



Better Air Quality Workshop 2008 Bulletin

A Summary Report of the Better Air Quality Workshop (BAQ) 2008
Published by the International Institute for Sustainable Development (IISD)

ONLINE AT [HTTP://WWW.IISD.CA/YMB/SDBAQ/](http://www.iisd.ca/YMB/SDBAQ/)
VOLUME 159, No. 1, SUNDAY, 30 NOVEMBER 2008



BETTER AIR QUALITY WORKSHOP 2008: 12-14 NOVEMBER 2008

The Better Air Quality Workshop 2008 (BAQ 2008) was held in Bangkok, Thailand, from 12–14 November 2008, under the theme “Air Quality and Climate Change: scaling up win-win solutions for Asia.” The meeting was organized by the Bangkok Metropolitan Administration, the Pollution Control Department of the Ministry of Natural Resources and Environment of Thailand, and the Clean Air Initiative for Asian Cities (CAI-Asia), in cooperation with the Asian Development Bank, United Nations Environment Programme, and United Nations Economic and Social Commission for Asia and the Pacific. It is the fifth BAQ meeting held since 2001.

The event attracted over 900 participants, including representatives from governments, non-governmental organizations, the private sector, academia and inter-governmental agencies. Over 43 countries were represented from Asia and elsewhere, including Europe and North and South America. Some 225 presentations were delivered in plenary and working group sessions within three thematic streams (Air Quality Management and Climate Change; Transport and Climate Change; and Stationary Sources and Indoor Air Pollution), in addition to many special events and receptions.

The overarching goal of the workshop was to cultivate a consensus on how Asian cities can more actively improve air quality and mitigate climate change by adopting a co-benefits approach that integrates urban air quality management, energy management and climate change mitigation. A general consensus was achieved at the meeting that a strong rationale exists for adopting a co-benefits approach to address both air quality and climate change, but that much remains to be accomplished in establishing linkages between these two issues.

A BRIEF HISTORY OF BAQ

Since 2001, BAQ has become the main forum for discussing air quality management (AQM) in Asia, and attracts a diverse range of stakeholders. The BAQ workshop was first held mainly as a local event in Hong Kong in 2001.

BAQ 2002: The first regional BAQ was held in Hong Kong, China, from 14-16 December 2002, and signaled BAQ’s launch as a regional and international workshop, with support from CAI-Asia, private sector sponsors, and supporting organizations. It featured sub-themes on: air quality monitoring;

control of stationary source pollution; motor vehicle emissions control; institutional arrangements for AQM; and climate change.

BAQ 2003: The second BAQ meeting, was held in Manila, the Philippines, from 17-19 December 2003, and included sub-themes on air quality monitoring and management; institutional capacity; mobile sources; and stationary sources.

BAQ 2004: The third BAQ meeting took place in Agra, India, from 6-8 December, 2004. Over 650 people from 30 countries attended the event, which concluded with commitments from 11 countries to take specific steps to improve their air quality.

BAQ 2006: The fourth BAQ meeting was held in Yogyakarta, Indonesia, from 13-14 December 2006. In addition to sessions on a variety of sub-themes, it included the First Governmental Meeting on Urban Air Quality in Asia, which discussed common challenges in urban AQM and ways to harmonize methods and standards on urban AQM in the region.

IN THIS ISSUE

A Brief History of BAQ	1
Report of BAQ 2008.....	2
Opening Plenary Session	2
Thailand Plenary.....	2
Thematic Stream 1: Air Quality Management and Climate Change	3
Sub-Plenary Sessions	3
Stream 2: Transport and Climate Change	5
Sub-Plenary Sessions	6
Stream 3: Stationary Sources and Indoor Air Pollution	8
Sub-Plenary Sessions	8
Special Events	10
Country Roundtables	10
Closing Plenary and BAQ Awards.....	11
Upcoming Meetings	11
Glossary.....	12

The *Better Air Quality Workshop 2008 Bulletin* is a publication of the International Institute for Sustainable Development (IISD) <info@iisd.ca>, publishers of the *Earth Negotiations Bulletin* © <enb@iisd.org>. This issue was written and edited by Douglas Bushey, Pak Sum Low, and Peter Wood. The Editor is Andrew Baldwin, Ph.D. <andrew@iisd.org>. The Director of IISD Reporting Services is Langston James “Kimo” Goree VI <kimo@iisd.org>. Funding for coverage of this meeting has been provided by the CAI-Asia Center. IISD can be contacted at 161 Portage Avenue East, 6th Floor, Winnipeg, Manitoba R3B 0Y4, Canada; tel: +1-204-958-7700; fax: +1-204-958-7710. The opinions expressed in the *Bulletin* are those of the authors and do not necessarily reflect the views of IISD. Excerpts from the *Bulletin* may be used in other publications with appropriate academic citation. Electronic versions of the *Bulletin* are sent to e-mail distribution lists (in HTML and PDF formats) and can be found on the Linkages WWW-server at <http://www.iisd.ca/>. For information on the *Bulletin*, including requests to provide reporting services, contact the Director of IISD Reporting Services at <kimo@iisd.org>, +1-646-536-7556 or 300 East 56th St., 11A, New York, New York 10022, USA.

REPORT OF BAQ 2008

Participants met from Wednesday to Friday in three plenary sessions, 16 sub-plenary sessions, and 38 sub-workshop sessions. In addition, participants took part in country roundtables, poster sessions, and a number of networking and social events.

OPENING PLENARY SESSION

Cornie Huijzena, CAI-Asia Center, welcomed participants and thanked the organizers and sponsors. He gave a history of the BAQ process, and stressed that everyone in Asia should be entitled to breathe clean air.

Sophie Punte, CAI-Asia Center, gave an overview of air quality levels in Asia. She noted that air quality in Asia is improving, but is still exceeds World Health Organization (WHO) guideline values, resulting in half a million premature deaths yearly. Citing rapid growth and urbanization as the primary causes of pollution, she stressed that particulate matter is the main pollutant of concern, and that ozone is becoming increasingly problematic. She described CAI-Asia's focus on both "scaling out" attention within cities to multiple sectors and all aspects of sustainable development, and "scaling up" to a growing number of large cities.

Ursula Schäfer-Preuss, Asian Development Bank (ADB), stressed that air quality improvement should be linked to climate change mitigation, and described ADB efforts in urban transport, cleaner and less carbon-intensive fuels, energy efficiency, and resource mobilization. Citing the Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report's call for integration of air pollution abatement and climate change mitigation, and noting the potentially large cost savings from addressing them together, she stated that bringing the AQM and climate change communities together is important to bring about co-benefits.

Madga Lovei, the World Bank, highlighted the challenges of urbanization and air pollution, which have implications for climate change, public health and livelihoods, and emphasized the importance of policy development to address these challenges as an integral part of poverty reduction. She complimented Asia's leadership in advancing air quality policy and good practices compared to other regions. Recognizing the need to address air quality and climate change together, she mentioned the World Bank's carbon finance initiatives, in particular, the Carbon Partnership Facility, and appealed to all stakeholders to work together for a healthier future.

Robert O'Keefe, Health Effects Institute, US, highlighted the health impacts of air pollution in Asia. He pointed out that most deaths in Asia are attributed to urban particulate matter. He identified challenges, including the limited science on air quality in developing countries, but noted that Asian science has been accelerating rapidly in recent years. He concluded that regulatory interventions can have significant benefits on public health in Asia as they have had in other regions.

Shaoyi Li, Economic and Social Commission for Asia and the Pacific, urged taking an integrated approach to addressing environmental, social and economic sustainability. He emphasized that such an approach would decrease pollution abatement costs and ensure cross-sectoral synergies.

Young-Woo Park, UNEP, noted that climate change and pollution both pose risks to food security, and that these problems necessitate transboundary cooperation. He highlighted UNEP regional initiatives, including the harmonization of legislation across countries; the ASEAN agreement on haze pollution; facilitation of information exchange; and capacity building.

Elisea Gozun, CAI-Asia, described CAI's successes in collecting and disseminating knowledge, engaging stakeholders, and shaping and influencing standards and policies. She highlighted, CAI's work in organizing governmental meetings toward a process to harmonize policy for AQM across Asia, and stressed the urgency of addressing the threats of climate change.

Pongsak Semsan, Bangkok Metropolitan Administration (BMA), welcomed participants to Bangkok, and described the city's attempts to address its air quality problems and global climate change. He highlighted the establishment of an air quality protection volunteer program and a black smoke hotline, as well as the BMA's Declaration of Cooperation on Alleviating Global Warming, which involves 35 public and private organizations, and aims to reduce total greenhouse gas emissions by at least 15% by 2012.

Saksit Tridech, Ministry of Natural Resources, Thailand, reflected on the importance of BAQ 2008 in encouraging the adoption of a co-benefits approach to addressing pollution, and noted the establishment of Thailand's Greenhouse Gas Management Organization in 2006, which promotes low-carbon communities. He emphasized the need for collaboration between civil society, government and inter-governmental agencies in addressing air quality.

PRESENTATION OF KONG HA AWARD: Supat Wangwongwatana, Ministry of Natural Resources and Environment, Thailand, introduced the Kong Ha Award for Air Quality Management, which was handed out by Saksit Tridech to Shi Han Min, Beijing Environmental Protection Bureau, for his work on improving Beijing's air quality before, during and after the 2008 Olympic Games. Shi Han Min accepted the award via pre-recorded video, briefly described the anti-pollution strategies that went into preparing for the Games, and said he would look into having Beijing host BAQ 2010.

THAILAND PLENARY

On Thursday, participants attended a plenary session focused on Thailand's air quality situation, chaired by Nantawan Wijitr-Wathakarn, Thammasat University.

Khunying Mathuros Ruchirawat, Chulaplon Research Institute, presented research examining cancer risk from exposure to urban air pollution, highlighting that a number of carcinogenic air pollutants are not monitored. She presented research demonstrating that traffic police with high exposure to transport emissions, particularly polycyclic aromatic hydrocarbons, benzene and 1, 3 butadiene, show significantly higher risks of cancer as a result of this exposure.

Supat Wangwongwatana, Pollution Control Department (PCD), gave an overview of AQM practices in Thailand. He described the monitoring and control of common pollutants and increased attention to toxins. He said that particulate matter and ozone are the main concerns, with volatile organic compounds as an emerging issue. Detailing successes to date, he noted lead

phase-out in gasoline, the phase-out of two stroke motorcycles, improved vehicle emission and fuel quality standards, and sulfur dioxide control from power plants.

Chanchai Vitoonpanyakij, Department of Drainage and Sewerage, discussed the problems faced and strategies taken by the city of Bangkok. Against the backdrop of a rapidly growing number of vehicles, he described black smoke roadside inspection, and road dust control. On climate change, he described Bangkok's five-year plan for global warming alleviation, targeting a 15% reduction of greenhouse gas emissions by 2012.

Chintana Thaweema, Office of Natural Resources and Environmental Policy and Planning, presented Thailand's National Strategy for Climate Change, as adopted in early 2008. She detailed the six strategies of the plan, including building capacity for climate change adaptation, and supporting international cooperation on climate change mitigation and sustainable development.

THEMATIC STREAM 1: AIR QUALITY MANAGEMENT AND CLIMATE CHANGE

There were four sub-plenaries and fifteen sub-workshops on AQM and climate change. At least five major themes emerged across the discussions in this stream. First, participants identified many possibilities to take advantage of co-benefits between air quality and climate change. Integrated air quality and climate change inventories can help to identify these co-benefits. In particular, the benefits of reducing black carbon emissions were raised in the context of improving air quality and reducing climatic warming. Second, although conditions differ from place to place, particulate matter and ozone were identified as the most serious threats to air quality in Asia. Third, data needs were a common problem that arose in many sessions. Cases were made for the benefits of public access to data to stimulate action, and for starting with crude data and moving to better data as it becomes available. Fourth, strengthening compliance and enforcement capacity were described as high priorities in many sessions. Finally, many sessions warned against over-generalizing between different locations, including blindly importing solutions from North America and Europe that may be too costly or inappropriate in Asia.

SUB-PLINARY SESSIONS

Air Quality and Climate Change: Measurement and Management: Markus Amann, International Institute for Applied Systems Analysis, presented on the Greenhouse Gas – Air Pollution Interactions and Synergies model in Asia (GAINS-ASIA), and identified synergies and trade-offs between air pollution control and greenhouse gas mitigation in India and China. He stressed the cost-minimization aspect of the model, and its consideration of damage to human health and vegetation, as well as the six greenhouse gases considered in the Kyoto protocol. In addition, he noted that it also quantifies how specific mitigation measures have simultaneous impacts on different pollutants. Regarding implementation in India and China, Amann said that GAINS has indicated where emission control measures have benefitted economic development and local air pollution while at the same time reducing emissions of global greenhouse gases.

Kim Oanh, Asian Institute of Technology, presented on black carbon (BC) and its implications for climate change, based on six Asian country case studies. She noted that BC contributes to global warming by absorbing atmospheric radiation, and is on the rise in Asia due to increased traffic, industrial and agricultural sources. She said that BC levels are higher in the dry season and in urban areas.

Kevin Hicks, Stockholm Environment Institute, presented the major outcomes of a conference held in Stockholm in September 2008 on "Air pollution and climate change: Developing a framework for integrated co-benefits strategies." He highlighted key conclusions, including: reducing black carbon, ozone and methane benefits both the climate and local air quality; that decreasing aerosols (in the interest of human health) may actually remove their 'cooling' effect on the climate; and that there are large benefits in considering air pollution and mitigation of climate change together.

Air Quality Impacts on Vulnerable Populations: Health Effects, Exposure, and Climate Change: Sumi Mehta, the Health Effects Institute, presented on inter-linkages between climate change, air pollution, poverty, and health. She drew attention to the disproportionate impacts of pollution suffered by the poor due to vulnerabilities linked to roadside exposure, occupation, and cooking methods. She lamented that these result in "diseases of poverty," but added that education can counter these effects. She presented the results of research in Ho Chi Minh City, confirming that the poor suffer greater health effects of pollution, as measured by household expenditures.

Tord Kjellstrom, Australia National University, presented on the importance of localizing climate change models to predict how particular communities will experience the effects of this phenomenon. He noted that although the 2003 European heat wave killed thousands in France, temperatures in Eastern Europe were actually cooler than usual, adding that average regional temperatures do not reflect such variances. He noted consequences of climate change, including greater incidence and spread of diseases such as dengue fever, which he predicted would reach as far as Brisbane, Australia by 2085. He stressed that poor laborers will suffer the greatest consequences of increased temperatures, noting this will add stress and decrease productivity. He said that such effects are heightened by the "heat island" effect within urban areas and for those who cannot afford air conditioning.

Jim Zhang, Rutgers University, presented on lessons learned from efforts to improve Beijing's air quality prior to the 2008 Olympics, noting that although air quality improved substantially leading up to the event, this has since lapsed, and that health impacts have increased. He described the biological mechanisms by which air pollution causes pulmonary inflammation, adding that different pollutants are associated with different biological stresses. He noted that reducing pollution reduces the burden of oxidative stress, which is linked to cancer and accelerated ageing.

Innovative Public Policies to Address Air Quality and Climate Change: Siegfried Ruprecht, CIVITAS, presented on the European Union's legal framework on air pollution, noting that although the EU's total greenhouse gas emissions have been reduced by 8% since 1990, transport emissions remain high. He called for greater EU coordination of urban mobility policy, and

highlighted the ability of citizens to take their local authorities to court for failing to uphold air quality standards. He said the health benefits of improving air quality are five times the costs, and added that challenges are more political than technological.

Bhure Lal, Environmental Pollution (Prevention) Control Authority, India, presented on urban AQM in India. He said that



Bhure Lal, Environmental Pollution Control Authority, India, described strategies employed to reduce New Delhi's air pollution

a recent ruling by India's Supreme Court has provided a strong mandate to improve air quality. He described efforts in major cities, including: the conversion of vehicles to compressed natural gas and scrapping all commercial vehicles 15 years and older. He said that some changes have met with resistance, such as lowering the sulfur content of diesel, and that transportation is an intensely political issue.

Norihiko Tanaka, Ministry of Land Infrastructure Transport and Tourism, Japan, lamented that Japan's greenhouse gas levels continue to rise despite its commitment to the Kyoto Protocol. He said that regulation and tax incentives have had a strong effect on improving fuel efficiency, and described new measurement methods for heavy-duty vehicles.

John Courtis, California Air Resource Board (CARB), said that despite gains achieved, 90% of Californians breathe unhealthy air. He noted CARB takes a multi-pollutant performance-based approach, allowing flexibility in meeting standards at the lowest cost. He highlighted CARB's extensive enforcement capacity, and successes achieved to date, including a 50% decrease in ozone. Regarding reducing greenhouse gases, he described a proposed plan intended to reduce emissions to 1990 levels by 2020 that would use a mix of market mechanisms and regulations. He said that this plan aspires to increase renewable energy to 33 % of state consumption, and is expected to bring economic benefits, including job creation.

Barriers to Scaling up Co-benefit Strategies to AQM and Climate Change: Lars Nordberg, Scand Environment, presented on implementing strategies at the mega-city and national scales, estimating that a 60% reduction in emissions is possible within the UK alone. He estimated the impacts of air pollution at 9-21 billion pounds per year, and said that placing a price on carbon should underlie any climate change strategy, such as offering taxation incentives and disincentives. Nordberg said that at the local level, adaptation is more important than mitigation. He emphasized that analysis and quantification of impacts are key to communicating costs and benefits to politicians, and stressed that it is possible to decouple pollution from economic development.

Stefan de Bakker, Energy Research Center of the Netherlands, provided an overview of the mechanics of the Clean Development Mechanism (CDM), and described its potential to reduce emissions in four Asian case studies. He noted barriers to participation, including proving additionality and attributing causality. He described the activities of the CDM and Urban Air Quality (CURB-AIR) Project, including building partnerships



Stefan de Bakker, CURB-AIR described the CDM's potential to reduce emissions in four Asian case studies

between governments, project developers and international initiatives. He also described several innovative projects, including biomass gasification for power generation, which lack approved methodologies under the CDM.

Glynda Bathan, CAI-Asia Center, presented on the integration of AQM policies and other environmental and sectoral policies in Ho Chi Minh City, with a focus on a

review of laws, standards and institutions. She said that the air pollution issue is cross-sectoral and requires inter-sectoral and intergovernmental coordination. She added that the national-level Ministry of Labor, Invalids and Social Affairs, responsible for poverty reduction, is not linked to its municipal equivalent. She called for adoption of the "polluter pays principle," noting that a third of all child hospitalizations in Vietnam are due to pollution-related respiratory illnesses, accounting for a considerable part of the national health budget.

SUB-WORKSHOPS: Fifteen sub-workshops were held on AQM and climate change, and three of these are summarized below. Remaining sessions under this stream covered the following topics (abstracts can be accessed via: <http://www.baq2008.org/program>):

- Integrated emission inventories;
- Characterization of particulate matter pollution in Asia;
- Public information on AQM and climate change;
- Integrated Strategies to Manage air quality and climate change;
- Black carbon, air quality and climate change;
- Young Voices Award on Urban Air Pollution and Climate Change;
- Quantifying the health effects of air pollution in Asia;
- City-based action plans on air quality and climate change;
- Integrated assessment of health impacts and climate risks of air pollution;
- Localizing AQM and climate change action;
- Integrated decision support tools for AQM and climate change; and
- Strengthening the rule of law to address climate change and AQ in Asia.

Impacts of Air Quality and Climate Change on Food Production, Biodiversity and Forestry: Chitnucha Buddhaboon, Prachin Buri Rice Research Center, Thailand, presented on the effects of climate change on rice production in Southeast Asia. He noted that the number of days where plant growth is reduced by excessive heat is predicted to increase substantially in the region. He said that this is predicted to decrease rice yields up to 9% for irrigation-dependant rice production, but that areas with high rainfall will fare relatively well.

Denise Mauzerall, Princeton University, presented on the impacts that surface ozone will have on food production in East Asia, and cautioned that the region is on the cusp of substantial reductions in grain production, up to 50% between 1990 and 2020. She said that ozone is the pollutant most damaging to plants

and that this will result in crop losses worth billions of dollars annually. She urged the enforcement of regulations curbing ozone levels, noting that this would also benefit the climate.

Luong Quang Huy, International Union for the Conservation of Nature -Vietnam, presented on the effects of climate change and regional air pollution on biodiversity. He expressed alarm that Southeast Asia has the highest rate of biodiversity loss of any major tropical region, and that the region could lose three quarters of its original forests by 2100 and up to 42% of its biodiversity. He said the impact of pollution on biodiversity is not well known, but that preliminary evidence suggests that this, compounded by the effects of climate change, will disrupt and diminish regional ecosystems processes, and genetic and population diversity.

Rafaela Jane P. Delfino, World Agroforestry Centre, presented on the linkages between climate change, air pollution and tropical forests. She noted that air pollution is strongly affected by climate, and vice versa, and that together they impact forests' ability to function. She described the potential for forests to mitigate climate change, lamenting that this function is threatened by increased incidence of fire associated with increased temperatures and human activity. She urged ramping up current levels of reforestation.

Integrated Regional and Transboundary Scenarios on Climate Change and AQM: Carey Jang, the US Environmental Protection Agency (US EPA), described research that has attempted to model the interaction between air quality and regional climate, stressing the need to downscale climate modeling to the regional level. He stressed that in addition to mitigating climate change, controlling pollutants such as ozone will provide measurable local benefits. He described direct effects of air pollution, such as the reflection of solar radiation by sulfate aerosols, and indirect effects, such as increasing rainfall due to increased cloud condensation nuclei.

Alan Gertler, Desert Research Institute, US, presented on transboundary pollution over the Red Sea, noting that this involved Israeli and Palestinian scientists working together as a team. He highlighted findings, including that power plants, large industry and shipping are major contributors. He noted that northerly prevailing winds bring with them long range pollutants, including nitrate radicals, which react to form secondary pollutants.

Judith Chow, Desert Research Institute, US, presented on US EPA "Supersites", which provide intensive monitoring of aerosols over the long term and at local, regional and global levels, noting that sulfate levels in northeastern US are much higher than in California. She encouraged the expansion of the programme, noting that existing compliance networks can be leveraged into supersites, and said the gap between regional and global climate change modelers must be bridged. She added that pollution may be increasing the intensity of typhoons.

Savitri Garavait, King Mongkut's University of Technology, Thailand, presented on characteristics of particulate matter from biofuels, describing the increased incidence of biomass burning as a global problem, particularly during the dry season, and highlighted Indonesia as a key concern due to elevated levels

of deforestation to produce palm oil, and other commodities. She said that this form of pollution is hard to monitor as it is widespread and non-point source.

Participants discussed: ensuring consistency of data between supersites; transboundary cooperation: distinguishing between local and long-range sources of pollution in measurement; urban health implications; and how to estimate the area of burned land.

AQM and Climate Change Mitigation in Latin America:

Luis Cifuentes, Catholic University of Chile, presented on air pollution, health, and cost-benefit analysis (CBA) in Chile. He said that at least three Chilean cities exceed air quality standards, but noted that gains have been achieved, such as the control of sulfur emissions from copper smelters. He described CBA methods, noting that impacts evaluated are mostly concerned with health. He noted that the greatest potential for reductions is associated with agricultural and residential wood burning.

Veronica Garibay, National Ecology Institute, Mexico, presented on methodologies for estimating co-benefits of pollution reduction. She described the use of CBA to assess the relative merits of various policy measures in Mexico City, noting that the city's topography exacerbates pollution impacts. She indicated that of the options considered, renovating the city's taxi fleet offered the greatest potential return on investment. She emphasized that CBA is time and energy intensive and requires extensive collaboration.



Veronica Garibay, National Ecology Institute, Mexico, presented on methodologies for estimating the co-benefits of pollution reduction

Toni Lindau, Centre for Sustainable Transportation, Brazil, presented on air quality and greenhouse gas benefits in Brazil, noting that all of Brazil's cities are required by law to have Urban Mobility Plans. He noted that Curitiba is about to build upon its innovative bus rapid transit (BRT) system with a "green line" to enable cross-town traffic. He contrasted this with the city of Porto Alegre, which has a large downtown terminal that concentrates emissions.

Dario Hidalgo, World Resources Institute (WRI), US, presented on BRT systems in Latin American cities, including Quito, Bogota, and Mexico City. He noted challenges associated with infrastructure maintenance and enforcing bus priority lanes, and stressed the need to uphold high quality service.

STREAM 2: TRANSPORT AND CLIMATE CHANGE

There were four sub-plenaries and fourteen sub-workshops on transport and climate change. At least four broad themes emerged across the various sessions. First, the importance of pedestrians and two- and three-wheeled vehicles was stressed across sessions. This issue emerged both in the context of transportation planning, and improving regulations, particularly for two and three-wheeled vehicle efficiency and emissions.

Second, the lack of strategic transportation policy and planning was identified as problematic. Some noted that this problem is exacerbated by poor accountability. Third, difficulties gathering data were mentioned in multiple sessions, both in terms of

calculating emission factors and describing vehicle-use patterns. Finally, institutional issues were identified as a common problem across the region, particularly in terms of coordinating different agencies and scales within government to address complex transportation issues.

SUB-PLenary SESSIONS

Measuring Road Transport and its Air Quality and Greenhouse Gas Impacts: Lee Schipper, Stanford University, discussed various driving forces within the transport sector, and the need for a carbon strategy to confront these forces. He discussed elements of such a strategy, including strengthening the institutional architecture that links the public, private, and research sectors, as well as building the political will to enforce standards and targets. He also stressed the importance of having good and timely data for monitoring and fixing policies.

Lewis Fulton, International Energy Agency (IEA), France, introduced IEA's World Energy Outlook 2008 that contains both a reference scenario and a low-carbon scenario, projecting energy mixes up through 2030. He commented that higher oil prices have little effect on demand for new vehicles and noted the need for massive investments in efficient transport infrastructure.

Vance Wagner, Ministry of Environmental Protection, China, described the recent vehicle emission inventory work that has been undertaken in China, including the methodology, software used, and data requirements. He stressed the need for a common framework to promote dialogue and sharing of experiences among countries.

Anneli Lontoc, Department of Transportation and Communications, the Philippines, discussed regional cooperation efforts within the Association of Southeast Asian Nations (ASEAN) to de-couple economic and transport growth and to promote sustainable urban transport. She emphasized the importance of policy influence, including vehicle pricing, public transport promotion, and energy efficiency. Participants discussed: the relationship between fuel price and car sales; the need for subsidies to enable developing countries to adopt new technologies; and ways to encourage the purchase of more efficient cars.

Current and Future Technological Challenges of Transportation in Asia: Timothy Johnson, Corning, via teleconference from the US, pointed out that the diesel cycle is inherently more efficient and fuel diverse than other engine cycles, and that CO₂ emissions are about 20% lower than for gasoline engines. He also highlighted that diesel particulate filters could reduce the effective carbon footprint of the engine by at least 20%.

Harjeet Singh, Society for Automotive Fitness and Environment, India, discussed India's future of motorization, including its Automotive Mission Plan 2006-2016; tailpipe emission trends and regulations; energy security, including fuel efficiency and alternative fuels; and electric and hybrid vehicles.

Pierpaolo Cazzola, IEA, highlighted the importance of fuel economy measures for improved energy security and climate policy, and that a 50% improvement in fuel efficiency by 2050 is technologically possible with commercially available technology. He recognized that differentiated efforts across countries are likely, and that there is a risk that vehicle-kilometers travelled

will increase in response to fuel efficiency, and that therefore coordinated action is needed to limit potential travel demand growth. He noted that additional analysis using better data is needed for an evaluation of baseline values and current trends in individual countries.

Chris Cherry, University of Tennessee-Knoxville, US, assessed the use of the E-Bike in China and its environmental impacts and benefits; and highlighted the need for developing an electric bike policy and a lead acid battery recycling policy that mandates or encourages sustainable recycling practices.

Land-Use and Mobility: Air Quality and Climate Change Scenarios: Enrique Peñalosa, former Mayor of Bogota, Colombia, discussed mobility and land use based on Bogota's experience, and suggested actions that can make cities more socially and environmentally sustainable, including the provision of low-cost and high-frequency public transport, and higher density residential areas that include large green parks.

Rudolf Petersen, GTZ consultant, discussed urban land use that favors sustainable urban transportation, and highlighted that better air quality can be achieved through: transportation demand reduction; shifting to public transport; cleaner vehicles and fuels; better traffic flow, and improved driver behavior. He stressed that proper land-use planning and development, vertical integration of planning levels, and mixed-use development are essential for efficient transport.

James Leather, ADB, reviewed urban development and transport in Asia, and highlighted the challenges faced by growing cities and options to address them, including: integration of land use and transport; more efficient modes of travel; and improved vehicle, engine and fuel technology. He called for a holistic co-benefits approach.

Min-Keong Chong, Centre for Livable Cities, shared Singapore's successes on using various mechanisms that integrate transport and land use for sustainable urban development, including: greening the high density living environment; financing key infrastructures; using integrated planning; regulating public transport; implementing road pricing and vehicle quota systems; and encouraging good governance.

Turning Public Transport Around: Madhav Pai, WRI-EMBARQ, India, critically reviewed the BRT system in India, including its financial sustainability, fare levels and bus occupancy. He pointed out the need to create a division to collect data for system planning.

Andreas Kopp, World Bank, discussed the evaluation of transport policies. He highlighted the shortcomings of conventional evaluation methods, saying that they tend to underestimate both the benefits and costs of most transportation policies. He explained that this is because secondary benefits and costs such as congestion, local air pollution, road safety and climate change effects, are neglected, and that it assumes constant relative prices. He introduced a comprehensive evaluation framework that captures the consequences of climate change and considers changing relative prices.

Alexandre Blaquièrre, Public Transport Authority of Toulouse, France, provided an overview of Toulouse's mobility characteristics and urban public transport network. He described its involvement in the CIVITAS-MOBILIS project that aims

to achieve a more sustainable, clean and energy efficient urban transport system by implementing an ambitious integrated mix of technology and policy-based measures.

Chanin Manopiniwes, World Bank, provided an overview of Thailand's transport-energy system, including patterns of energy consumption and greenhouse gas emissions; low energy efficiency in transport; and lack of fuel economy standards, regulations and data. He recognized the great potential for Thailand to realize efficiency gains in the transport sector, but noted a need to strengthen policy and institutional coordination, and to overcome political and institutional impediments. He highlighted that pricing mechanisms can be used to induce behavioral changes and sectoral adjustment.

SUB-WORKSHOPS: Fourteen sub-workshops were held on transport and climate change, and three of these are summarized below. Remaining sessions under this stream covered the following topics (abstracts can be accessed via: <http://www.baq2008.org/program>):

- Fuel economy;
- Maritime emissions and green ports;
- Reducing air pollution and greenhouse gas emissions from in-use vehicles;
- Marketing public transportation;
- Transport and motorization in India;
- Two and three-wheelers;
- Inclusion of walking and two and three-wheelers in transport planning;
- Future emission control and fuel quality regulation in Asia;
- Emission factors and measuring emissions from land transport;
- Use of taxation and other financial instruments for sustainable urban transportation; and
- Bus systems and regulation.

Quantifying Co-benefits from Transport Interventions:

Silbel Koyluoglu, WRI-EMBARQ, discussed Istanbul's "Clean Fuels, Clean Vehicles" project and vehicle activity study. She highlighted projects on: urban eco-driving; retrofitting, replacing and retiring vehicles; public awareness; BRT systems; sea transport; and improving transportation infrastructure.

Andre Bourbeau, Transport Canada, presented recent and historical trends in vehicle performance and fuel consumption in Canada. He discussed data inputs required to support the bottom-up model used for Canadian and North America markets, and how this model might be applied to Asian economies.

Puji Lestari, Bandung Institute of Technology, Indonesia, discussed the inventory of greenhouse gas emissions from the transportation sector using vehicles kilometers traveled and fuel consumption approaches in Bandung based on data available from 2004 to 2006. He said that the results reveal a discrepancy between the two approaches.

Bert Fabian, CAI-Asia Center, presented an overview of the projections of particulate matter and CO₂ emissions from transportation in Asia from 2005-2035, including the methodology for estimating emissions and energy consumption and the type of data required. Participants discussed how to: address uncertainties in emissions inventories; include emission factors and activity data; and validate observed and modeled data.

The Role of Biofuels for AQM and Climate Change

Mitigation: Wijarn Simachaya, PCD, Thailand, discussed the country's air quality, vehicle pollution control strategy and biofuel policy, including: emission reduction of new and in-use vehicles; fuel quality improvement; bio-diesel and gasohol roadmaps; and research support policy for emission measurement from gasohol vehicles. He also highlighted the need for improvement in AQM, effective implementation of various policies, and local, national and international cooperation.

Jane Romero, Institute for Global Environmental Strategies, Japan, reviewed the status of existing biofuel policies in selected Asian countries; and the theoretical potential for biofuels in Asia by 2030. She highlighted challenges for achieving sustainable biofuels, including food/fuel conflicts, the need for life cycle assessment (LCA) to evaluate biofuels' benefits; and their role in the current and future climate frameworks.

Shabbir Gheewala, King Mongkut's University of Technology, Thailand, discussed the importance of using LCA for evaluating the lifecycle energy use and greenhouse gas emissions from biofuels, illustrating this with a case study in Thailand. He showed that expanding the system boundaries of biofuel evaluations affects their calculated benefits.

Pieter Hammingh, Netherlands Environmental Assessment Agency, discussed the effects of biofuels on emission of air pollutants, including "well to tank" (production) and "tank to wheel" (exhaust) emissions, as well as the potential effects on national projected emissions of nitrogen oxides and PM_{2.5} relative to fossil fuel by 2020. He highlighted gaps in knowledge, and concluded that legislation is the main tool for avoiding excessive emissions.

Land Use Planning as a Transport Planning and Environmental Management Tool: Min-Keong Chong, Centre for Livable Cities, described Singapore's manual and electronic road pricing system, which specifies restricted zone and area license scheme (ALS) charges that are used to contribute to infrastructure development. He noted the significant effects of ALS charges on traffic flow to the city business district, and that a successful road pricing system requires good governance in management, enforcement, and attention to legal, technical and administrative aspects.

Salvador Tan, Ayala Land Inc., the Philippines, shared experiences and lessons from the Philippines on the incorporation of sustainable practices in private developments. In particular, he described the Pedestrian Facilities Project in Makati Central Business District (MCBD); the proposed BRT network between MCBD and Bonifacio Global City; the proposed Makati Loop Project; and the future integration of Makati Loop Stations with pedestrian underpasses.

Mark Zuidgeest, International Institute for Geo-Information Science and Earth Observation, the Netherlands, examined the relationship between land use, urban form and the transport ecological footprint (TEF). He described the application of the TEF concept to the proposed BRT system in Ahmadabad, India, and assessed its impacts. He concluded that TEF analysis of BRT system alternatives provides useful information for refining appropriate development strategies for sustainable urban transport development.

STREAM 3: STATIONARY SOURCES AND INDOOR AIR POLLUTION

There were three sub-plenaries and seven sub-workshops on stationary sources. At least four major themes emerged across the sessions. First, there was strong agreement that energy efficiency measures provide significant co-benefits, including fuel savings, greenhouse gas emission reductions and air quality improvement. Second, many sessions mentioned the large potential for improvement in emissions from stationary sources, but cited lack of capacity, finance and regulation as major impediments to progress. Third, the issue was also recognized as a regional one, and the potential benefits of regional partnerships to address it were explored. Finally, the importance of technology transfer and South-South cooperation to disseminate successful and proven technologies was discussed in multiple sessions.

There was one sub-plenary and two sub-workshops on indoor air pollution. Some participants noted that indoor air quality was a serious health problem with technologically available solutions, and suggested that this issue receive greater attention at future BAQ meetings.

SUB-PLenary SESSIONS

Successful Strategies for Reducing Indoor Air Pollution from Household Energy Use: Zohir Chowdhury, San Diego State University, US, presented research on indoor PM_{2.5} and CO concentration reduction from improved stove installation in rural Yunnan Province, China. The project studied air quality in homes with improved stoves, improved fireplaces, solar water heaters, and biogas stoves. He reported PM_{2.5} reductions between 68% and 83% and wood savings between 45% and 89% when compared with traditional stoves and fireplaces.

Nahida Khudadad, Aga Khan Planning and Building Service, Pakistan, described the monitoring and evaluation of household energy projects in northern Pakistan. She noted the reluctance of many households to adopt improved cookstoves, and observed that sharing monitoring results of indoor air quality studies was helpful in convincing people to install improved stoves.

John Mitchell, US EPA, highlighted that half of the world uses traditional fuels for cooking or heating, and that more than 1.6 million people die every year from breathing indoor smoke. He noted that the problem was difficult for individual government departments to address because it deals with numerous issues, such as poverty, health, the environment, women's issues and the economy. Describing the Partnership for Clean Indoor Air, he detailed their comprehensive approach which involves: incorporating social and cultural customs, supporting sustainable local markets, meeting design and performance criteria, and demonstrating reduced concentrations.

Discussions addressed quantifying health effects from indoor air pollution, problems with ventilation, particularly in areas with large mosquito populations, and the relative health impacts of different types of biomass fuels.

Energy Scenarios for Asia and their Air Quality and Greenhouse Gas Impacts: Lewis Fulton, IEA, presented IEA's World Energy Outlook 2008. He raised concerns that underinvestment would lead to an energy supply crunch from

2010 to 2015. Noting that non-OPEC conventional oil production is peaking, he stated that incremental world fossil fuel production will come largely from non-OECD countries.

Andrew Stevenson, Civic Exchange, Hong Kong, described the role of Asian cities in addressing climate change. He proposed that city-based sustainable development plans in Asian developing countries might serve as their national commitments in a post-2012 climate change agreement. He said that these plans could include both mitigation and adaptation activities and be financed by an international fund.

Alvin Mejia, CAI-Asia Center, and Edith Cabrera, San Miguel Corporation, presented a pilot study for integrated accounting of greenhouse gases and regional air pollutants. They described the emissions reporting from a single brewery and concluded that combined accounting is feasible and helps make co-benefits more apparent.

Shobhakar Dhakal, Global Carbon Project, Japan, talked about urban energy use and carbon emissions in China. In the context of rapid urbanization and higher demand for energy in urban settings, he stressed the importance of urban emission trends in China. He identified shifts away from industry and toward commercial and transport emissions, as well as an increasing fuel share for electricity and oil at the expense of coal.

Clean Energy For All – Sustainable Local Scale Energy Solutions: Samuel Tumiwa, ADB, opened the session by reminding the panel that nearly one billion people lack electricity access in Asia and the Pacific, and asked the sub-plenary to consider the potential benefits of a regional initiative for energy access.

Jeroen van Bruggen, Netherlands Development Organization, described work to scale up household biogas in Asia, resulting in the construction of over 200,000 digesters. He noted that sector sustainability is the ultimate goal and stated that a regional approach allows for replication of proven approaches, sharing information, attracting carbon buyers, and coordinating NGOs.

Jeff Dickinson, E & Co., presented viable business models for access to energy projects. He described strategies to seed and scale-up successful models to generate triple bottom line returns. He stressed that different approaches and financing strategies are needed in different situations. He presented a development company approach, helping to seed and finance local entrepreneurs, a build-own-transfer approach for small-scale biogas projects, and a fee-for-service approach for hot water provision.

Jiwan Acharya, ADB, described issues and ways to scale-up energy access in Asia and the Pacific, focusing on a new "energy for all" regional partner-driven initiative. He discussed the role of the initiative in involving the private sector to create local drivers to take the issue forward, and highlighted key activities, including: identifying and mainstreaming innovative financing mechanisms, showcasing successful approaches, and facilitating networking.

Air Pollution and Greenhouse Gas Emissions from Large Sources: C.V. Mathai, Arizona Public Service Company, US, gave an overview of power production and climate activities in the US. He stressed that business-as-usual emissions are projected

to double by 2050 and that new technologies will be needed to make emission reductions. He noted that the economic crisis may delay US legislative action on climate change.

Peter du Pont, USAID, discussed cleaner coal as a pollution reduction strategy in Asia. Against the backdrop of growing demand for coal and increasing prices and trade, he described the USAID ECO-ASIA Clean Development and Climate Program to promote market transformation leading to increased clean energy investments and greenhouse gas reductions.

Magda Lovei, World Bank, described the Bank's activities in the area of climate change and development. In detailing its strategic framework, she noted that the Bank remains neutral with respect to UNFCCC negotiations. She described the Bank's climate financing instruments, particularly the Climate Investment Funds, New Carbon Funds – which focus on programmatic approaches – and the Forest Carbon Partnership Facility.

SUB-WORKSHOPS: Nine sub-workshops were held on stationary sources and indoor air pollution, and three of these are summarized below. Remaining sessions under this stream covered the following topics (abstracts can be accessed via: <http://www.baq2008.org/program>):

- Integrated assessment of air pollution and greenhouse gas emissions from industrial sources;
- Co-benefits of energy efficient buildings;
- Energy and AQM scenarios for China;
- Assessing health, socioeconomic and environmental impacts of improved stoves and fuels;
- The potential for energy-saving lamps to reduce energy consumption, greenhouse gas emissions and local air pollution; and
- How to make the power, cement and steel industries more sustainable in Asia.

Scaling-Up and the Multiple Benefits of Adopting Improved Cooking and Heating Technology: Guangqing Liu, Beijing University of Chemical Technology, China, presented a project on scaling up high-efficiency biomass household stoves among farmers in western China. He described attempts to help manufacturers understand farmers' needs in order to improve technical designs. Training multiple stakeholders was stressed, including manufacturers, government, technicians, and end-users, by way of workshops, posters and manuals.

Min Bikram Malla Thakuri, Practical Action Nepal Office, described research on the adoption of improved cookstoves and smoke hoods in rural Nepal. He presented a cost-benefit analysis that showed the impact of these improvements, including reductions in: demand for health services; time loss due to illness; fuel collection and cooking time; and CO₂ emissions. He reported that the value of these benefits was greater than three times the cost of the improvements.

Samuel Bryan, GERES - Cambodia, detailed the success of a bucket stove project saving 21% of fuel and generating carbon finance in Cambodia. Stressing the importance of good monitoring and confidence in data, he described parallel phases in project development. Specifically, he noted that as projects move from research and development to upscaling, financing options shift from small seed donor funds, to potential pre-finance by carbon buyers to sales to large carbon buyers.

Jimmy Tran, University of California at Berkeley, US, presented on carbon financing for switching from coal to biomass stoves in China. He stressed the importance of accurate monitoring to ensure real emission reductions and grow a sustainable market for stove project credits. To meet this need, he described heat sensing stove-use monitoring devices that could potentially reduce monitoring uncertainties and costs. He also noted that different locations require different stove designs and encouraged consideration of redistributing carbon revenues to end-users.

Energy and Greenhouse Gas Impact of International Trade and Potential of International Emission Trading to Improve AQM and Climate Change Mitigation: Dennis Leaf, US EPA, described the design of the US sulfur dioxide cap and trade programme. He noted that although the programme was expensive to establish and maintain, it has paid off many times over by reducing the cost of compliance by billions of dollars. He stressed the importance of monitoring, observing that it can be difficult to maintain funding for this once the programme has been deemed to have addressed the problem.

Yang Laike, East China Normal University, presented research on the environmental impact of trade between the EU and China. Noting that China has had difficulty meeting its environmental goals, he pointed out that China's trade surplus with the EU results in an "emissions imbalance" whereby EU consumption leads to emissions by less efficient Chinese industries. He argued that China should upgrade the industrial structure of its export sector, improve energy efficiency, and consider CO₂ conditionality as part of the World Trade Organization's trade rules.

Nguyen Hoang Minh, ISPONRE, Vietnam, described a potential air pollution charge system in Vietnam whereby emitters pay a fee based on their emission levels of various regulated gases. He proposed that revenues from this charge establish a fund for improving air quality.

Sustainable Brick-Kilns Addressing Air Quality and Climate Change Issues: Mohammed Nasiruddin, Department of Environment, Bangladesh, gave an overview of the brick sector in Bangladesh, presenting data on the potential benefits of adopting improved technologies. Despite demonstrating that the value of the total benefits of improved technologies is more than five times the costs, he stated that lack of capacity and supporting regulations are inhibiting technology adoption.

Suyesh Prajapati, Vertical Shaft Brick-Kiln Programme, Nepal, described the benefits and limitations of vertical shaft brick kiln (VSBK) dissemination in South Asia, particularly Nepal. Noting that brick making is the largest employment-generating sector in South Asia, and also a significant emitter, he demonstrated that switching all kilns in Kathmandu Valley to VSBK could reduce PM by 33%, requiring a total investment of US\$5.3 million. He showed that dissemination is occurring but that policy incentives could encourage greater adoption.

Hoang Anh Le, Korea Institute of Science & Technology, presented an integrated monitoring-modeling tool to develop AQM strategies for brick kiln manufacturing in Vietnam. He showed how his tool, requiring inputs from stack gas monitoring, air quality monitoring and meteorology data, can help model

different management strategies, including low sulfur coal, changing technologies, control devices, and timing use, to determine what will be most effective in different incentive scenarios.

The subsequent discussion took up the limitations of VSBK technologies, including requiring greater soil quality and low sulfur coal, and the benefits, including greater efficiency, lower coal usage and lower emissions. One participant suggested a guidebook to help weigh these costs and benefits in different scenarios.

SPECIAL EVENTS

ANNOUNCEMENT OF NEW PROJECTS AND

PUBLICATIONS: On Wednesday afternoon participants were invited to announce new projects, studies and programmes. ADB and CAI-Asia Center released their “Road Map for Cleaner Fuels and Vehicles in Asia”; Civic-Exchange launched its new book, “Climate Change Negotiations: Can Asia Change the Game?,” and Sarath Guttikunda, Desert Research Institute, India, announced his new primer on AQM (available at urbanemissions.info).

KYOTO DECLARATION SIGNING CEREMONY:

The UN Centre for Regional Development, Ministry of the Environment of Japan, and CAI-Asia Centre hosted a special event for the signing of the Kyoto Declaration by Asian Mayors for the Promotion of Environmentally Sustainable Transport in Cities. The Declaration aims to achieve greater synergies between national, local and city authorities in an effort to achieve sustainability in the transport sector. The Declaration was signed by the mayors of Bangkok (Thailand), Baguio, Makati, and Cebu (the Philippines), Colombo (Sri Lanka), Batam, Makassar, and Palembang (Indonesia), Guwahati and Surat (India), Karachi (Pakistan), and Kathmandu (Nepal).

COUNTRY ROUNDTABLES

Introduced as a new feature at BAQ 2006, the Country Roundtables during BAQ 2008 allowed for the review of achievements and challenges in AQM, making use of country reports prepared by CAI-Asia country networks. Participants exchanged experiences and lessons learned regarding tackling specific air quality problems in South Asia, Southeast Asia and East Asia.

SOUTH ASIA: Glynda Bathan, CAI-Asia Center, gave an overview of the findings of the CAI-Asia Country Network reports, and panelists identified the most pressing issue in their country and described what is needed to address it. Mohammed Nasiruddin, Bangladesh, identified vehicular emissions and described efforts to introduce a BRT system and new pedestrian overpasses.

H.K. Parwana, Indian Association of Air Pollution Prevention and Control, also selected vehicle emissions as the most pressing issue. She described fuel quality gains, including phasing out lead and introducing compressed natural gas and liquid petroleum gas, and also identified mass transit and road interchange improvement as promising strategies. Bipin Raj Bhandari, Nepal, said the brick industry was the most polluting and described economic incentives for low emitting sources. He also highlighted the transportation sector, pointing to needs to improve fuel quality and perform spot checks on vehicles.

Zia Ul Islam, Pakistan Environmental Protection Agency, stated that standards related to clean fuels, ambient air quality and vehicle emissions are all important, but noted that the capacity to implement these is lacking. He called for help from CAI-Asia and development banks. Anura Jayatilake, Sri Lanka, noted that 60% of Sri Lanka’s pollution is from mobile sources. He described efforts to control vehicular emissions and use cleaner fuels, but said that implementation was a challenge.

Participants discussed: the importance of indoor air quality; problems with national enforcement capacity; traffic congestion and emissions resulting from the availability of inexpensive automobiles; and the difficulty of implementing science-based decision-making in developing countries. The Chair noted the lack of attention to climate change, and stated that this reflects the reality on the ground that local pollutants are viewed as more important.

SOUTHEAST ASIA: Elisea Gozun, CAI-Asia Partnership, stressed the importance of sharing experiences and information on AQM in ASEAN. May Ajero, CAI-Asia Center, provided a brief overview on trends in air quality and its health, economic and environmental impacts, and on the Clean Air Network. She also highlighted the major achievements and challenges in AQM in Indonesia, Thailand and the Philippines.

Ridwan Tamin, Ministry of Environment, Indonesia, regarded education in AQM as a top priority, while Hoang Duong Tung, Vietnam, stressed the need to develop an Air Quality Action Plan for his country. Tessam Castillo, the Philippines, regarded the transport sector as a key concern, and expressed the need to review and revise the emission standards. Wijarn Simachaya, Pollution Control Department, Thailand, discussed his country’s various responses to improve air quality. All panelists elaborated on their national activities in AQM.

Participants discussed, *inter alia*: air quality sampling (automatic and manual) and monitoring; data acquisition, analysis and interpretation; data comparability and inter-calibration of monitoring equipment within countries and across ASEAN; harmonizing standards; measurement of PM_{2.5} instead of PM₁₀; urban land-use planning; promotion of cycling; pollutant transport from urban to rural areas; regional cooperation dialogues; monitoring networks and collaborative research; and integration of AQM into the national sustainable development plan.

EAST ASIA: This roundtable was chaired by Wang Xin, Ministry of Environmental Protection (MEP), China, and facilitated by Yan Peng, China Representative of CAI-Asia Center, and focused on two topics: priorities for AQM in China, and suggestions for future CAI-Asia activities in Chinese cities. Participants expressed their appreciation for CAI-Asia, describing it as a high-level international platform for knowledge and experience sharing, and urgently needed by both research professionals and practitioners. Participants encouraged building upon lessons learned from Chinese city success stories such as Weihai. Several participants expressed interest in taking part in the activities of the CAI-Asia China Network. Peng responded by saying that the CAI-Asia China office will, in consultation with MEP, work out a mechanism to engage more Chinese cities. Some participants suggested that smaller workshops could be held in addition to BAQ in order to target specific topics, such as: how

to get AQM discussed at higher political levels; the benefits of taking a health-based approach to AQM, and the need for more scientific research and management on health-related pollutants; and city-specific air quality modeling, including erosion from acid deposition. It was remarked that while there are many Chinese professionals capable of carrying out domestic AQM research, international experts could contribute their expertise in methodology and lessons learned in other countries.

CLOSING PLENARY AND BAQ AWARDS

Cornie Huizenga, CAI-Asia Center, chaired the plenary. Glynda Bathan, CAI-Asia Center, presented a summary of the country roundtables. She highlighted the participation of women in the roundtables and drew out major themes of the discussions.

Supat Wangwongwatana, PCD, Thailand, reported on the governmental meeting, which was held in parallel with the BAQ. He highlighted that government representatives generated a long-term vision on urban air quality in Asia that involved making significant progress toward achieving WHO air quality guidelines by 2030. Describing other outcomes of the meeting, he noted that representatives agreed that cleaner technologies are important, but that they need to be combined with non-technology, demand-side management approaches. He noted that countries were encouraged to prepare their own national long-term vision statements for urban air quality for further discussion at the Third Governmental Meeting on Urban Air Quality in 2010.



Alan Gertler, International Union of Air Pollution Prevention and Environmental Protection Associations, summarized key issues discussed at BAQ 2008

REPORTING COMMITTEE

SUMMARY: Alan Gertler, International Union of Air Pollution Prevention and Environmental Protection Associations, presented a summary of the meeting on behalf of the BAQ 2008 Reporting Committee. He noted that over 900 people from 43 countries had participated, and that a total of 225 presentations had been given.

He highlighted major themes of the meeting, including:

- linkages between local air quality and climate change are beginning to be understood, but the issue of scale (local versus global concern) has resulted in a disconnect between the groups that address these;
- adopting a co-benefits approach offers “win-win” solutions;
- improvements in technology and fuel efficiency have been offset by increased consumption and traffic;
- public and private sector participation can improve implementation;
- it is important to learn from both successes and failures;
- voluntary agreements can produce measurable improvements in air quality;
- interactions between air quality and climate change need to be considered, and synergies identified;
- indoor air quality has a major impact on health; and
- both climate change and local air pollution reduce crop outputs and threaten food security.

Gertler also listed issues which the Reporting Committee identified as needing further attention, including: technology transfer; validation of emissions estimates and model predictions through “ground-truthing”; and identification of co-benefits from improving indoor air quality.

PRESENTATION OF YOUNG VOICES AWARDS: Jitu Shah, World Bank, presented the 2008 Young Voices Awards on Urban Air Pollution and Climate Change to: Deepty Jain, International Institute for Geo-Information Science and Earth Observation; Jun Wang, Nankai University; Andrew Stevenson, Hong Kong University; and Rong Wang, Peking University.

CLOSING REMARKS: Wangwongwatana invited participants to explore Bangkok and wished participants a safe homeward journey. Sophie Punte, CAI-Asia Center, thanked the organizers, CAI-Asia Center team, the events-organizer,



Sophie Punte and Cornie Huizenga, CAI-Asia Center, bid farewell to one another, as the former assumes the latter's role as Executive Director of the Center

and student volunteers for the successful organization of BAQ, and congratulated Huizenga on his work at the CAI-Asia Center. Huizenga wished Punte success in her new role as Executive Director of CAI-Asia Center, and closed the meeting by saying that he looks forward to attending future BAQ meetings.

UPCOMING MEETINGS

EXPERT GROUP MEETING (EGM) ON CITIES AND CLIMATE CHANGE: The EGM on Cities and Climate Change is scheduled to take place from 22-23 November 2008 in Nairobi, Kenya. This expert group meeting, convened by UN-HABITAT, will address issues related to mitigation and adaptation in the urban environment, and aspires to develop a common understanding of challenges related to cities and climate change. For more information, contact: UN-HABITAT Secretariat; tel: +254-20-7621234; fax: +254-20-7624266; e-mail: infohabitat@unhabitat.org; internet: <http://www.unhabitat.org>

FOURTEENTH CONFERENCE OF THE PARTIES TO THE UNFCCC (COP 14) AND FOURTH MEETING OF THE PARTIES TO THE KYOTO PROTOCOL (COP/MOP 4): UNFCCC COP 14 and Kyoto Protocol COP/MOP 4 are scheduled to take place from 1-12 December 2008 in Poznań, Poland. These meetings will coincide with the 29th meetings of UNFCCC's subsidiary bodies and the fourth meeting of the *Ad Hoc* Working Group on Long-Term Cooperative Action (AWG-LCA) and the resumed sixth session of the AWG on Further Commitments for Annex I Parties under the Protocol (AWG-KP). For more information, contact: UNFCCC Secretariat; tel: +49-228-815-1000; fax: +49-228-815-1999; e-mail: secretariat@unfccc.int; internet: <http://unfccc.int>

AWG-LCA 5 AND AWG-KP 7: The fifth meeting of the *Ad Hoc* Working Group on Long-Term Cooperative Action and the seventh session of the AWG on Further Commitments for Annex

I Parties under the Protocol are scheduled to take place from 30 March-9 April 2009 in Bonn, Germany. For more information, contact: UNFCCC Secretariat; tel: +49-228-815-1000; fax: +49-228-815-1999; e-mail: secretariat@unfccc.int; internet: <http://unfccc.int>

C40 LARGE CITIES CLIMATE SUMMIT: The C40 summit is scheduled to take place from 18-21 May 2009 in Seoul, the Republic of Korea. For more information, contact: C40 Summit Division, Seoul Metropolitan Government; tel: +82-2-2155-7796; fax: +82-2-2155-7799; e-mail: c40seoul@seoul.go.kr; internet: <http://www.c40seoulsummit.com/>

WORLD RENEWABLE ENERGY CONGRESS-ASIA: The World Renewable Energy Congress (WREC) – Asia is scheduled to take place from 19-22 May 2009 in Bangkok, Thailand. For more information, contact: WREC 2009 Secretariat; tel: +66-2-470-8309-10 ext. 4133/4134/4152; fax: +66-2-872-9805; e-mail: secretariat@wrec2009asia.com; internet: <http://www.wrec2009asia.com/>

ASIA PACIFIC CLIMATE RISK AND ADAPTATION CONFERENCE: The Asia Pacific Climate Risk and Adaptation Conference is scheduled to take place from 26-29 May 2009 in Beijing, China. This international and interdisciplinary conference, held by the Chinese Academy of Science Climate Change Research Center, aims to gather top experts to brief decision-makers on adaptation issues. For more information, contact: Paul Chan; e-mail: chanp@img.com; internet: <http://asiapacificclimate.org/>

30TH SESSIONS OF THE UNFCCC SUBSIDIARY BODIES: The 30th sessions of the Subsidiary Bodies of the UN Framework Convention on Climate Change (UNFCCC) – the Subsidiary Body for Implementation (SBI) and the Subsidiary Body for Scientific and Technological Advice (SBSTA) – are scheduled to take place from 1-12 June 2009, in Bonn, Germany. For more information contact: UNFCCC Secretariat; tel: +49-228-815-1000; fax: +49-228-815-1999; e-mail: secretariat@unfccc.int; internet: http://unfccc.int/meetings/unfccc_calendar/items/2655.php?year=2009

AIR AND WASTE MANAGEMENT ASSOCIATION ANNUAL CONFERENCE AND EXHIBITION: The 102nd annual conference of the AWMA is scheduled for 16-19 June, 2009 in Detroit, US. The theme for the conference is “Driving Environmental Progress.” For more information, contact AWMA: tel: +001-412-232-3444; fax: +001-412-232-3450; e-mail: info@awma.org; internet: <http://www.awma.org/ACE2009/>

FIFTEENTH CONFERENCE OF THE PARTIES TO THE UNFCCC AND FIFTH MEETING OF THE PARTIES TO THE KYOTO PROTOCOL: 30 November 2009 - 11 December 2009. Copenhagen, Denmark. UNFCCC COP 15 and Kyoto Protocol COP/MOP 5 are scheduled to take place from 30 November-11 December 2009 in Copenhagen, Denmark. These meetings will coincide with the 31st meetings of the UNFCCC’s subsidiary bodies. Under the “roadmap” agreed at the UN Climate Change Conference in Bali in December 2007, COP 15 and COP/MOP 5 are expected to finalize an agreement on a framework for combating climate change post-2012 (when the Kyoto Protocol’s first commitment period ends). For more information contact:

UNFCCC Secretariat; tel: +49-228-815-1000; fax: +49-228-815-1999; e-mail: secretariat@unfccc.int; internet: http://unfccc.int/meetings/unfccc_calendar/items/2655.php?year=2009

GLOSSARY

ADB	Asian Development Bank
ASEAN	Association of Southeast Asian Nations
AQM	air quality management
BC	black carbon
BMA	Bangkok Metropolitan Administration
BRT	bus rapid transit
CAI-Asia	Clean Air Initiative for Asian Cities
CARB	California Air Resources Board
CBA	cost-benefit analysis
CDM	Clean Development Mechanism
CO ₂	Carbon dioxide
IEA	International Energy Agency
LCA	life cycle analysis
MEP	Ministry of Environmental Protection
PCD	Pollution Control Department, Ministry of Natural Resources, Thailand
PM	particulate matter
PM2.5	particulate matter less than or equal to 2.5 micrometers in diameter
PM10	particulate matter less than or equal to 10 micrometers in diameter
TEF	transport ecological footprint
VSBK	vertical shaft brick kiln
WHO	World Health Organization
WRI	World Resources Institute
US EPA	United States Environmental Protection Agency



Group photograph at the end of the workshop