reason for a broader scope is that this strategy also provides the basis for the more detailed business plans for the CAI-Asia Center and work plans of Country Networks, and is one of the inputs into the business plans for member organizations of the CAI-Asia Partnership, as shown in Figure 2. The strategy covers the period January 2009 to December 2012, and replaces the previous CAI-Asia Partnership Strategy 2007-2010.<sup>3</sup>

The draft CAI-Asia Strategy 2009-2012 will be presented at the CAI-Asia Partnership Meeting on 11 November 2008 in Bangkok and subsequently endorsed by the CAI-Asia Partnership Council. The strategy presents

- Air quality trends in Asia, the business case for addressing urban air pollution and an approach for integrated air quality management (AQM) (chapter 2).
- Scope and priorities for CAI-Asia for 2009-2012 (chapter 3).
- Roles of the CAI-Asia Partnership, the CAI-Asia Center, and Country Networks (chapter 4).

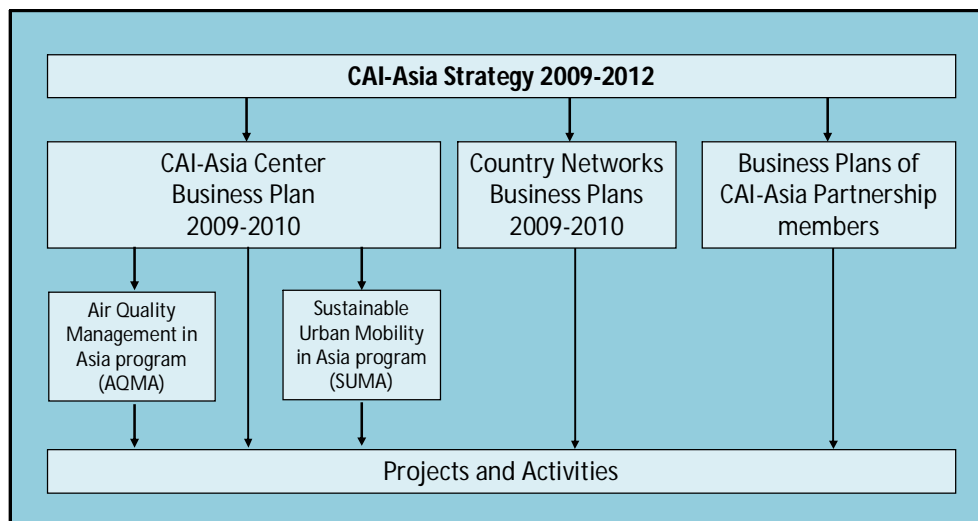


Figure 2: Implementation of the CAI-Asia Strategy

<sup>3</sup> <http://www.cleanairnet.org/caiasia/1412/article-71771.html>

## 2. AIR QUALITY IN ASIA

### 2.1 What is Air Quality?

“Urban air quality” refers to the conditions of the atmospheric environment in a city as measured by concentrations of air pollutants. The main sources of air pollution in cities are (a) mobile sources (i.e. transport, such as motor vehicles and marine vessels); (b) stationary sources (power plants and industries); and (c) area sources (e.g. waste burning and dust). Topographical and meteorological conditions are also important factors that affect the quality of urban air. Furthermore, urban air quality is more than a local issue. For example, a large share of pollution in Beijing and Hong Kong is attributed to sources outside the city boundaries. In cities like Ulaanbaatar and Kathmandu, indoor cooking and heating cause significant indoor and urban air pollution.

Air pollutants of most concern are known as “criteria pollutants” and include

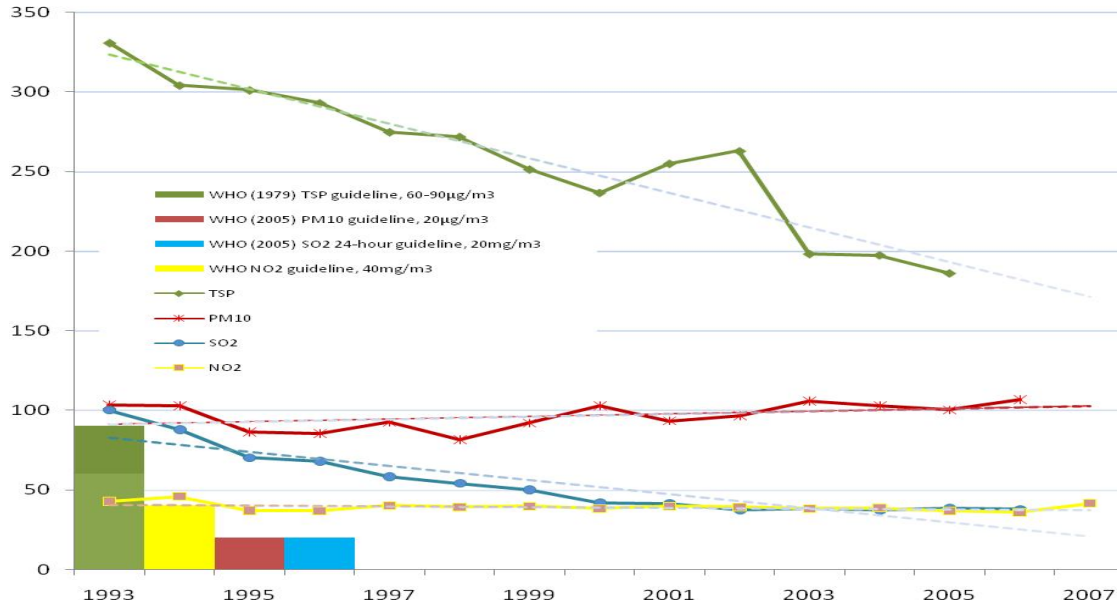
- Particulate matter (PM) - originating from a large number of sources, most importantly vehicles, power plants, construction sites, cooking stoves and heaters, and industrial processes. PM types are distinguished by their size as total suspended particulates (TSP,  $\leq 30$  micron),  $PM_{10}$  ( $\leq 10$  micron) and  $PM_{2.5}$  ( $\leq 2.5$  micron). One important component of PM is black carbon.
- Sulfur dioxide ( $SO_2$ ) - released when burning fossil fuels containing high sulfur levels.
- Nitrogen oxides ( $NO_x$ ) - emitted by vehicles, industrial and power plants.
- Carbon monoxide (CO) - emitted by vehicles and resulting from incomplete combustion of fossil fuels by, for example, cooking stoves and industrial furnaces.
- Ozone ( $O_3$ ) - a toxic gas formed by  $NO_x$  and VOCs, especially on sunny and windless days, and is a leading component of smog.
- Lead (Pb) - emitted by vehicles burning leaded gasoline and by industrial processes, such as lead smelting. Lead is highly toxic and is no longer used in gasoline in Asia, except for Cambodia, Laos, Mongolia and Myanmar.

Volatile organic compounds (VOCs, including hydrocarbons, alcohols, aldehydes, and ethers), heavy metals other than lead, (e.g. mercury), and air toxics (e.g. benzene, toluene, xylene, and ethylbenzene) are released by vehicles, power generation and industrial processes. Because these are not criteria pollutants they are currently rarely monitored and regulated in Asia, but they are still important.

### 2.2 The Business Case for Addressing Air Pollution

Outdoor air pollution is already causing over half a million premature deaths per year in Asia and millions more suffer from respiratory illnesses, especially children and the elderly. Resulting health costs and productivity losses wipe out 2-4% of gross domestic product (GDP) in Asian cities, while tackling air pollution would often cost a fraction of this. Air pollution also causes damage to agricultural productivity and forests, impacts the tourism potential of cities and countries, and leads to corrosion of buildings and heritage structures.

An AQM survey of Asia conducted by CAI-Asia showed that past efforts have contributed to a slow but steady reduction of average urban TSP and SO<sub>2</sub> concentrations over the last 15 years, while average concentrations of NO<sub>2</sub> and PM<sub>10</sub> have remained the same.<sup>4 5</sup> Unfortunately, until now, only a handful of Asian cities have pollution levels that meet World Health Organization (WHO) guidelines.



Note: TSP data aggregated from 17 cities; PM<sub>10</sub> data from 32 cities; SO<sub>2</sub> data from 31 cities; and NO<sub>2</sub> data from 29 cities. Data for other air pollutants are insufficiently available.

**Figure 3: Trends of Criteria Air Pollutants in Asian Cities, 1993-2007 (in µg/m³)**

Despite recent improvements, urban air pollution may worsen in the future due to the following factors:

- Asia is rapidly urbanizing – by 2015 more than half of Asians will be living in cities, compared to about one third in 1990.<sup>6</sup> Bigger and more cities put more pressure on available resources, including clean air.
- The GDP of Asian countries continues to rise, fuelled by rapid industrial growth. As a result, energy consumption is also increasing. Energy consumption in developing Asia is expected to more than double by 2030, from about 100 quadrillion BTU in 2004 to more than 280 quadrillion BTU in 2030.<sup>7</sup>
- Vehicle ownership is also growing rapidly. In 2004, the total number of registered vehicles in Asia was about 300 million, but by 2035 there will be over 1.2 billion vehicles on the road. With the exception of China, where cars will dominate, in most Asian countries motorbikes are growing fastest and will continue to be the dominant vehicle type.<sup>8</sup>

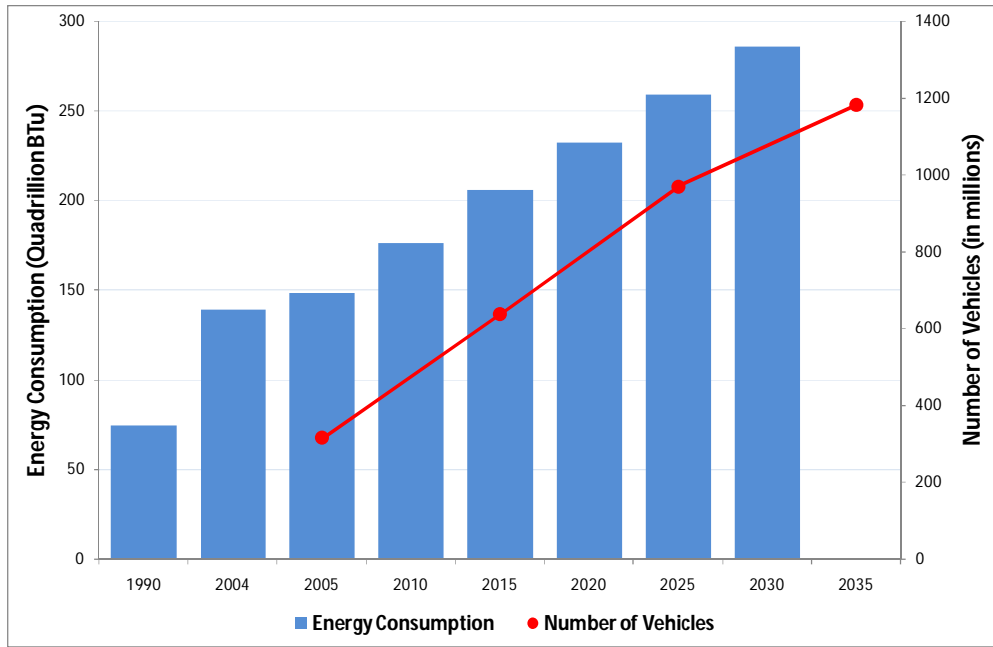
<sup>4</sup> Schwela, D.S., G. Haq, C. Huizenga, W. Han, H. Fabian, and M. Ajero. (2006). Urban air pollution in Asian cities. status, challenges, and management. Earthscan: London, UK.

<sup>5</sup> Country Synthesis Reports [full reference to be inserted]

<sup>6</sup> Source: United Nations. (2006). World Urbanization Prospects: The 2005 Revision. Table A.2. New York: Population Division, Department of Economic and Social Affairs, United Nations.

<sup>7</sup> Energy Information Administration (EIA), International Energy Annual 2004 (May-July 2006), www.eia.doe.gov/iea; EIA, System for the Analysis of Global Energy Markets (2007).

<sup>8</sup> Asian Development Bank, CAI-Asia Center and Segment Y Ltd, (2008). Unpublished.



Notes: Energy consumption figures reflect Non-OECD and OECD countries as stated in the EIA Annual Energy Outlook 2008. The vehicle projection figures include Japan, Pakistan, Singapore, Bangladesh, South Korea, Malaysia, Nepal, Sri Lanka, China, India, Indonesia, Thailand, Philippines, Viet Nam.<sup>9</sup>

**Figure 4: Overall Energy Consumption and Vehicle Growth in Asian Countries**

### 2.3 Integrated Air Quality Management

To improve the air quality in Asian cities effectively, it is important that AQM is integrated in a broader context (Figure 5).

On one hand, this involves the application of a “scaling out” approach within cities focused on (a) real improvements in air quality through on-the-ground actions; (b) integrating activities as part of wider urban planning; and (c) co-benefits of climate change and ultimately sustainable development. These are further explained in the sections below.

On the other hand, a “scaling up” approach is required to reach approximately 2,500 Asian cities with over 100,000 inhabitants. Many of these cities fall outside any international or national program to strengthen institutional capacity to improve AQM. As a consequence, they may adopt a business-as-usual approach, which is not sustainable. It is thus essential to replicate successful programs across Asian cities.

<sup>9</sup> CAI-Asia Center analysis based on information from EIA Annual Energy Outlook 2008.

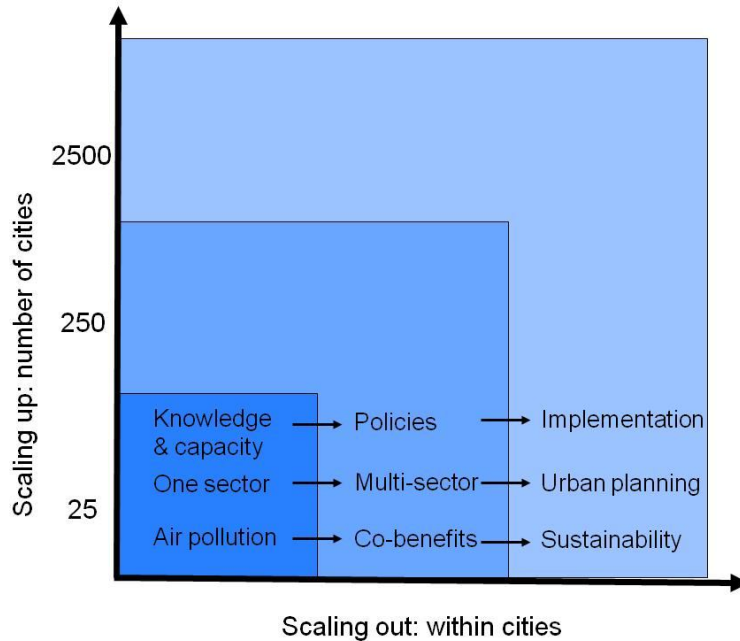


Figure 5: Integrating AQM in a Broader Context

### a) From knowledge to policies to implementation

Far too often, actions are not taken because activities that create knowledge, raise awareness and build capacity receive no follow-up, or because regulation is not enforced or adequately financed. Effective AQM is therefore needed and consists of the following three components:

- Building knowledge and capacity for policy makers, the public and other stakeholders to address air pollution. Data and information are needed to understand and measure the problem and monitor changes over time (e.g. through emissions inventories and source apportionment). There is also a need to build the capacity of individuals, organizations and institutions.
- Developing policies to mandate and facilitate change. This can take the form of standards (e.g. ambient air quality standards, emission standards for mobile and stationary sources, fuel quality standards), legislation (e.g. clean air act, rules restricting car access to city centers) and policies (e.g. AQM plans, policies to increase non-motorized transport).
- Implementing measures to improve the actual air quality in cities (e.g. the adoption of clean and green technologies, the use of cleaner or renewable energies, shifts from private to public transport, vehicle inspection programs, and improved waste collection to reduce open waste burning practices).

### b) Urban planning

Urban planning in Asia has traditionally focused on infrastructure planning with economic growth in mind, with insufficient consideration for environmental and social impacts. Furthermore, cities and countries apply a sector-based approach to policies and projects, which may be easier to implement but this narrower scope may affect the potential impact. Misalignment between national and local level institutions and policies is

another factor. What is thus needed is a better integration of sectors and issues into the urban planning process, combined with an improved alignment of institutions and policies at the national and local levels.

To achieve clean air and environmental sustainability it is important to move beyond one sector, such as transport, and place interventions in a multi-sectoral context and integrating activities as part of wider urban planning. Two examples include

- Transport. A city implementing a bus rapid transit system or light rail must consider plans for new residential areas, the construction of roads, shopping malls, office blocks or recreational parks.
- Industry. Rather than retrofitting an industrial plant it may be a better decision to move the plant out of the city if the government has plans to move industrial plants away from the city.

### c) Co-benefits and sustainable development

AQM has a much bigger chance of succeeding if placed in a broader context. Asians are concerned about air pollution in their cities because they can see and smell smog and smoke-belching vehicles and industrial stacks. At the same time, climate change is now recognized as a major global challenge, resulting in an emerging global consensus on the need for mitigation and adaptation. However, it will take years for climate change awareness to trickle down to the thousands of cities where local action is needed. Air pollution and climate change have the same drivers: increased energy use, vehicle growth, and industrialization. Moreover, the effects of air pollution and climate change are interlinked, i.e. some air pollutants (especially black carbon) also contribute to global warming, while climate change may also enhance air pollution (e.g. ozone). Therefore, addressing air pollution provides a unique opportunity to mitigate global climate change through local actions RIGHT NOW. The urgency for cities was highlighted in the recently published World Bank Primer for Climate Resilient Cities which noted that cities are likely to be most adversely impacted.<sup>10</sup>

An integrated approach to managing climate change, energy and air pollution makes sense and can offer multiple benefits (“co-benefits”) in the form of reduced air emissions and associated health and climate change risks, improved energy security and large cost reductions.<sup>11</sup> The co-benefits approach is supported by the Intergovernmental Panel on Climate Change (IPCC), which in its Fourth Assessment Report (2007) indicated that “Integrating air pollution abatement and climate change mitigation policies offers potentially large cost reductions compared to treating those policies in isolation.”<sup>12</sup>

There are other urban development issues that AQM should consider and which can generate additional co-benefits: reduced traffic congestion, improved public health, energy security and affordability, and a range of other socio-economic benefits. Air pollution may not always be the driver for change, but air quality is improved if actions are taken in related areas. Just as rising oil prices may lead a government to support the conversion of diesel buses so they can use compressed natural gas (CNG), this also can lead to reduced emissions from buses. Similarly, measures taken to address air pollution can result in less congestion and a more attractive city. Hence, AQM and climate change efforts should consider broader sustainable development issues, such as environmental protection, social progress and economic growth.

<sup>10</sup> [www.worldbank.org/eap/climatecities](http://www.worldbank.org/eap/climatecities)

<sup>11</sup> See <http://www.cleanairnet.org/caiasia/1412/article-71843.html> for an explanation of the co-benefits approach and an analysis of the status of the co-benefits approach in Asia.

<sup>12</sup> IPCC 4th Assessment Report, WG III, Summary for Policy Makers, <http://www.ipcc.ch/ipccreports/assessments-reports.htm>

### 3. SCOPE AND PRIORITIES FOR CAI-ASIA FOR 2009-2012

The scope and priorities determine activities carried out by the CAI-Asia Partnership, the CAI-Asia Center and Country Networks. CAI-Asia Partnership members, however, have their own scope of work, which overlaps with but is not always the same as that of CAI-Asia.

#### 3.1 Target Audience

Local, provincial and national government agencies influence the decisions that cities make and are therefore the primary target audience of CAI-Asia. CAI-Asia works both directly with policy makers at the national and local level, and through Partnership members and other stakeholders that influence them. Non-governmental organizations (NGOs), private sector, academic and research institutions, and development agencies and foundations are therefore the secondary target audience, as they exercise influence over the decisions of policy makers. The broader public and the media are a third target audience.

#### 3.2 Geographic Coverage

CAI-Asia conducts activities in South Asia, Southeast Asia and East Asia. Priority countries are those with a CAI-Asia Country Network: China, India (2009), Indonesia, Nepal, Pakistan, Philippines, Sri Lanka, and Viet Nam. A second priority is other developing Asian countries within the geographical scope of CAI-Asia: Bangladesh, Bhutan, Cambodia, Laos, Malaysia, Mongolia and Thailand (Myanmar and the Republic of North Korea will not be considered). CAI-Asia works together with Japan, Korea and Singapore to assist developing Asian countries in learning from their experiences. CAI-Asia currently does not focus on Central Asia and the Middle East, but countries from this sub-region can be included in CAI-Asia activities on a case-by-case basis.

#### 3.3 Thematic Coverage

CAI-Asia's thematic coverage for 2009-2012 is clustered into four thematic categories that can accommodate all major and emerging topics in air pollution, sustainable urban transport, clean energy, and climate change:

- Enabling frameworks for sound policy and program development. Such frameworks at the local and national levels consist of monitoring, institutional framework, knowledge and capacity of policy makers and stakeholders, policies, financing, and technologies. It covers AQM and related areas, all sources and sectors.
- Air quality monitoring, measurement and information. Up-to-date, reliable and easily accessible data and information provide the basis for building knowledge and capacity and developing sound policies.
- Strengthening and harmonization of national and regional standards and policies. Asian cities and countries often respond to good examples in and peer pressure from neighboring countries and cities. Harmonized standards and policies allow comparison between countries and thus encourage lagging cities and countries to improve and collaborate with each other.
- Co-benefits of air pollution and climate change. This cross-cutting theme is important because air pollution and climate change have similar causes, interacting impacts, and overlapping solutions. The co-benefits approach then reduces costs and emissions. It also allows optimizing use of international

funding for climate change by linking this to air pollution reduction and other national and local development objectives.

Each thematic category is described below. Outcomes are aimed at policy makers as the primary target audience of CAI-Asia. We emphasize sustainable transport more than industry and other area sources because of CAI-Asia's experience in the transport sector. For this strategy period, we will reach out to the private sector and identify new industry-related priority areas to strengthen work and expertise in stationary sources for the future.

**a) Enabling frameworks for sound policy and program development**

**Outcome:** *policy makers are able to develop and implement policies and programs within an improved AQM framework.*

Priority areas of work	Rationale
<p>General</p> <ul style="list-style-type: none"> <li>• AQM framework surveys and assistance to improve these frameworks.</li> <li>• Best-practice policies, strategies, technologies and financing mechanisms, and barriers to their adoption and spread.</li> <li>• City networks and city-to-city learning.</li> <li>• Collaboration structures between CAI-Asia Partnership members and other partnerships, forums, and networks.</li> </ul>	<ul style="list-style-type: none"> <li>• Cities are challenged with consistently changing urban air quality problems which grows and changes in parallel with their development. While cities generally differ in priority air quality problems, all will require strong AQM systems to address air pollution from all sources.</li> <li>• The improvement of AQM frameworks can lead to effective and efficient use of funds as the actions become integrated resulting to less costs and maximized benefits</li> <li>• The capacity of cities and countries to improve air quality varies enormously and Asian cities and countries need guidance on how to improve this.</li> <li>• It is not the absence of AQM frameworks but rather unfilled gaps and weaknesses in existing frameworks that cause less effective AQM. This provides an opportunity for improvement with limited time and resources.</li> <li>• Typical weaknesses and gaps relate to misalignment of institutions and policies; lack of air quality-specific institutional responsibilities and policies; weak policy implementation and regulatory enforcement; and limited knowledge of and access to available strategies, technologies and financing mechanisms.</li> <li>• Specific issues are often given too little attention in government policies, such as emissions from 2- and 3-wheelers, and emissions from ports. Some Partnership members work on these issues (e.g. USEPA for ports) but not extensively in Asia.</li> <li>• Cities learn best by interacting with their peers nationally and internationally. City networks are effective in bringing cities together but less effective in working together to cover multiple environmental issues and sectors and to reach a large number of cities.</li> <li>• Improving AQM frameworks of cities and countries requires the collaboration of multiple stakeholder groups, which places CAI-Asia in a unique position to assist. CAI-Asia Center and Stockholm Environment</li> </ul>

Priority areas of work	Rationale
	Institute's benchmarking of cities AQM capacities provide a sound basis for further work. <sup>13 14</sup>
Transport <ul style="list-style-type: none"> <li>• Clean fuels and vehicles</li> <li>• Public transport and non-motorized transport</li> <li>• Transport demand management</li> </ul>	<ul style="list-style-type: none"> <li>• The existing ADB and Sida funded Sustainable Urban Mobility in Asia (SUMA) program, which involves the main players on SUT in Asia, focuses around these three categories.</li> </ul>

## b) Air quality monitoring, measurement and information

**Outcome:** Policy makers have better access to reliable data and information on air quality and related areas on which to base their local and national policies.

Priority areas of work	Rationale
<ul style="list-style-type: none"> <li>• Monitoring of pollution baselines and trends of criteria air pollutants. GHG emissions are also included because of their relevance to the co-benefits approach of AQM.</li> <li>• Emission inventories</li> <li>• Road-side monitoring</li> <li>• Source apportionment</li> <li>• Health impacts of air pollution</li> <li>• Air quality modeling</li> <li>• Surveys of air quality, emission and fuel standards</li> </ul>	<ul style="list-style-type: none"> <li>• Science-based policy support is essential for effective AQM. While there are a large number of AQM-related research in Asia (both institutions within and outside Asia), they are not readily accessible to policy-makers.</li> <li>• While monitoring of air quality is improving, many Asian cities lack air quality monitoring and reporting systems required to measure trends and the effectiveness of policy measures. While some have monitoring systems in place, results are not documented and communicated well to public.</li> <li>• There is a need to harmonize the air quality monitoring systems in Asian Cities to be able to set a stable foundation for harmonized standards and policies on AQM.</li> <li>• Ambient air quality monitoring is often not supplemented with an analysis of the contribution by different sources, thus preventing policy makers to better tailor policies to sources.</li> <li>• Gaps exist in monitoring of pollutants that have significant health effects, most importantly PM<sub>2.5</sub> (usually TSP and PM<sub>10</sub> are measures), O<sub>3</sub> and VOCs. Similarly, monitoring of human exposure to air pollution, especially at roadsides, is often lacking. Both are needed to develop health-based AQM policies.</li> <li>• Urban air pollution needs to be considered in the context of air pollution at the national, regional and hemispheric levels, as urban air pollution affects and is affected by pollution sources outside urban areas.</li> <li>• CAI-Asia Center's annual benchmarking surveys of Asian cities' air pollution trends and standards provide a good basis for further work.</li> </ul>

<sup>13</sup> Schwela, D.S., G. Haq, C. Huizenga, W. Han, H. Fabian, and M. Ajero. (2006). Urban air pollution in Asian cities. status, challenges, and management. Earthscan: London, UK.

<sup>14</sup> "Country Synthesis Reports on Urban AQM in Asia" were prepared for various Asian countries in 2006. <http://www.cleanairet.org/caiasia/1412/article-70822.html>

### c) Strengthening and harmonization of local, national and regional standards and policies

**Outcome:** *policy makers are able to strengthen their standards and policies relative to and together with other Asian cities and countries.*

Priority areas of work	Rationale
<ul style="list-style-type: none"> <li>• Surveys of existing standards and plans to improve these, especially for air quality, fuels, vehicle and point source emissions.</li> <li>• Working with policy makers to strengthen standards and policies</li> <li>• Harmonization of standards, targets and approaches to achieve these.</li> <li>• Collaboration structures between CAI-Asia Partnership members and other partnerships, forums, and networks.</li> </ul>	<ul style="list-style-type: none"> <li>• Asian cities and countries are sensitive to peer pressure – harmonized standards and policies allow comparison between countries and thus apply peer pressure to lagging cities and countries to improve and collaborate with each other.</li> <li>• Air quality levels in most cities of criteria pollutants are above WHO guidelines, in particular PM<sub>10</sub> and SO<sub>2</sub>.</li> <li>• Asian cities and countries currently have different air quality standards and air pollution indexes – a “good” air day in one city is not necessarily a “good” air day in another city. While standards exist, improvement targets are less present, and these are often not based on WHO guideline or local health impact studies. In some cases standards are set unreasonably high, resulting in lack of enforcement and compliance monitoring. Furthermore, while some cities and countries are improving standards and policies, other risk lagging behind – these cities and countries need to be persuaded to continue strengthening their standards and policies.</li> <li>• The United Nations Environment Programme (UNEP) and the CAI-Asia Center jointly developed the Long Term Vision on Urban Air Quality in Asia 2030, which can be used as a basis for improving air quality standards and levels closer to WHO guideline targets.</li> <li>• Collaborations and strategies at the regional and hemispheric level are increasing but need further expansion. Regional approaches may include areas within one country, such as the Pearl River Delta in China or the Mumbai-Pune area in India. Existing Asian multi-country efforts include the Male Declaration, East Asia Network for Acid Deposition (EANET), and Atmospheric Brown Cloud (ABC).<sup>15</sup> The Task Force on Hemispheric Transport of Air Pollution (HTAP) concerns hemispheric air pollution.<sup>16</sup></li> <li>• Harmonizing national and regional standards and policies requires the collaboration of multiple stakeholder groups, which places CAI-Asia in a unique position to assist.</li> </ul>
<p>Transport</p> <ul style="list-style-type: none"> <li>• Dissemination and implementation of the “Roadmap for Cleaner Fuel and Vehicles in Asia”</li> <li>• Fuel economy</li> </ul>	<ul style="list-style-type: none"> <li>• Most Asian cities and countries use the Euro standards as a basis for setting vehicle and vehicle emission and fuel standards. However, not every country has a strategy to move to the next Euro standard level. The “Roadmap for Cleaner Fuel and Vehicles in Asia” can help governments to improve or develop strategies.</li> </ul>
<p>Industry / stationary sources</p> <ul style="list-style-type: none"> <li>• Surveys of existing</li> </ul>	<ul style="list-style-type: none"> <li>• Emission standards for stationary sources of air pollution have received relatively less attention in Asia compared to mobile sources of air pollution.</li> </ul>

<sup>15</sup> For more details on these initiatives – Male Declaration - <http://www.rrcap.unep.org/issues/air/malededec/>, EANET - <http://www.eanet.cc> and ABC - <http://www.rrcap.unep.org/issues/air/impactstudy/index.cfm>

<sup>16</sup> HTAP website –<http://www.htap.org>

Priority areas of work	Rationale
<p>standards and plans to improve these</p> <ul style="list-style-type: none"> <li>• Increase understanding of the AQ issues and challenges surrounding the industry sector</li> <li>• Engaging more private sector participation in AQ community</li> </ul>	<p>Several Asian countries still only use volume-based emission standards for point sources and not mass-based standards.</p> <ul style="list-style-type: none"> <li>• While some countries regulate industries based on self-reporting of emissions, some countries have started linking continuous emissions monitoring systems of industries to government regulatory agencies.</li> </ul>

#### d) Co-benefits of air pollution and climate change

**Outcome:** *Policy makers understand the co-benefits of air pollution and climate change and integrate the co-benefits approach into government policies and programs.*

Priority areas of work	Rationale
<p>General</p> <ul style="list-style-type: none"> <li>• Tracking and documenting work on the science of interacting impacts of air pollutants and greenhouse gas emissions, with a specific focus on black carbon and O<sub>3</sub>, as these are considered both air pollutants and direct climate change agents.</li> <li>• Integration of the co-benefits approach in policies and programs of Asian cities and countries.</li> </ul>	<ul style="list-style-type: none"> <li>• Scientific evidence that link air pollution and climate change are increasingly revealed and support rationale for addressing both problems together.</li> <li>• Air pollution and climate change have similar causes (mostly related to energy use), interacting impacts, and overlapping solutions.</li> <li>• The IPCC found that “Integrating air pollution abatement and climate change mitigation policies offers potentially large cost reductions compared to treating those policies in isolation.</li> <li>• International development agencies, bilateral donors and foundations give funding priorities to climate change mitigation. At the same time, national and local governments place importance to development issues, including air pollution. The co-benefits approach allows international funding to be linked with national and local development objectives.</li> <li>• Aside from activities by various CAI-Asia Partnership members, the CAI-Asia Center’s compendium of organizations, programs and training courses, plus its newly established knowledge portal provides a good basis for further work.</li> </ul>
<p>Transport</p> <ul style="list-style-type: none"> <li>• Measurement of CO<sub>2</sub> and air pollutant emissions from the transport sector.</li> <li>• Promoting policies for the transport sector that can reduce both air pollution and greenhouse gas emissions.</li> </ul>	<ul style="list-style-type: none"> <li>• Transport policies are influenced by various factors: energy costs and security, traffic congestion and improved mobility, climate change, air pollution, road safety, social equity and poverty alleviation. Climate change is expected to become a more important driver of future transport policies in Asian cities and countries.</li> <li>• Reduction of CO<sub>2</sub> and air pollutant emissions is often implicitly, and sometimes wrongly, assumed for transport policies and infrastructure projects. Projecting and monitoring CO<sub>2</sub> and air pollutant emissions of transport policies and infrastructure projects allows for the (a) demonstration of an actual reductions, which may be important for CDM or other carbon credit mechanisms or provide an added argument to overcome any public or other resistance for a policy or project; (b) identification and integration of measures to reduce CO<sub>2</sub> and air pollutant emissions in</li> </ul>

Priority areas of work	Rationale
	<p>transport policies or projects.</p> <ul style="list-style-type: none"> <li>• Information on transport and CO<sub>2</sub> and air pollutant emissions is growing but scattered and a wide range of methodologies for monitoring emissions from the transport sector is available. Increasingly, CO<sub>2</sub> emissions are being determined but air pollutants are left out.</li> <li>• Several CAI-Asia Partnership members, including the ADB, and the CAI-Asia Center have done work on co-benefits in the transport sector, on which future CAI-Asia activities can build.</li> </ul>
<p>Industry</p> <ul style="list-style-type: none"> <li>• Integration of the co-benefits approach in GHG accounting and reporting systems of organizations, through integrating air pollutant emissions in the system.</li> <li>• Link with energy efficiency, lighting, buildings.</li> </ul>	<ul style="list-style-type: none"> <li>• Corporations and other organizations increasingly establish greenhouse gas (GHG) accounting and reporting systems, mostly based on the internationally recognized GHG Protocol (<a href="http://www.ghgprotocol.org">www.ghgprotocol.org</a>). It is possible and beneficial (e.g. CDM projects consider air pollutant reduction as a sustainable development benefit) for organizations to integrate energy-related air pollutant emissions in such systems.</li> <li>• Energy efficiency measures in industry and buildings contribute to reduced CO<sub>2</sub> and air pollutant emissions, either directly or through reduced electricity demand from power plants.</li> </ul>

## 4. ACTIVITIES AND ROLE OF CAI-ASIA

The CAI-Asia Partnership members, the CAI-Asia Center, and Country Networks have different roles to play in implementing the CAI-Asia strategy, supported by different activities.

### 4.1 CAI-Asia Partnership

The CAI-Asia Partnership provides a platform where stakeholders can freely discuss and aim to reach a consensus on important air quality issues in Asia, and related issues such as transport, climate change, health, and energy management. This creates opportunities for organizations and different stakeholder groups to work in "synergy" - a cooperation which results in impacts greater than what they would achieve on their own.

Each of the six stakeholder groups of the CAI-Asia Partnership plays an important role in achieving better air quality in Asian cities:

- Cities – mayors and city governments take the lead in policies and action towards cleaner air.
- Government – is primarily responsible for developing and implementing policies to ensure that the air people breathe is clean and does not harm their health and the environment.
- Non-governmental organizations (NGOs) – make people and organizations aware of the impacts of air pollution and the choices they can make to prevent and reduce air pollution, and contribute to the efforts of government and other stakeholders in managing air pollution.
- Private sector – provides technologies, expertise, and funding to help reduce air pollution from transport, industry and other sources.
- Academic and research institutions – conduct research to create the knowledge as the basis for government policies and provide training to air quality and urban transport managers.
- Development agencies, donors and foundations – provide international experience, expertise and funding.

Member organizations of the CAI-Asia Partnership will have their own business plans. These incorporate various programs, projects and activities relevant to the CAI-Asia strategy, whether conducted in partnership with other organizations or individually. We have identified projects and activities where CAI-Asia Partnership members have a key role to play under the CAI-Asia umbrella. CAI-Asia Partnership members will be expected to fund these projects and activities, while the CAI-Asia Center and Country Networks will play a facilitating role. A secondary purpose is to expand the membership of the CAI-Asia Partnership, in particular that of developing agencies and the private sector, and to increase the active involvement of all members in CAI-Asia activities. These projects are (a) CitiesACT; (b) BAO conferences; (c) campaigns; (d) online community of professionals; and (e) dialogues with stakeholder groups.

#### a) CitiesACT

The CitiesACT portal aims to be the "first-point-of-entry" for data and information on **A**ir quality, **C**limate change and energy, and **T**ransport. Over time, the portal will include the approximately 2,500 Asian cities

with more than 100,000 people. As a portal, data and information can be tailored to different users, ranging from policy makers to the general public. These users can access information by

- Cities or countries – initially covering Asian countries where CAI-Asia Country Networks exist and covering the largest cities, but gradually expanding to include more countries and cities.
- Topics within air quality, climate change and energy and transport, such as particulate matter, bus rapid transit systems, 2- and 3-wheelers, health impacts, and ports.
- Type of information – currently including key statistics/data, projects/programs, training courses, and organizations, and these will be expanded with policies, technologies and other categories.

The CitiesACT portal will co-exist with the CAI-Asia website. Data and information will increasingly be stored on the CitiesACT portal, while the CAI-Asia website will be tailored as a “corporate” website. The CitiesACT is a true CAI-Asia Partnership portal. We expect members to provide data and information, funding, in-kind support, and linking their websites to the portal and vice versa.

### **b) Better Air Quality (BAQ) Conference**

Better Air Quality (BAQ) was first organized as a workshop with 40 participants by the Hong Kong Environmental Protection Department and the Hong Kong Polytechnic University in 2001. Since 2002, BAQ is organized by CAI-Asia with active support from ADB and a large number of other groups. It is now held every two years and has grown to a conference of over 800 policy makers and other stakeholders to network and discuss research, policies and concrete actions. The 3-day BAQ conferences consist of plenary and breakout sessions, country roundtables, poster presentations, exhibition booths, and networking and social events. CAI-Asia Partnership members host pre-events during the two days preceding the conference.

BAQ conferences will again be held in 2010 and 2012, and will likely continue to focus on the co-benefits of AQM and climate change mitigation. The CAI-Asia Center will work together with the CAI-Asia Partnership Council to decide on future conference host cities, formats, themes and participants, with input from participant evaluations from prior BAQ conferences.

### **c) Campaigns**

Campaigns are an effective way to raise awareness of the wider public and mobilize action. CAI-Asia will run a two-year campaign with a theme that is clear, scalable, and adaptable to individual cities and countries and changing conditions. The campaign aims to strengthen policies parallel to raising awareness and mobilizing action among the general public. The proposed topic of the 2009-2010 campaign is air quality, climate change and transport, with the following implementation steps:

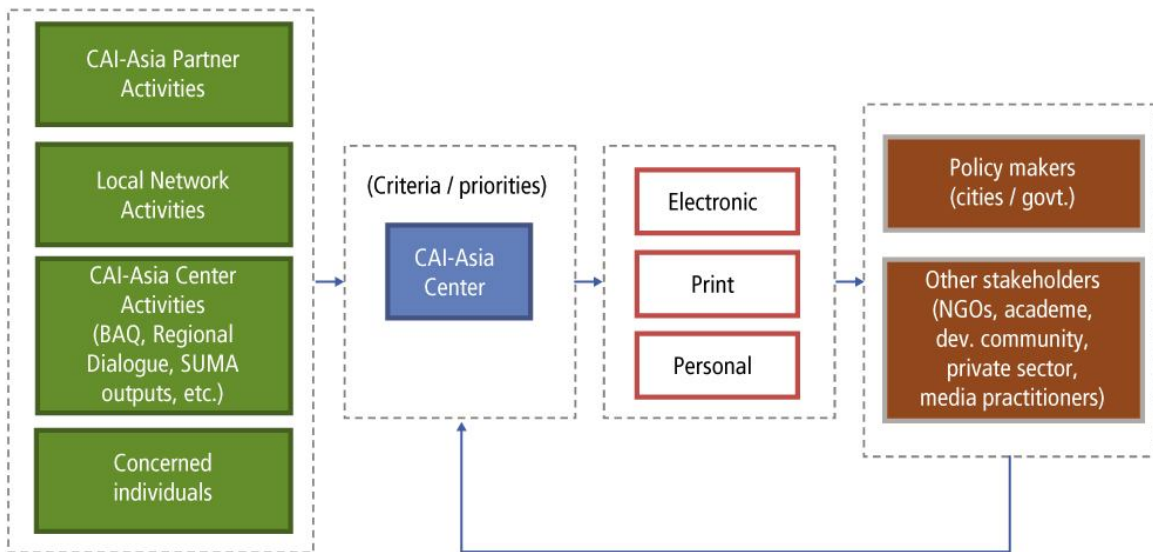
- 2009 – Intensive campaign in Philippines focusing on smoke belching specifically. This campaign will be a test case for a broader regional campaign the following year. We will conduct preparation activities for the regional campaign;
- 2010 – Regional campaign supplemented with national and city-based campaigns that can be tailored to local issues within the theme, for example, mass rapid transit, two-wheelers, cycling and walking. The CAI-Asia campaign will aim to link to other relevant campaigns to avoid overlap and maximize reach.

**d) Exchange program**

The “Clean Air and Blue Skies for Asia exchange program” organized by the CAI-Asia Center and CAI-Asia Country Networks with support from Fredskorpset, Norway, posts young professionals for ten months in another Asian country to gain practical skills in air quality management and sustainable transport which they can apply upon their return to their home countries. The exchange program is expected to continue for another 3-5 years, and additional countries and volunteers may be added in the coming years.

**e) Online community of professionals**

The CAI-Asia Center and its Country Networks tap into the existing knowledge bases of the CAI-Asia Partnership members and other organizations and bring data, experiences and insights on air quality, climate change and energy, and transport to a wider audience. The main idea behind this process is to create an online “community of professionals.” Initially focused on e-groups and websites that facilitate communication between professionals, the ultimate purpose is to use software to create online “social networks” of professionals and businesses, a platform that is a balance between a Wiki and a more actively managed “peer reviewed” site. This in turn will improve access of cities to the information, expertise and services they need thus developing their capacity to address urban air quality and related issues. Communities for specific stakeholder groups, such as academia and researchers, may also be created.



**Figure 4: Process of Capturing and Transferring Knowledge**

**f) Dialogues with stakeholder groups**

The CAI-Asia Center’s effectiveness as secretariat to the CAI-Asia Partnership is highly dependent on its ability to consult and communicate with stakeholder groups that its members represent. Starting in 2009, the CAI-Asia Center, in collaboration with several CAI-Asia Partnership members, will hold more structured dialogues with cities, government, the private sector, and the development community. These will be supplemented with less formal and bilateral communications, including with NGOs and academic and research institutes.

## Cities

Cities are the prime focus of CAI-Asia, and efforts to work directly with cities will be strengthened during 2009-2012. These include:

- Network of City Networks – Several organizations are working with cities to address sustainability issues, and amongst those, several have formed “city networks” to facilitate learning between cities to thus accelerate the adoption of measures. Establishing a Network of City Networks will enable these networks to jointly achieve something that they individually cannot: to scale up their efforts to 2,500 Asian cities across a broader range of sustainability issues (see section 2.3) and benefit from each other. The “city-to-city learning” approach brings together further developed “peer cities” to coach less developed “pilot cities” in Asia to see for themselves that change is possible and beneficial, then develop and implement transition plans.
- City Dialogues – A second mechanism is to consult with cities at the national level through local government associations, leagues of cities, or leagues of mayors. At the regional level, dialogues could be organized together with, amongst others, the Network of City Networks, the United Cities and Local Governments (UCLG), or ICLEI – Local Governments for Sustainability. City Dialogues may be supplemented with analyses of cities’ policies and programs on air quality and related issues and results would be included in the CitiesACT portal.

## Government

UNEP and the CAI-Asia Center held the first Governmental Meeting on Urban Air Quality in Asia in Yogyakarta, Indonesia, in December 2006, which resulted in the Yogyakarta Summary. As a follow up, the two organizations developed the “Long Term Vision on Urban Air Quality,” which describes the desired state of urban air quality in 2030 and can help inspire Asian cities and countries in the development of their AQM policies and programs. This vision will be discussed at the second Governmental Meeting in Bangkok, Thailand in November 2008. This meeting will also discuss the proposed purpose of future regional Governmental Meetings: to track progress towards implementing the vision and to harmonize approaches between Asian countries in tackling urban air pollution and related areas. National Governmental Meetings within individual countries could also be considered, covering AQM, sustainable transport and other related areas.

## Private sector

The involvement of the private sector in addressing air pollution and climate change mitigation in Asian cities is essential. To foster support from the private sector in providing technologies, expertise, and funding, “Private Sector Dialogues” will be held every two years in selected countries with a CAI-Asia Country Network. Regional dialogues may also be held, possibly preceding future BAQ conferences. At these dialogues the private sector will have the opportunity to explain current and future efforts, discuss issues and concerns, and recommend priority areas for CAI-Asia. The CAI-Asia Center and its Country Networks will seek the involvement of CAI-Asia Center corporate members, industry associations and federations and the World Business Council for Sustainable Development (WBCSD) and its national chapters, in organizing these dialogues.

## Development agencies, donors and foundations

Together with UNEP, the CAI-Asia Center will continue to host the annual “Regional Dialogue of Development Agencies” to promote coordination and cooperation among air quality programs and projects. Participants representing development agencies, bilateral donors and foundations, which have initiatives and programs focusing on air quality management, energy management, and climate change mitigation. Presentations and discussions will continue to focus on three areas: (a) status of air quality and related areas in Asian cities; (b) updates on the activities of UNEP and the CAI-Asia Center; and (c) air quality and climate change activities of participating organizations.

## 4.2 CAI-Asia Center

The CAI-Asia Center was incorporated on 20 June 2007 as a non-stock, non-profit corporation in the Philippines. Through its new status as an independent organization, the CAI-Asia Center is able to take more proactive efforts in facilitating and strengthening the AQM agenda at the local, national and regional levels.

The CAI-Asia Center serves as the secretariat of the CAI-Asia Partnership, which involves

- Monitoring projects and activities of CAI-Asia Partnership members within the scope and priorities of CAI-Asia described in chapter 3. Descriptions of these projects and activities will be included in the CitiesACT portal for each organization, and each year a summary report will be prepared on organizations working in Asia on air quality and related issues and the projects and activities they conduct.
- Facilitating and coordinating the CAI-Asia Partnership activities described in section 4.1.
- Other support activities, most importantly, developing and updating of the CAI-Asia Strategy, organizing two-yearly CAI-Asia Partnership Meetings that coincide with BAQ conferences, recruiting new Partnership members, and maintaining the CAI-Asia website ([www.cleanairnet.org/caiasia](http://www.cleanairnet.org/caiasia)).

The CAI-Asia Center has ten staff and an Executive Director, supervised by a Board of Trustees (BoT). The Center is guided by its business plan covering two-year periods and updated annually. Progress is monitored through quarterly reports and an annual report and discussed at quarterly BoT meetings. In addition, CAI-Asia Center’s members (including private sector members and donor organizations) meet annually to discuss achievements of the past year and plans for the following year.

The overall **goal** of the CAI-Asia Center (versus CAI-Asia overall, i.e. the CAI-Asia Partnership, Center and Country Networks combined) is to better integrate AQM in the strategies, policies, programs and projects of developing countries in Asia and development agencies. The CAI-Asia Center accomplishes this through its two flagship programs: the Air Quality Management in Asia (AQMA) program, and the Sustainable Urban Mobility in Asia (SUMA) program. Activities and projects under these programs are aimed at integrating AQM and SUT in policies and programs of Asian cities and countries through building knowledge and capacity, developing policies and implementing on-the-ground measures.

In addition, projects and activities are carried out in support of both the AQMA and SUMA programs, and which largely coincide with the CAI-Asia Partnership activities described earlier. The Center also maintains a Listserv (e-group) on AQM with over 1,250 members and posting 10-20 messages each week on average.

Center staff and board members are frequent speakers at workshops, seminars and conferences on AQM, climate change, transport and other related areas.

### **4.3 Country Networks**

Country Networks share CAI-Asia's common vision of better air quality for Asia. They are part of the CAI-Asia Partnership and are organized as registered associations or non-stock, non-profit entities. Some are informal networks. Country Networks exist in China, Indonesia, Nepal, Pakistan, Philippines, Sri Lanka, and Viet Nam. A Country Network will commence in 2009 in India. By 2012, at least ten Country Networks should be established, with Bangladesh, Bhutan, and Mongolia as potential candidates.

Country Networks were established to mobilize action at the national and local level and to facilitate the exchange of information and experiences among Asian cities and countries. In essence, Country Networks provide at the national level what the CAI-Asia Partnership provides at the regional level: a platform where stakeholders can freely discuss and aim to reach a consensus on important air quality issues in their countries, and related issues such as transport, climate change, health, and energy management.

Country Networks play an important role in supporting CAI-Asia activities. In addition, each Country Network has a coordinator, an electronic newsletter on AQM and related areas, and its own work plan covering one or two-year periods.<sup>17</sup> Business plans describe goals, planned projects and activities. Their progress is monitored at least on an annual basis through progress reports, and they are updated annually. Each year, a Country Network Summit is hosted by the CAI-Asia Center to share past achievements and future plans, and to create a stronger collaboration among Country Networks.

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<sup>17</sup> See <http://www.cleanairnet.org/caiasia/1412/propertyvalue-26649.html>