

# International Workshop on Strengthening the International Cooperation Framework and Science-Policy Interface to Promote Air Pollution Control in East Asia 2014

March 7-8, 2014, Pacifico-Yokohama, Yokohama, Japan

## Proceedings

**International Workshop on Strengthening the International Cooperation Framework and Science-Policy Interface to Promote Air Pollution Control in East Asia 2014: Proceedings**

**Editors:**

Mark Elder and Naoko Matsumoto

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# Contents

Workshop Agenda.....	1
Workshop Summary .....	5
Workshop Presentations .....	21
<b>1. Introduction and Opening Remarks</b>	
▪ Introduction & Objectives: Research on Regional Framework and Co-benefit Approach to Promote Air Pollution Control in East Asia Prof. Katsunori Suzuki (Kanazawa University, Japan).....	22
<b>2. Overall Issues</b>	
▪ Enhancing International Cooperation on Air Pollution in East Asia by Strengthening the Scientific Epistemic Community Dr. Mark Elder (IGES, Japan) .....	24
▪ For Better Air Quality in Asia: Proposal of Asian Science Panel for Air and Climate (ASPAC) and Plan for ad-hoc Scientists Meeting on Air Pollution and Climate in Asia Dr. Hajime Akimoto (ACAP, Japan).....	29
▪ Options on Possible Regional Framework for Better Air Quality/Atmospheric Management Prof. Katsunori Suzuki (Kanazawa University) .....	32
▪ LRTAP: Organizational Structure and Science-Policy Interface and Prospects for Regional / Global Cooperation Dr. Kevin Hicks (SEI, University of York, UK) .....	35
▪ Enhancing Regional Cooperation for Tackling Air Pollution in Asia Mr. Hiroshi Fujita (Ministry of the Environment, Japan) .....	41
<b>3. International Organizations and Frameworks</b>	
▪ Science - Policy Interface for Air Pollution Issues in Asia-Pacific Dr. Iyngararasan Mylvakanam (UNEP) .....	42
▪ A New Look at Role of Epistemic Communities in the Context of North East Asia Mr. Kilaparti Ramakrishna (UNESCAP-East and North-East Asia Office) .....	44
▪ Science-Policy Interface in EANET and ASEAN Dr. Supat Wangwongwatana (EANET).....	48
▪ Future Development of the LTP Project Dr. Young Sunwoo (Konkuk University, Korea) .....	52
▪ Climate and Clean Air Coalition to Reduce Short-Lived Climate Pollutants (CCAC) Dr. Kevin Hicks (SEI, University of York, UK) .....	57
▪ The ACP, CCAC, and Thoughts on Regional Cooperation Dr. Eric Zusman (IGES, Japan) .....	60
▪ Strengthening Science-Policy Interface for AQM Ms. Kaye Patdu (Clean Air Asia) .....	64
<b>4. Approaches to the Science-Policy Interface</b>	
▪ SPRINTARS global aerosol forecasting system and introduction of the S-12 project Dr. Toshihiko Takemura (Research Institute for Applied Mechanics, Kyushu University, Japan) .....	69

▪ Current status and future potential of the multi-pollutant approach to air pollution control in Japan, China, and South Korea Dr. Mark Elder (IGES).....	71
<b>5. Expert views and comments on strengthening the epistemic community &amp; science policy interface to strengthen international cooperation on air pollution</b>	
▪ Urgent need for regional cooperation to mitigate the adverse effects of PM pollution in Northeast Asia Dr. Young J. Kim (Gwangju Institute of Science and Technology, Korea) .....	75
▪ Global Warming and Air Quality Prof. Shaw Chen Liu (Research Center for Environmental Change, Academia Sinica).....	79
▪ What We All Know and What We Must Do – to Strengthen International Cooperation on Air Pollution in East Asia - Dr. Young Sunwoo (Konkuk University, Korea) .....	85
▪ China’s Cases of Science-Policy Interface to Promote Air Pollution Control Prof. Kebin He (Tsinghua University, China) .....	89
▪ Opinions on Proposal for Asia Science Panel for Air and Climate (ASPAC) Dr. Noppaporn Panich (Chulalongkorn University, Thailand).....	95
▪ Some personal thoughts about ASPAC Dr. Marcus Amann (IIASA).....	101
List of Participants .....	103

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**Workshop Agenda**

<b>DAY 1 (Half Day)</b>	<b>Time</b>
<b>1. Introduction and Opening Remarks</b> (Chair: Mark Elder, IGES)	13:00-13:25
<ul style="list-style-type: none"> <li>➤ Opening Remarks               <ul style="list-style-type: none"> <li>• Hajime Akimoto (ACAP)</li> <li>• Hideyuki Mori (IGES)</li> </ul> </li> </ul>	
<ul style="list-style-type: none"> <li>➤ Introduction &amp; Objectives: Research on Regional Framework and Co-benefit Approach to Promote Air Pollution Control in East Asia               <ul style="list-style-type: none"> <li>• Katsunori Suzuki (Kanazawa University)</li> </ul> </li> </ul>	
<b>2. Overall Issues</b> (Chair: Hideyuki Mori, IGES)	13:25-15:00
<ul style="list-style-type: none"> <li>➤ Enhancing International Cooperation on Air Pollution in East Asia by Strengthening the Scientific Epistemic Community               <ul style="list-style-type: none"> <li>• Mark Elder (IGES)</li> </ul> </li> </ul>	
<ul style="list-style-type: none"> <li>➤ For Better Air Quality in Asia: Proposal of Asian Science Panel for Air and Climate (ASPAC) and Plan for ad-hoc Scientists Meeting on Air Pollution and Climate in Asia               <ul style="list-style-type: none"> <li>• Hajime Akimoto (ACAP)</li> </ul> </li> </ul>	
<ul style="list-style-type: none"> <li>➤ Options on Possible Regional Framework for Better Air Quality/Atmospheric Management               <ul style="list-style-type: none"> <li>• Katsunori Suzuki (Kanazawa University)</li> </ul> </li> </ul>	
<ul style="list-style-type: none"> <li>➤ LRTAP: Organizational Structure and Science-Policy Interface and Prospects for Regional/Global Cooperation               <ul style="list-style-type: none"> <li>• Kevin Hicks (SEI)</li> </ul> </li> </ul>	
<ul style="list-style-type: none"> <li>➤ Japan's strategy on international air pollution control               <ul style="list-style-type: none"> <li>• Hiroshi Fujita (Ministry of the Environment of Japan)</li> </ul> </li> </ul>	
<input type="checkbox"/> Discussion	
<b>Coffee Break</b>	15:00-15:15
<b>3. International Organizations and Frameworks</b> (Chair: Katsunori Suzuki)	15:15-17:00
<ul style="list-style-type: none"> <li>○ Existing situation of the science-policy interface</li> <li>○ Views &amp; comments on strengthening the &amp; science policy interface &amp; epistemic community for international cooperation on air pollution</li> </ul>	
<ul style="list-style-type: none"> <li>➤ UNEP (including ABC, Male Declaration, etc.)               <ul style="list-style-type: none"> <li>• Iyngararasan Mylvakanam (UNEP)</li> </ul> </li> </ul>	
<ul style="list-style-type: none"> <li>➤ UNESCAP-SRO (including NEASPEC)               <ul style="list-style-type: none"> <li>• Kilaparti Ramakrishna (UNESCAP-SRO)</li> </ul> </li> </ul>	
<ul style="list-style-type: none"> <li>➤ EANET               <ul style="list-style-type: none"> <li>• Supat Wangwongwatana (EANET)</li> </ul> </li> </ul>	

➤ LTP	
• Young Sunwoo (Konkuk University)	
➤ CCAC	
• Kevin Hicks (SEI)	
➤ Asia Co-benefits Partnership	
• Eric Zusman (IGES)	
➤ Clean Air Asia	
• Kaye Patdu (CAA)	
☐ Discussion	
<b>Coffee Break</b>	17:00-17:15
<b>4. Approaches to the Science-Policy Interface</b> (Chair: Hajime Akimoto, ACAP)	17:15-17:55
➤ Perspective from the S-12 Project	
• Toshihiko Takemura (University of Kitakyushu)	
➤ The Potential of the Multi-Pollutant Multi-Effect as a Focus of Air Pollution Cooperation in East Asia	
• Mark Elder (IGES)	
☐ Discussion	
<b>Reception</b>	18:30
➤ Ristorante ATTIMO	
<b>DAY 2 (Full day)</b>	
<b>5. Expert views and comments on strengthening the epistemic community &amp; science policy interface to strengthen international cooperation on air pollution</b> (Chair: Mark Elder, IGES)	9:15-10:25
○ Existing situation of the science-policy interface	
○ Perspectives on strengthening the & science policy interface & epistemic community	
➤ Y.J. Kim (Gwangju Institute of Science and Technology)	
➤ Shaw C. Liu (Academica Sinica)	
➤ Young Sunwoo (Konkuk University)	
➤ Kebin He (Tsinghua University)	
➤ Noppaporn Panich (Chulalongkorn University)	
➤ Marcus Amann (IIASA)	
☐ Discussion	
<b>Coffee Break</b>	10:25-10:45
<b>6. Discussion on ASPAC</b> (Chair: Hajime Akimoto, ACAP)	10:45-12:05
<b>LUNCH</b>	12:05-13:20
<b>7. Discussion on the Ad Hoc High-Level Science Meeting for Asian Air Pollution</b> (Chair: Hajime Akimoto, ACAP)	13:20-14:40
<b>Coffee Break</b>	14:40-14:55
<b>8. Discussion on the Regional Cooperation Framework for Air Pollution</b> (Chair: Katsunori Suzuki, Kanazawa University)	14:55-16:25

<b>Coffee Break</b>	16:25-16:40
<b>9. Conclusion and Wrap-Up</b>	16:40-17:30
➤ Final Discussion	
• Akimoto/Suzuki	
➤ Closing Remarks	
• Hideyuki Mori (IGES)	
• Hajime Akimoto (ACAP)	





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## Workshop Summary

1. The International Workshop on Strengthening in the International Cooperation Framework and Science-Policy Interface to Promote Air Pollution Control in East-Asia 2014 was held on March 7-8, 2014 at Pacifico-Yokohama, Yokohama, Japan.
2. The participants of the Workshop included experts from China, Chinese Taipei, Japan, Republic of Korea, Thailand, Philippines, Austria, United Kingdom, United States, the United Nations Environment Programme (UNEP), East and North-East Asia Office of the UN Economic and Social Commission of Asia and the Pacific (UNESCAP-ENEA), Regional Resource Centre for Asia and the Pacific, Clean Air Asia, Asia Center for Air Pollution Research, S-7-3 project researchers, and other IGES researchers.
3. The workshop was opened by Hajime Akimoto (ACAP) and Hideyuki Mori (IGES). Dr. Akimoto, the leader of the S-7 Project, welcomed all the participants and explained the importance of this annual international workshop of S-7. He encouraged the participants to actively participate as this is the final opportunity for discussion before the conclusion of the project. Mr. Mori expressed his expectation for a fruitful meeting and appreciation for the participants to attend this meeting which is held back-to-back with the Workshop “Toward and Integrated Approach to Co-benefits in Asia: Building Bridges and Making Connections.”
4. Katsunori Suzuki (Kanazawa University), the theme leader of S-7-3, made an introductory presentation on the project, including the background, objectives, and research outcomes through the project over last five years. The research demonstrated the need for a better science-policy interface in East Asia and establishment of an epistemic scientific community, and the proposal for an Asia Science Panel for Air and Climate (ASPAC) developed through the research was presented. The results of the examination of possible frameworks towards better air quality/atmospheric management, including global principles to harmonize regional initiatives, and possible options to strengthen regional initiatives were also presented. The objectives of the workshop were introduced as: (1) to discuss the proposal to promote a regional epistemic scientist community – Asia Science Panel for Air and Climate (ASPAC) – and especially an Ad Hoc High-Level Scientists Meeting for Air Pollution in Asia as a first step to develop ASPAC; and (2) to discuss views and comments on how to strengthen the regional cooperation framework for better air quality/ atmospheric management.

5. Session 2, which addressed overall issues, was chaired by Hideyuki Mori (IGES).
6. Mark Elder (IGES) made a presentation titled “Enhancing International Cooperation on Air Pollution in East Asia by Strengthening the Scientific Epistemic Community.” First, he surveyed major air pollution problems in East Asia, noting that there is a wide range of problems which are worsening and becoming more complex. They are both domestic and transboundary, so countries cannot solve these problems by their own efforts. Therefore, more international cooperation is necessary. He noted that there are already a number of existing frameworks in the region. While they have made certain accomplishments, they also have certain problems, and their overall effectiveness has been limited. Existing efforts to strengthen existing frameworks and foster synergies among them have so far not been successful. Slow progress in East Asia is sometimes compared with the more developed LRTAP framework in Europe. He pointed out that it is necessary to recognize that in Europe, the path to LRTAP actually took a very long time, and that when searching for lessons from LRTAP, East Asian countries should focus more on the period before LRTAP’s establishment, not just on its current advanced form. In Europe, there was a long process of consensus building and development of an epistemic community to reach a transnational mutual understanding among scientists, which helped to persuade policymakers about the desirability of forming LRTAP. Likewise, in East Asia, more emphasis should be placed on development of the epistemic community and consideration for how to strengthen the science-policy interface. Existing frameworks in East Asia also have science bodies, but these have various limitations and their effectiveness has been limited. There are some positive trends regarding the emergence of an epistemic community in East Asia, so the question is how this development could be accelerated. ASPAC is one possible means to do this, and it could be implemented in stages. He also discussed various options for the functions and scope of a stronger international cooperation framework, including its science-policy interface. Considerations for designing ASPAC were also enumerated. He concluded by observing that the timing is good for strengthening international cooperation, and mentioned several positive trends including increasing perceptions of the severity of air pollution in the region, much greater prioritization by governments, greater and recognition of transboundary aspects. Moreover, countries in the region, including are already unilaterally strengthening their domestic policies.
7. Hajime Akimoto presented a proposal to establish Asia Science Panel for Air and Climate (ASPAC) and a plan to hold an Ad Hoc High-level Scientists Meeting on Air Pollution and Climate in Asia in order to develop ASPAC. The objective of ASPAC is to synthesize scientific knowledge on air pollution in the Asian region to reach a common understanding among scientists and policy makers, and to develop an international initiative for an integrated approach to air pollution and climate change reflecting the views of Asian scientists. He observed that the situation in Asia is very different from the European and North American context, where regional cooperation on air pollution based on scientific knowledge is well developed. The project identified that: (1) scientific epistemic community on air pollution is

necessary to be established for the discussion of international atmospheric management in Asia; (2) it is very important to input the views of Asian scientists to those of European and North American, since their understandings and views on Asian situation might be different from Asians. Major aspects of ASPAC which need to be decided include: major functions, geographical scope, selection of members, organizational structure and linkages, and possible funding sources. He concluded the presentation by proposing to hold an Ad Hoc High-Level Scientists Meeting as an immediate initiative to further develop ASPAC and by sharing a list of candidates of the members.

8. Katsunori Suzuki made a presentation on options on possible regional framework for better air quality/ atmospheric management. First, he explained about the changing situation of air pollution in East Asia and the need for improvement. Overall, air pollution is increasing in East Asia, and transboundary movement is becoming more important. Better linkage with climate change, especially on short-lived climate pollutants (SLCPs), is necessary. It is necessary to reduce the costs of control measures (e.g. through cobenefits), strengthen capacity building, and the links between science and policy. To meet these challenges, a more effective cooperation framework is needed for Asia. The presentation identified options of such a framework at global and/or regional level including functions, modalities etc., which should be further discussed and elaborated among relevant stakeholders. Regional dialogue on this topic should be promoted through an appropriate forum, for instance, the Joint Forum on the Atmospheric Environment in Asia and the Pacific.
9. Kevin Hicks (SEI) first explained the organizational structure and science-policy interface of the Convention on Long-range Transboundary Air Pollution (LRTAP). He noted that the LRTAP's executive body, which combines scientists and policymakers, is the core of its science policy interface. Three main bodies report to the executive body: 1) the Working Group on Effects, 2) the EMEP Steering Body, and 3) the Working Group on Strategies and Review. Under these three main bodies are various task forces and program centers. Integration is performed by the Task Force and Center on Integrated Assessment Modeling. While analysis of transboundary movement is conducted, several other factors are important for LRTAP's success such as the focus on cost effectiveness, differentiated national responsibilities, and capacity building for countries not in compliance. Although LRTAP's enforcement mechanism is not very strong, it has resulted in some actions being taken, and valuable knowledge has been produced. In the second part of the presentation, he discussed the prospects for regional/global frameworks. First, current international co-operation processes have not been able to deal with most harmful pollutants such as ozone and particulates, or the linkages between air pollution and climate change. Second, strengthening of regional networks and co-operation between them seems to be the best way forward. Third, while progress has been slow, there are some potential catalysts including climate/air pollution link, recognition of benefits from integrating regulatory and voluntary approaches, and recognizing different roles played by different actors. Fourth, a new common model for networks is needed which links voluntary and regulatory approaches, is

coordinated through a 'Framework Convention', and has a regional implementation role on climate strategy. Next steps were proposed including: (1) SLCP Strategy for the northern hemisphere on a non-mandatory 'alliance of willing' basis initiated by LRTAP Convention; (2) dual regulatory-voluntary approaches could be developed by non-treaty-based networks; and (3) a global 'watch' could be established to review the status of the key issues for global governance of the troposphere.

10. Hiroshi Fujita (MOEJ) presented Japan's strategy on international air pollution control. The government published "Enhancing Regional Cooperation for Tackling Air Pollution in Asia" which laid out basic concept of future efforts on March 15. It aims to make sharing clean air in the Asian region as a common goal among countries. To achieve the goal, the strategy intends to promote measures such as expansion and sharing of scientific findings and sharing of Japan's experiences and technologies by making use of existing international cooperation frameworks. In addition, it seeks to facilitate discussions to strengthen regional cooperation on air quality in Asia, aiming at developing a common understanding and promoting collaboration among various stakeholders. In order to realize the goal of sharing clean air in the Asian region, a policy package of comprehensive measures for PM<sub>2.5</sub> was announced in December 2013 by the MOEJ. It consists of the following three pillars: (1) a trilateral policy dialogue on air pollution involving Japan, China, and South Korea to be held in Beijing on 20 and 21 March 2014; (2) cooperation with the UNEP and CAA and; (3) cooperation through EANET.
11. In Session 2, the discussion included the following points:
  - a. The question of how regulatory and voluntary approaches could be combined was discussed. Voluntary approaches are especially used in the case of developing countries. They generally agree to declarations. In Africa, measures for low sulfur fuels were attractive, and even though there was no legally binding framework, UNEP worked with the governments, and many governments moved forward voluntarily. The key point is that information on the benefits needs to be available. It is also important to get the right people around the table. In Europe and North America, there is a more legalistic approach.
  - b. At the beginning of LRTAP, source-receptor analysis was conducted. This was based on already well-established international law. LRTAP, however, does not use punitive actions for enforcement, but rather assistance. It may be good to consider different international principles. The fundamental principles may be gradually changing.
  - c. Developing countries are usually very reluctant to agree to binding treaties. Even in LRTAP, there is a lot of non-compliance. Bringing air pollution and climate together (cobenefits) may be a good incentive.
  - d. There are two different issues. First, there is the lack of an epistemic community and efforts to create it, and the other is the international cooperation framework. It is not clear whether we should discuss these together. Should the epistemic community discuss how to

reorganize international cooperation in Asia? Creating the epistemic community is a task in itself. These two tasks are not in the same pot. If they are, then you need to include policy and social scientists. Nobody is asking atmospheric scientists how to respond to air pollution.

- e. LRTAP has many expert groups in which experts are nominated by governments. Not just anyone can attend. They make a consensus report, which will be communicated to the WG on Strategies which includes the ministry people. This WG screens policy responses and starts policy negotiations if necessary. There are many of these scientific groups, they meet once per year. The Center for Integrated Assessment has a special role in order to implement the integration.
12. Session 3, chaired by Katsunori Suzuki, aimed to (1) share existing situation of the science-policy interface, and (2) exchange views and comments on strengthening the science policy interface and epistemic community for international cooperation on air pollution.
  13. Iyngararasan Mylvakanam (UNEP) made a presentation on the science-policy interface for air pollution issues in Asia-Pacific. He first presented a need for an integrated response among pollutants and sectors, over different time periods in order to realize sustainable development. He then summarized the existing science bodies supporting various initiatives in Asia, and explained how each science body differs in terms of expertise and focus. To address the current situation, he presented an idea of science body (Asia-Pacific Science Panel) which builds on existing initiatives and covers thematic expertise. He suggested that an inception meeting of the science meeting could be organized in conjunction with the Joint Forum, focusing on terms of reference. It also discussed one assessment, which is based on integration, to translate existing knowledge for policy makers, and contribute to the Joint Forum and other sub-regional initiatives. He concluded that monitoring, modelling, impacts assessment, emission inventory, and mitigation are all necessary for the further development of the science policy interface for air pollution, and that this should be based on concepts summarized by “POLICY” (Parallel, Ownership at the national and regional level, Low cost and cost effective mitigation measures, Incremental programmatic approach, Complementary, and Yielding (results based)).
  14. Kilaparti Ramakrishna (UNESCAP-ENEA) reviewed various projects for environmental sustainability including the North-East Asian Subregional Programme of Environmental Cooperation (NEASPEC), and suggested taking a new look at the role of epistemic communities in the context of North East Asia. He observed that NEASPEC has also conducted a survey of existing air pollution cooperation frameworks and recommended the development of a holistic regional strategy in Northeast Asia including control of all main pollutants, data gathering, modeling, impact assessment, emissions abatement strategy, addressing climate-air interaction (including SLCPs) and coordinating with other networks. He noted that idea of relying on scientific advice has become an internationally accepted practice and that every convention now

has a scientific body. The United Nations Secretary-General's Scientific Advisory Board to Strengthen Connection between Science and Policy is a comprehensive science body and is the first such body set up by the United Nations Secretary-General. He suggested to consider linking ASPAC to this. He noted that the concept of epistemic community has been useful but there are also some problems. Merely putting together a group is not enough. Every effort needs to be made to ensure that the group is not self-selected; it has the respect of all relevant stakeholders; and that it ensures the process of reaching its conclusions is as transparent as possible. It of course needs legitimacy and strong political and financial backing from its proponents. The last part of his presentation focused on regional environmental governance and the discussion covered roles, primary conditions, domains, actors and factors, and the way forward of environmental governance in North East Asia.

15. Supat Wangwongwatana (EANET) made a presentation on the science - policy interface in EANET and ASEAN. He provided an overview of science-policy interface mechanism in EANET, such as the institutional framework, provisions in the Instrument for Strengthening EANET on its Scientific Advisory Committee (SAC), Network Center, and the Medium Term Plan for the EANET (2011). He noted that the ASEAN does not have this kind of science policy interface, even in Haze Agreement, as the technical task force is no longer active (although the good news is that Indonesia's parliament has agreed to ratify the Haze Agreement). He further noted important points for strengthening science-policy interface including: (1) transboundary environmental problems, including air pollution, require a unified response but this is difficult due to differences of national interest; (2) members of an international epistemic community in a number of different countries can become connected through intergovernmental channels, producing a transnational governance network, and facilitating the promotion of international policy coordination; and (3) as a result, an international epistemic community will help overcome the barriers to greater international cooperation and will have a direct input on how international cooperation may develop in the long term. He noted that the science policy interface in EANET faced several challenges. He concluded by identifying the issues to be considered in the development of an international epistemic community for transboundary air pollution in Asia as governance, transparency, independency, institutional arrangement, and financial arrangement.
16. Young Sunwoo (Konkuk University) introduced the plan for the future development of the Long-range Transboundary Air Pollutants in North East Asia (LTP) Project. Following the background and history of the LTP project and its limitations, he presented a new proposal titled "NorthEast Asian program for Long-range Transboundary air Pollution (NEALTP). It would not be legally binding but rather a form of "inter-institutional agreement (program/arrangement)". Its scope is research of long-range transboundary air pollutants including monitoring and modeling, emission inventories of acid rain precursors, photochemical pollutants, hazardous air pollutants, and short-lived climate forcers. The aim is to provide support in developing air quality policy and strategies, through activities including

research, monitoring, advisory meetings, and information exchange, to mitigate the adverse impact of air pollution in Northeast Asia. The new elements are expected to be expansion of data sharing through monitoring and modeling, establishment of annual emission inventories, refinement of estimation of source-receptor relationships, and reinforcement of the comprehensive analysis function.

17. Kevin Hicks (SEI) presented an update of the Climate and Clean Air Coalition (CCAC) and its science-policy interface. Research suggests that fast action on SLCPs can significantly increase public health, food and energy security, and reduce near-term climate change. CCAC aims to translate the science into policy and action, leverage high-level engagement and political will, and catalyze action to address SLCPs as a global and collective challenge. It is a voluntary and partner-led coalition, and the number of partners has grown from 6 to 80 over two years as of February 2014. CCAC has approved 10 high-impact initiatives to catalyze and scale-up action to reduce SLCPs. To ensure that action on SLCPs is underpinned by robust up-to-date assessments of relevant science, it has been decided that regional assessments of SLCPs will be conducted. The first regional assessment is now being conducted for the Latin America and Caribbean (LAC) region.
18. Eric Zusman (IGES) made a presentation on the Asian Cobenefits Partnership (ACP), the Climate and Clean Air Coalition (CCAC), and thoughts on regional cooperation. He introduced basic information about the Asian Co-benefits Partnership. It is an informal dialogue and interactive platform that aims to facilitate stakeholder dialogue on co-benefits in Asia. It has important links to existing and ongoing initiatives that focus on different environmental media and sectors. He observed that there is a range of perspectives on co-benefits, and ACP helps to bridge these different perspectives. ACP has just published a White Paper entitled, “Bridging Development and Climate Together in Asia.” ACP also supports stakeholder dialogues. Next, he provided an overview of the activities of CCAC. A regional assessment on SLCPs in Asia is likely to be conducted in 2014-15. Even though China is not a member of CCAC, it is implementing a co-control strategy which includes SLCPs.
19. Kaye Patdu of Clean Air Asia (CAA) made a presentation titled “Strengthening Science-Policy Interface.” After introducing the mission, background, and structure of CAA, she discussed strengthening science-policy interface from two perspectives: integration and bridging gaps. Integration has both horizontal and vertical axes and need to engage stakeholders including urban, environment, economics, development, energy, transport, and financial institutions. Also important are integration from national to local as well as non-governmental bodies such as academe, private sector, and civil society. Enabling components for bridging gaps include capacity building, knowledge sharing, and multi-stakeholder processes. She shared various programmes related to bridging gaps and, among others, introduced the regional trends towards improving fuel quality and vehicle emission standards. The presentation was concluded with the announcement that the Better Air Quality Conference will be held in Sri Lanka on 19-21 November 2014.

20. Session 4, which focused on “Approaches to the Science-Policy Interface,” was chaired by Hajime Akimoto (ACAP).
21. The first presentation, made by Toshihiko Takemura (Research Institute for Applied Mechanics, Kyushu University), introduced a new research project, S-12, of the Environment Research and Technology Development Fund; and (2) the SPRINTARS global aerosol forecasting system which is widely used. The S-12 project aims to quantitatively assess climate change and environmental impacts of SLCPs and develop an integrated system for generating suitable paths for reducing greenhouse gases and SLCPs basically using scientific approaches. SPRINTARS is a Global aerosol climate model, and its aerosol forecasting system has been in operation since 2007. The data is open to the public through its website, which has drawn significant media attention as well as recognition by the MOEJ. He concluded that specialists should consider the need of the public when disseminating information related to air pollution and climate change.
22. Mark Elder (IGES) made a presentation on the potential of the Multi-Pollutant Multi-Effect (MPME) approach as a focus of air pollution cooperation in East Asia. This approach is typically associated with LRTAP which is a legally binding framework, and thus thought to be not very feasible for East Asia. However, he argued that the MPME is basically a system of scientific analysis using integrated modeling. It provides the basis for setting targets. However, he noted that it is possible to conduct such scientific analysis without linking it to a treaty. It is a kind of science policy interface that can provide advice to policymakers and negotiations. The Northeast Asian countries are already moving in the direction of the MPME approach. The Beijing Olympics first introduced a mini domestic LRTAP in China, which will be further developed with the regional Five-Year Plan on air pollution. Korean GAINS is now under development, while Japan is now developing systems similar to GAINS. Russia is already a member of LRTAP. Some members of LRTAP are developing domestic GAINS to improve effectiveness of air pollution reductions as well as negotiations with LRTAP. Key benefits of the MPME approach include a focus on cost effectiveness of reductions and justification for differentiated targets. Of course, countries can set domestic air pollution targets without MPME, but they will be less effective and more costly. Therefore, he concluded that it is desirable for the MPME approach to be a focus of international cooperation on air pollution in East Asia. Cooperation by linking domestic models on a voluntary basis would improve the effectiveness and reduce the costs of each country’s own domestic measures. The main challenge would be expanding the geographic scope to developing countries which lack sufficient scientific capacity. Capacity development for MPME could be another focus of international cooperation.
23. Session 5, chaired by Mark Elder (IGES), focused on expert views and comments on strengthening the epistemic community and science policy interface to strengthen international cooperation on air pollution.
24. Y.J. Kim (Gwangju Institute of Science and Technology) made a presentation on the “Urgent need for regional cooperation to mitigate the adverse effects of PM pollution in Northeast Asia.”



PM<sub>10</sub> concentration in Seoul was decreasing from 2007-2012, but in the winter of 2013-2014, Seoul experienced unprecedentedly high concentrations of PM<sub>2.5</sub>. Korea is conducting PM<sub>2.5</sub> forecasting, but need to improve accuracy He mentioned new research projects including a new one which will start next month to develop a new PM index accounting for new human health effects and new technology for PM. More international collaboration on PM<sub>2.5</sub> is needed in Northeast Asia. More research is needed in toxicity human health effects, improvement of PM<sub>2.5</sub> forecasting models, and especially new technologies to remove PM<sub>2.5</sub> particles. Geo-engineering approaches may also be considered as emergency responses. Regarding ASPAC, he recommended that it should focus on enhanced research collaboration and capacity building of atmospheric scientists, climate scientist, and public health scientists. It is especially important to develop a framework for cooperation. Regarding the scope, at the first stage it should focus on East Asia, and later extend to Asia as a whole. Due to the diverse/different functions of ASPAC, it would be better to create a new body for ASPAC under the framework of UNEP, ESCAP, UNU, or similar international organization.

25. Shaw C. Liu (Academica Sinica) made a presentation on “Global Warming and Air Quality” which demonstrated the impacts of global warming on air quality based on research on air pollution in China. There was a significant increase in haze in China during 1975-1980 which cannot be explained by increased emissions. Instead, it is best explained by the relatively large global temperature increase. This temperature increase fostered conditions for haze formation including reducing the amount of light rain and clouds, and increasing the number of dry days. Therefore, controlling GHGs can have a positive co-benefit effect on haze. He also made several other points regarding the impacts of global warming on air quality. Reduction in boundary layer winds decreases the ventilation of air pollutants, but reduces Asian dust storms. Increase in global total precipitation is estimated to be about 2-3% per degree warming, providing a small beneficial effect. Finally the urban heat island effect can enhance the convective ventilation of air pollutants in the urban area, but this effect is compensated to certain degree by the decrease in relative humidity.
26. Young Sunwoo (Konkuk University) made a presentation on ideas for strengthening international cooperation on air pollution and recommendations for ASPAC. He noted the various obstacles to strengthening international cooperation such as differences in socio-political systems and economic levels, perception gaps and differences of interest between countries, weak scientific knowledge, overlapping existing programs, and weaker participation or exclusion of N. Korea, Mongolia, and Russia from discussions on air pollution. He suggested that EANET and LTP could be integrated or modified to avoid overlap. He also noted that LTP intends to reinforce the comprehensive analysis function, and is also considering to form a science advisory committee to prepare a comprehensive report for policymakers. He thinks ASPAC is a great idea. Many details need to be worked out, but it is better to first decide to create ASPAC and then decide the details later. He suggested to follow the LRTAP model which has been successful. ASPAC could be placed under UNESCAP, and EANET and LTP

could become program centers under ASPAC. Regarding the geographic scope, it may be better to start with China, Japan, and Korea with TEMM approval but independent of governments. Then, it could be expanded to include Southeast and West Asian countries. Linkage with NEASPEC could also be considered. A great compromise will probably be necessary in order to be successful. In his personal view, Japan could be recognized as the initiator and leader of ASPAC, but in return, the initial base should be outside Japan, and consider rotating the host country every 5 or 10 years. There should be an intensive focus on China's PM2.5 problem. Now is a good time to take action, since the PM2.5 crisis has galvanized the attention of both governments and the public in the region. Governments in China and Korea are ready to take action; is Japan also ready? Korea is already moving in multiple directions to collaborate with China independently. Academic societies could play an important role in promoting cooperation. The IUAPPA World Clean Air Congress will be held in September 2016 in Busan, Korea, targeting 1500 participants and attempting collaboration with CAA/BAQ. This would be a good opportunity to launch an Asian LRTAP agreement.

27. Kebin He (Tsinghua University) made a presentation on "China's Cases of Science-Policy Interfaces to Promote Air Pollution Control," focusing on the Beijing Olympics in 2008 and the Guangzhou Asian Games in 2010. Both of these cases used advanced scientific techniques to successfully reduce air pollution for these events. These included a high resolution emissions inventory, regional source apportionment, and monitoring and observation network system. Particularly notable was the MEIC emissions database. Strong control measures were used, especially for power plants and vehicles. Overall, the system was very effective in reducing the pollution, but the pollution returned after the control measures were relaxed.
28. Noppaporn Panich (Chulalongkorn University) presented her views and comments on ASPAC. The purpose should focus not only on synthesis, but also on promoting new research, including research coordination, and scientific capacity building, which should start with building up university programs, and public awareness. Generally, ASEAN needs a stronger science policy interface; some previous efforts were not very successful. ASPAC could be very helpful in helping Southeast Asian countries to address air pollution problems. She observed that the Southeast Asian countries are mostly geographically close together so air pollution can be a transboundary problem. Greater environmental cooperation will be needed along with the establishment of the ASEAN Economic Community in 2015. In particular, environmental regulations should be more unified, especially regulations for industrial and vehicle emissions. Otherwise, countries will worry about losing economic competitiveness if their air pollution regulations are stricter than other countries after the start of the ASEAN Economic Community. ASPAC may be able to help provide scientific support for more unified and higher air pollution regulations in ASEAN. It is necessary for ASPAC to include social scientists such as environmental economists and political/policy scientists. Good analysis of economic costs and benefits is essential to persuading policymakers in Southeast Asia. Existing research has not been enough to persuade policymakers. In ASPAC, there may need to be different focuses

between Northeast Asian and Southeast Asia. Air pollution modelling in SEA has been insufficient partly due to a lack of meteorological data. The structure of ASPAC could be similar to the IPCC, and it should be linked to international organizations. Funding requirements would not be large just for symposiums, workshops, and modelling, and initially could come from international organizations and developed countries, but in the long run, it needs to come from all member countries. There could be some linkage to the private sector.

29. Marcus Amann (IIASA) presented his views and comments on ASPAC. Overall, he believes that ASPAC is a great idea. He had several key points of advice. First, it is very important to focus on benefits and opportunities rather than the analysis of transboundary movement of air pollution in order to assign blame and responsibility. Second, ASPAC members need to be interdisciplinary. Involvement of health, ecological, economic, social and development sciences is essential; this also helps to shift the focus to benefits and opportunities and away from blame. Third, the focus should be on answering questions from policymakers; this will help it to be more action-oriented. Science panels which took scientific questions as their starting point have not been very effective. In particular, it is important to avoid too much emphasis on documenting uncertainties, and focus instead on specific measures that can be taken. The SLCP report is a good example, which focused on 16 measures instead of the uncertainties about black carbon. Fourth, the organizational structure of ASPAC is very important. It should not be linked to a single policy framework, but instead it should sit on the top. It should bring together all of the science and scientists from all of the related science panels. It should be institutionally inclusive, not just involving Nobel laureates. Strong scientific leadership is necessary to achieve integration of results, since many issues need a interdisciplinary perspective which is resisted by most scientists. The governance structure must promote integration. Finally, he concluded that ASPAC is a necessary but not sufficient condition to solve AP. Politics and policy will remain decisive.
30. The discussion in Session 3 addressed the following points:
  - a. The issue of the roles of different UN organizations was discussed. The roles of UN organizations have been different in Europe and Asia. In Europe, LRTAP comes under UNECE, while in Asia, UNEP has played a larger role in existing frameworks such as EANET and the Male Declaration.
  - b. It was clarified that it is necessary for science advisory bodies to go beyond physical knowns and unknowns. It is important to consider what policy decisions can be taken. It is necessary to show that measures taken will lead to improvements and benefits
  - c. While recognizing the importance of avoiding too much focus on blame, the issue of responsibility is important too. In the climate change area, the principle is “common but differentiated responsibilities.” In air pollution, we say that there is a common responsibility, so a common response is necessary. But the response must be differentiated. There are

different ideas for how to come up with a differentiated solution. Not everyone needs to act in the same way. The cost effectiveness principle is used in Europe. Some sectors may need to do more than others. There are many different possibilities. A science panel does not need to go into this in the first phase. This is a common problem, and we have common responsibility.

31. Sessions 6 and 7 addressed overall issues relating to ASPAC and the proposed High Level Science Meeting. They were chaired by Prof. Akimoto as a plenary session. The following points were made during the discussion.
  - a. It was clarified that the purpose of the Ad Hoc High Level Science meeting would be to discuss the details of ASPAC and make a concrete proposal. The discussion at this workshop would serve as a preliminary input.
  - b. General agreement that ASPAC is a good idea, and that it is timely. There was also general agreement on the need to establish a scientific epistemic community.
  - c. It is very important to have multidisciplinary membership, especially from the social and policy sciences. Policymakers are especially interested in economic analysis of costs and benefits of possible mitigation measures. The Chinese government is already organizing multidisciplinary research groups for major research projects.
  - d. It is better to emphasize opportunities and benefits as well as practical mitigation measures, instead of blame. Transboundary aspects should be deemphasized.
  - e. Many experts thought it was desirable in principle to keep the number of members of ASPAC relatively small, but it was also recognized that it may be difficult for ASPAC to perform the function of integrating knowledge from different disciplines if it is too small. Initially, a size of 15 may be optimal, but later it might grow to a size of 50-100 including different working groups. A balance between the number of experts and different disciplines needs to be maintained.
  - f. There was general agreement that a range of scientific functions is necessary. These possible functions include scientific assessment, prioritizing research areas, conducting or coordinating basic research, capacity building, public awareness, and technology development. However, sequencing and institutionalization of different functions needs more consideration. Some functions, like capacity building, may be important to strengthen but not necessarily through ASPAC. Moreover, there are a variety of types of capacity building that are needed, which might need to be promoted in different ways. It is important to clearly identify ASPAC's value added, since there are already many bodies conducting scientific assessments.
  - g. Assessment should be action oriented, not just focused on trend analysis. The focus should be on what positive actions could be taken. The experience of the Black Carbon assessment

is a good example. Integration of different disciplinary perspectives is necessary to implement an action oriented approach.

- h. There was a general agreement on the need for a balance between scientific independence and linkage to policymaking. There should be some kind of institutional linkage with policymaking. Scientists need to ensure that their work is relevant to policy questions. It may be better to focus more on analyzing possible policy responses rather than too much focus on scientific uncertainty.
- i. Many could support a wider geographic scope covering Southeast and South Asia as well as Northeast Asia, but Korean experts still prefer at least starting with Northeast Asia before expanding. The issues in different subregions may be different, and these differences should be taken into consideration. A staged process could be considered.
- j. It was recognized that the IPCC model could be a reference, but that the focus, scope, and organization relevant for air pollution in East Asia might be different. The IPCC structure has certain weaknesses, and there are other models to consider with different advantages and disadvantages, such as LRTAP, ICSU, and IGAC. For example, the IPCC does not integrate different perspectives. The LRTAP structure is very effective, but it requires significant resources to sustain.
- k. Regarding membership selection, it may be better to have a mixed selection process by which some are selected by scientific bodies and others by governments. This may help to ensure that the panel is both scientifically sound but also governments will seriously consider the recommendations. Some criteria for membership selection should be developed, including representation of diverse scientific disciplines. It is better to ensure that a wide range of stakeholders is represented in order to minimize criticism of the results. Academic societies could play an important role.
- l. Regarding funding, in the long run, it will be necessary to obtain support from governments. Countries could focus on their areas of interest, using a lead country approach, and a portion of the funds could be channeled to the center. Overall, the cost should not be very expensive if the focus is mainly on meetings, or even modeling research. For more expensive research or capacity building, the relevant team could raise additional funds from other sources. It was noted that it is easy to start these kinds of initiatives, but difficult to sustain.
- m. There was not a consistent view on how climate and air pollution issues could be combined. There was support for the cobenefits approach in principle, but some emphasized the desirability of starting from the standpoint of air pollution rather than climate change.
- n. Institutionalization of ASPAC through endorsement by the UN Environmental Assembly may be desirable, but it would require sustained multi-year leadership and commitment to achieve. Non-UN status may also be a feasible option for ASPAC.

- o. It was suggested that ASPAC could be linked to Asian regional networks such as the Joint Forum, and networks outside the region such as HTAP. This would facilitate the science policy interface and international cooperation.
  - p. It was recommended to give additional consideration to the name of ASPAC. It is important not to give the impression that it is mainly a group of scientists doing scientific research.
  - q. It is also important to explain how ASPAC would relate to existing initiatives and clarify what is the value added.
  - r. It is important to learn lessons from past experience. There are already many scientific advisory bodies in the world. Experience shows that they are easy to start, but difficult to sustain in the long run. It is necessary to be persistent and have a long term commitment. Getting the structure right is also very important. It is necessary to ensure that all relevant stakeholders are included, since whoever is left out may oppose it. It is not likely to work if it is decided by only a few people.
  - s. It is necessary to have a key group of individuals willing to make a substantial long term time commitment to make it work. Strong follow up is essential.
  - t. IUAPPA 2016 in Korea could be a good occasion to showcase a major result.
  - u. Prof. Akimoto proposed the tentative members for the High Level Science Meeting. The workshop discussed a number of other possible candidates.
  - v. Some participants noted that the proposed members are mainly natural scientists focusing on air pollution issues, and recommended to consider including more members from other disciplines. It was also noted that the scope of the members should be related to the objective of the meeting. In China, MEP and MOST have already organized large multidisciplinary air pollution research projects, so there is already a list of related experts in China.
32. Session 8 addressed overall issues relating to the regional cooperation framework, and was chaired by Prof. Suzuki as a plenary session. The following points were made during the discussion.
- a. If the focus is to be on UNEP, then it is important to consider the process, which can be challenging. The best long term means is to get a decision from the United Nations Environment Assembly (UNEA – formerly the UNEP Governing Council). This would ensure that it becomes an integral part of UNEP activities. However, this takes a long time and a great deal of effort.

- b. Other options could be the UNSG's science panel, linked to UNESCO, or the environmental health ministers meeting. In NEASPEC, Russia is considering an LRTAP-type arrangement in Northeast Asia.
  - c. Asia still has made more progress on institutionalization compared to Latin America or Africa. It is important to build on existing frameworks. It is important to clarify the value added of creating something new.
  - d. A staged process could be considered for strengthening cooperation and linkages among existing frameworks, or even consideration of merging some.
33. The conclusion and wrap up in Session 9 was chaired by Prof. Suzuki. He summarized key points of the workshop as follows:
- a. The issue is not just air pollution by itself, but air pollution should be considered in the context of sustainable development.
  - b. The importance of a unified voice to policymakers from the scientific community was emphasized. Currently, different mechanisms have somewhat different messages, and are limited to narrow areas.
  - c. Importance of an integrated approach has been emphasized.
  - d. Importance of mitigation efforts, not just assessment of damage was emphasized. Policymakers are very interested in economic aspects.
  - e. Importance of balance between independence from governments and recognition by governments was noted. The balance between scientific independence and links to policymakers is important. Regarding the member selection process, among 3 options, it was generally agreed that some mixed system would be good, to ensure buy-in by governments and to keep scientists focused on policy relevant issues. The importance of keeping the number small was emphasized.
  - f. There was general agreement on the need for establishing the epistemic community, although the specific aspects of ASPAC need to be further elaborated.
  - g. ASPAC could be established by UNEP or other organization outside of Japan.
  - h. It is desirable to achieve a concrete results by IUAPPA 2016.
  - i. The importance of coordination, and linkage between environment and energy was emphasized.

- j. Regarding funding, there were 3 options. The workshop did not reach a clear conclusion on this. But at the initial stage, international funding should be explored, but later, funding from the participating countries should be explored. This is related to long term sustainability.
  - k. It is very important to emphasize benefits for all, integration, and cobenefits. Also the importance of interdisciplinary expertise, not just natural scientists but also social scientists, was emphasized.
  - l. The focus should be on policy questions from decision makers, and recommendations should be action oriented.
  - m. Various existing science panels should be connected.
  - n. Inclusiveness is important– not just large countries.
  - o. Strong scientific leadership is very important.
  - p. Capacity building is important.
  - q. There was a general consensus on establishing a science body, for which UNEP will take the lead. The timing of the preparatory meeting will be in the summer/autumn of 2014 and will be further consulted with relevant organizations.
34. Closing remarks were made by Hideyuki Mori, President of IGES and Prof. Akimoto.



- Workshop Presentations -

## S—7 Project Framework

### Comprehensive Research on Improved Regional Air Quality Management through Analysis of Regional Air Pollution and Co-benefits Approach

5-year research project funded by the Ministry of the Environment, Japan

## Introduction and Objectives

### Research on Regional Framework and Co-benefit Approach to Promote Air Pollution Control in East Asia

Katsunori Suzuki  
Kanazawa University

- Theme 1: Research on East Asian/hemispheric level ozone/aerosol pollution by integration of mathematical model and observation
- Theme 2: Improvement of emission inventories and development of emission scenarios for air pollutants in East Asia
- Theme 3: Policy development for regional framework and co-benefit approach to promote air pollution control in East Asia

2

## Background

### Need to improve current air quality management framework in East Asia

- **Simultaneous occurrence of various air pollution problems**
  - Traditional local air pollution, acid deposition and other transboundary air pollution, climate change etc.
- **Lack of inter-linkages between different air pollution problems**
  - Separate approaches for different air pollution problems and no regional framework for inter-linkage
- **Need to address newly emerging problems**
  - Hemispheric transport of air pollutants
  - Need to pay attention to SLCF/SLCP

3

## Objectives of the Project

- To develop a proposal on an environmental regime for comprehensive atmospheric management in East Asia, and identify major issues for consensus building on such a regime; and
- To identify major factors towards comprehensive atmospheric management strategy .

4

## A Few Research Outcomes (1)

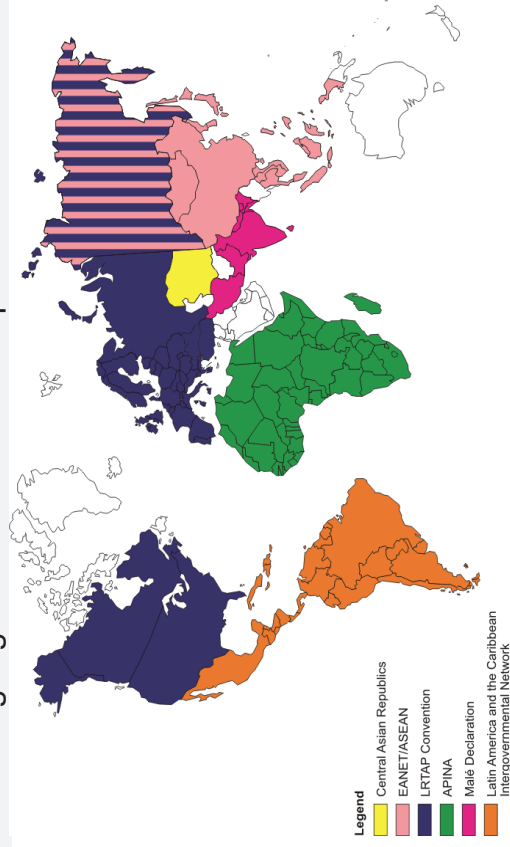
- Consensus on the need for better science-policy interface in East Asia and establishment of epistemic scientific community
- Proposal on Asia Science Panel for Air and Climate (ASPAC) and
- Ad Hoc High-Level Scientists Meeting for Air Pollution in Asia on an ad hoc basis

5

23

## Global vs Regional Initiatives

Existing regional initiatives on air pollution control



**Types:** - Binding International Treaty

- Regional Inter- governmental Agreements and Declarations
- International Research Initiatives and Programmes

7

## A Few Research Outcomes (2)

- Possible global vs regional frameworks towards better air quality/atmospheric management
- ◆ Global principles to harmonize regional initiatives
- ◆ Regional initiatives to better fit regional conditions

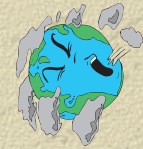
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## Objectives of this workshop

- To discuss on the proposal on a regional epistemic scientist community – Asia Science Panel for Air and Climate (ASPAC) and especially an Ad Hoc High-Level Scientists Meeting for Air Pollution in Asia as a first step towards a regional epistemic scientist community; and
- To discuss views and comments on possible regional framework for better air quality/atmospheric management.

8

# Enhancing International Cooperation on Air Pollution in East Asia by Strengthening the Scientific Epistemic Community



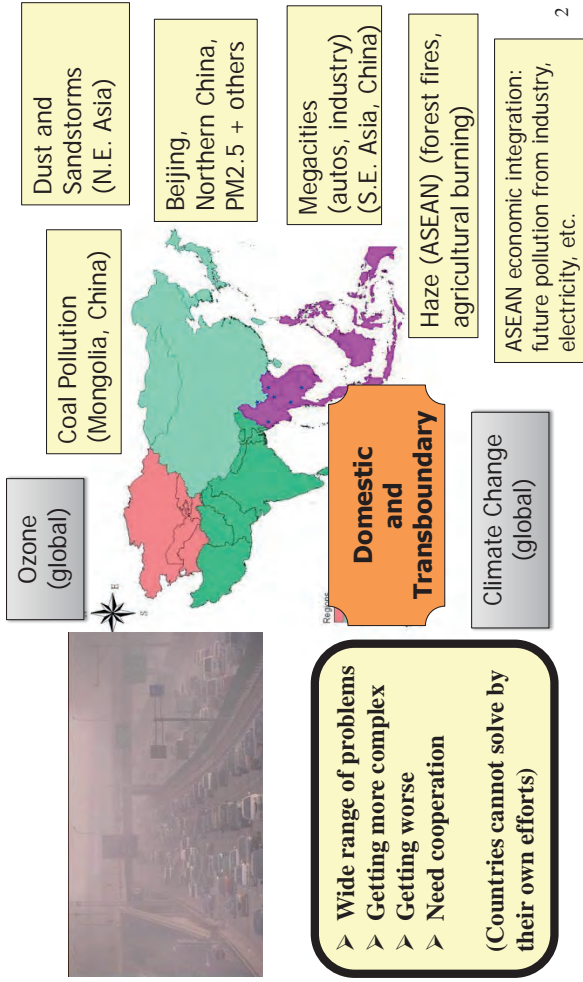
Mark Elder, IGES

March 7-8, 2014

International Workshop on Strengthening the International Cooperation Framework and Science-Policy Interface to Promote Air Pollution Control in East Asia 2014  
Yokohama, Japan



## Major Air Pollution Problems in East Asia



## Comparison of Selected Existing Cooperation Frameworks on Air Pollution in East Asia

Framework/Secretariat	Focus/Functions	Focus/Pollutants	Observations/Challenges
EANET/ UNEP/RRCAAP	<ul style="list-style-type: none"> <li>Monitoring</li> <li>Research</li> <li>Cap. Bldg.</li> </ul>	<ul style="list-style-type: none"> <li>Acid Rain</li> </ul>	<ul style="list-style-type: none"> <li>Difficult to expand the scope of activities, monitoring</li> </ul>
ASEAN Haze/ ASEAN Secretariat	<ul style="list-style-type: none"> <li>Information sharing</li> <li>Capacity building</li> </ul>	<ul style="list-style-type: none"> <li>Haze</li> </ul>	<ul style="list-style-type: none"> <li>Legally binding treaty</li> <li>Not ratified by all members</li> <li>Narrow focus</li> </ul>
NEASPEC / ESCAP-SRO (Incheon)	<ul style="list-style-type: none"> <li>Capacity building</li> <li>Research</li> <li>Policy Development</li> </ul>	<ul style="list-style-type: none"> <li>SO2 (China &amp; Mongolia)</li> <li>Coal power plants</li> </ul>	<ul style="list-style-type: none"> <li>Limited scope of activities</li> <li>Limited capacity</li> </ul>
TEMIM (China, Japan Korea)	<ul style="list-style-type: none"> <li>Dust &amp; sandstorms (DSS)</li> <li>Some joint research</li> </ul>	<ul style="list-style-type: none"> <li>DSS</li> <li>Ozone</li> </ul>	<ul style="list-style-type: none"> <li>Focus on air pollution not extensive except for DSS</li> </ul>
LTP/ NIER-Korea	<ul style="list-style-type: none"> <li>Monitoring</li> <li>Modeling</li> <li>Emission inventories</li> </ul>	<ul style="list-style-type: none"> <li>SO2, NOX, PM10/2.5, O3, etc.</li> </ul>	<ul style="list-style-type: none"> <li>Is a research project</li> <li>Wider scope of research</li> <li>Only 3 countries</li> </ul>
CAA	<ul style="list-style-type: none"> <li>Knowledge provision</li> <li>Promote policy &amp; action</li> <li>Facilitate communication</li> </ul>	<ul style="list-style-type: none"> <li>Comprehensive air pollution</li> <li>Air/climate</li> </ul>	<ul style="list-style-type: none"> <li>Multistakeholder partnership, not intergovernmental</li> </ul>
CCAC	<ul style="list-style-type: none"> <li>Knowledge sharing</li> <li>Awareness raising</li> <li>Capacity building</li> </ul>	<ul style="list-style-type: none"> <li>SLCP</li> </ul>	<ul style="list-style-type: none"> <li>Multistakeholder</li> <li>Limited E.A. membership</li> </ul>

## Problems with Several Existing Frameworks

- Overall: too cautious, lacking in ambition, voluntary
- Duplication & overlap, extra cost
- Insufficient scope: Need more
  - Types of pollutants
  - Emphasis on mitigation
- Linkage between air pollution & climate change
- Insufficient funding
- Inadequate Science-Policy Interface

## Overall: Limited Effectiveness

- Clarification:
- This is not a systematic evaluation
  - Existing networks have important activities and achievements
  - But, air pollution problems are not solved, need to move to the next steps.

# Problem Identification

- Epistemic Community & experts;**
- Network of scientists & experts;
  - Some shared understandings
  - Not governmental
  - May try to influence policy

**Underdeveloped epistemic community**

**Inadequate science-policy interface**

**Governments do not well understand the science (& some scientific uncertainty)**

**Basic Problem: Low priority of international cooperation on air pollution**

- Sci-Policy Interface**
- Mechanism/process/institutionalized
  - Link between science & policy
  - Provide knowledge & information

## Regional air pollution science-policy interface institutionalization

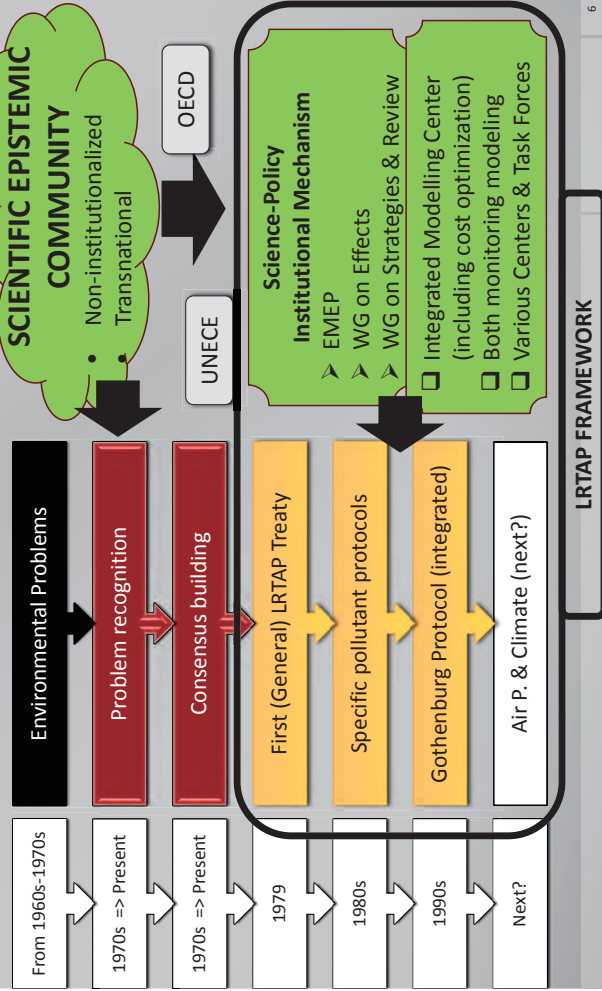
Framework	Characteristics
EANET	<ul style="list-style-type: none"> <li>• Intergovernmental recognition</li> <li>• Network center</li> <li>• Scientific Advisory Committee</li> <li>• Conducting Assessment Report</li> </ul>
LTP	<ul style="list-style-type: none"> <li>• Joint research project, not international institution</li> <li>• Government officials attend meetings</li> </ul>
TEMM	<ul style="list-style-type: none"> <li>• Ozone workshop – government funded but activities suspended</li> <li>• Air pollution policy dialogue (March 2014) will include experts</li> </ul>
CCAC	<ul style="list-style-type: none"> <li>• Government-led multistakeholder partnership (incl. NGOs, experts, etc.)</li> <li>• Scientific advisory panel</li> <li>• Actual projects</li> </ul>
CAA	<ul style="list-style-type: none"> <li>• Multistakeholder partnership</li> <li>• Governments participate</li> </ul>

**Some progress, but significant limitations:**

- Inconsistent government attendance delays decisions
- Results are limited
- Openness of data is a problem
- Governments decide based on political not scientific considerations

➤ **No mutual scientific understanding or consensus**

## European Trajectory towards LRTAP



## Overall observations on current science-policy interface in East Asia

➤ **An epistemic community on air pollution emerging, but not well-developed**

Positive Trends	Limitations
<ul style="list-style-type: none"> <li>• Expanding personal networks linking scientists in different countries</li> <li>• Increasing international/regional scientific conferences</li> </ul>	<ul style="list-style-type: none"> <li>• Progress is gradual</li> </ul>
<ul style="list-style-type: none"> <li>• Some networks with governmental participation</li> <li>• CCAC has more well developed science-policy interface</li> </ul>	<ul style="list-style-type: none"> <li>• Participation by different countries is variable, only a few countries represented sometimes</li> <li>• Sometimes research is obstructed instead of promoted</li> <li>• Limited Asian country membership</li> </ul>

■ A science panel may survey existing knowledge

■ Still, new knowledge and advanced research is still needed

➤ **How can the development of the epistemic community be accelerated?**



## Possible Trajectory of Development of Epistemic Community & Science Policy Interface

### Epistemic Community

#### STAGE 1

- Transnational
- Not directly linked to governments
- Not linked to specific cooperation frameworks



#### STAGE 2

- Linked to specific cooperation frameworks
- Institutionalization

### Possible Modalities

- International conferences
- Linkages between national academic societies and science bodies
- Joint (multinational) research projects

### Science-Policy Interface

#### Issues

- Which cooperation framework?
- Functions? (New research, assessment, etc.)
- Structure? (Network Center, advisory committee, etc.)
- Nature of connection to governments

## Strengthening the Science Policy Interface for Air Pollution Issues in Asia

More scientific capacity building

More research & cooperative research

Stronger regional epistemic community

Common understanding of air pollution problems

Institutional framework to provide scientific advice to policymakers

Making progress (conferences, joint research), but more needed. (e.g. IUAPPA 2016)

Key issue in East Asia

➢ Which of these aspects to focus on?

10

## Options for Functions/Scope of an International Cooperation Framework

### Desirable Functions

- Monitoring
- Modelling
- Assessment
- Research
- Capacity Building
- Emissions Reduction/Mitigation

More difficult

### Scope of Pollutants - Options

- Multi-pollutant (more comprehensive)
- Climate/air
- SLCP
- Expandable

Connection to CCAC? New framework for each new pollutant or issue?

Need similar considerations for Science-Policy Interface

### Geographic Scope

- Global/regional/ subregional?
- NE Asia & SE Asia – together or separate?

➢ One or several frameworks?

➢ Allocation of functions among frameworks

12

## Science-Policy Interface Linkage with International Cooperation Frameworks

- ✦ Many existing air pollution cooperation frameworks
- ✦ Many functions are needed
  - Monitoring, modeling, integrated assessment, capacity building, etc.
- ✦ Maybe difficult to include all functions in one framework/organization
- ✦ Maybe good to coordinate role sharing among existing frameworks/ organizations
- ✦ Consideration of LRTAP example
  - Many Centers, WGs, etc. which are geographically dispersed
  - Integrated Assessment Center to integrate all of the components – needs to be perceived as neutral

➢ How can the epistemic community & science policy interface be integrated into the system of international cooperation frameworks?

11

# Possible Options for Strengthening the International Cooperation Framework

OPTIONS	DISCUSSION
Global Convention on Atmosphere	<ul style="list-style-type: none"> <li>Comprehensive</li> <li>Legally binding – enforcement power</li> <li>Need coordination with existing initiatives</li> <li>Long time to negotiate</li> </ul>
Global standards to link to regional/sub-regional initiatives	<ul style="list-style-type: none"> <li>Voluntary/non-legally binding</li> <li>Harmonization of regional initiatives</li> <li>Easier to agree</li> </ul>
Strengthening of existing regional/sub-regional initiatives	<ul style="list-style-type: none"> <li>Limited past achievement</li> <li>Does not solve overlapping/duplication</li> </ul>
Merge existing regional/sub-regional initiatives or create a new alternative initiative (e.g. NEA or EA LRTAP).	<ul style="list-style-type: none"> <li>New mechanism or reform of existing initiative(s)</li> <li>Better chance to address present challenges</li> <li>May reduce overlapping/duplication</li> <li>Not easy to negotiate</li> </ul>

# Some Considerations for ASPAC

Aspects	Comments
Functions/Objectives	Synthesis/Assessment, new science, capacity building
Geographic Scope	Broader (Asia, East Asia), narrower (NEA)?
Institutional Structure	Science panel? Network center?
Linkage (or not) to Governments	How to link or communicate?
Linkage (or not) to Existing International Frameworks?	Which framework?
How to create?	Who will decide?
Membership	Criteria? Who selects?
Governance	How decisions are made? Procedures?
Funding	Who funds?
Secretariat	Competing candidates

# What is ASPAC?

The aim is to synthesize scientific knowledge on air pollution in the Asian region to reach a common understanding among scientists and policy makers, and to develop an international initiative for an integrated approach to air pollution and climate change reflecting the views of Asian scientists.

Original idea focuses on synthesis, similar to IPCC for climate change.

There are also other needs regarding the science-policy interface in East Asia.

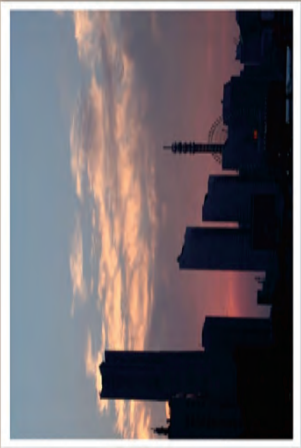
– Should these other functions be included in ASPAC or separate?

# Now is good timing: Positive trends for cooperation

Aspect	Converging Trends
Perceptions of severity	Growing convergence, esp. NEA
Prioritization of air pollution	<ul style="list-style-type: none"> <li>Increasing prioritization in general</li> <li>Some convergence on priority pollutants (PM2.5), emerging interest in ozone.</li> <li>Less interest in CCAC in East Asia</li> </ul>
Strengthening domestic policies	China, Japan, Korea
Recognition of transboundary aspects	<ul style="list-style-type: none"> <li>Chinese government funding transboundary research</li> <li>China's domestic policies address domestic regional transboundary air pollution</li> </ul>
International cooperation frameworks	Overall greater (modest) proactive stance by several countries
Scientific epistemic community	Gradual expansion of international cooperation

## Challenges

- Different views on how to strengthen the science policy interface
- Differences in how to strengthen cooperation frameworks
- Variety of similar initiatives & frameworks
- Some differences in interest in focus areas



**Thank You !**

**Mark Elder, IGES**  
[elder@iges.or.jp](mailto:elder@iges.or.jp) [www.iges.or.jp](http://www.iges.or.jp)

Acknowledgments: This research was supported by the Environment Research and Technology Development Fund (S-7-3) of the Ministry of the Environment, Japan.



## For Better Air Quality in Asia

Proposal of Asia Science Panel for Air and Climate (ASPAC)  
- Plan for Ad Hoc High-level Scientists Meeting  
on Air Pollution and Climate in Asia -

Hajime Akimoto and Katsunori Suzuki  
Japanese Research Team on Atmospheric Management  
in the Project S-7-3

1

## S-7-3 Project

### International Framework for Atmospheric Management in East Asia

Importance and Needs for Science-Policy Interface

Importance of Establishment of Epistemic Scientific Community

Proposal of Asia Science Panel for Air and Climate (ASPAC)  
[Initially: Asia Science Panel for Air Quality (ASPAQ) ]

## New Situation of Atmospheric Environmental Issues around MOEJ in the Last one Year

Serious air pollution by “haze” came up to political issue in China.

Serious public concern on PM<sub>2.5</sub> in Japan including trans-boundary transport.

Prime Minister requested to MOEJ for strengthening of cooperation on Asian air pollution measures.

MOEJ decided “Better Air Quality in Asia Plan” which includes:

1. Policy dialog on air pollution under TEMM
2. Technological support making use of local governments and private industries
3. **Promotion of multilateral discussion through UNEP (Including ASPAC)**
4. Promotion of specific measures on country and city levels through CAA

## Proposal

**Asia Science Panel for Air and Climate (ASPAC) (tentative name)**

The aim is to synthesize scientific knowledge on air pollution in the Asian region to reach a common understanding among scientists and policy makers, and to develop an international initiative for an integrated approach to air pollution and climate change reflecting the views of Asian scientists.

## Background of the Proposal

However, the situation in Asia is different from Europe and North America.

### In Europe and North America : CLRTAP

Regional cooperation on air pollution mitigation based on scientific knowledge has been well developed

**In Asia: No framework for scientific discussion on air pollution to be reflected into policy makers.**

Our project identified that:

- Scientific epistemic community on air pollution is necessary to be established for the discussion of international atmospheric management in Asia.
- It is very important to input the views of Asian scientists to those of European and North American, since their understandings and views on Asian situation might be different from Asians.

5

30

## Possible Contents of ASPAC (1)

### (i) What should be the major functions of ASPAC?

- ASPAC may review newly emerging scientific findings on air pollution for consensus building among scientists. The scope may include:
  - Atmospheric science
  - Impact assessment
  - Clean air technology and mitigation measures
- Whether the focus of activities should be mainly on review of existing research, or whether the focus should be broader including:
  - Research collaboration
  - Capacity building of atmospheric scientists

6

## Possible Contents of ASPAQ (2)

### (ii) What should be the geographical scope?

East Asia and South Asia?

### (iii) How ASPAC members should be selected?

National nomination, selection by a scientific selection committee or both?

### (iv) How should be the organizational structure and link?

UNEP, Joint Forum, ABC-Asia, EANET, Male declaration etc

### (v) What would be possible funding sources?

Voluntary contributions by countries and/or other bodies, e.g. Asian Development Bank etc.?

7

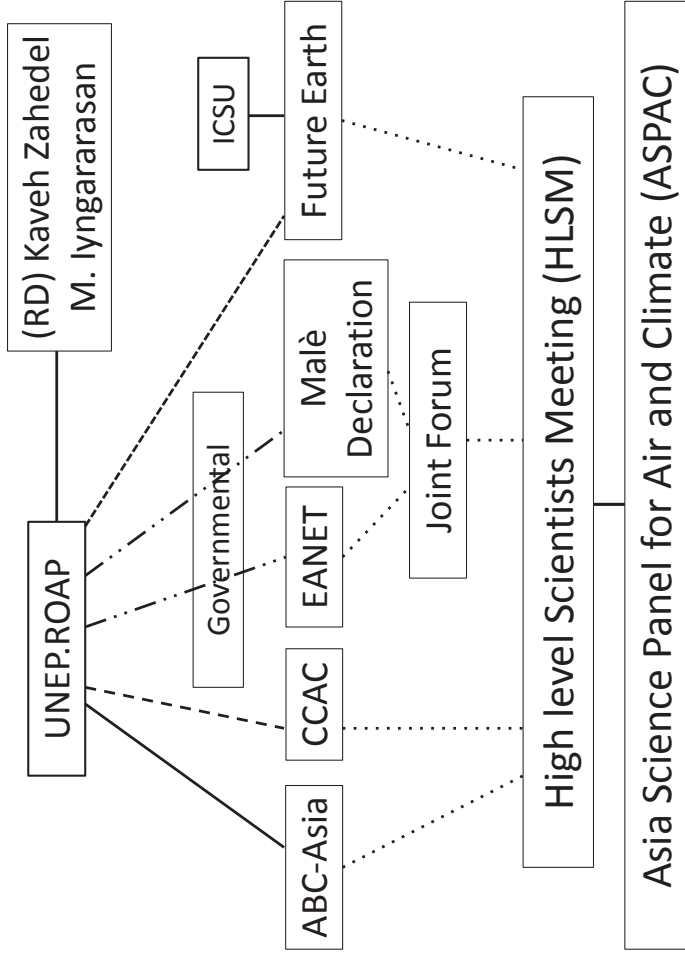
## Proposal as an Immediate Initiative Ad Hoc High-Level Scientists Meeting

An ad hoc high-level scientists meeting for air pollution in Asia is planned for the purpose of discussing importance of Asian air pollution in a global perspective, and the best way of synthesizing scientific views on relevant issues and of conveying them to policy makers inside and outside the region, It will hopefully to propose ASPAC.

The participants of the high-level science meeting may consist of eminent scientists of the highest level in this field in East Asia as well as some from outside regions. Policy makers and other scientists in Asia will be invited as observers.

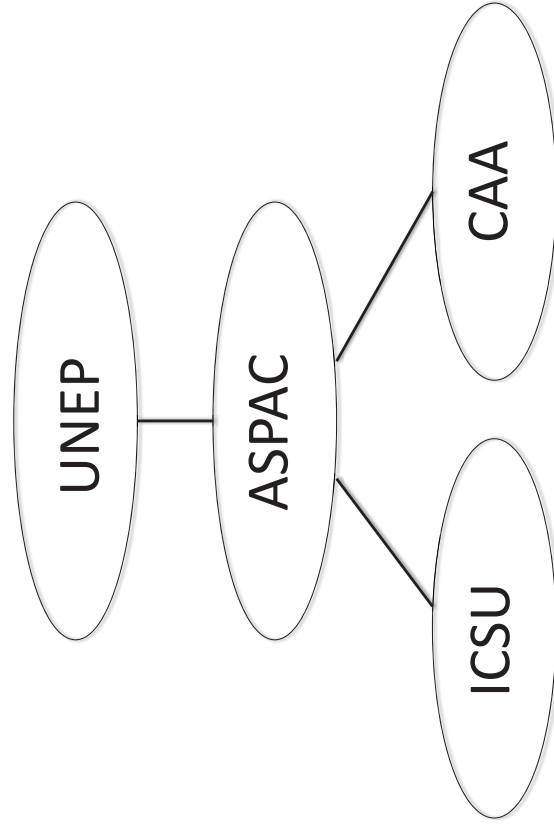
Discussion is underway with **UNEP/ROAP**.

8



## Candidates of HLSM Members

Yuan Tee Lee	1986 Nobel Prize Laureate in Chemistry, Academia Sinica President of ICSU (International Council of Science Union)
Jiming Hao	School of Environment, Tsinghua University, Academician, The Chinese Academy of Engineering
Xiaoyan Tang	College of Environmental Science and Engineering, Peking University Academician, The Chinese Academy of Engineering
Shaw C. Liu	Research Center for Environmental Changes, Academia Sinica, Taiwan Academician, Academia Sinica
Young-Joon Kim	Gwangju Institute of Science and Technology (GIST), President
Soon-Chang Yoon	School of Earth and Environmental Sciences, Seoul National University
Hajime Akimoto	Asia Center for Air Pollution Research, Director General
Teruyuki Nakajima	Atmospheric and Ocean Research Institute, The University of Tokyo Vice Director
Ibrahim Rehman	Social Transformation Division, Director The Energy and Resources Institute, TERI
J. Srinivasan	Divecha Center for Climate Change, Chairman Indian Institute of Science, Bangalore
Marcus Amann	International Institute for Applied System Analysis (IIASA), Program Leader
Greg Carmichael	Iowa State University, Associate Dean, Professor



*Thank you  
for your attention!*

## Changing situation and needs for improvement

- Overall air pollution is increasing in East Asia
- Transboundary movement is becoming more important
- Need to address multiple issues simultaneously
  - Local air pollution
  - Transboundary aspects
  - Linkage with climate change
- Need to reduce costs of control measures (e.g. through co-benefits)
- Need to strengthen capacity building
- Need to strengthen the links between science and policy
- Greater emphasis on reduction/mitigation measures

2

## Options on possible regional framework for better air quality/atmospheric management

Katsunori Suzuki  
Kanazawa University

## Overview of global/regional initiatives

### Regional/sub-regional

- Sub-regional initiatives in Asia and Africa, and regional initiatives in Latin America and Caribbean have been successful.
- **Asian Co-benefits Partnership (ACP)** and **Clean Air Initiative (CAI)-Asia** have been playing important roles for promotion of better air quality management in Asia.

### Global

- To effectively promote air quality management, some global mechanisms for e.g., information sharing and funding, especially for SLCPs, may be needed to support regional efforts.
- Global Atmospheric Pollution (GAP) Forum as well as UNEP has been playing an important role for global information sharing.

3

## Past Efforts to Strengthen International Cooperation in Northeast and Southeast Asia

- **Focused on strengthening each framework individually**
  - Different countries had different priorities or reservations
  - Results limited: small changes, no significant expansion of scope, no focus on reduction measures
    - EANET: New Instrument
    - NEASPEC: New review study
    - LTP: Currently discussing new stage
- **Possibility to merge some frameworks**
  - Differences in geographic scope and focus
  - Administrative differences and complexity

- A common interest among countries to strengthen international cooperation is emerging
- But there are different views on what is the best way

4

## Global/Hemispheric Level Options

### RATIONALE

- Many pollutants are now global or hemispheric: Ozone, Aerosols, GHG,
- Desirability of linking & coordinating regional frameworks
- Global scope addresses trade competitiveness concerns of mitigation measures more comprehensively

OPTIONS	COMMENTS
Global Convention on Atmosphere (Vancouver Declaration 2010, IUAPPA)	<ul style="list-style-type: none"> <li>• Would be comprehensive</li> <li>• Difficult to agree, long time to negotiate</li> <li>• Linkage/ division of responsibility with climate</li> <li>• Structure, focus?</li> <li>• Binding/Voluntary? Principles/Actions?</li> </ul>
Global standards to link to regional/subregional conventions/initiatives	<ul style="list-style-type: none"> <li>• Easier to agree</li> <li>• Could be weaker than a global convention</li> <li>• Would build on existing mechanisms and promote cooperation among them</li> </ul>

5

33

## Regional/ Subregional Level Options

### RATIONALE

- Regional linkage of air pollution is clearer, especially to local aspects
- Easier to reach agreement due to fewer countries

OPTIONS	ADVANTAGES/CHALLENGES/COMMENTS
1. More coordination among existing frameworks (e.g. strengthen Joint Forum)	<ul style="list-style-type: none"> <li>• Good in theory, difficult in practice</li> <li>• Does not solve overlap &amp; duplication</li> <li>• Information sharing could be main benefit</li> </ul>
2. Stronger efforts to strengthen existing frameworks	<ul style="list-style-type: none"> <li>• Seems easiest, but limited past effectiveness</li> <li>• Does not solve overlap &amp; duplication</li> <li>• Hard to increase efficiency &amp; cost effectiveness</li> </ul>
3. Merge existing frameworks	<ul style="list-style-type: none"> <li>• Better chance to reduce overlap &amp; duplication</li> <li>• Challenges: differences in functions, geographic scope, administrative procedures</li> </ul>
4. Create new framework	<ul style="list-style-type: none"> <li>• More optimal scope (more ambitious)</li> <li>• How to relate to existing frameworks</li> <li>• Cost sharing? Secretariat?</li> </ul>

6

## Existing Selected Cooperation Frameworks and Science-Policy Interface

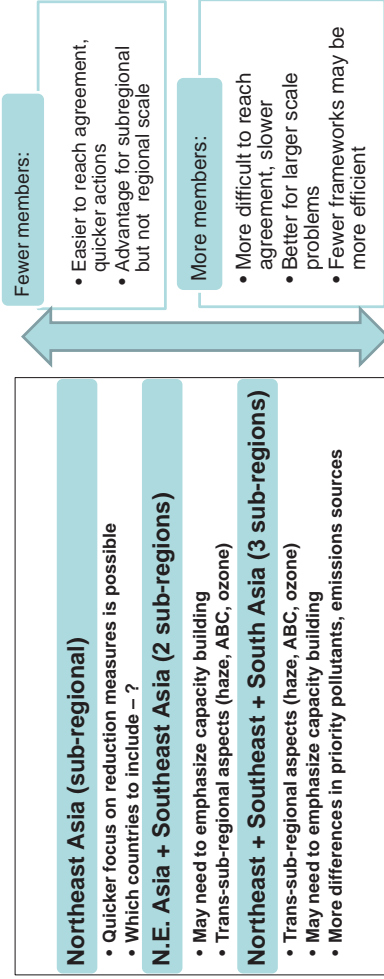
### PROBLEMS WITH EXISTING SCIENCE POLICY INTERFACE

- (Different interfaces have different problems)
- Sometimes difficult for scientists (especially from different countries) to reach a common understanding
- Governments sometimes restrict the scope of scientific activity and advice; determine which scientists will advise
- Advice is not always relevant to governments or communicated effectively
- Interface is sometimes not adequately institutionalized
- Governments often do not take scientific advice (due to different priorities, or inadequate understanding)

8

## Discussion of Geographic Scope

- Regional / sub-regional focus more realistic in short/ medium term
- Advantages & disadvantages of regional/sub-regional focus



- Asian participation in global air pollution frameworks should be strengthened (e.g. GAPF, HTAP, etc.)

7

## Requirements for possible new regional framework

- to promote more comprehensive atmospheric management covering various air pollutants as well as greenhouse gases;
- to adopt multi-pollutants, multi-effect approach to consider inter-linkages between different pollutants from both air and climate viewpoints;
- To use integrated approach from monitoring, emission inventories, modeling and policy measures;
- To promote cooperation/coordination on policy measures.

34

9

## Summary and conclusions

- At global/ regional levels, there are various regional/sub-regional initiatives.
- There are emerging needs for better air quality management, such as significant air pollution problems in/beyond one country, hemispheric transport of AP, better linkage with climate change especially on SLCPPs.
- To meet emerging challenges, a more effective framework is needed for Asia. Such a framework might be either global or regional.
- Possible options for functions, modalities etc. of such a framework has been identified. They should be further discussed and elaborated among relevant stakeholders.
- Regional dialogue on this topic should be promoted through an appropriate forum, for instance, the Joint Forum on the Atmospheric Environment in Asia and the Pacific.

11

## Possible major components of a framework

Key components	Possible options
Modality	Legally binding/non-legally binding/political agreement
Geographical scope	Asia/East Asia/sub-regions such as Northeast Asia
Target gases/substances	air pollutants linking with climate/air pollutants/specific species such as SO <sub>2</sub> , NO <sub>x</sub> , O <sub>3</sub> , PM etc.
Science panel	Functions, selection criteria etc.
Monitoring	what species?
Emission inventory	what species?
Modeling	one model/several models
Assessment/research	how to prescribe in the instrument
Mitigation strategies/measures	how to prescribe in the instrument
Capacity building	What cooperation/supporting measures
Funding	International funding/burden sharing among countries

10

## LRTAP: Organizational structure and science-policy interface for regional/global co-operation

Kevin Hicks (SEI, University of York, UK) and Richard Mills (IUAPPA)

International Workshop on Strengthening the International Cooperation Framework and Science-Policy Interface to Promote Air Pollution Control in East Asia 2014, March 7-8<sup>th</sup>, 2014



STOCKHOLM ENVIRONMENT INSTITUTE

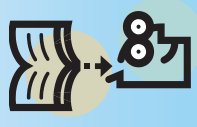
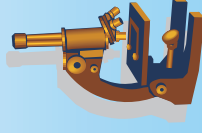


GLOBAL ATMOSPHERIC POLLUTION FORUM



## Outline of Presentation

- LRTAP: Organizational structure and science-policy interface
- Why was LRTAP successful?
- Prospects for regional /global frameworks
- Key messages



## Essential Ingredients for LRTAP Convention

### 1. Violation of a principle

The ultimate reason for initiating negotiations can be found in the notion of emitters/polluters on the one hand and receivers/victims on the other and the political tensions caused. For LRTAP the USSR and its allies supported the Nordic countries against EEC countries.

“States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental policies and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction”. (Declaration of the United Nations Conference on the Human Environment, Stockholm 1972, Chapter 11).

*At the time few countries believed in long-range transport of air pollution and acid rain*



## Essential Ingredients for LRTAP Convention

### 2. Monitoring - ‘who does what to whom’

**1977** a European-wide monitoring programme for transboundary air pollution set-up, the Co-operative Programme for Monitoring and Evaluation of Long-range Transmission of Air Pollutants in Europe (EMEP)

**1979** LRTAP Convention signed (34 countries) but not binding commitments for reducing emissions ...states that countries shall ‘endeavour to limit and, as far as possible, gradually reduce and prevent air pollution, including long-range transboundary air pollution’ ...and that in order to achieve this they shall ‘use the best available technology that is economically feasible’

**1983** Convention ratified (24 countries) and entered into force

**1984** EMEP Protocol – parties to Convention took over financial responsibility for EMEP

**1988** EMEP Protocol Ratification.



## Essential Ingredients for LRTAP Convention

### 3. Knowledge Generation

Parties develop policies and strategies to combat the discharge of air pollutants through exchanges of information, consultation, research and monitoring.

The Parties meet annually at sessions of the Executive Body to review ongoing work and plan future activities including a workplan for the coming year.

The three main subsidiary bodies - the **Working Group on Effects**, the **Steering Body to EMEP** and the **Working Group on Strategies and Review** - as well as the **Convention's Implementation Committee**, report to the Executive Body each year.



5

## Essential Ingredients for LRTAP Convention

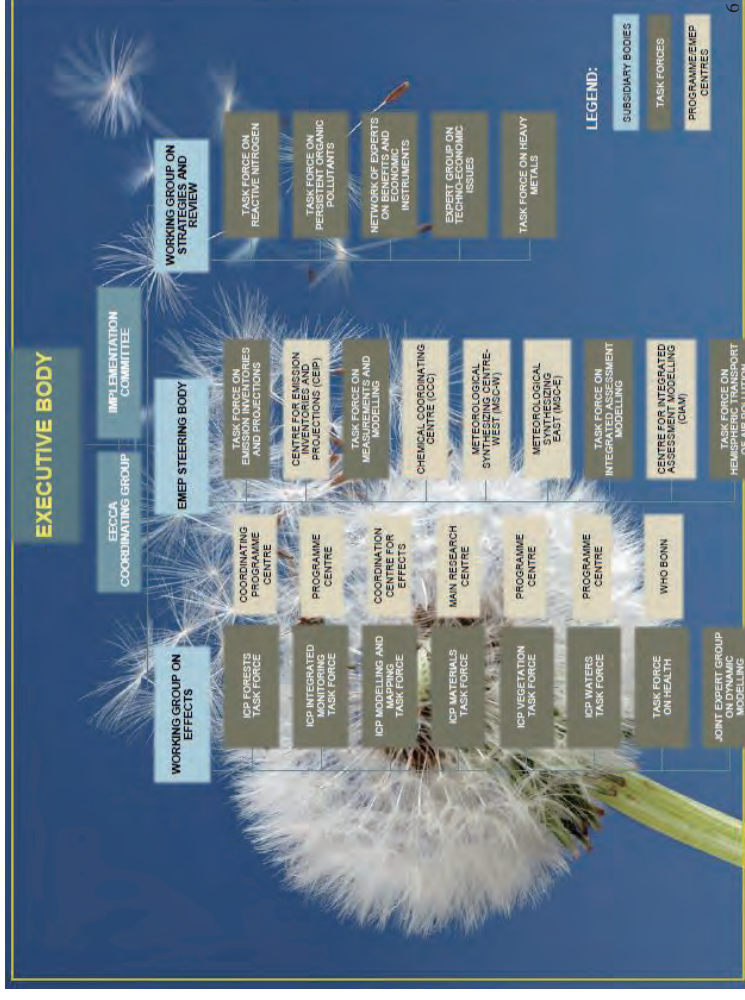
### 4. Common principles

The Executive Body to the Convention as well as the EU have basically adopted common grounds and common science for action:

- Effects-orientation
- Reliable monitoring
- Transboundary concerns
- Modelling of atmospheric transport
- Cost-effectiveness analysis and optimizations
- Legally-binding commitments - **differentiated responsibilities** and commitments, based on integrated assessment modelling, critical loads and levels and regional cost-effectiveness
- Implementation and compliance
- Transparency and reporting
- Follow-up and assistance to countries in non-compliance
- Burden-sharing
- Responsiveness to emerging challenges
- Close links between science and policy
- Participation of NGOs (public interest groups and industry)
- Innovative information strategies



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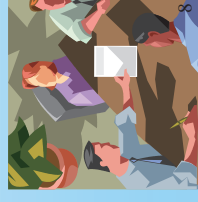


36

## Is it worth the effort?

Most international environmental agreements, including the protocols under the LRTAP convention, are relatively weak but there are still some good reasons for keeping up and even increasing international activities:

- Even seemingly weak demands mean that some action is taken, including by the worse performers;
- Preparation for negotiation generates large amounts of relevant information involving from national experts who are often used as advisors by their national governments
- Knowledge generated on emissions, deposition, effects and abatement measures is valuable in itself but can also feed into raising public awareness and opinion both nationally and internationally
- Negotiations and signing of agreement by high level politicians usually attracts media attention helping to raise the profile. This in turn generates further public awareness and knowledge.



8



## Current International Co-operation Processes for Air Pollution – and their Limitations

- **Global** – treaties on Stratospheric Ozone, POPs and Mercury
- **Hemispheric** – only scientific assessments - HTAP
- **Regional** – various networks, varying for and effectiveness

### Key issues:

- No international mechanisms for most harmful pollutants – Ozone and Particulates (particularly Black Carbon)
- Links between Climate and Air Pollution only emerging
- SLCPs link these two factors and can be catalyst

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37

## Pathways to Better Global Co-operation on Air Pollution

**Indirect:** Globalization indirectly promoting global co-operation on air pollution through harmonisation e.g. product standards, ISO, and air and sea transport

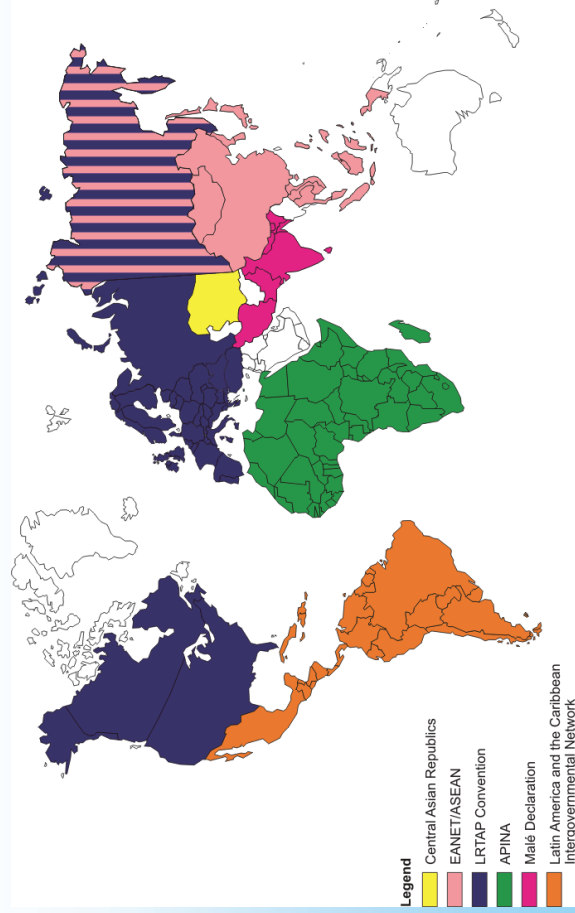
**Direct:** institutional change needed to secure environmental goals:

- new global treaty - unrealistic?
- bring within UNFCCC - unwanted and unrealistic?
- co-operation among regional networks - more realistic – but slow?

But SLCPs may now provide catalyst for faster progress?



## Regional Air Pollution Networks



11

## Varieties of Regional Network

- **Treaty-based** – single or multi-pollutant (LRTAP Convention, ASEAN Haze Agreement)
- **Science-based assessment networks** (EANET, Malé Declaration, APINA)
- **Regional Strategies/Action Plans** (Latin America)
- **Policy Declarations** (African sub-regions)

12

## LRTAP Convention – the leading model; increasing regulatory sophistication

- Basic Model – Framework Convention and Protocols - Regional initiatives in Europe have led to global action on e.g. persistent organic pollutants (POPs) and on mercury
- Increasing complexity
  - % reductions
  - BAT and BATNEEC
  - Optimized Strategies in 2<sup>nd</sup> Sulphur Protocol
  - Multi-pollutant and multi-effect approach in Gothenburg Protocol

....but low ratification rate undermines effectiveness

13

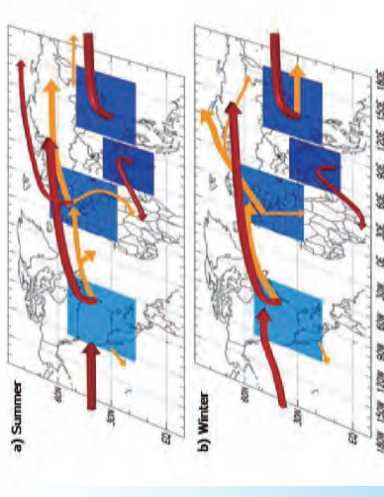
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## LRTAP Convention: New Developments

Black Carbon included in international legislation for the first time



## Task Force on Hemispheric Transport of Air Pollution (HTAP)

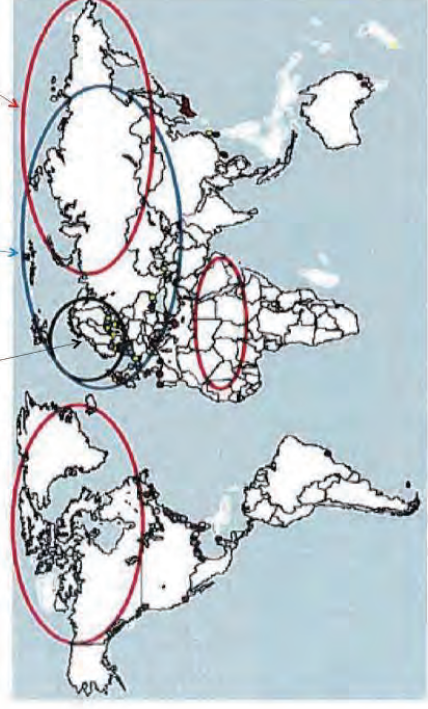


The region where the emissions occur matters

Region of radiative forcing

Source region

Region of radiative response



## CLRTAP Hemispheric Task Force on Hemispheric Transport of Air Pollution (HTAP)

In 2010, the Executive Body of the Convention renewed the mandate for TF HTAP to:

- Examine the transport of air pollution, including ozone and its precursors and particulate matter and its components (including black carbon), across the Northern Hemisphere
- Assess potential emission mitigation options available inside and outside the UNECE region
- Assess their impacts on regional and global air quality, public health, ecosystems, and near-term climate change in collaboration with other groups both inside and outside the Convention

Linkages to other initiatives such as ABC, IPCC and EU Projects important



## Lessons from Emerging Networks in Africa and Latin America

Asia in part following LRTAP approach, but Africa and Latin America following different approach.

**Key divergence** - retreat from regulation and legal certainty to more voluntary and flexible approaches

**Advantages** - reflects cultural diversity

- allows more rapid and differentiated action
- need diverse options to reflect cultural differences

**Disadvantages** - less pressure on recalibrant to progress

- weaker secretariats and processes undermine stability
- No burden-sharing

17

39

## Implications - General

- Diversity important, but can benefit from others' experience. Convergence will allow more co-operation on hemispheric/global issues
- Common model for networks needed which links voluntary and regulatory approaches; could be co-ordinated through a 'Framework Convention'; with regional implementation role on climate strategy
- **Next steps:**
  - LRTAP could initiate SSCP Strategy for northern hemisphere on non-mandatory 'alliance of willing' basis?
  - Non-treaty-based networks could develop dual regulatory-voluntary approaches?

18

## Possible Ways Forward

- Joint Forum may be right scale for Framework Agreement
  - monitoring, reporting, public access to information, shared research etc
- Regional Networks could consider scope for supplementing current plans with possibility of voluntary 'alliance of willing' initiatives cf CCAC
- Regional networks could also explore scope for taking more account of climate issues and interactions.

19

## Summary and Conclusions

- Current international co-operation processes inadequate
  - do not deal with most harmful pollutants
- Strengthening of regional networks and co-operation between them seems best way forward
- Progress slow, but catalysts could be:
  - climate/air pollution link
  - recognition of benefits from integrating regulatory and voluntary approaches
  - Recognising different roles played by different actors e.g. governments versus industry

20

## Evidence of impacts from effects based approach using critical loads and levels



See: <http://www.unece.org/env/lrtap>

22

### Summary and Conclusions (cont)

- New common model for networks needed which links voluntary and regulatory approaches; co-ordinated through a 'Framework Convention'; with a regional implementation role on climate strategy
- **Next steps:**
  - LRTAP Convention could initiate SLCP Strategy for northern hemisphere on non-mandatory 'alliance of willing' basis?
  - Non-treaty-based networks should develop dual regulatory-voluntary approaches?
- A global 'watch' could be established to review the status of the key issues for global governance of the troposphere?

21

40

## Thank You

### Acknowledgements:

**Lars Nordberg** for his long memory and sharing it with me and for some key ingredients that made LRTAP successful

**Christer Agren** – NGO Secretariat on Acid Rain, Sweden who wrote a European chapter for the background document that fed into the meeting in Asia that led to the adoption of the Malé Declaration.

23

## Enhancing Regional Cooperation for Tackling Air Pollution in Asia

### The Current State

15. March, 2013

- Air pollution caused by chemicals, such as PM<sub>2.5</sub>, PM<sub>10</sub>, photochemical oxidant, sulfur oxides and nitrogen oxides, is a common challenge among Asian countries that could damage health of their citizens.
- Further efforts are necessary for achieving substantial improvements in air quality, in addition to domestic efforts of each country and existing international cooperation.
- Japan is taking the initiative to utilize Japan's rich experience and advanced technologies and to enhance regional cooperation so that Asian countries can enjoy cleaner air.

### Basic concept of future efforts

1. Aim: To make sharing clean air in the Asian region as a common goal among countries.
2. Promote the following measures in a comprehensive manner to achieving the above goal
  - Expand and share scientific findings (including monitoring data, air pollution mechanisms, behaviours of air pollutants, and impacts on health).
  - Share Japan's experiences, build capacities of human and institutional resources, support policy-making, and utilize advanced environmental technologies.
  - Stimulate international discussion, making use of existing frameworks such as the Acid Deposition Monitoring Network in East Asia (EANET).
3. Promote regional collaboration based on achievements and progresses of these efforts as well as the status of activities in each country.
  - Holding discussions towards strengthening regional cooperation on air quality in Asia, aiming at developing common understanding among Asian countries.
  - Strengthening and facilitating various cooperation activities, including the individual measures mentioned above, through collaboration among various stakeholders (e.g. international organizations, donor agencies, national governments, local governments, businesses, research institutions).
4. Promote implementation of effective measures in each Asian country, thereby mitigating impacts of air pollution in Asia.

Comprehensive Measures on PM<sub>2.5</sub> (Policy Package)  
December 2013, Ministry of the Environment

Objective 3: To share clean air in the Asian region

### Promote regional initiatives in Asia

- A trilateral policy dialogue on air pollution involving Japan, China, and South Korea will be held in Beijing on 20 and 21 March next year to promote international cooperation for countermeasures against air pollution.

- Experts and researchers will also be involved in the policy dialogue. In addition to sharing the policies and measures put in place by each country, there are also plans to hold discussions about elucidating the PM<sub>2.5</sub> phenomenon and the direction toward future cooperation.

- Efforts are made to strengthen cooperation between research institutes and cities of the three countries through the policy dialogue.

- Promote cooperation with the United Nations Environment Program (UNEP) and Clean Air Asia (CAA).

- In cooperation with UNEP, efforts are made by experts and researchers in Japan and abroad to consolidate and enrich scientific knowledge and findings about air pollution. Furthermore, forums that involve government officers are held, government officials are provided with scientific knowledge and findings that form the basis for policy decisions, and efforts are made to share information about air pollution problems in Asia and to cooperate on a regional basis.

- In cooperation with CAA, the Guidance Framework (GF) on Urban Air Quality in Asia that is currently being drawn up will be completed next fiscal year. The aim is to utilize GF in formulating and implementing policies in the respective Asian cities. Furthermore, Governmental Meeting on Urban Air Quality in Asia, involving practitioners in air pollution measures, will be held next fiscal year as part of efforts to build the capacity to utilize GF.

- Promote cooperation with the Acid Deposition Monitoring Network in East Asia (EANET)

- Efforts are made to strengthen the monitoring network for air pollution in East Asia, and to share and manage the accuracy of data obtained through monitoring activities.



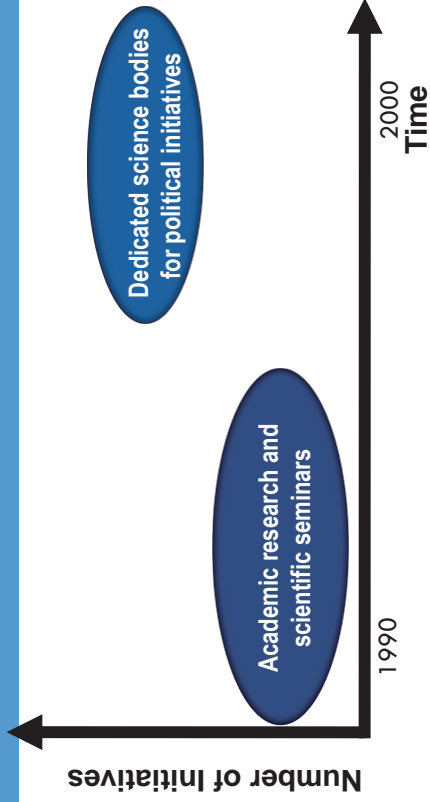
Figure: Promoting cooperation with Asian countries

# SCIENCE – POLICY INTERFACE FOR AIR POLLUTION ISSUES IN ASIA - PACIFIC

1

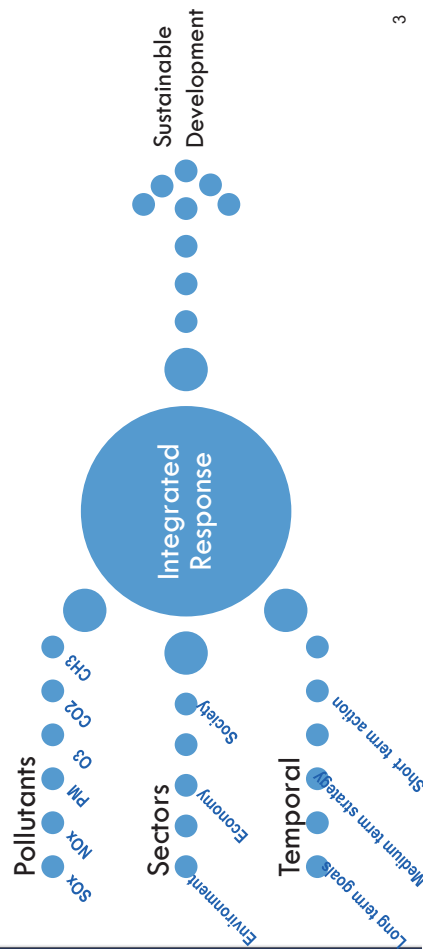


## Air Pollution in Asia: Scientific-Policy Interface



2

## Integrated Response



3



## Existing Scientific Support

Initiatives	Science Body	Monitoring, Modeling, Co-benefits (ABCs)
ABC	Science Team	Monitoring, Modeling, Co-benefits (ABCs)
ACP	Experts/Institutions*	Monitoring, Modeling, Co-benefits (ABCs)
ASEAN HA	Haze Technical Task force	Monitoring, Modeling, Co-benefits (ABCs)
CAA	Experts/Institutions*	HCFC
CCAC	Science Advisory Panel	Health Impacts
EANET	Scientific Advisory Group	Monitoring, Modeling, Co-benefits (ABCs)
EH Regional Forum	Thematic Working Groups	Monitoring, Modeling, Co-benefits (ABCs)
LTP	LTP	Health, Crop, Soil, Emission, Monitoring
MD	Regional Centers	Health, Crop, Soil, Emission, Monitoring

## One Science Body

### Asia-Pacific Science Panel

Building on existing initiatives (10-15)

Thematic expertise (monitoring, modeling, impacts, mitigation)

Geographical coverage

Gender balance

5



## Inception meeting

- In conjunction with the Joint Forum
- Terms of Reference
- One assessment

6



43

## One Assessment

### Asia-Pacific Assessment

#### Integration

Translate existing knowledge for policy makers

Contribute to the Joint Forum and other sub-regional initiatives

7



## Conclusions

- Monitoring, modeling, impacts assessment, emission inventory, mitigation

Science

Parallel

Ownership at the national and regional level

Low cost and cost effective mitigation measures

Incremental programmatic approach

Complementary

Yielding (Results based)

8



# A New Look at Role of Epistemic Communities in the Context of North East Asia



Presented at: International Workshop on Strengthening the International Cooperation Framework and Science-Policy Interface to Promote Air Pollution Control in East Asia 2014, IGES, Japan

7 March 2014

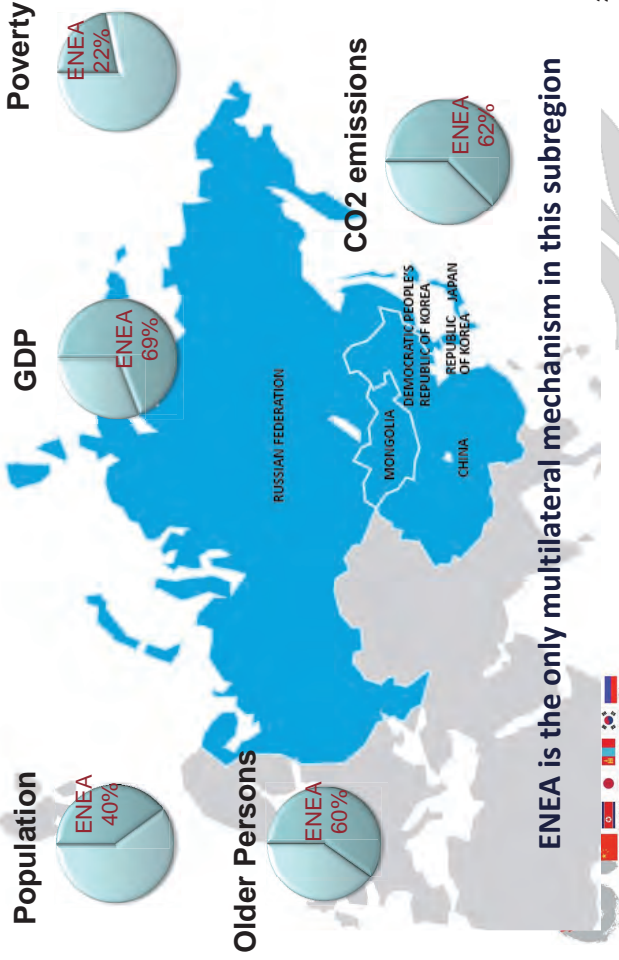
Kilaparti Ramakrishna

Director



## Reaching out to the public

## ENEA within Asia-Pacific



## Programme Areas of ESCAP-ENEA





## Improving Environmental Sustainability including NEASPEC

### Mitigating Transboundary Air Pollution (TAP)

- Carried out intergovernmental consultations and analytical activities to develop a new subregional framework on TAP

### Promoting Nature Conservation in Transboundary Areas

- Facilitated cooperation among governments and stakeholders on knowledge sharing, adoption of best practices, and joint action on nature conservation in transboundary areas

### Combating Desertification

- Catalyzed desertification prevention in Mongolia through piloting a field project, building GIS-based information system combating desertification, as well as enabling local capacity via training workshops



5

45

## Improving Environmental Sustainability including NEASPEC

### Protecting Marine Environment

- Enhanced subregional cooperation in marine protection through intergovernmental consultation and launching of the North-East Asia Marine Protected Areas Network (NEAMPAN)

### Building Eco-Efficiency Partnerships

- Promoted information sharing on low carbon city (LCC) development and launched subregional LCC platform
- Established the Asia Carbon Footprint Network (ACFN) to facilitate cooperation on improving carbon intensity of products

### Improving Energy Security and Cooperation

- Facilitated a series of subregional consultation and dialogue on energy security and cooperation



6

## Improving Environmental Sustainability including NEASPEC

### Mitigating Transboundary Air Pollution (TAP)

- Carried out intergovernmental consultations and analytical activities to develop a new subregional framework on TAP

### Promoting Nature Conservation in Transboundary Areas

- Facilitated cooperation among governments and stakeholders on knowledge sharing, adoption of best practices, and joint action on nature conservation in transboundary areas

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5

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## Mitigating Transboundary Air Pollution (TAP)

- In 2012, NEASPEC implemented a project on the “Review of existing and required capacities for addressing adverse environmental impact of transboundary air pollution in North-East Asia”.
- The project conducted a comprehensive review of existing regional and multilateral mechanisms and scientific studies on air quality monitoring and management, which include the Acid Deposition Monitoring Network in East Asia (EANET), the Joint Research Project on Long-range Transboundary Air Pollutants in North-East Asia (LTP Project), Model Inter-comparison Study in Asia (MICS-Asia) and the Convention on Long-range Transboundary Air Pollution (LRTAP).
- The project also reviewed results from national studies on environmental impacts of air pollution, national policies and the linkages between domestic measures and regional/subregional mechanisms.
- This review showed strong potential for further improvement of national and subregional capacity on air pollution issue both on technical and policy levels, and identified existing gaps and possible steps forward.



7

## Mitigating Transboundary Air Pollution (TAP)

- Develop a regional strategy addressing transboundary air pollution in North-East Asia;
- Develop a regional mechanism (framework) for cooperation that would take into account the identified gaps, building on experience and capacity of existing mechanisms;
- Address the air pollution-climate interaction while tackling short-lived climate pollutants (SLCPs);
- Implement a holistic program of transboundary air pollution regulation including control of all main pollutants, air quality monitoring and emissions data gathering, atmospheric modeling, impact assessment on health and ecosystems, and an effective emissions abatement strategy;
- Strengthen connection between research and policy, using CLRTAP and its EMEP as a model; and
- Provide a channel for open and effective exchange of knowledge and data among members.



8

## UN Secretary-General's Scientific Advisory Board to Strengthen Connection between Science and Policy

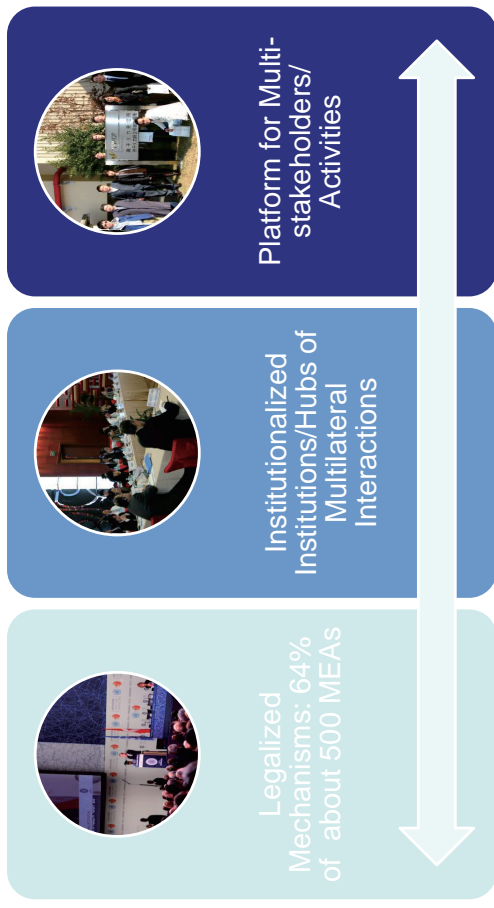
- first such body set up by the UN SG to influence and shape action by the international community to advance SD and eradicate poverty
- UNSG High Level Panel on Global Sustainability, "Resilient People, Resilient Planet – A Future Worth Choosing"(Jan 2012)
- ensure that up-to-date and rigorous science is appropriately reflected in high-level policy discussions within the UN system
- offer recommendations on priorities related to science for sustainable development that should be supported or encouraged
- provide advice on up-to-date scientific issues relevant to sustainable development
- identify knowledge gaps that could be addressed outside the UN system by either national or international research programs
- identify specific needs that could be addressed by on-going assessments (e.g., IPCC or the IPBES)
- and advise on issues related to the public visibility and understanding of science



9

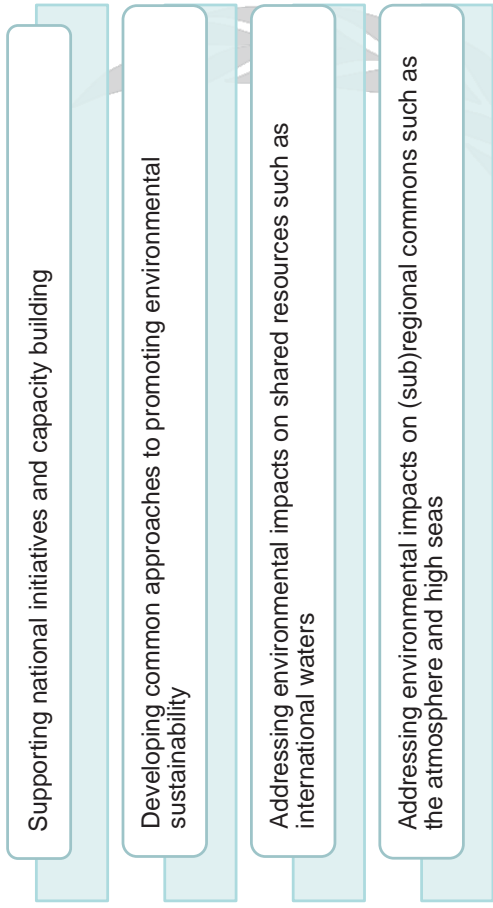
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## Roles of Regional Environmental Governance



10

## Domains of (Sub)regional Environmental Governance



12

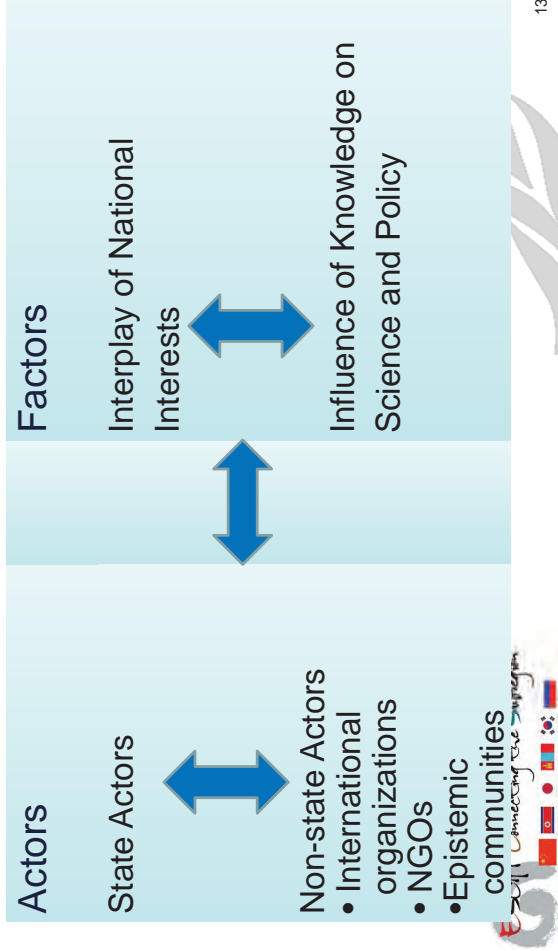
## Primary Conditions for REG

- Minimizing potential adverse impacts from "Ecological Interdependence"
- Acting as good neighbors in the condition of "Complex Interdependence"
- Mutually supplementing asymmetric conditions to comply with Global Environmental Governance



11

## Environmental Governance: Actors and Factors



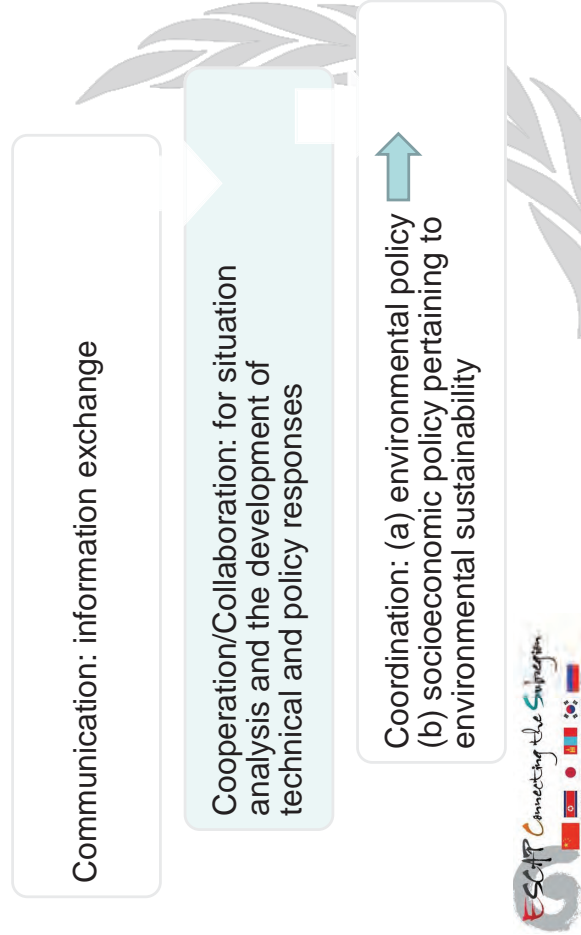
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## Environmental Governance: Actors and Factors in NEA

State Actors/ Interests	<ul style="list-style-type: none"> <li>• High intensity of heterogeneities in socioeconomic and environmental conditions</li> <li>• Lack of experiences and supporting mechanisms of multilateral cooperation</li> </ul>
Knowledge/ Epistemic Community	<ul style="list-style-type: none"> <li>• K/ EC: outcome of institutional progress rather than the trigger</li> <li>• Limited role in strengthening governance mechanisms</li> </ul>
International Organizations	<ul style="list-style-type: none"> <li>• Instrumental roles in building and operating governance mechanisms</li> <li>• Lack of external coalition partners and effective means for leadership</li> </ul>
NGOs	<ul style="list-style-type: none"> <li>• Limited interactions between formal mechanisms and NGO networks</li> </ul>

The **ESCAP Connecting the Singapore** logo is at the bottom left, and the number 14 is at the bottom right.

## Way Forward for Effective Environmental Governance





**International Workshop on Strengthening the International Cooperation Framework and Science-Policy Interface to Promote Air Pollution Control in East Asia 2014**

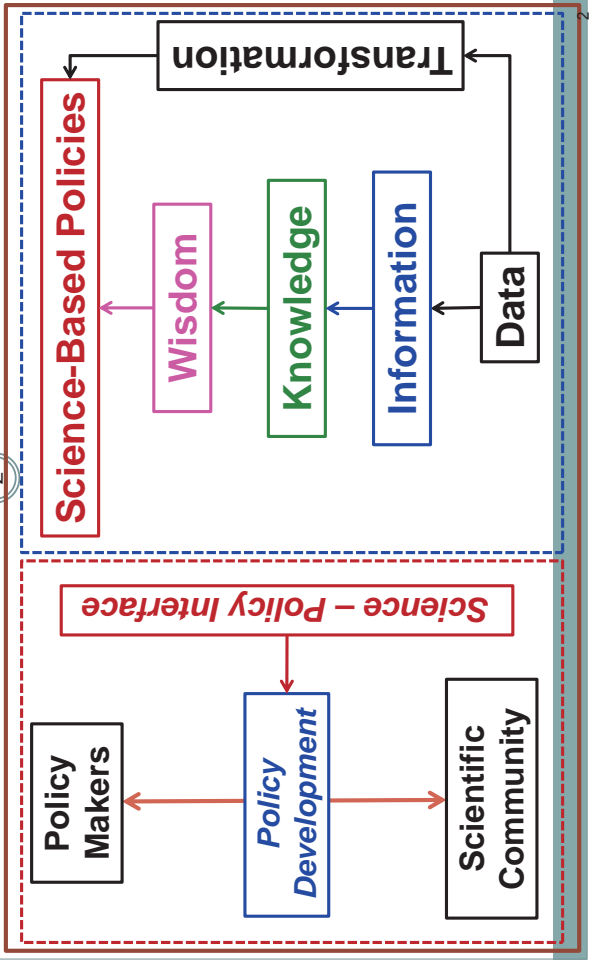
Yokohama, Japan,  
March 7 - 8, 2014

1

**Science – Policy Interface in EANET and ASEAN**  
**Dr. Supat Wangwongwatana**  
**Coordinator of the Secretariat**  
**Acid Deposition Position Monitoring Network in East Asia (EANET)**

**Why does Science – Policy Interface is needed for Policy Development?**

2



**Instrument for Strengthening the Acid Deposition Monitoring Network in East Asia (EANET)**

4

**Item 12**

**Scientific Advisory Committee**

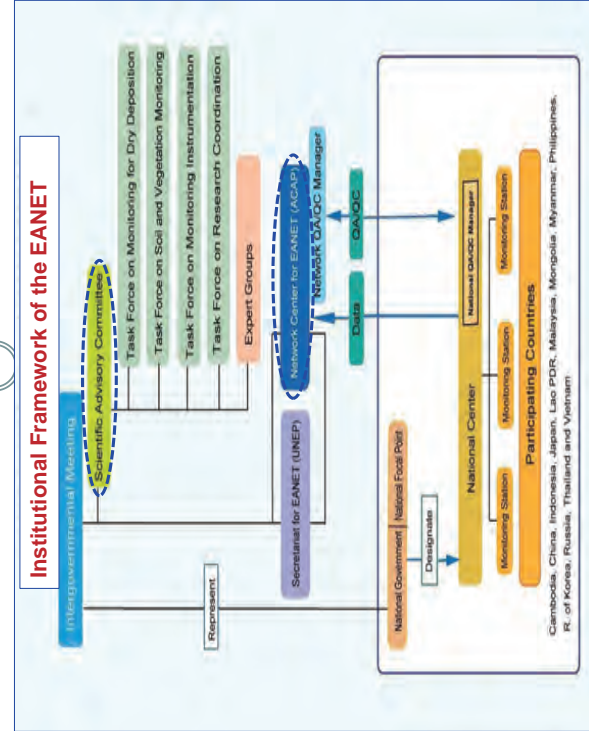
The SAC, composed of scientific and technical experts from the Participating Countries, will advise and assist the IG with various scientific and technical matters related to the EANET activities as indicated to it by the IG. These matters will include the following:

- a) scientific and technical aspects for the EANET;
- b) development and revision of the monitoring guidelines and technical manuals;
- c) matters related to the selection of monitoring sites, QA/QC programs, data reporting procedures and formats;



**Current Science-Policy Interface Mechanism in EANET**

3





## Instrument for Strengthening the Acid Deposition Monitoring Network in East Asia (EANET)

5

### Item 12

#### Scientific Advisory Committee

- d) matters related to collection, evaluation, assessment and analysis of monitoring data;
- e) preparation of periodic assessment reports on the state of acid deposition in East Asia, based on, but not limited to the data compiled by the NC;
- f) matters related to studies on acid deposition; and
- g) other scientific matters as requested by the IG.

If the Committee considers it necessary for fulfilling its objectives, experts from countries other than the Participating Countries may be invited to assist the Committee.

5



## Instrument for Strengthening the Acid Deposition Monitoring Network in East Asia (EANET)

6

### Item 13

#### Network Center

1. The NC, to handle scientific and technical matters of the EANET activities and to facilitate cooperation among the Participating Countries in a transparent manner, will carry out the following tasks under the guidance of the IG:

- a) Central compilation, evaluation, storage and analysis of monitoring data and related information;
- b) Preparation of data reports on acid deposition in East Asia;
- c) Dissemination of monitoring data and other relevant information;

6



## Instrument for Strengthening the Acid Deposition Monitoring Network in East Asia (EANET)

8

### Item 13

#### Network Center

- h) Provision of scientific and technical support for the IG, the SAC and other subsidiary bodies;
  - i) Promotion of capacity building and public awareness in cooperation with the Secretariat; and
  - j) Other tasks a requested by the IG.
2. The entity currently serving as the NC for EANET is designated as the NC unless otherwise decided by the IG.
  3. Other entities could be designated as Network Center for EANET by the decision of the IG, as the need arises.

8



## Instrument for Strengthening the Acid Deposition Monitoring Network in East Asia (EANET)

7

### Item 13

#### Network Center

- d) Provision of technical assistance to the Participating Countries in implementing the EANET activities;
- e) Implementation and coordination of QA/QC activities;
- f) Development and implementation of education/training programs for those engaged in the EANET activities;
- g) Implementation of research activities on acid deposition;

7



## Medium Term Plan for the EANET (2011 – 2015)

9

No.	Activities to be undertaken	Targets	Expected Outputs	Implementation period
20	Sharing a common understanding on atmospheric environment issues among the scientific community and policy makers by exchanging information through a network of experts	To support formation of an epistemic community in East Asia	Creation of a network of experts concerned with atmospheric environment issues within East Asia	2011 - 2015

9



## Strengthening Science – Policy Interface

10

- Often environmental policymakers do not understand the technical aspects of the issues they are regulating.
- Policymakers then seek expert knowledge and advice to reduce this technical uncertainty, on issues including
  - The magnitude of environmental problems,
  - Cause-and-effect interrelations of ecological processes,
  - How (science-based) policy options will play out.
- An epistemic community, a network of knowledge-based experts, will create and justify knowledge to help policymakers to define the problems they face, identify various policy solutions and assess the policy outcomes.

10



## Development of An International Epistemic Community for Transboundary Air Pollution in Asia

12

### Issues to be considered

- Governance
- Transparency
- Interdependency
- Institutional Arrangement
- Financial Arrangement :
  - Governments
  - International Organizations
  - Private Sector

12

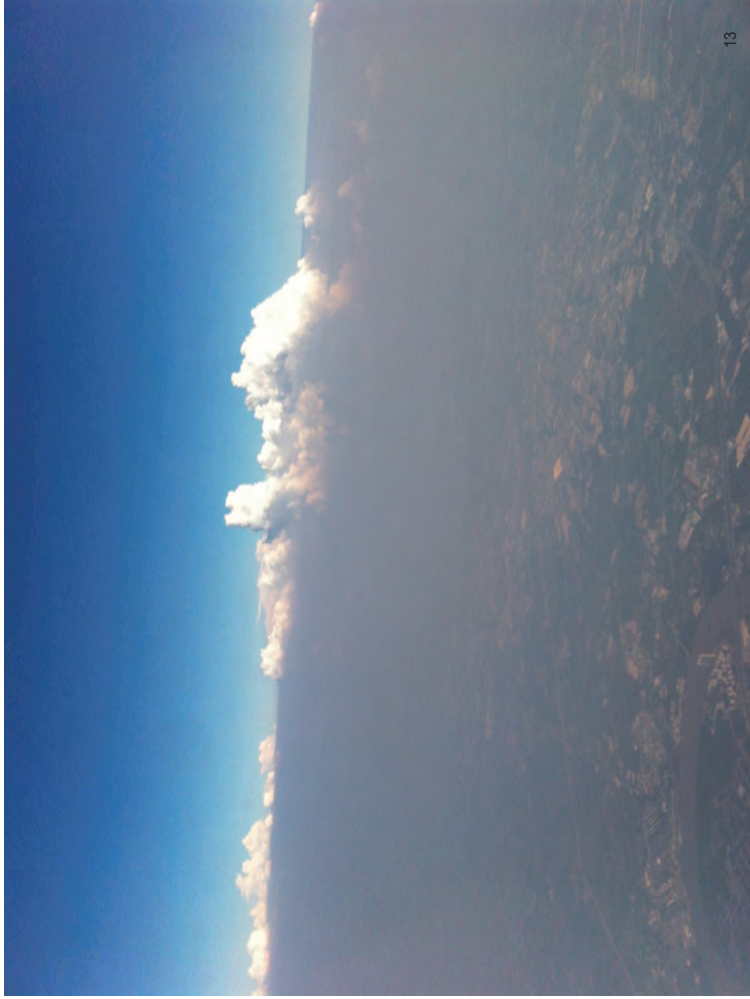


## Strengthening Science – Policy Interface

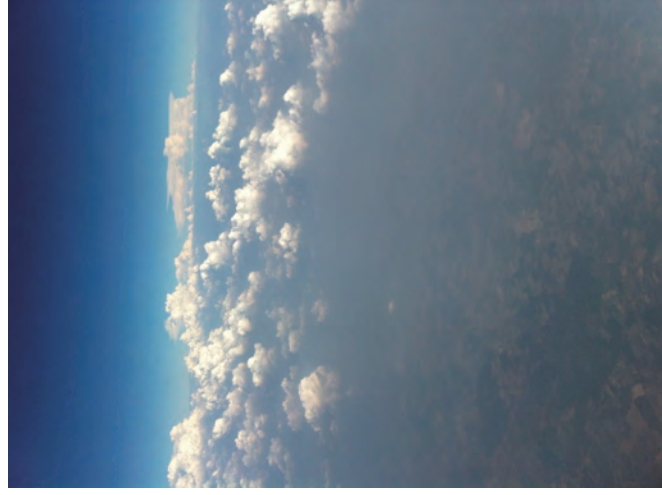
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- Transboundary environmental problems, including air pollution, require a unified response but this is mostly problematic due to differences of state interest.
- Members of an international epistemic community in a number of different countries can become connected through intergovernmental channels, producing a transnational governance network, and facilitating the promotion of international policy coordination.
- As a result, an international epistemic community will help overcome the barriers to greater international cooperation and will have a direct input on how international cooperation may develop in the long term.

11



51



14



**International Workshop on Strengthening the International  
Cooperation Framework and Science-Policy Interface to  
Promote Air Pollution Control in East Asia 2014**

Yokohama, Japan,  
March 7 - 8, 2014

15

**Thank you for your attention**

15

**LONG-RANGE TRANSBOUNDARY AIR POLLUTANTS IN NORTH EAST ASIA**  
**Pacifico Yokohama, March 7-8, 2014**

**International Workshop on Strengthening the International Cooperation Framework and Science-Policy Interface to Promote Air Pollution Control in East Asia 2014**

**Future Development of the LTP Project**

**Young Sunwoo**  
 Department of Environmental Engineering  
 Konkuk University  
 Seoul, Korea

1

**History of LTP Project**

3

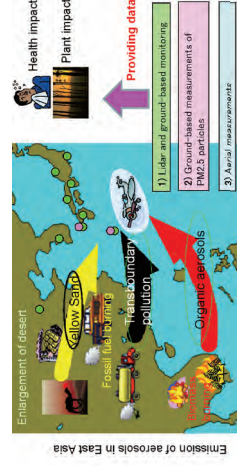
- The LTP Project is a joint research project on long-range transboundary air pollution to improve air quality in NE Asia
- Started in 2000 by S. Korea, China, and Japan and has gone through 3 stages
  - Stage 1 : 2000~2004**
    - Established foundation for joint research
    - Established database on concentrations, emissions of air pollutants and set up the modeling system
  - Stage 2 : 2005~2007**
    - Estimation of emissions by/the three countries
    - Research on particulate matter and gaseous pollutant concentration at background sites in each country
    - Research on S-R relationship for sulfur
  - Stage 3 : 2008~2012**
    - Research on impacts of NO<sub>x</sub>, O<sub>3</sub>, and PM



**Background**

2

- With accelerated economic development in East Asia, there is a rising necessity that various air pollutants need to be addressed along with Ozone and PM<sub>2.5</sub>, including Nitrogen Oxides, Volatile Organic Compounds, Heavy Metals, and Persistent Organic Pollutants
- LTP has laid out stage-wise and yearly research plans to enhance scientific understanding of trans-boundary air pollution and to build research capacity

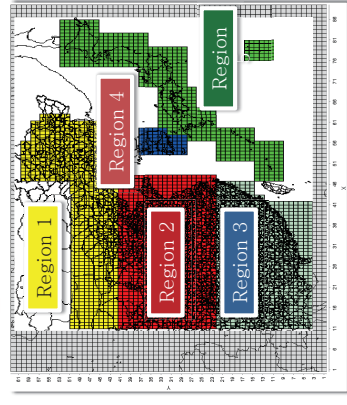


2

**Source-Receptor Studies by LTP**

4

- WRF**
  - Global data : NCEP FNL
  - Spatial resolution : 1.0° X 1.0°
  - Temporal resolution : 6h
- SMOKE**
  - INTEX-B, TRACE-P, and REAS
  - 7 species (SO<sub>2</sub>, NO<sub>x</sub>, NH<sub>3</sub>, VOCs, CO, PM<sub>10</sub>, PM<sub>2.5</sub>)
  - Natural emission: MEGAN version 2.04
  - SAPRC99 chemical mechanism
- CMAQ4.6**
  - SAPRC99 chemical mechanism
  - Aerosol Module: AERO5
- Numerical Experiment**
  - Domain: Horizontal Resolution(60km), vertical layer (23 level)
  - Period: usually one month
  - Validation: Photochemical Assessment Monitoring Stations, Intensive Monitoring Network, Aerial Monitoring

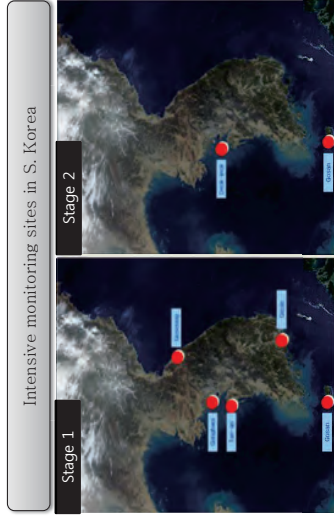


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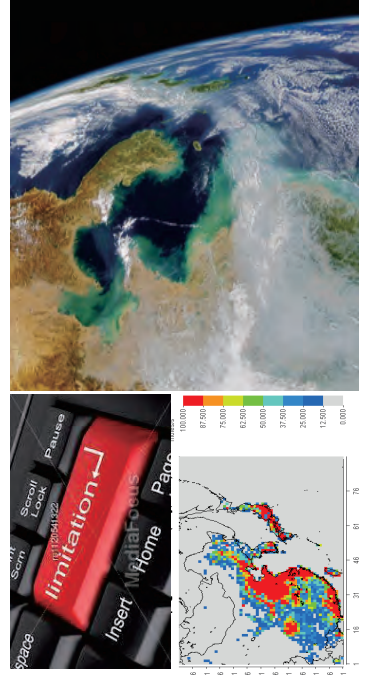
**Stages 1 and 2 (2000-2007)**

- Participated in monitoring part as P. I.
  - Intensive monitoring at background monitoring sites in S. Korea
  - Analyzed conc. of ions, metals, and ECOC for PM and various gaseous pollutants such as DMS, VOCs, etc.
  - Estimated source region and source contribution using HYSPLIT, PMF, and PSCF
- Participants in Stage 1
  - Prof. J.-P. Cheoung(Kyungsoong Univ.) for Geogjae site
  - Prof. C.-H. Kang(Jeju Nat. Univ.) for Gosan site
  - Prof. Y.D. Kim(Kwandong Univ.) for Goseong site
  - Prof. J.-H. Kim(Hanseoo Univ.) for Tae-an site
- Participants in Stage 2
  - Prof. C.-H. Kang(Jeju Nat. Univ.) for Gosan site
  - Prof. K.W. Lee(Hankuk Univ. of Foreign Studies)



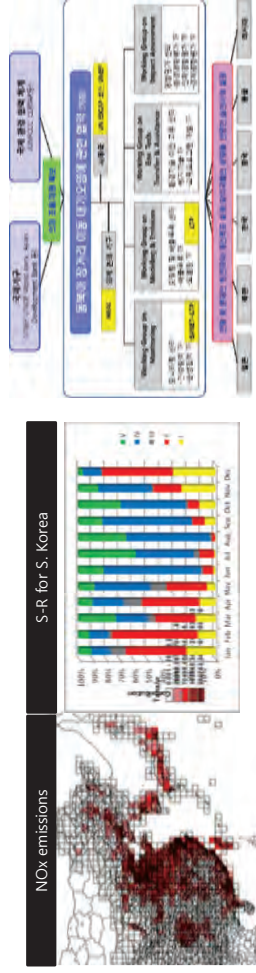
**Limitation**

- LTP's contributions to data distribution and utilization, promotion and collaboration with other networks, and miscellaneous promotional activities are rated minimal
- LTP has not adequately managed the central compilation of monitoring and modeling data and results



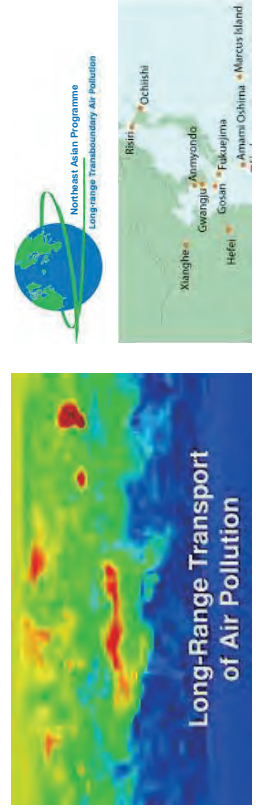
**Stage 3 (2008-2012)**

- Participated in emissions and modeling part as P. I.(2008-2010)
  - Developed emission inventory to estimate S-R relationship for total nitrate in 2006 with prof. J.-H Woo (2008)
  - Estimated S-R relationship for total nitrate in 2006 (2009-2010)
- Conducted a project to develop suggestions for future plan of LTP project and international cooperation framework as P. I.(2011-2012)
  - Reviewed current environment in NE Asia, research methods and results of the LTP project and other related studies, and major existing international and regional cooperation programs



**NEALTP**

- Stands for "NorthEast Asian program for Long-range Transboundary air Pollution"
  - new proposal
- Form of "inter-institutional agreement (program/ arrangement)"
  - legally non-binding



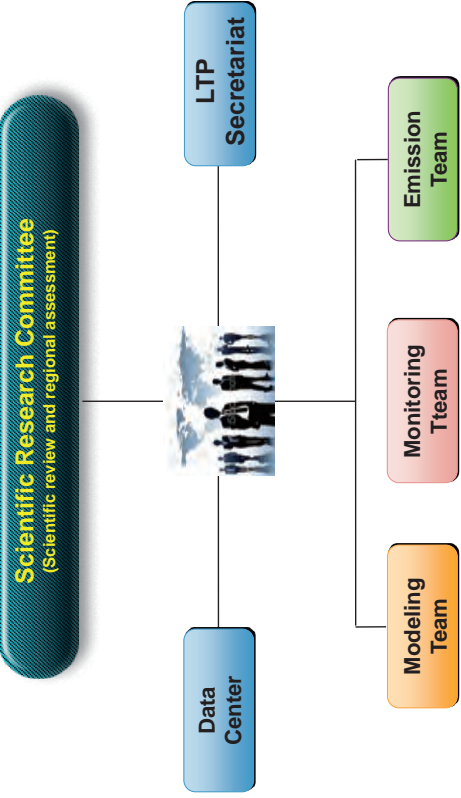
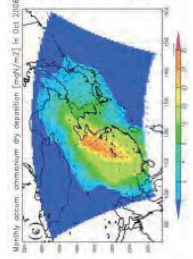
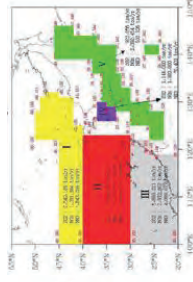
**Scope**

Research of long-range transboundary air pollutants including monitoring and modeling, emission inventories of acid rain precursors, photochemical pollutants, hazardous air pollutants, and short-lived climate forcers

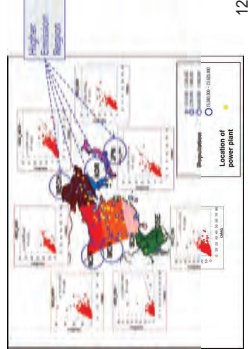
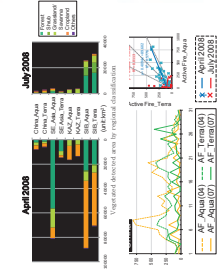
**Aim**

To provide support in developing air quality policy and strategies, through activities including research, monitoring, advisory meetings, and information exchange, to mitigate the adverse impact of air pollution in Northeast Asia.

- Monitoring and modeling of long-range transboundary air pollutants in Northeast Asia
- Sharing of monitoring data and information , especially during events of regional air pollution caused by natural or anthropogenic hazards
- Facilitating in-depth research by opening access to data obtained by NEALTP activities



- Expansion of Data Sharing through Monitoring and Modeling
- Establishment of Annual Emission Inventories
- Refinement of Estimation of Source-Receptor Relationships
- Reinforcement of Comprehensive Analysis Function



### Expansion of Data Sharing through Monitoring and Modeling

- Need to expand number of urban and suburban stations
  - From 6 stations to 12 (4 in each country)
  - Expand one each, urban and suburban stations, in addition to two background stations
- Expand items of monitoring
  - From 4 in ( $\text{SO}_2, \text{NO}_2, \text{CO}, \text{PM}_{10}$ ) to 9 categories adding  $\text{O}_3$ ,  $\text{PM}_{2.5}$ , heavy metals, VOCs, and POPs
- Increase efficiency of intensive monitoring
  - Limitation of monitoring items and period, and absence of intercomparison observations
  - Joint monitoring at one designated station
  - Maximize efficiency of monitoring period from current "ten days each in spring and fall every year" to "one month every 2-3 years"
  - Monitoring items: Gaseous species ( $\text{SO}_2$ ,  $\text{NO}_2, \text{CO}$ ,  $\text{O}_3$ , VOCs),  $\text{PM}_{10}/\text{PM}_{2.5}$ (mass concentration, ionic constituents, EC/OC, heavy metals, mercury,etc.), POPs

### Refinement of Estimation of Source-Receptor Relationships

- Currently, source-receptor relationships have been estimated for five regions of Northeast Asia centered around countries. However, effects of long-range transport vary considerably depending on the region-specific emission characteristics. It is necessary to understand the relationship between regional emissions and long-range transport by further subdividing the regions.

### Establishment of Annual Emission Inventories

- Existing emission inventories do not keep up with the trends of emission changes, which leads to limitations in analysis and interpretation of monitoring and modeling data, and thus establishment of annual emission inventories are necessary
- Statistical data provided on an annual basis by each country's research team of the LTP project could be used to estimate annual emissions, which could be utilized by the monitoring and modeling teams

### Reinforcement of Comprehensive Analysis Function

- Currently, monitoring and modeling activities are conducted and the report for these activities is prepared by each country independently, and thus an overall comprehensive analysis is generally lacking
- It is suggested to form a science advisory committee consisting of authoritative experts of the three countries and publish a comprehensive report for policymakers by integrating and analyzing reports from each country

**Thank you for your attention**





**CLIMATE AND CLEAN AIR COALITION**  
TO REDUCE SHORT-LIVED CLIMATE POLLUTANTS



## Translating the Science into Policy and Action



**“If someone proposed that you could save close to 2.5 million lives annually, cut global crop losses by around 30 million tonnes a year and curb climate change by around half a degree Celsius ... what would you do?”**

**“Act of course ...”**

Achim Steiner  
Executive Director  
United Nations Environment Programme (UNEP)



## The SLCP Challenge and Opportunity

The main SLCPs are **BC, CH4, tropospheric O3** and some **HFCs**:

- Relatively short lifetimes in the atmosphere
- Responsible for a substantial fraction of climate change
- For some detrimental impacts on health, agriculture and ecosystems

**16 measures** identified in UNEP reports for mitigating BC and CH4:

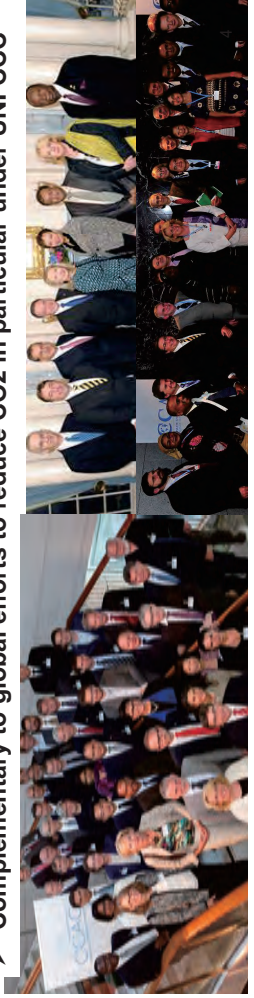
- 2.4M lives saved globally each year (outdoor air po only)
- 32M tonnes avoided losses from four major crops each year
- Reduce global warming by 0.5° C by 2050
- No technical breakthroughs required
- Half the reductions at low cost or cost-neutral
- Additional measures with additional gains from mitigating HFCs (0.1° C by 2050)

**Fast action on SLCPs can significantly increase public health, food and energy security, and reduce near-term climate change.**

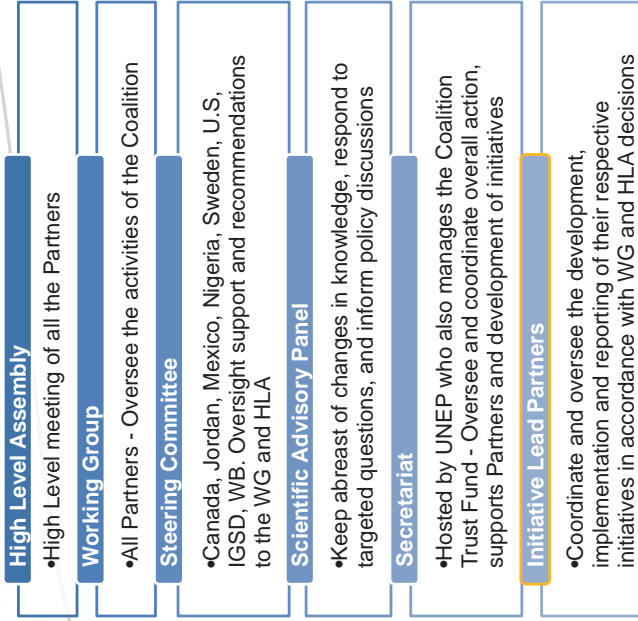


## The CCAC

- **Leverage high-level engagement and political will, and catalyze action to address SLCPs as a global and collective challenge** to protect the environment and public health, promote food and energy security, and address near term climate change
- **Voluntary, Partner-led Coalition**
  - Feb 2012 -> 6 Partners
  - Feb 2014 -> 80 Partners: 36 States, IGOs, NGOs and private sector
- **Science driven, action-oriented**
- **Building on and bringing together existing efforts**
- **Complementary to global efforts to reduce CO2 in particular under UNFCCC**



## Partner-led Effort



## High impact Initiatives



### ➤ Celebrating first success!

- About USD 50 Million pledged and over USD 15 Million already allocated to specific activities under the initiatives

## Catalyzing Action

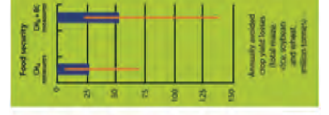
CCAC Initiatives strategic streams of work guiding collective and individual action of the CCAC Partners (not limited to activities funded by the CCAC)

- **Key criteria:** Long term goal(s), magnitude of SLCP reductions; comparative advantage of the Coalition; ability to complement, scale-up and accelerate existing efforts; and ability to catalyze new actions.
- **Partner-led:** ultimate success depends directly on engagement and capacity dedicated by Partners

## Regional Assessment of SLCPs

### NEWLY APPROVED

- **Long term goal:** Develop a scientifically robust policy-relevant integrated assessment of SLCPs for each global region
- First regional assessment for Latin America and the Caribbean (LAC) region underway with focus to provide justification and support for national SLCP planning



- **Release in 2015**

The screenshot shows the CCAC website homepage. At the top, there is a navigation menu with links for 'About', 'Short-Lived Climate Pollutants', 'Actions', 'Barriers', 'Related Efforts', 'Publications', 'News', 'Outreach', 'How to Join', and 'Login'. The main header features the CCAC logo and the URL 'www.unep.org/ccac'. Below this is a large banner image of a heavily polluted landscape with smoke rising from the ground. To the right of the banner is a text block: 'The first global effort to treat short-lived climate pollutants – such as black carbon (or soot), methane and many hydrofluorocarbons (HFCs) – as an urgent and collective challenge. The Climate and Clean Air Coalition to Reduce Short-Lived Climate Pollutants is catalyzing rapid reductions in these harmful pollutants to protect human health and the environment from the slow but steady rate of climate change within the first half of this century.' Below the banner are several content tiles: 'First Actions of the Coalition' with a photo of people working in a field; 'Outreach' with a 'BRICKS MATTER' poster; 'Short-Lived Climate Pollutants' with a cartoon illustration; and 'CCAC at COP19 in Warsaw, Poland' with a call to action to join the CCAC at COP19 in Warsaw on the 18th and 19th of November. There are also social media icons for Twitter and Facebook, and a 'News' section with a 'New Report Supports Need for Immediate Cuts in Short-Lived Climate Pollutants'.

# The ACP, CCAC, and Thoughts on Regional Cooperation: An Overview

Eric Zusman  
Area Leader  
Integrated Policies for Sustainable Societies  
IGES  
S-7 Workshop  
Photo: Reuters

## Roadmap

- The Asian Co-benefits Partnership
- The Climate and Clean Air Coalition in Asia
- Thoughts on cooperation on co-benefits with links to China

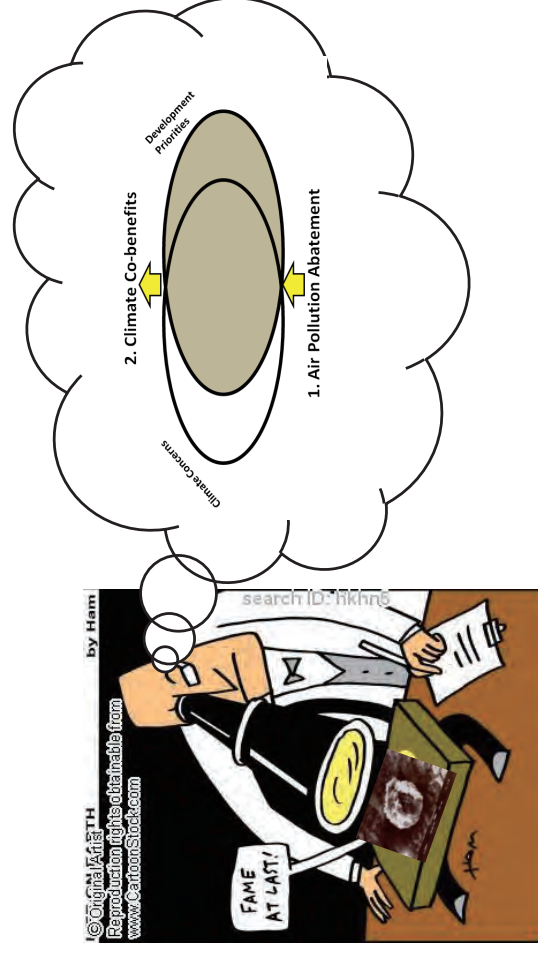
## The Asian Co-benefits Partnership

[www.cobenefit.org](http://www.cobenefit.org)

- A platform to improve information sharing and stakeholder dialogue on co-benefits in Asia.
- Goal: to support the mainstreaming of co-benefits into decision-making processes in Asia.



## The ACP Helps Bridge Different Perspectives on Co-benefits





# The ACP Disseminates Information

**Fact Sheet No.1**  
**What are Co-benefits?**

**What are Co-benefits?**

Co-benefits are the additional benefits that can be realized through the implementation of climate change mitigation measures. These benefits can be realized in a number of ways, including:

- Improved air quality, which can lead to health benefits and reduced mortality.
- Improved water quality, which can lead to health benefits and increased agricultural productivity.
- Improved energy efficiency, which can lead to cost savings and increased competitiveness.
- Improved land use, which can lead to increased food security and reduced deforestation.
- Improved infrastructure, which can lead to increased economic growth and reduced poverty.

**How can co-benefits be realized?**

Co-benefits can be realized through a number of ways, including:

- Implementing climate change mitigation measures that also address other development goals.
- Promoting policies and programs that address multiple development goals.
- Encouraging private sector investment in climate change mitigation measures that also address other development goals.
- Encouraging public sector investment in climate change mitigation measures that also address other development goals.

Source: ACP-UNEP Partnership, 2011

5

# The ACP Supports Stakeholder Dialogue



61

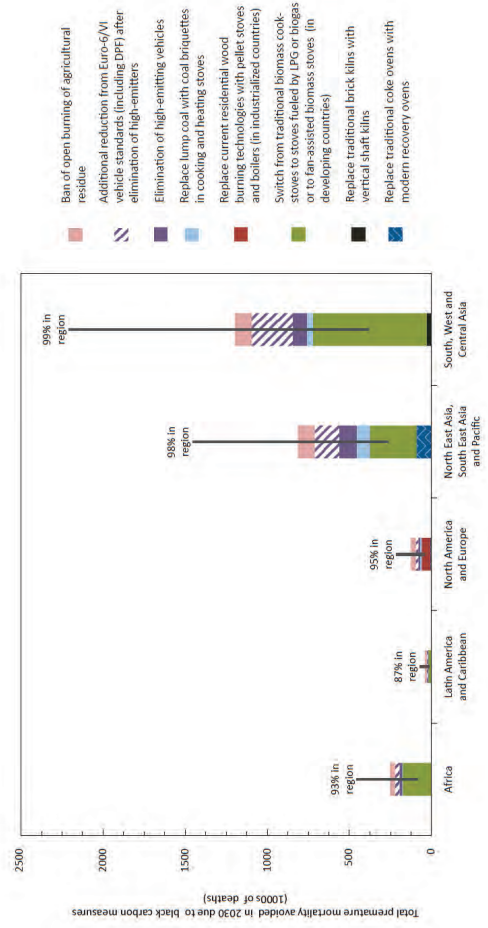


Sector based initiatives	Cross-cutting initiatives
<ol style="list-style-type: none"> <li>1. Reducing Black Carbon Emissions from Heavy-Duty Diesel Vehicles and Engines</li> <li>2. Mitigating SLCPs and Other Pollutants from Brick Production</li> <li>3. Mitigating SLCPs from Municipal Solid Waste</li> <li>4. Promoting HFC Alternative Technology and Standards</li> <li>5. Accelerating Methane and Black Carbon Reductions from Oil and Natural Gas Production</li> <li>6. Reducing SLCPs from Household Cooking and Domestic Heating</li> <li>7. Addressing SLCPs From Agriculture</li> </ol>	<ol style="list-style-type: none"> <li>8. Supporting National Planning for Action on SLCPs Initiative (SNAP)</li> <li>9. Financing Mitigation of SLCPs</li> <li>10. Regional Assessments of SLCPs</li> </ol>

Source: CCAC 2013

7

# The CCAC in Asia

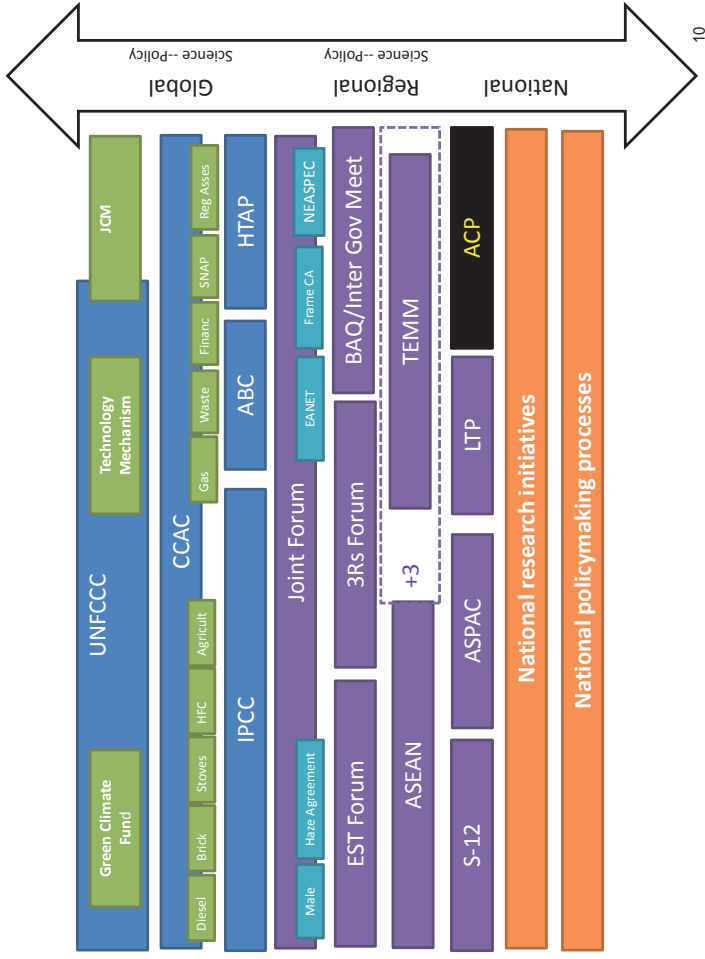


Source: UNEP 2011

8

# Next steps for SLCPs in Asia

- Subregional Consultation on SLCPs in Asia (likely Jan 2014)
- Co-benefits White Paper (March 2014)
- Regional Assessment on SLCPs in Asia (likely 2014-2015)



## Literature on Co-benefits

Table A.1. Studies estimating the co-benefits of climate change mitigation in developed countries.

Study	Geography	Sectors included	Value of co-benefits (2008\$/CO <sub>2</sub> )				Geography	Sectors included	Value of co-benefits (2008\$/CO <sub>2</sub> )							
			Midrange	High	Low	n.e.			Midrange	High	Low	n.e.				
1. Apte and Walker (1991)	US	All	68	n.e.	n.e.	China	Electric	n.e.	n.e.	n.e.	29. Vance and Samiti (1999)	China	Electric	n.e.	n.e.	n.e.
2. Apte and Walker (1991)	Germany	All	128	n.e.	n.e.	Brazil	All	n.e.	n.e.	n.e.	30. Citarelli et al. (2001)	Mexico	All	n.e.	n.e.	n.e.
3. Baccini (1992)	Norway	All	68	n.e.	n.e.	India	All	n.e.	n.e.	n.e.	31. Citarelli et al. (2001)	Mexico	All	n.e.	n.e.	n.e.
4. Baccini (1992)	UK	All	60	n.e.	n.e.	India	All	n.e.	n.e.	n.e.	32. Bassolo and O'Connor (2001)	India	All	n.e.	n.e.	n.e.
5. Baccini (1992)	Norway	All	51	60	42	China	All	n.e.	n.e.	n.e.	33. O'Connor et al. (2003)	China	All	n.e.	n.e.	n.e.
6. Baccini et al. (1993)	US	Electric	4	n.e.	n.e.	Chile	All	n.e.	n.e.	n.e.	34. Dessus and O'Connor (2003)	Chile	All	n.e.	n.e.	n.e.
7. Dornwald et al. (1993)	US	Electric	44	n.e.	n.e.	China	Electric	36	n.e.	n.e.	35. Aunan et al. (2004)	China	Electric	36	n.e.	n.e.
8. Scollard (1993)	UK	All	50	82	18	China	Electric	27	n.e.	n.e.	36. Aunan et al. (2004)	China	Electric	27	n.e.	n.e.
9. Barker (1993)	US	All	103	n.e.	n.e.	China	Electric	36	n.e.	n.e.	37. Aunan et al. (2004)	China	Electric	36	n.e.	n.e.
10. Barker (1993)	Norway	All	98	125	71	China	Electric	36	n.e.	n.e.	38. Aunan et al. (2004)	China	Electric	36	n.e.	n.e.
11. Barker (1993)	US	Electric	116	n.e.	n.e.	China	Electric	36	n.e.	n.e.	39. Aunan et al. (2004)	China	Electric	36	n.e.	n.e.
12. Vissler et al. (1994)	US	Electric	51	n.e.	n.e.	China	Electric	98	n.e.	n.e.	40. Aunan et al. (2004)	China	Electric	135	n.e.	n.e.
13. Rowe (1995)	US	All	53	n.e.	n.e.	China	Electric	135	n.e.	n.e.	41. Kim et al. (2004)	China	All	n.e.	n.e.	n.e.
14. Doherty and Barman (1995)	US	Electric	6	n.e.	n.e.	China	All	n.e.	n.e.	n.e.	42. Kim et al. (2004)	China	All	n.e.	n.e.	n.e.
15. Doherty and Barman (1995)	US	Electric	31	n.e.	n.e.	China	All	n.e.	n.e.	n.e.	43. Murgstein et al. (2004)	China	Electric	119	196	43
16. EPA (1997)	US	Electric	49	89	10	Mexico	All	n.e.	n.e.	n.e.	44. West et al. (2004)	Mexico	All	n.e.	n.e.	n.e.
17. Macmillin (1997)	US	Electric	49	89	10	Mexico	All	n.e.	n.e.	n.e.	45. McKinley et al. (2005)	Mexico	All	n.e.	n.e.	n.e.
18. Kato and Constable (2001)	Canada	All	13	n.e.	n.e.	Thailand	All	n.e.	n.e.	n.e.	46. Li (2006)	Thailand	All	n.e.	n.e.	n.e.
19. Svir et al. (2001)	EU-15	All	n.e.	n.e.	n.e.	China	Electric	119	n.e.	n.e.	47. Venetian et al. (2006)	China	Elec. & Industrial	n.e.	n.e.	n.e.
20. Han (2001)	Korea	All	80	91	69	China	Electric	119	n.e.	n.e.	48. Zhang et al. (2010)	China	All	n.e.	n.e.	n.e.
21. Svir et al. (2002)	Finland	All	n.e.	n.e.	n.e.	China	Electric	119	n.e.	n.e.						
22. Jaxa et al. (2002)	Norway	All	18	26	11	China	Electric	119	n.e.	n.e.						
23. Svir et al. (2002)	Finland	All	n.e.	n.e.	n.e.	China	Electric	119	n.e.	n.e.						
24. Barman et al. (2003)	US	Electric	17	18	15	China	Electric	119	n.e.	n.e.						
25. Han et al. (2003)	Belgium	All	n.e.	n.e.	n.e.	China	Electric	119	n.e.	n.e.						
26. Kim Yoon et al. (2006)	Europe	All	n.e.	n.e.	n.e.	China	Electric	119	n.e.	n.e.						
27. Baker et al. (2009)	Netherlands	All	n.e.	n.e.	n.e.	China	Electric	119	n.e.	n.e.						

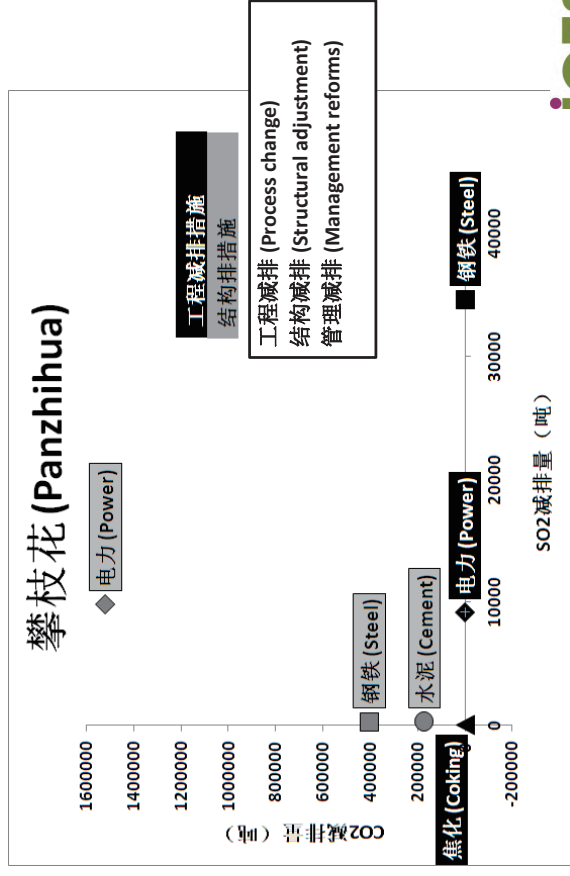
## China's Co-control Strategy

Time period	Cooperating countries	Project (Partner organization in China)	Related benefits
1999-2008	China and the United States (USEPA)	<ul style="list-style-type: none"> <li>Phase 1 Shanghai (Shanghai Research Academy of Environmental Sciences)</li> <li>Phase 2 Beijing (Qinghua University)</li> <li>Phase 3 China (National Study) (Qinghua University)</li> <li>Phase 4 Policy Impact Assessment (PRCEE)</li> </ul>	<ul style="list-style-type: none"> <li>Beijing: <ul style="list-style-type: none"> <li>• 185kt SO<sub>2</sub></li> <li>• 415 kt NO<sub>x</sub></li> <li>• 56 kt PM10</li> </ul> </li> <li>• Avoided premature deaths by PM10 concentration</li> <li>• Reduced deaths (781)</li> <li>• 1.38 billion RMB worth of health benefits</li> <li>• Estimated social benefits of PM10 cuts: 113-950 m USD in 2010, 327-2,884 m USD in 2020</li> </ul>
2002-	China	<ul style="list-style-type: none"> <li>Shijiazhuang (PRCEE)</li> <li>East West Gas Pipeline (PRCEE)</li> <li>Climate Change and China's Environment Policy Assessment (PRCEE)</li> <li>China Co-benefits Research (CAEP)</li> </ul>	
2003-2008	China and Norway (Cicero)	2003-2008 Co-benefits Workshops (PRCEE)	
2007-	China and Japan (MoE/JOECC)	Sino-Japan Co-benefit Joint Studies in Panshuihua and Xiangtan (PRCEE)	<ul style="list-style-type: none"> <li>• GHG emission reduction: 2,104,000t/yr CO<sub>2</sub></li> <li>• Pollutant emission cuts: SO<sub>2</sub> 55,800t/yr</li> </ul>

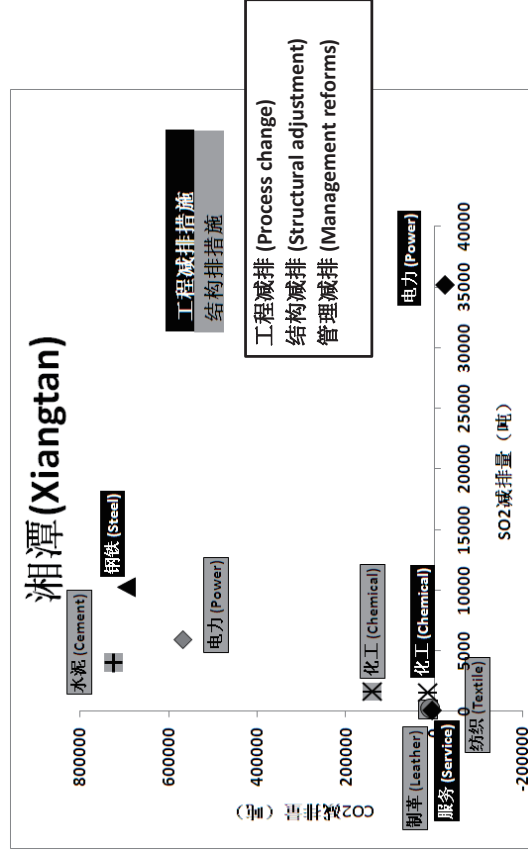
# Energy Intensity Promotion Criteria

Assessment Indicator	Points	Examination content	Scoring Standards
Energy Intensity Target	40	Reduction of Energy Consumption per 10,000 RMB of GDP	If the annual target is reached, 40 points will be allocated; if 90% of the target is reached, 36 points will be allocated; if 80% of the target is reached, 32 points will be allocated; if 70% of the target is reached, 28 points will be allocated; if 50% of the target is reached, 20 points will be allocated. If the target is exceeded, then for every 10% above target, 3 additional points will be awarded. This target takes precedence over the energy consumption targets below.
	2	The Energy Efficiency Work of Organizations and Officials	1. Establishing the region's energy intensity statistics, monitoring and evaluation system; 1 point 2. Establishing an energy-efficiency coordination mechanism, a clear division of responsibilities, and regular energy efficiency study the major issues; 1 point
	3	Allocation and Implementation of Energy Efficiency Target	1. Allocation of energy efficiency target; 1 point 2. Completion of an evaluation of progress in achieving the energy savings target; 1 point 3. Regularly publishing energy consumption indicators; 1 point
	20	Adjusting and Optimizing the Condition of the Industrial Structure	1. If the service sector accounted for an increased proportion of the region's GDP; 4 points 2. If the high tech industry accounted for an increased portion of value-added production; 4 points 3. Developing and implementing energy efficient and review procedures for fixed asset investment projects; 4 points 4. Completing the year's goal of eliminating retrograde production capacity; 8 points
Energy Savings Measures	10	Energy Savings Investment and Implementation of Key Projects	1. Establishing special funds for energy efficiency and sufficient implementation; 3 points 2. Increasing the proportion of fiscal revenue allocated for special energy efficiency funds; 4 points 3. Organizing and implementing key energy efficiency projects; 4 points
	9	The Development and Expansion of Key Enterprises and Industries	1. Including the energy efficient technologies in the annual and science technology plan; 2 points 2. Increasing the annual proportion of fiscal revenue spent on energy efficiency R & D; 3 points 3. Encouraging key enterprises to develop energy efficient products and technologies and organizing and developing mechanisms to promote energy-efficient products and technologies and energy efficient services; 3 points
	8	Managing the Energy Efficiency of Key Enterprises and Industries	1. If key energy-intensive enterprises (including the Top-1000 program) meet their annual energy intensity targets; 3 points 2. Implementing the annual energy saving monitoring plan; 1 point 3. Meeting the annual energy efficiency target rate of minimum energy efficiency in newly constructed buildings; 4 points if 80% of the target is achieved than 2 points; if less than 70% of the target is achieved then no points
	3	Implementing Laws and Regulations	1. Issuing and improving supporting regulations for the Energy Conservation Law; 1 point 2. Monitoring and enforcing the law with respect to energy efficiency; 1 point 3. Implementing standards that limit energy consumption for energy-intensive industries; 1 point
Energy Savings Measures	5	Implementation of Basic Energy Efficiency Work	1. Strengthening energy-efficiency modeling teams and institutional capacity; 1 point 2. Improving the system for energy statistics and institutional capacity building; 1 point 3. Installing energy measuring devices in accordance with the market mechanisms; 1 point 4. Carrying out energy efficiency awareness and training; 1 point 5. Implementing the energy efficiency incentive system; 1 point

# Case Studies



# Case Studies



# Key Messages

- The ACP is an informal and interactive platform that aims to facilitate stakeholder dialogue on co-benefits in Asia
- The ACP has important links to existing and ongoing initiatives that focus on different environmental media and sectors
- These links could potentially be important for the growth and development of co-benefits initiatives in Asia— including CCAC and ASPAC
- These initiatives could benefit from experiences and research on co-benefits in China

# Strengthening Science-Policy Interface for AQM

**Kaye Patdu, Glynnda Bathan**  
Clean Air Asia

International Workshop on Strengthening the International Cooperation Framework and Science-Policy Interface to Promote Air Pollution Control in East Asia

7 March 2014  
Yokohama



## Strengthening Science-Policy Interface

- Horizontal and vertical integration
  - Engaging stakeholders: urban, environment, economics, development, energy, transport, financial institutions
  - National to local
  - Academe, private sector, civil society
- Bridging gap through
  - **Capacity building:** Train-for-Clean-Air (T4CA) Regional Training – course for high-level decision makers
  - **Knowledge sharing:** Master class; Closed door sessions; Regulators roundtable
  - **Multi-stakeholder process:** Beijing Olympics example; developing Clean Air Plan for Iloilo City; tools to support countries in policy evaluation

## About Clean Air Asia



**Mission: to promote better air quality and livable cities by translating knowledge to policies and actions that reduce air pollution and greenhouse gas emissions from transport, energy and other sectors.**

Clean Air Asia was established by the Asian Development Bank, World Bank and USAID in 2001. Since 2007, Clean Air Asia consists of

- the Clean Air Asia Center as an independent NGO
- a UN recognized partnership of more than 240 organizations in Asia and worldwide
- Country Networks in China, India, Indonesia, Nepal, Pakistan, Philippines, Sri Lanka and Vietnam .



**Air Quality and Climate Change Program**



**Low Emissions Urban Development Program**



**Clean Fuels and Vehicles Program**



**Green Freight and Logistics Program**

## Capacity Building

### ASEAN – German Technical Cooperation

#### Clean Air for Smaller Cities in the ASEAN Region

- To develop clean air plans for smaller cities
- Co-benefits
  - Climate Change Mitigation
  - Better health for local citizens
  - More tourism and increased overall quality of life
- The Regional Training Approach: ‘Train for Clean Air’

[www.citiesforcleanair.org](http://www.citiesforcleanair.org)



## Capacity Building Train-for-Clean-Air (T4CA)



Top 5 Priority Courses	Target Population	Time
General AQ management for decision makers of smaller cities	Mayor, Chief Administrative Officer	1 day
Emission inventories for smaller cities	Technical officer	4 days
Air quality monitoring for smaller cities		3 days
General AQM for NGOs in smaller cities	Influencer (e.g. NGOs, Media, Civil Society)	2 days
Effective Communication for NGOs on Air Quality Management		2 days



5

## Capacity Building Train-for-Clean-Air (T4CA) 1



- **Goal:** To equip decision makers with knowledge and information on urban AQM in order to take informed decision when planning city development and measuring environmental impact of policy decisions
- **Target Population:** Decision makers in local city government and administration such as mayors/ vice-mayors and chiefs of provincial administrations; city top administration official; heads of agriculture, environmental, health, transport, energy, city planning departments

6

## Knowledge-Sharing Clean Fuels and Vehicles Forum in ASEAN Region



- Regional forum for peer-to-peer learning among ASEAN senior officials from the energy, environment and transport ministries; engaging stakeholders to support policies and programs for cleaner fuels and vehicles; and for ASEAN senior officials to gain access to knowledge from peers and resource persons

Organized by:



In partnership with:



Supported by:



## Knowledge-Sharing Clean Fuels and Vehicles Forum in ASEAN Region



- **Master Classes** facilitated by recognized experts to provide in-depth knowledge and practical experiences to ASEAN regulators.
  - Strengthening national fuel quality and vehicle emissions standards in the ASEAN region
  - Formulating fuel economy policies and standards
  - Making periodic testing and inspection for in-use vehicles work



8

## Knowledge-Sharing Clean Environment Regulators Roundtable (CERR)



- Organised by the National Environment Agency (NEA)
- 2013 CERR's theme of "Managing Pollution in Urban Cities"
- Offers government regulators an opportunity to learn from each other's experiences, exchange environmental regulatory case studies and use their collective wisdom to draw learning points and develop solutions to tackle pollution issues (*'closed door sessions'*)
- Regulators discussed challenges in monitoring industrial and vehicular emissions, water pollution, noise pollution and enforcing regulations to ensure environmental standards are complied with
- Some of the case studies shared at the CERR included:
  - Australia's case study on Brooklyn Industrial Precinct Strategy, which is a successful project targeted to address the significant environmental impact on residents.
  - Singapore's case study on the NEA telemetric stack monitoring system, where in-stack monitors are installed to transmit real-time emission readings to NEA.
  - Singapore's Project Neptune, which allows real-time continuous monitoring of coastal water quality.
  - Thailand's case study on air quality management, in particular, regulating vehicular emissions.
  - Vietnam's case study on the achievements and challenges pertaining to air pollution management.

9

## Multi-Stakeholder Process Iloilo City, Philippines



- Iloilo City: one of the two Philippine cities selected for pilot implementation of the Clean Air for Smaller Cities in ASEAN Region Project which aims to support emerging cities in developing science-based clean air action plans
- Air Quality Research Consortium: Central Philippine University, University of the Philippines – Visayas, University of San Agustin
- Jumpstart longer-term collaboration between the city and academic institutions through conduct of technical studies and researches which can serve as basis for legislative measures or policy reforms in the area of air quality management
- Clean Air Plan implementation – formation of task forces to identify action points from different city agencies, etc.



<http://cleanairinitiative.org/portal/node/7442>

11

## Multi-Stakeholder Process Beijing Olympics

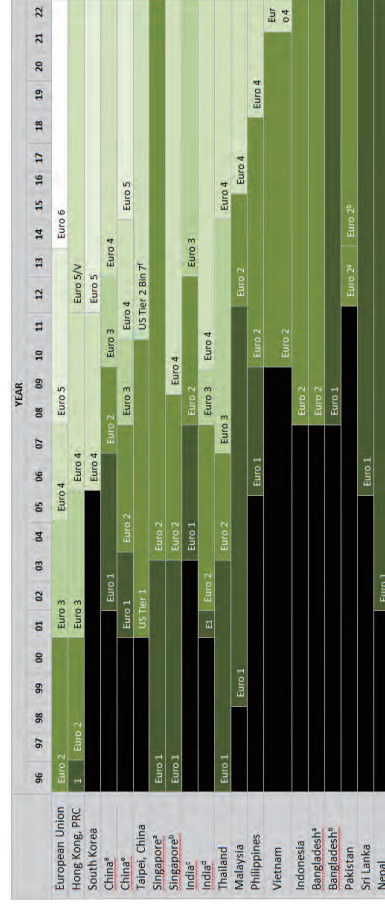


- MEP and BJ municipal government jointly developed "Air Quality Guarantee Plan for the 29th Olympics in Beijing."
- *Research Group*: twenty experts and the Meteorological Institute to compile the research and identify measures
- *Leadership Group*: headed by Vice Minister of MEP and Vice Governors of the Hebei Province and the five surrounding provinces. This was supported by key Advisors from Tsinghua University and Peking University.
- *Evaluation Committee*: monitored progress in the implementation of AQM plans. Representatives from the China Academy of Sciences, the China Research Academy of Environmental Sciences and the Meteorological Bureau sat on this committee.
- First Coordination Meeting: Advisors presented the underlying science and research of air pollution, and allowed the Leadership Group to ask questions to ensure that they would have sufficient understanding of the reasons behind the selection and planning of measures, and thus gain support for their implementation.
- AQM plan for Hebei Province was prepared first by the Research Group and the Beijing Environmental Protection Bureau. This served as an example for other provinces to do the same.
- Second Coordination Meeting: Plans were discussed and it was decided which provinces needed to do more. A third and fourth meeting followed and then an agreement was reached on the plans for all six provinces

[http://cleanairinitiative.org/portal/sites/default/files/documents/10\\_The\\_Story\\_of\\_Blue\\_Skies\\_at\\_the\\_Beijing\\_Olympics\\_Factsheet\\_17\\_Aug\\_2010.pdf](http://cleanairinitiative.org/portal/sites/default/files/documents/10_The_Story_of_Blue_Skies_at_the_Beijing_Olympics_Factsheet_17_Aug_2010.pdf)

10

## Improving Fuel Quality and Vehicle Emission Standards



Notes:

\*The level of adoption vary by country but most are based on the Euro emission standards  
 Italics – under discussion; a – gasoline; b – Diesel; c – Entire country; d – Delhi, Mumbai, Kolkata, Chennai, Hyderabad, Bangalore, Lucknow, Kanpur, Agra, Surat, Ahmedabad, Pune and Sholapur; Other cities in India are in Euro 2; e – Beijing [Euro 1 (Jan 1999); Euro 2 (Aug 2002); Euro 3 (2005); Euro 4 (1 Mar 2008)]; Euro 5 (2012)]; Shanghai [Euro 1 (2000); Euro 2 (Mar 2003); Euro 3 (2007); Euro 4 (2010)] and Guangzhou [Euro 1 (Jan 2000); Euro 2 (Jul 2004); Euro 3 (Sep-Oct 2006); Euro 4 (2010)]; f – Equivalent to Euro 4 emissions standards

Source: Clean Air Asia. February 2013. Emission standards for new light-duty vehicles

12

## Improving Fuel Quality and Vehicle Emission Standards



- 2003: Dialogue for Cleaner Fuels and Vehicles in Asia with support from ADB - led to Singapore Statement supported by 12 major international and local oil companies
- 2008: Roadmap for Cleaner Fuels and Vehicles in Asia - provides decision makers with information on how to clean up fuels in Asia by developing their own road maps. Discusses interaction between fuels and vehicle technologies and approaches that Asian refineries can take to produce cleaner fuels, with recommended next steps (introduction scenarios).
  - Uniform introduction across country
  - Prioritized introduction in selected cities
  - Harmonized standards across Asia

13



## Participants of the Oil Dialogue

- The dialogue brings together, for the first time, the 12 major regional and national oil companies Bangkok Petroleum Public Company, BP, Chevron Texaco, ExxonMobil, Indian Oil Corporation, Pakistan State Oil, Petron Corporation, PTT Public Company Ltd., Shell, Showa Shell Sekiyu K.K., Singapore Petroleum Company and Thai Oil Company Ltd.
- TWG (Shell, Petron Corp., Indian Oil Corp., ExxonMobil?)
- Membership to be expanded to other major oil companies in the region as the dialogue proceeds
- Auto Industry joined in the dialogue process

15

## Road Map Process



- Kick-off meeting July 2003 in Singapore which resulted in the adoption of the "Singapore Statement"  
(see <http://cleanairinitiative.org/portal/node/2975>)
- Expert team worked on report (a) Impact of Fuels on Vehicles and Engines, (b) Production of Clean Fuels, (c) Pricing, Taxation and Incentives for Clean Fuels
- Consultation workshop on first draft report in May 2006
- Supplemental analysis on Enhancing Octane in Gasoline 2007
- Second Consultation draft posted online in December 2007
- Active support from Health Effects Institute, Shell and US-EPA

14



## Improving Fuel Quality and Vehicle Emission Standards

- Guided by this regional roadmap, working with national governments to push for national policy roadmap to improve emission standards for new and in-use vehicles and improve fuel quality
  - Agreed timeline: introducing Euro 4 compliant fuel and vehicles by 2016 in the Philippines, and for Vietnam in 2016 for fuels and 2017 for light duty vehicles, emphasizing sulfur reductions
- Regional dialogues in ASEAN to promote harmonization of policies and standards for fuel quality and vehicle emissions.

16



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**Clean Air Asia Country Networks**  
 China • India • Indonesia • Nepal • Pakistan • Philippines • Sri Lanka • Vietnam

<p><b>Clean Air Asia Center Members</b></p> <ul style="list-style-type: none"> <li>• Asia Clean Fuels Association</li> <li>• Corning</li> <li>• Shell</li> </ul>	<p><b>240 Clean Air Asia Partnership Members</b></p> <ul style="list-style-type: none"> <li>• Cities</li> <li>• Environment ministries and government agencies</li> <li>• Development agencies and foundations</li> <li>• Non-government organizations</li> <li>• Academic and research institutions</li> <li>• Private sector companies and association</li> </ul>	<p><b>Donors in 2012 to 2013</b></p> <p>Asian Development Bank • Cities Development Initiative for Asia • ClimateWorks Foundation • DHL/IREX/UPS • Energy Foundation • Fredskorpset Norway • Fu Tak Iam Foundation • German International Cooperation (GIZ) • Institute for Global Environmental Strategies (IGES) • Institute for Transport Policy Studies • Institute for Transportation and Development Policy • International Union for Conservation of Nature • L'Agence Française de Développement (AFD) • MAHA • Philipinas Shell • Rockefeller Brothers Fund • Shakti Foundation • Shell Foundation • United Nations Environment Program Partnership for Clean Fuels and Vehicles (UNEP PCFV) • USAID CEnergy • Veolia • World Bank</p>
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# SPRINTARS global aerosol forecasting system and introduction of S-I2 project

**Toshihiko Takemura**

Research Institute for Applied Mechanics, Kyushu University, Japan

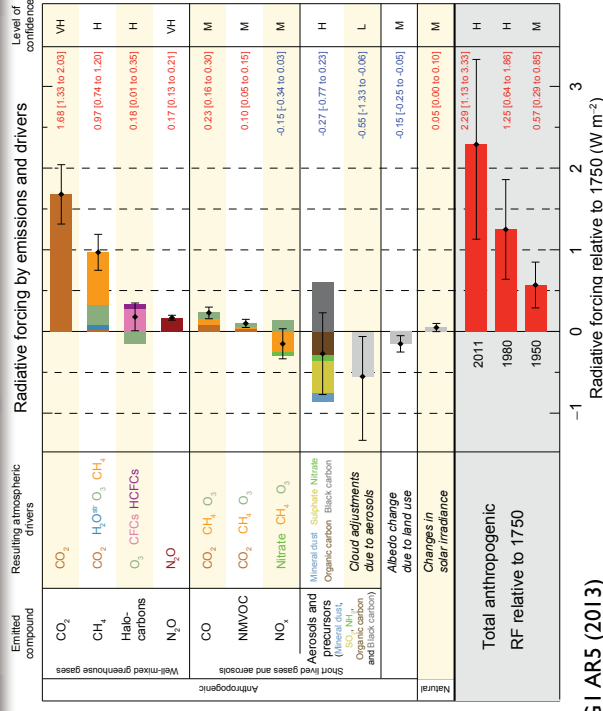
Lead Author: IPCC WG I 5th Assessment Report

## Contents

- General introduction of the Environment Research and Technology Development Fund S-I2.
- General introduction of SPRINTARS global aerosol forecasting system which is widely put to practical use.

International Workshop on Strengthening the International Cooperation Framework and Science-Policy Interface to Promote Air Pollution Control in East Asia 2014 (March 7, 2013; Yokohama, Japan)

# Radiative forcing assessed in IPCC AR5

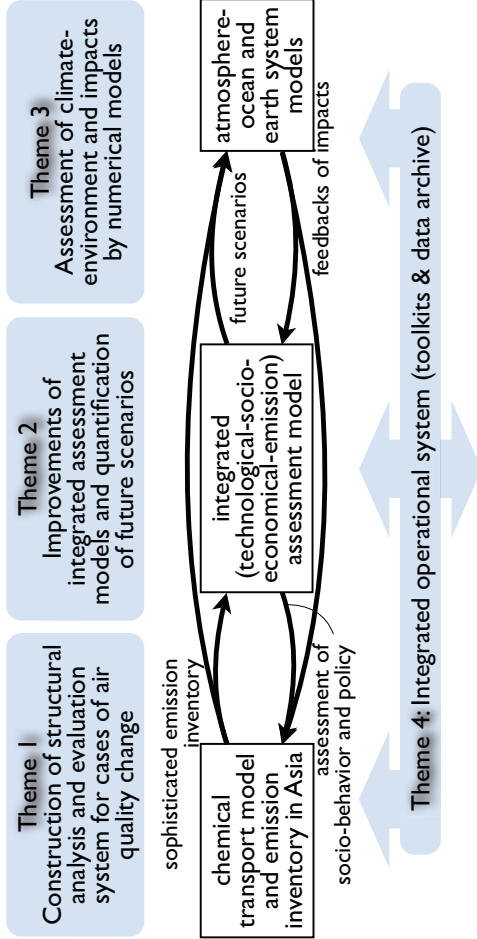


IPCC WG I AR5 (2013)

International Workshop on Strengthening the International Cooperation Framework and Science-Policy Interface to Promote Air Pollution Control in East Asia 2014 (March 7, 2013; Yokohama, Japan)

# Environment Research and Technology Development Fund: S-I2

Promotion of measures on climate change by assessing environmental impact and searching reduction path of SLCPs

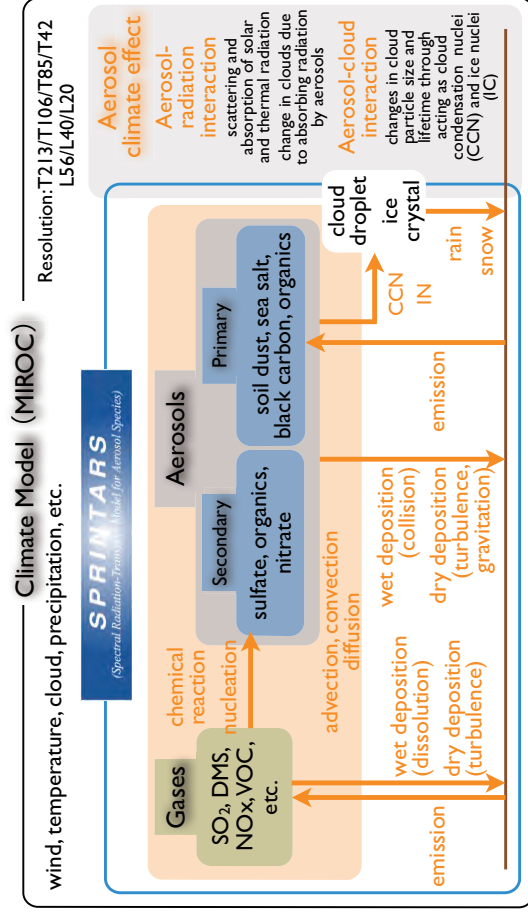


policymakers, stakeholders, science communities, general communities

International Workshop on Strengthening the International Cooperation Framework and Science-Policy Interface to Promote Air Pollution Control in East Asia 2014 (March 7, 2013; Yokohama, Japan)

# Global aerosol climate model SPRINTARS

References: Takemura et al. (GR, 2000; JLI, 2002; JGR, 2005; ACP, 2009)



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# SPRINTARS global aerosol forecasting system

\* automatically operated once a day.

RIAM NEC SX-9F 8CPU (spare: 8-core Xeon x 2)

- Download forecasted meteorological field and semi-realtime biomass burning data.
- daily sea surface temperature and 3-hourly horizontal wind speed and temperature of NOAA/NCEP Global Forecast System (GFS).
  - daily MODIS hotspot data from Fire Information for Resource Management System (FIRMS) of University of Maryland/NASA GSFC.
- ➡ conversion to BC, OC, and SO<sub>2</sub> emissions using climatological GFEDv2 data.

Simulation of global aerosol distributions and its radiative forcing by SPRINTARS (T213 (~0.56° x ~0.56°); L20).

- 8-day simulation from the day before the starting time of forecast.
- initial values from the simulation the day before.
- nudged by the GFS wind and temperature.

Making figure and HTML files.

↕ upload around 6:00JST (21:00UTC) every day.

SPRINTARS web server (<http://sprintars.net>)

International Workshop on Strengthening the International Cooperation Framework and Science-Policy Interface to Promote Air Pollution Control in East Asia 2014 (March 7, 2013; Yokohama, Japan)

## Discussion and conclusions

- Environment Research and Technology Development Fund S-12 will quantitatively assess climate change and environmental impacts by SLCPs and develops integrated system for searching suitable paths toward reducing VMGHGs/SLCPs basically from scientific approaches.
  - The SPRINTARS aerosol forecasting system has been operated since 2007, and its homepage is cited by a lot of media, e.g., public broadcast in Japan, some commercial broadcastings, some newspaper, some websites, and a few smartphone apps like weather forecast every day, Homepages of MOE in Japan and some local governments set up a link to the SPRINTARS homepage.
- ➡ We specialist have to again recognize which information for air pollution and climate change the public really need.

## Acknowledgements

- MIROC (AOR/NIES/JAMSTEC GCM) developing group
- RIAM/Kyushu University supercomputer system (NEC SX-9F)
- Funding Program for Next Generation World-Leading Researchers in Japan (GR079)

International Workshop on Strengthening the International Cooperation Framework and Science-Policy Interface to Promote Air Pollution Control in East Asia 2014 (March 7, 2013; Yokohama, Japan)

# Website of SPRINTARS aerosol forecasting system

Takemura (Tenki, 2009 (in Japanese))

<http://sprintars.net/forecastj.html>

The screenshot shows the SPRINTARS website interface. At the top, there are navigation tabs for 'ホーム', '最新予測(英語版)', '最新予測(日本語版)', and 'アーカイブ'. The main content area is divided into two columns. The left column features a map of Japan with a color-coded aerosol concentration overlay, titled '2011年のPM2.5予測'. Below the map is a text box with the title '最新のエアロゾル予測' and a sub-section '予測結果'. The right column contains a table titled '大気エアロゾル(硫酸粒子)濃度予測' with columns for dates from 5月14日 to 5月20日 and rows for various aerosol species like SO4, NH4, NO3, etc. The website also includes a QR code and a footer with contact information.

## Current status and future potential of the multi-pollutant approach to air pollution control in Japan, China, and South Korea

Mark Elder, Naoko Matsumoto, Akira Ogihara, Mika Shimizu, Andrew Boyd, Xinyan Lin, Sunhee Suk, Hideyuki Mori, Changsub Shim

International Workshop on Strengthening the International Cooperation Framework and Science-Policy Interface to Promote Air Pollution Control in East Asia 2014

March 7-8, 2014 Yokohama, Japan

## MPME's Role in the LRTAP/Gothenburg Protocol

MPME as a system of scientific analysis

Can conduct analysis without linking to a treaty

MPME Role: Support Negotiations

- Informs target setting
- Cost-benefit optimization
- Target concept, principles
- Scientific justification

MPME as a science policy interface

GOTHENBURG PROTOCOL

- Legally binding treaty
- Reduction targets informed (recommended) by MPME
- But actual targets are decided politically
- Countries have different targets
- Targets are cost optimized

Note:

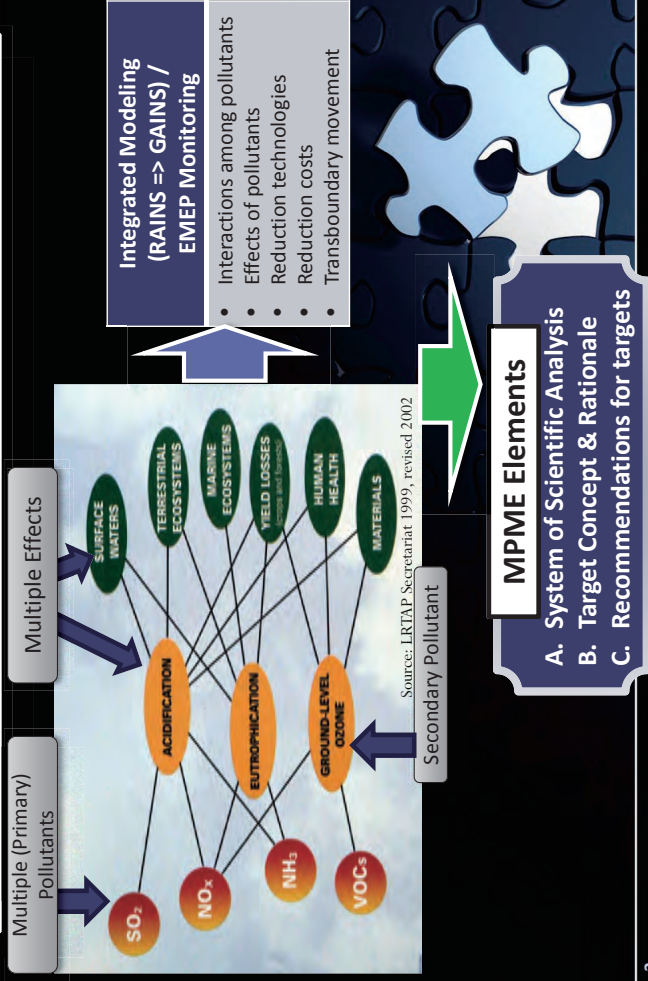
Gothenburg/MPME is an integrated approach, but not comprehensive (still room for more)

Example of adding new pollutants, new effects

Negotiations for Revision of Gothenburg Protocol

- How to incorporate new pollutants (e.g. PM2.5)
- How to incorporate climate change?

## Concept map of the Multi-pollutant Multi-effect (MPME) approach in the Gothenburg Protocol of LRTAP



## Variety of Similar Concepts of MPME

- Integrated approach
- Multi-pollutant approach
- Risk based approach
- > Sometimes different focuses on different multi-pollutants or different multi-effects (e.g. health, ecosystems)
- > Basically it means a modeling system
  - > Monitoring, modeling, transport
- > Therefore, requires a certain level of scientific capacity
- > Can be used in single countries or subnational geographic areas (not just for international cooperation)

## Main Arguments

### Conventional Thinking

- MPME is an integrated approach.
- MPME is closely linked to a legally binding treaty (LRTAP).
- Therefore, MPME may not be feasible in East Asia

### Main Results

- MPME consists of several components.
- MPME is a system of scientific analysis, not a treaty
- MPME assists decision making about targets (sci./policy link)
- **MPME improves effectiveness, lowers costs**
- **Can set targets without MPME, but will be less effective**
- Components can be separated and implemented in steps
- China, Japan, Korea, already moving towards MPME steps (can be used domestically, not just for international treaties)
- Less developed countries can also begin steps

MPME is a science policy interface

### International cooperation can be helpful without a treaty

- Focus can be on information sharing & capacity building
- Can use MPME in E. Asia as a scientific system w/o a treaty
- Scientific epistemic community can promote MPME

5

## Northeast Asian Countries Already Moving in MPME Direction (Domestically)

Country	Direction
China	<ul style="list-style-type: none"> <li>➢ China GAINS (not endorsed by the government)</li> <li>➢ Regional management system in 12<sup>th</sup> FYP =&gt; Future domestic LRTAP?</li> <li>➢ Beijing Olympics control system: Mini-temporary domestic LRTAP</li> <li>➢ Government is supporting related research</li> </ul>
Korea	<ul style="list-style-type: none"> <li>➢ Korean GAINS under development</li> <li>➢ Related research underway</li> </ul>
Japan	<ul style="list-style-type: none"> <li>➢ Developing systems similar to GAINS</li> <li>➢ Related research underway</li> </ul>
Russia	<ul style="list-style-type: none"> <li>➢ Member of LRTAP</li> <li>➢ Promoting NEA LRTAP-type framework in NEASPEC</li> </ul>

6

## China: Regional Air Pollution Management

- 12th Five Year Plan On The Prevention And Control Of Air Pollution In Key Regions
- Further elaborated by the Air Pollution Action Plan of Sept. 2013

- China's domestic pollution is transboundary;
- Provinces & local governments can't address internal pollution
- Designates key regions and city clusters
- Sets up coordination mechanisms
- Regional management is a key policy

- Stronger targets & implementation measures
- (e.g. stronger EIA, tech. requirements, industrial adjustment, key projects, etc.)



### Analysis

- Good policies on paper / difficult to implement
- Sets up a coordination structure
- (But coordination may be difficult)
- Originates from Beijing Olympics w/modeling
- Modeling/MPME analysis could be incorporated
- Could become domestic LRTAP
- Beijing Olympics: Was a mini (temporary) domestic LRTAP



7

## Importance of National Models (not just unified regional model)

- ❖ Countries can address domestic transboundary movement
- ❖ Countries can estimate international transboundary movement
- ❖ Analysis of cost effectiveness can be used domestically
- NEA countries already developing them.

### European/LRTAP Case

- Development of several national GAINS models (e.g. Italy, Ireland)
- Only some countries have national models
- National GAINS models are more detailed
- Used to negotiate obligations with EU and implementation with local governments

8

## Major Advantages of MPME (& GAINS-type Models)

- Cost Effective Reductions
- Differentiated Targets (in International Agreements)
- Countries can't achieve reductions on their own (and costs are not minimized)
- LRTAP: country can negotiate with LRTAP & local authorities

Not just about transboundary movement

East Asian countries should be interested in cost effectiveness and differentiated targets.

9

## Necessary Capacity for MPME

Key Foundation: Scientific Capacity (Many developing countries lack)

How to capacity is a key for including developing countries, especially SEA

### Scientific

- Analytical capability (human resources)
- Multidisciplinary cooperation
- Monitoring capability

### Administrative

- Officials need some technical understanding
- Ability to coordinate between departments
- Legal framework that allows differentiated targets

### International cooperation

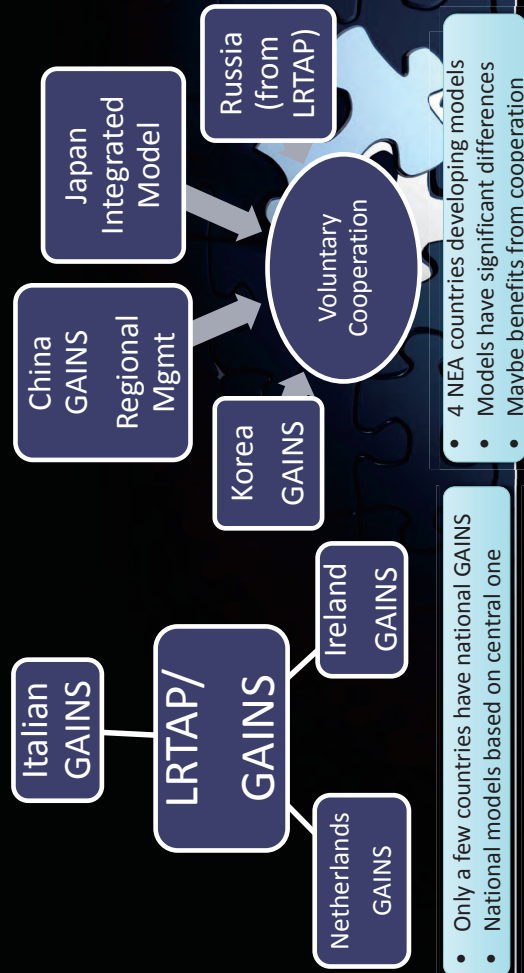
- Means for international cooperation among scientists
- Mechanism for information sharing
- Means for scientists to communicate with policymakers

10

## MPME Cooperation Images

LRTAP: TOP DOWN

EAST ASIA: BOTTOM UP?



- Only a few countries have national GAINS
- National models based on central one

- 4 NEA countries developing models
- Models have significant differences
- Maybe benefits from cooperation

11

## MPME Steps and Choices: Overall

### Main Ideas

- MPME can be introduced in a stepwise manner
- Range of possible focuses for pollutants & effects
- Focus first on scientific analysis, then incorporate into policy (variable scientific support for an influence on targets)
- Targets: range of possible magnitudes, types, principles

### Scientific Analysis

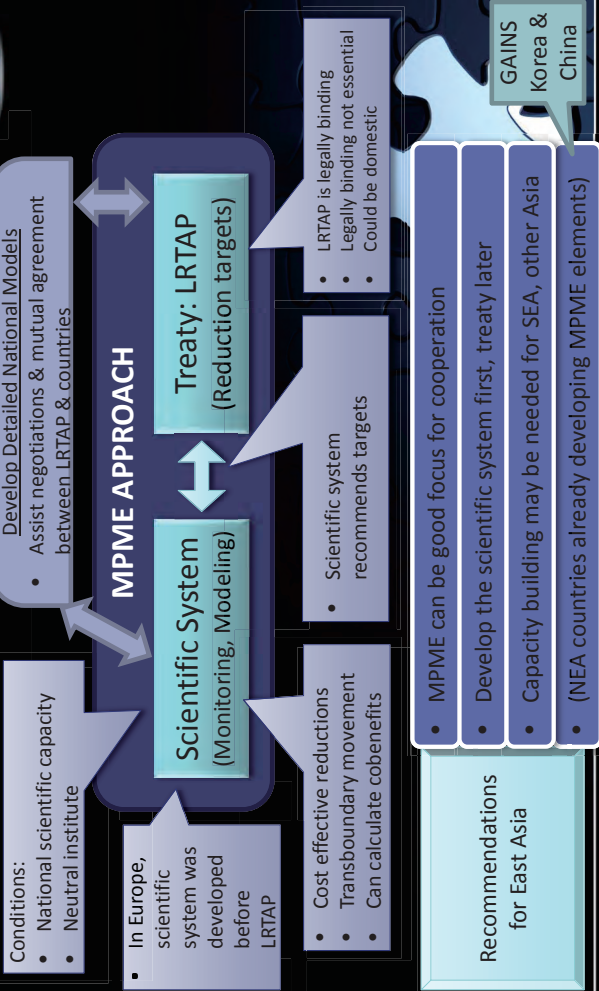
- Start with studies & models
- Focus on interactions & effects
- Less emphasis on transboundary aspects

### Policy

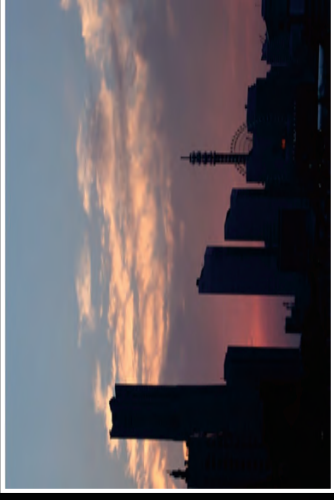
- Start with domestic policy framework
- International cooperation can use various models
- International cooperation can be voluntary
- May recommend differentiated targets

12

# Multipollutant-MultiEffect Approach and Regional Cooperation



Institute for Global Environmental Strategies  
www.iges.or.jp



Thank You!

Acknowledgment: this research was supported by the Environment Research and Technology Development Fund (S-7-3) of the Ministry of the Environment, Japan.

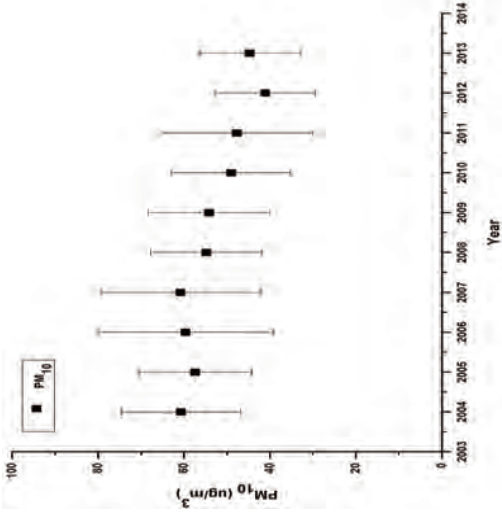
Adapted from Paper Prepared for the Society for Environmental Economics and Policy Studies (SEEPS), 18<sup>th</sup> Annual Meeting, Univ. of Kobe, (Kobe, Japan), Sept. 22-23, 2013

**Urgent need for regional cooperation to mitigate the adverse effects of PM pollution in Northeast Asia.**

March 8, 2014  
IEGS Workshop, Yokohama, Japan

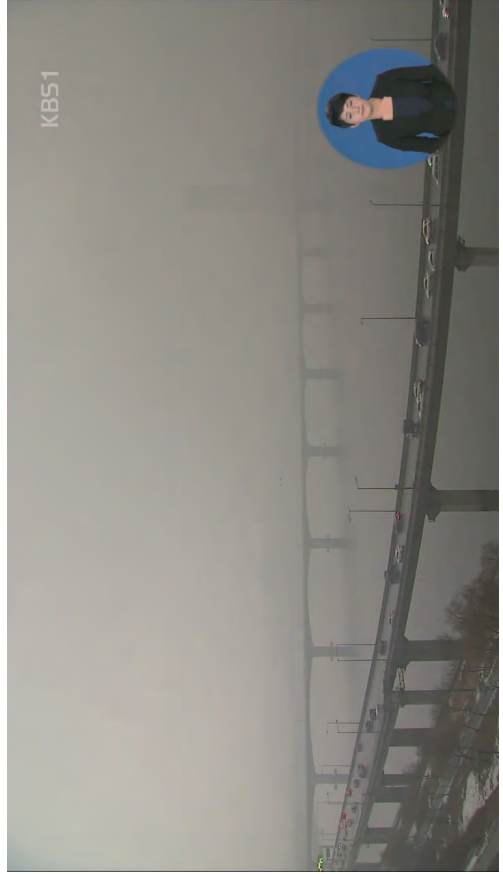
**Young J. Kim**  
President, Gwangju Institute of Science and Technology (GIST)  
Korea

**PM<sub>10</sub> annual average concentration during last 10 years (2004 ~ 2013) Seoul, Korea**

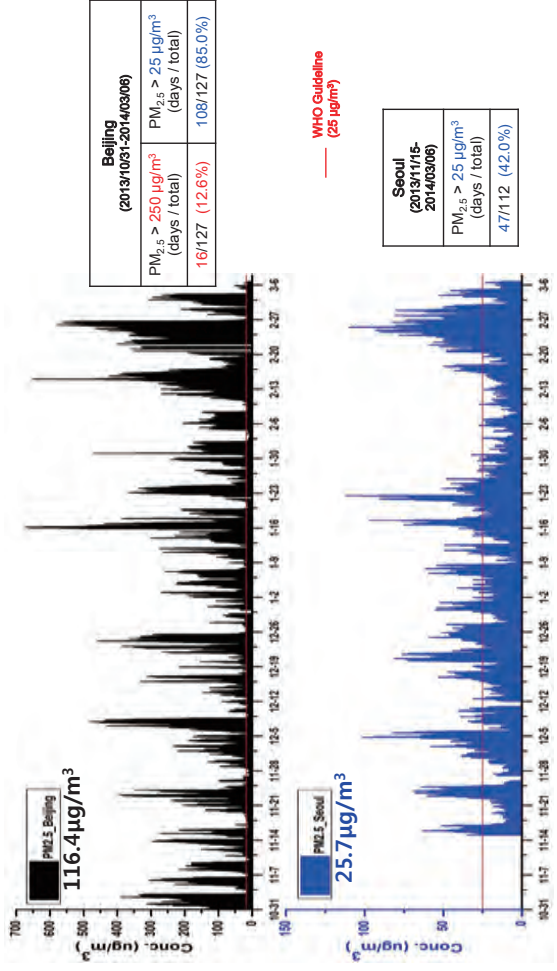


	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Average	60.8	57.4	59.7	60.8	54.8	54.2	49.1	47.7	41.1	44.7
Stdev.	13.9	13.1	20.4	18.5	12.9	14.2	13.9	17.7	11.6	11.8

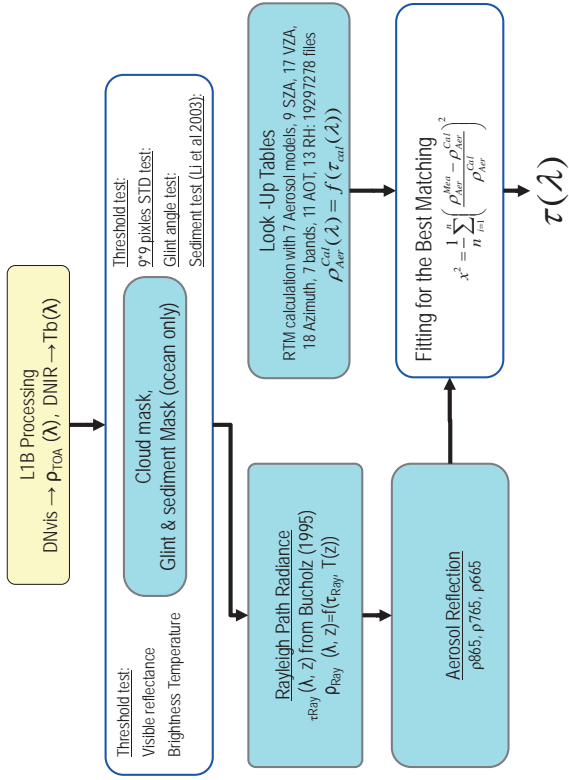
**Unprecedentedly high level of PM2.5 concentration was observed frequently in Seoul this winter!!**



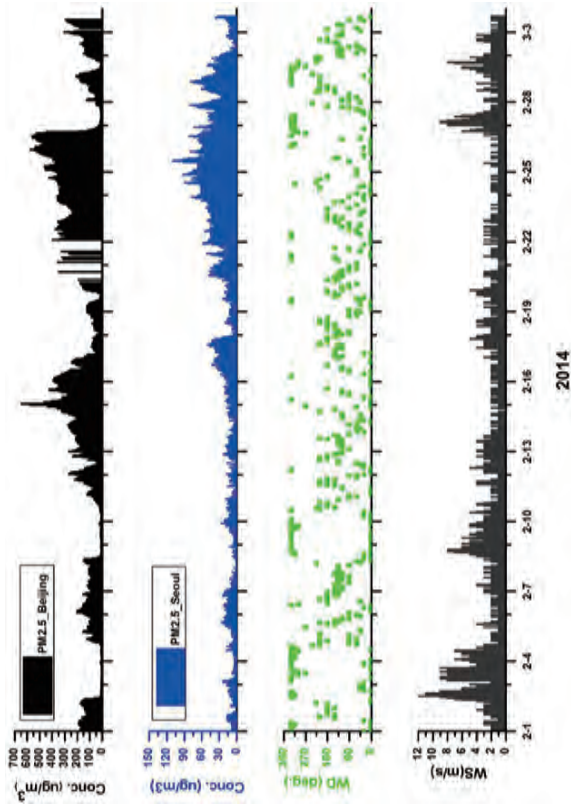
**Unhealthy Air!**



# GIST Aerosol Retrieval (GSTAR)

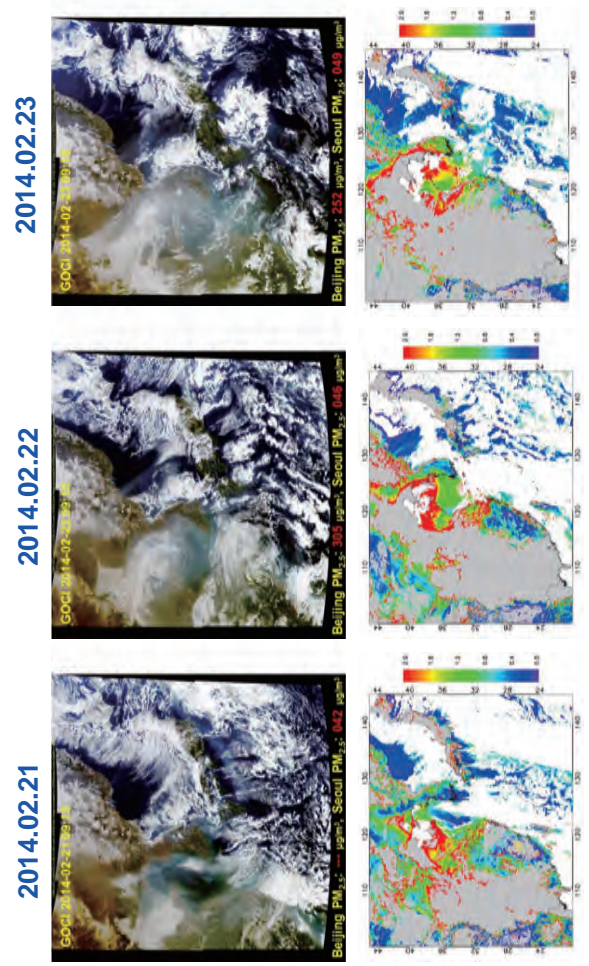


PM concentration with WD and WS



[Beijing WS, WD data (<http://www.wunderground.com/history>)]

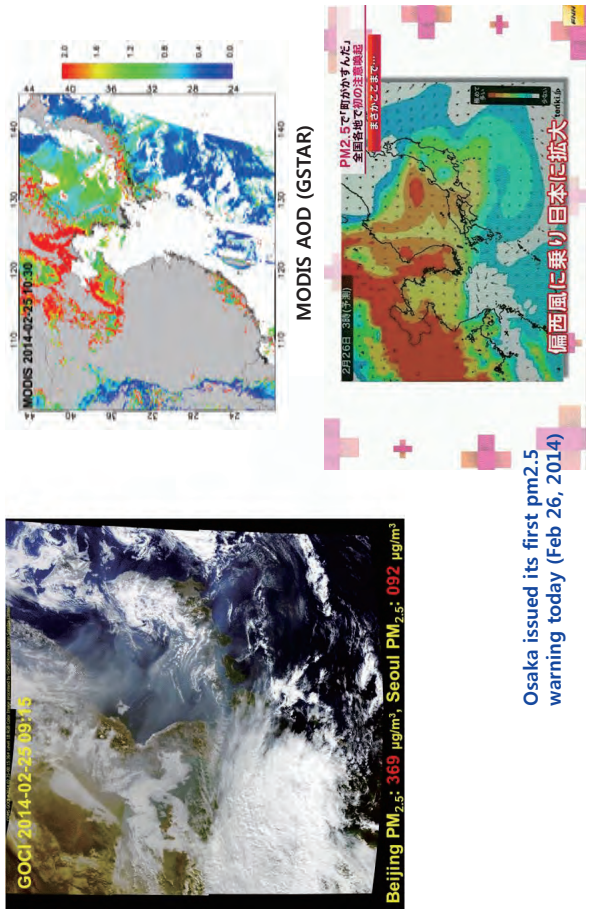
## 4 RGB from GOMS/GOCI & AOD analysis from MODIS (Geostationary Ocean Color Imager)



MODIS AOD (GSTAR)

## 5

## RGB from GOMS/GOCI & AOD analysis from MODIS 2014.02.25 - 26



<http://kotaku.com/chinas-pollution-is-making-japanese-air-all-crappy-1531371641>

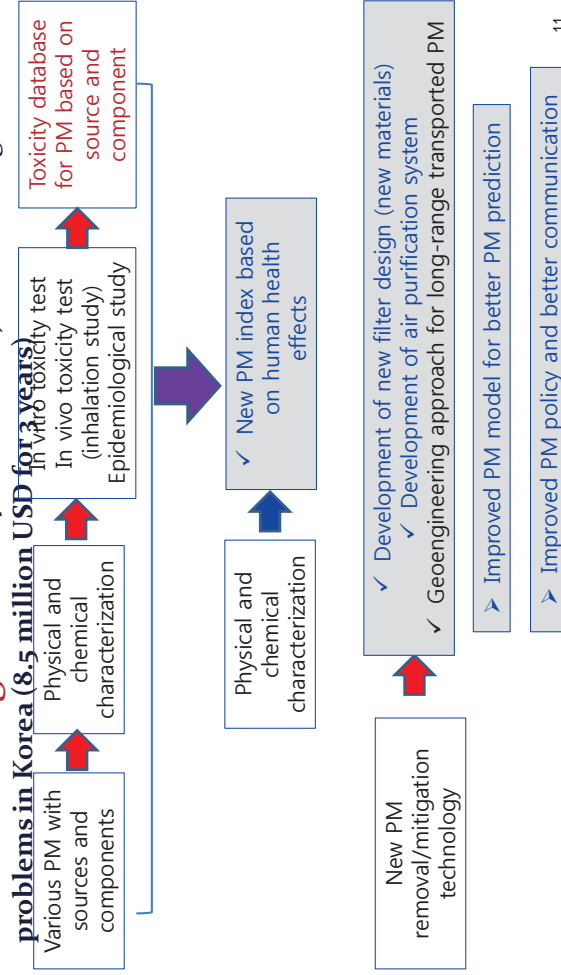


- ✓ International collaboration on PM2.5 pollution in Northeast Asia is highly required.
- ✓ How about toxicity and human health effects of those ultrafine PM ?
- ✓ Improve the accuracy of PM2.5 forecast through model improvement, data assimilation and updated emission inventories
- ✓ Develop new technologies for effective removal of PM2.5 particles
- ✓ Any Geo-engineering approach as emergency measures should be considered?

9

## New PM index accounting for human health effects and new technology for PM

**removal/mitigation:** 2014 Research Project for solving PM



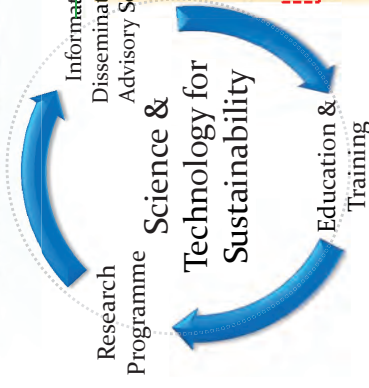
11



Operated by IEAEC (International Environmental Analysis and Education Center) in GIST since 2004 with an annual budget of ~1.5 million USD from Korean Government.

### UNU&GIST Joint PROGRAMME On Science And Technology For Sustainability

➢ The United Nations University (UNU) is a global think tank and postgraduate teaching organization in the UN system.



Research Program	Education & Training Programme
Main Topics 1. Monitoring and risk assessment of hazardous chemicals in the environment 2. Environmental application of advanced biotechnology 3. Trans-boundary transport of air pollutants in the Asian region 4. Climate changes and sustainable energy Activities 1. Funding to researchers from developing country 2. Conducting collaboration research	For postgraduates, government officers, researchers and professors 1. Internship programme 2. UNU & GIST joint programme symposium (workshop) 3. POSCO Asia fellowship programme Activities 1. Funding to researchers from developing country 2. Serve an educational training 3. Support student for M.S. programme

10

## Asia Science Panel on Air and Climate (ASPAC)

- to synthesize scientific knowledge on air quality and its relation to climate change in the Asian region
- to reach a common understanding among scientists and policy makers
- to develop an international initiative for an integrated approach to air quality and climate change monitoring, research, and mitigation.

77

12

(i) What should be the major functions? ASPAC may address newly emerging scientific findings for consensus building among scientists in the issue of air pollution in Asia and its linkage to climate. The scope of ASPAC could cover the field of: (1) atmospheric science, (2) impact studies, and (3) clean air technology and mitigation measures. Whether the focus of activities should be mainly on review of existing research, or whether the focus should be broader including enhanced research collaboration and/or capacity building of atmospheric scientists?

Discussion: We recommend the ASPAC focus on enhanced research collaboration and capacity building of atmospheric scientists, climate scientist, and public health scientists. Especially develop framework for cooperation.

13

(ii) What should be the geographical scope? East Asia or Asia as a whole?

Discussion: At the first stage, it would focus on East Asia, and then extend to Asia as a whole.

(iii) What should be the institutional framework? There are several different types of such scientific bodies, e.g. the Intergovernmental Panel on Climate Change (IPCC), the Ozone Panels under the Montreal Protocol, and science bodies under the CLRTAP. There are several bodies in Asia for which ASPAC could be incorporated, e.g. EANET, ABC Asia Technical Committee, NEASPEC, Joint Forum and etc. Whether a new body should be created for ASPAC, or one of the existing bodies could incorporate with ASPAC? ASPAC may preferably be under the framework of international bodies such as UNEP or ESCAP.

Discussion: Due to diverse/different functions of the ASPAC, it would be better to create a new body for ASPAC under the framework of UNEP, ESCAP, UNU, ???.

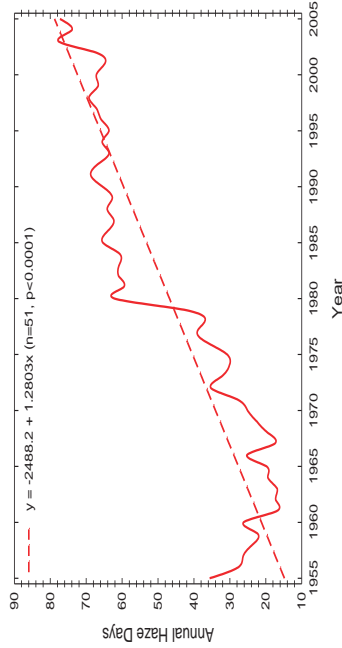
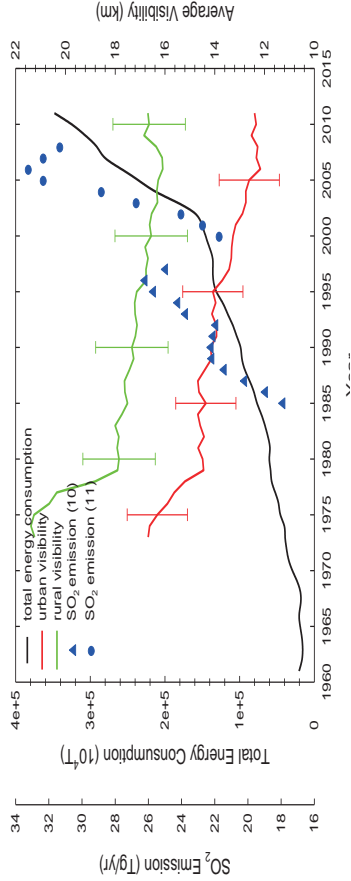
14

# Global Warming and Air Quality

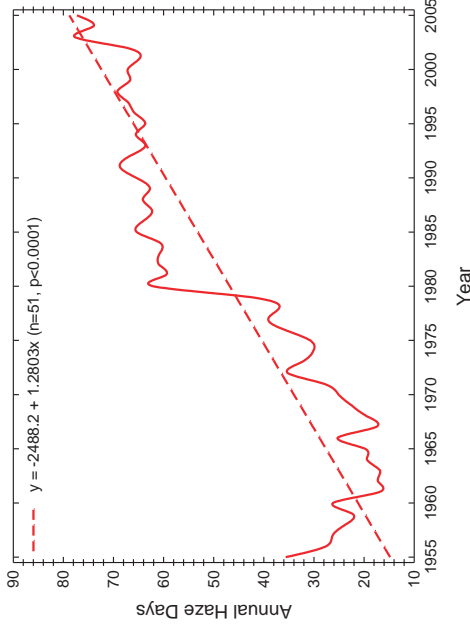
Shaw Chen Liu  
 Research Center for Environmental Change  
 Academia Sinica

International Workshop on Strengthening the International  
 Cooperation Framework and Science-Policy Interface to  
 Promote Air Pollution Control in East Asia 2014

Pacifico Yokohama, March 7-8, 2014



# Annual haze days in eastern China From Wu et al. (2010) (in Chinese, 吴允等)



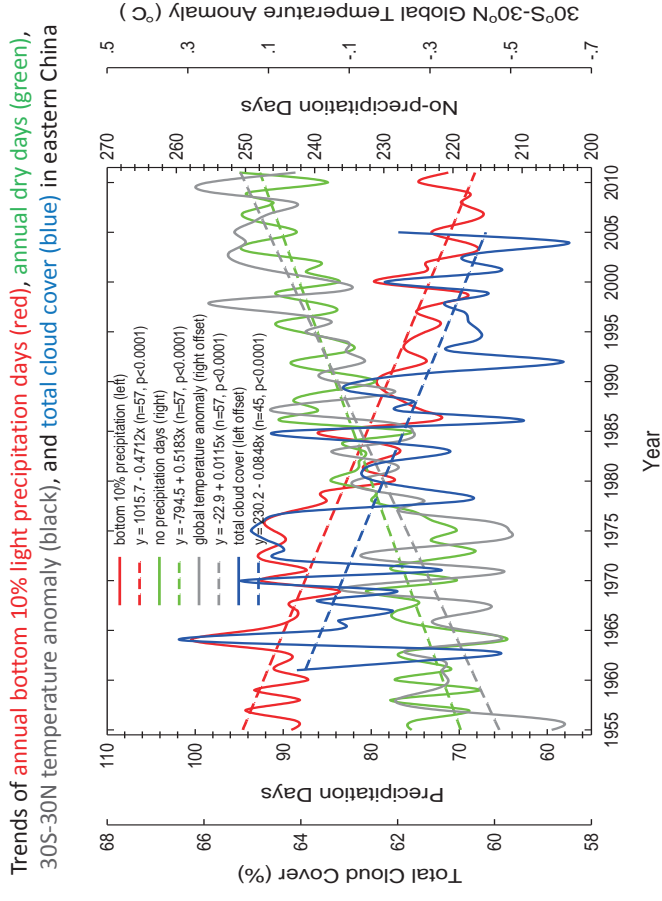
定义: 日均能见度小于10 km, 日均相对湿度小于90%, 并排除降水、吹雪、雪暴、扬沙、沙尘暴、浮尘、烟幕等其他能导致低能见度事件的情况为1个霾日。

# Necessary and Sufficient Conditions for a Typical Haze/Ozone Episode

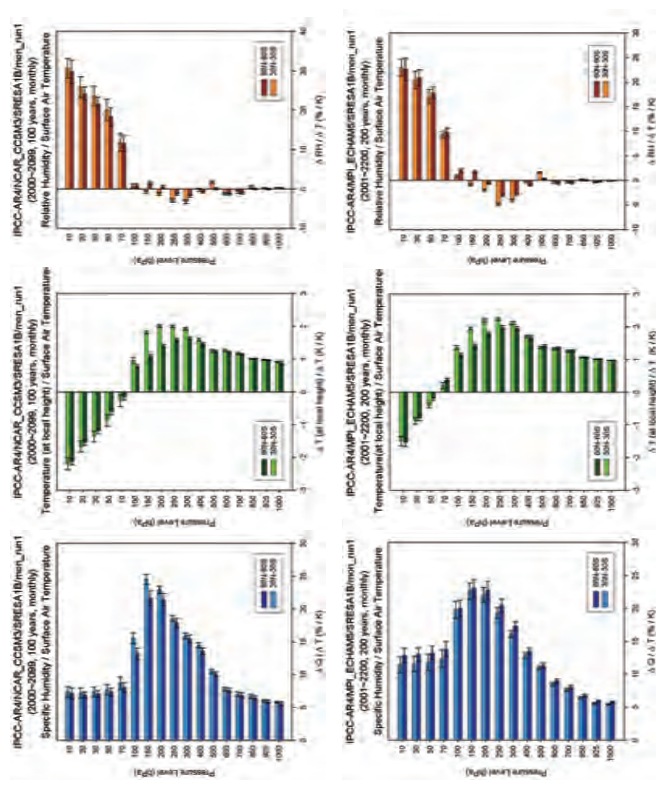
- Light winds for a few days
- No rain for a few days
- A few clear days
- Large emissions of air pollutants

## How do conditions for a typical haze/ozone episode change with global warming?

- Light winds (wind speed decreases with global warming)
- No rain (light rain less frequent [most rain events are light])
- Clear day (more clear days)
- Large emissions of air pollutants

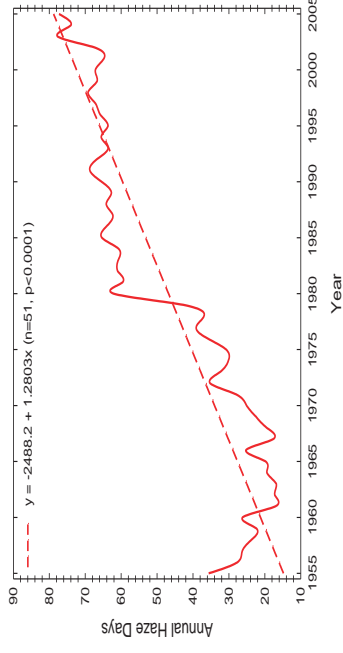
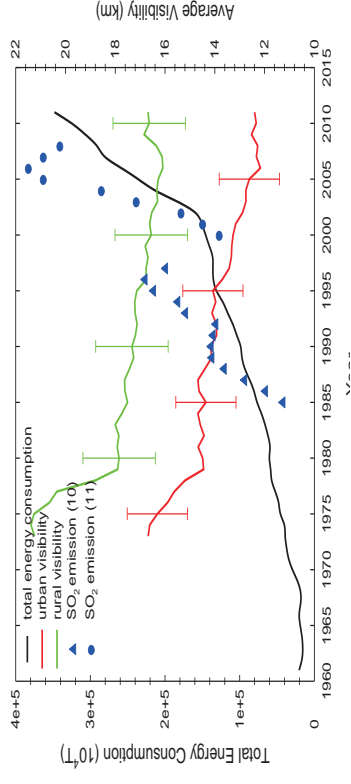
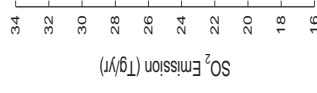
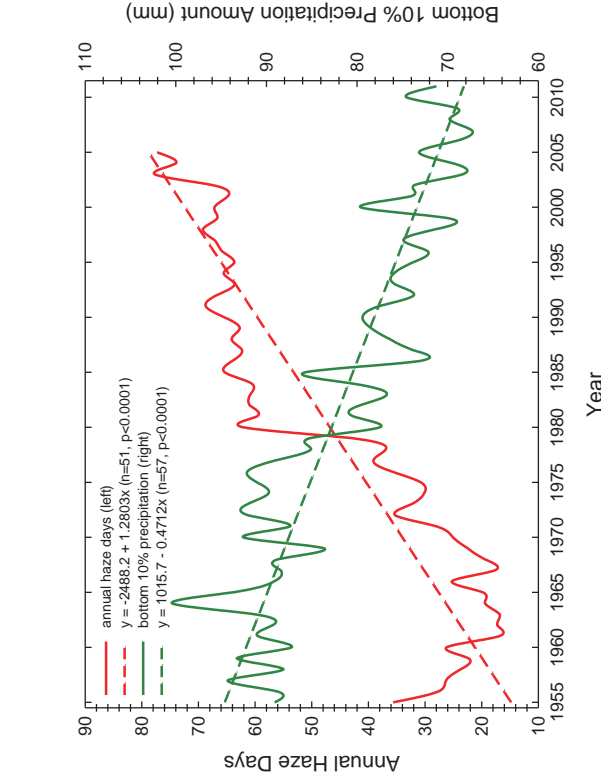


- One of the most robust features of climate models is the “water vapor/lapse rate” feedback during global warming, which is characterized by greater increases in water vapor and temperature in the upper troposphere than lower troposphere.

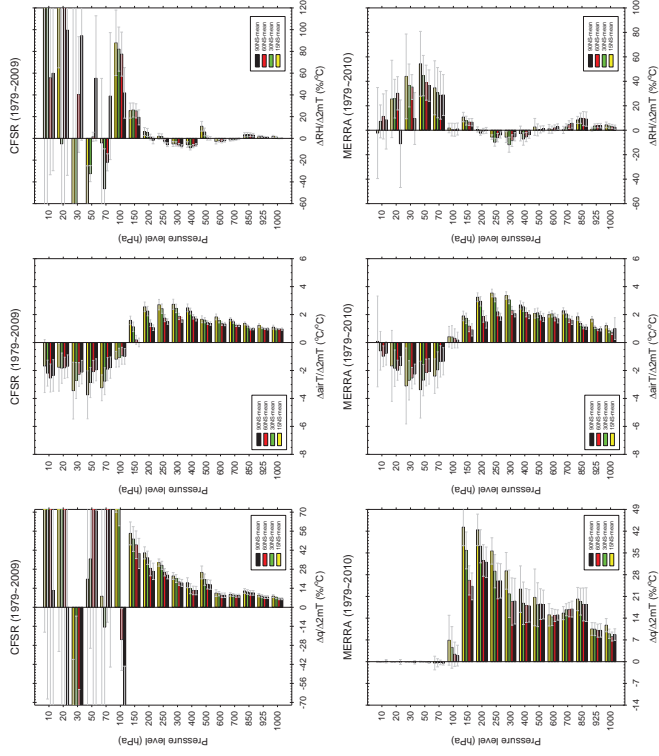


## Necessary and Sufficient Policies for reducing Haze/Ozone Episodes

- Light winds (Co-benefits, Reduce greenhouse gas emissions, Meteorological engineering)
- No rain (Co-benefits, Reduce greenhouse gas emissions, Meteorological engineering)
- Clear day (Co-benefits, Reduce greenhouse gas emissions, Meteorological engineering)
- Emissions of air pollutants (Co-benefits, strengthen CCAC)



Thank you for your attention!



13

82

## Conclusions on haze problem in China

- Surely emissions of aerosols and their precursors contribute to the increase in haze days. But the jump of 30 haze days during 1975-1980 can't be explained by the increase in emissions.
- The jump in haze days is best explained by the relative large global temperature increase of about 0.3 K, which induced a reduction of about 15 days in annual light precipitation, a corresponding increase of dry days, and a reduction in clouds. .
- Controlling greenhouse gas emissions can have a pivotal co-benefit effect.

15

## Impacts of global warming on air quality (I)

- Reduction of atmospheric lapse rate increases the stability of the atmosphere, thus increases trapping of air pollutants.
- Reduced lapse rate suppresses the formation of low and mid level clouds (thus the total cloud), results in less light and moderate precipitation, thus reduces the cleansing of air pollutants.
- Reduced cloud cover increases the formation of nighttime inversion, trapping more air pollutants.
- Reduced cloud cover increases photochemical reactions, thus increases the production of secondary air pollutants such as O3 and secondary aerosols.

14

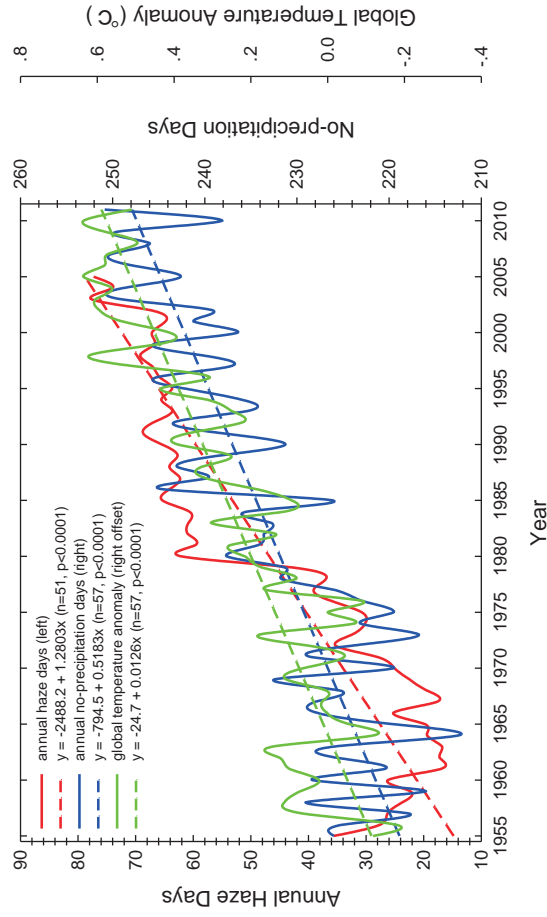
## Impacts of global warming on air quality (II)

- Reduction in boundary layer winds decreases the ventilation of air pollutants, but reduces Asian dust storms.
- Increase in global total precipitation is estimated to be about 2-3% per degree warming, providing a small beneficial effect.
- Increase in heavy precipitation is also a beneficial effect for air quality, but it is small as heavy precipitation events are infrequent.
- Urban heat island effect can enhance the convective ventilation of air pollutants in the urban area, but this effect is compensated to certain degree by the decrease in relative humidity.

16

- The factor of two “jump” in haze days (from 30 to 60 days) during 1975-1980 accounts for about half of the increase in haze days in the entire period of 1955-2005.
- So the key to understanding the increase in haze days in eastern China is to identify the cause of the jump.

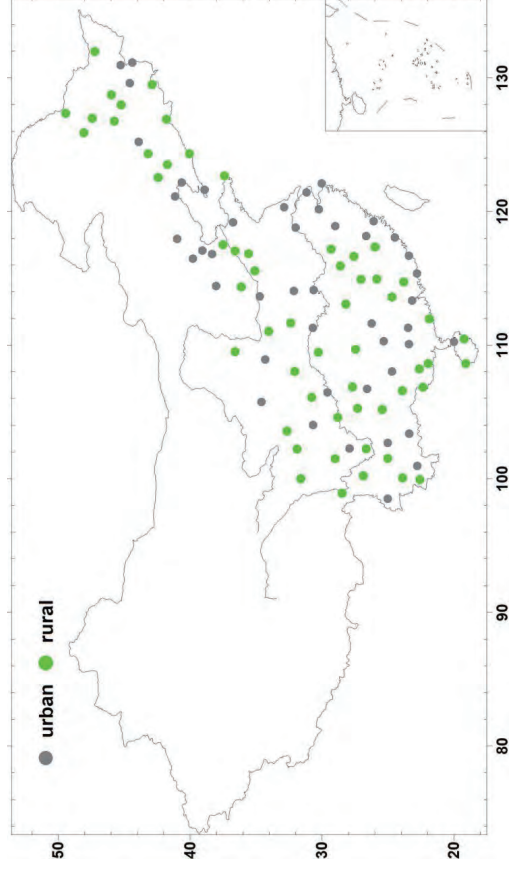
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17

- (10) Streets D, Tsai NY, Akimoto H, Oka K(2000) Sulfur dioxide emissions in Asia in the period 1985–1997. *Atmos Environ* 34: 4413–4424.
- (11) Lu Z, et al. (2010) Sulfur dioxide emissions in China and sulfur trends in East Asia since 2000. *Atmos Chem Phys* 10: 6311–6331.

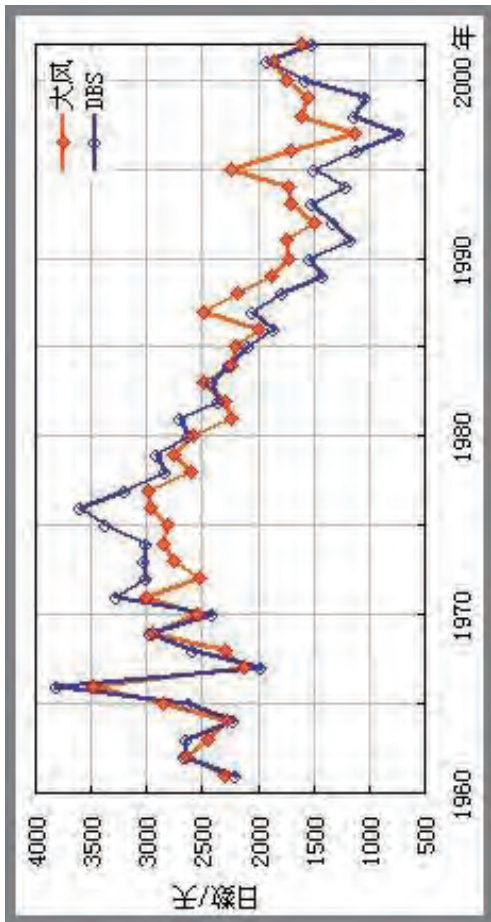
18



Geographical distributions of the 101 surface meteorological stations used in this study

19

20



Annual dust storm days and high wind days at 175 stations in northern China  
 中国北方175个站春季起沙活动日数合计值、大风日数合计值的逐年变化



# What We All Know and What We Must Do

- to Strengthen International Cooperation on Air Pollution in East Asia-

Pacifico Yokohama, March 7-8, 2014

Young Sunwoo

Department of Environmental Engineering  
Dean, College of Global Integrated Studies  
Konkuk University  
Seoul, Korea

## Obstacles in strengthening international cooperation

### Difference of social-political system and economic level

- Difficulty of establishing common goals caused by coexistence of capitalism and socialism, substantial difference in economic level among countries in East Asia
- In case of China, people have relatively weak volition for improving air quality due to relatively low economic growth level (GDP per 1 person)

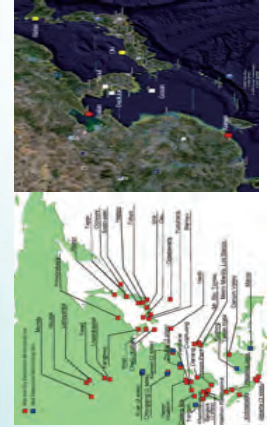
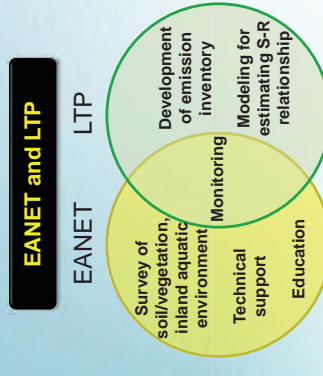
### Perception gap w.r.t differences of interest between the countries in East Asia

- China is source, S. Korea and Japan are receptors

### Weakness of scientific knowledge for improving environmental quality in East Asia

### Exclusion of N. Korea, Mongolia, and Russia in discussion for improving air quality in East Asia

## Overlapping functions among existing programs



EANET and LTP are individual international cooperation projects having similar objectives

EANET and LTP could be integrated/modified to avoid overlap

Barriers against integration of these projects

- Steering bodies
  - EANET : UNEP (Japan MOE)
  - LTP : Korea MOE (NIER)
- Difference in coverage area
  - Coverage area of LTP is a subset of EANET

Continuous discussion is needed

## LTP Project - Enhancement of Research Activities

### Reinforcement of Comprehensive Analysis Function

- Currently, monitoring and modeling activities are conducted and the report for these activities is prepared by each country independently, and thus an overall comprehensive analysis is generally lacking
- It is suggested to form a science advisory committee consisting of authoritative experts of the three countries and publish a comprehensive report for policymakers by integrating and analyzing reports from each country

- Great idea! Let us embrace it!
- Same talk of topics below.
  - pollutant items of interest
  - geographical range, countries to include
  - financial arrangements
  - legally binding or not
  - etc.

*Details should come later – after we decide to do it!*

- CLRTAP success under UNECE
  - Already have successful model in LRTAP to follow
  - Executive body and 3 Working bodies
- ASPAC proposed under UN ESCAP
  - EANET & LTP can form program centers under ASPAC

*Maybe we should be a little more naïve~~*

- The time is ripe for action now!
- The particulate matter crisis in East Asia!
- Governments (at least in China and Korea) primed for immediate action – Japan?
- Enough research and investigation  
-> need for action – now

- A Sense of Urgency may be needed
- The Korean government moving in multiple directions to collaborate with China independently
- Many past failed endeavors becoming mental obstacle

## *Death and Taxes...*

- Start with the 3 countries, with TEMM approval, but independent of government
- Expand to include SE Asian and W Asian countries
- NEASPEC affiliation a possibility

### Communication Problems

- Language
- Culture
- Government
- Science

### Who will carry the banner

- Who is talking with who?
- Academic society of each country to play a prominent role?

**LET ME BE ABSOLUTELY BLUNT!!!**

*Not the Japanese way, I know but~~~*

- The Great Compromise in U.S. ~
  - 2 houses of Congress: Senate & House of Representatives
- The Great Compromise for East Asian Air Quality
  - my personal opinion
  - Recognition of ASPAC: full credit to Japan as initiator & “leader”
  - Initial base outside of Japan:
    - a magnanimous gesture
    - rotational host system – term of 5-10 years
  - Intensive focus on China PM problem

### IUAPPA World Clean Air Congress 2016

- September of 2016 in Busan, Korea
- Attempting collaboration with CAA/BAQ
- Targeting 1500 participants
- Hopeful that “Busan Declaration” will include an Asian version of LRTAP agreement

***Expect all of you to be there!***

**Thank you for your attention**

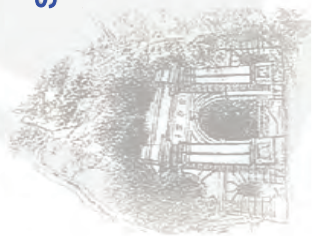
Time to really discuss how we can try to improve  
Air Quality in East Asia



# China's Cases of Science-Policy Interface to Promote Air Pollution Control

Kebin He  
School of Environment, Tsinghua University  
Beijing 100084, P.R.China

March 8, 2014, Yokohama

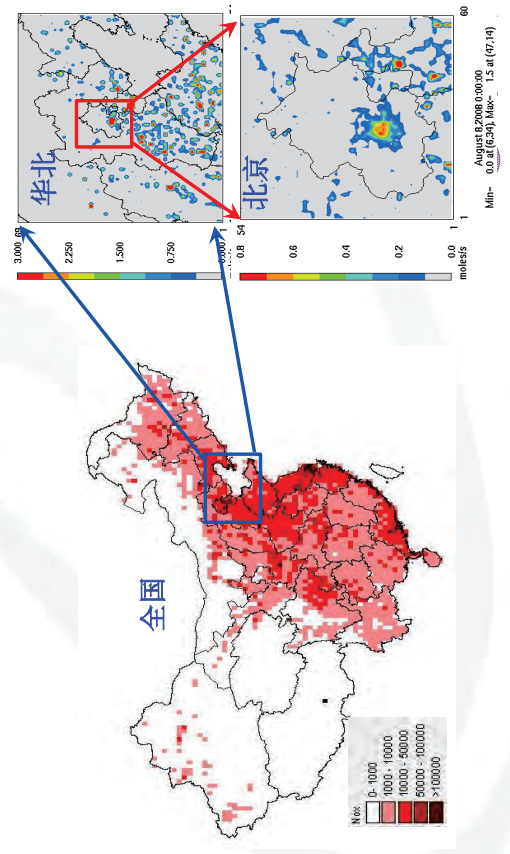


# Case for Beijing Olympic Game

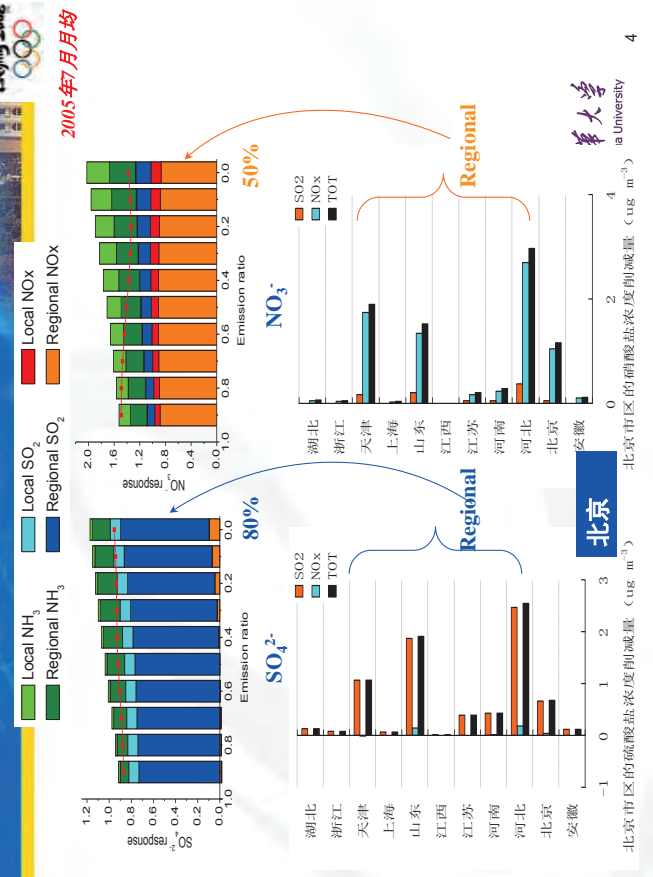


# High Resolution Emission Inventory

China (36x36), Northern China(12x12) and Beijing(4x4)

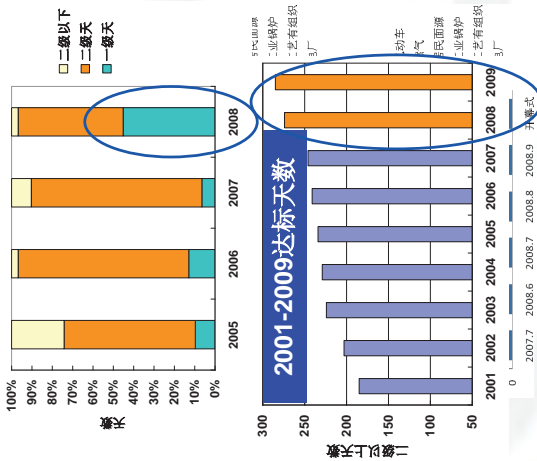


# Regional Source Appointment

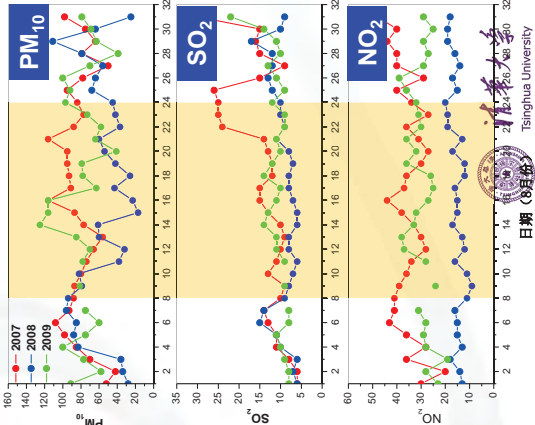


# RAQM: BJ Olympic Game 2008

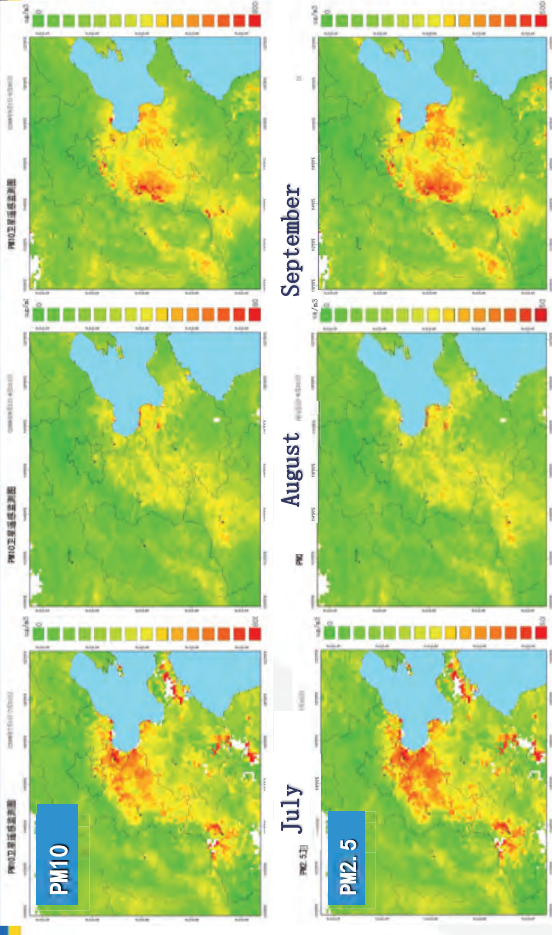
奥运期间颗粒物减排50%以上



空气质量全部达到奥委会要求



# PM10/PM2.5 concentration spatial distribution (2008)



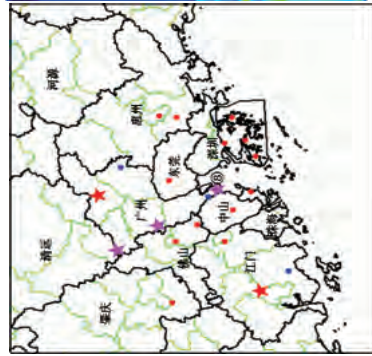
——Tao J., Zhang M., Chen L., SCIENCE CHINA Series D  
Tsinghua University



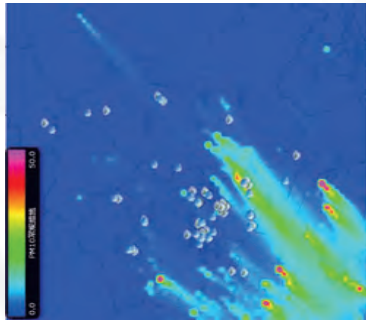
# RAQM: Guangzhou Asia Game 2010



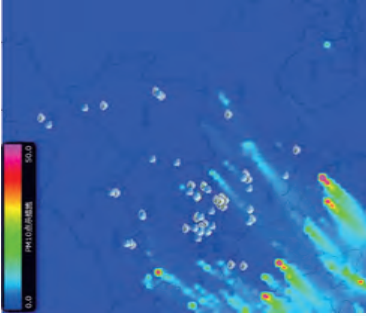
广州亚运联防联控区域



广州强化控制周边城市不强化控制

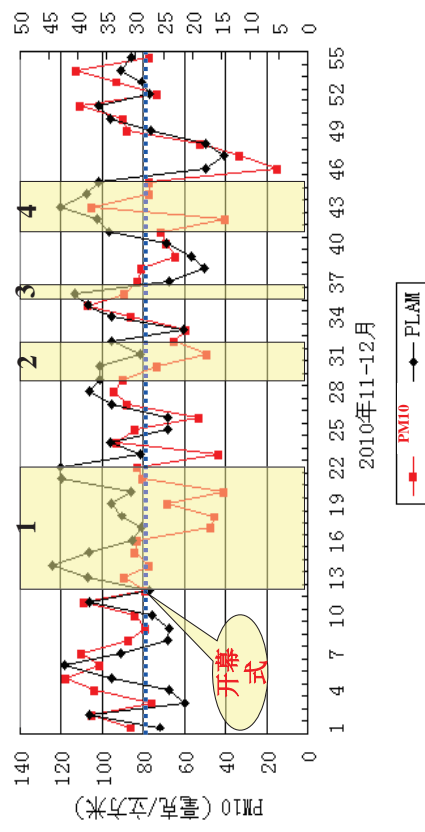


广州和周边城市联合强化控制

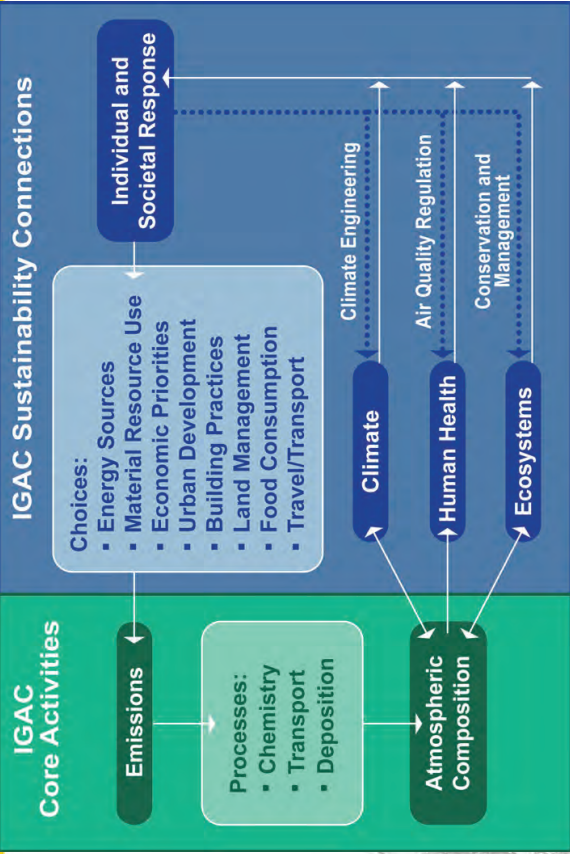


# Guangzhou Asia Game 2010

广州亚运会减排效果分析

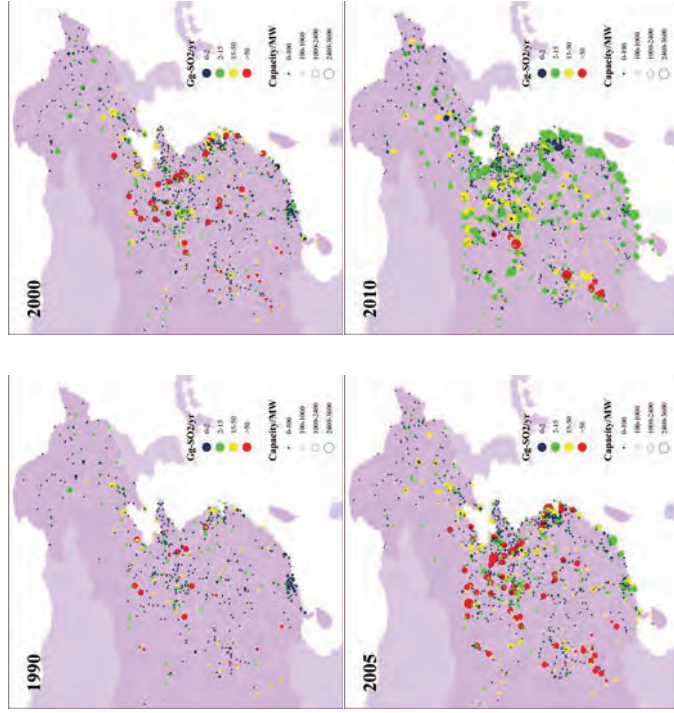


# 排放源清单是国际大气化学研究三大核心领域之一



IGAC (International Global Atmospheric Chemistry) Vision

## A spatially resolved, unit-based emission inventory for power plants



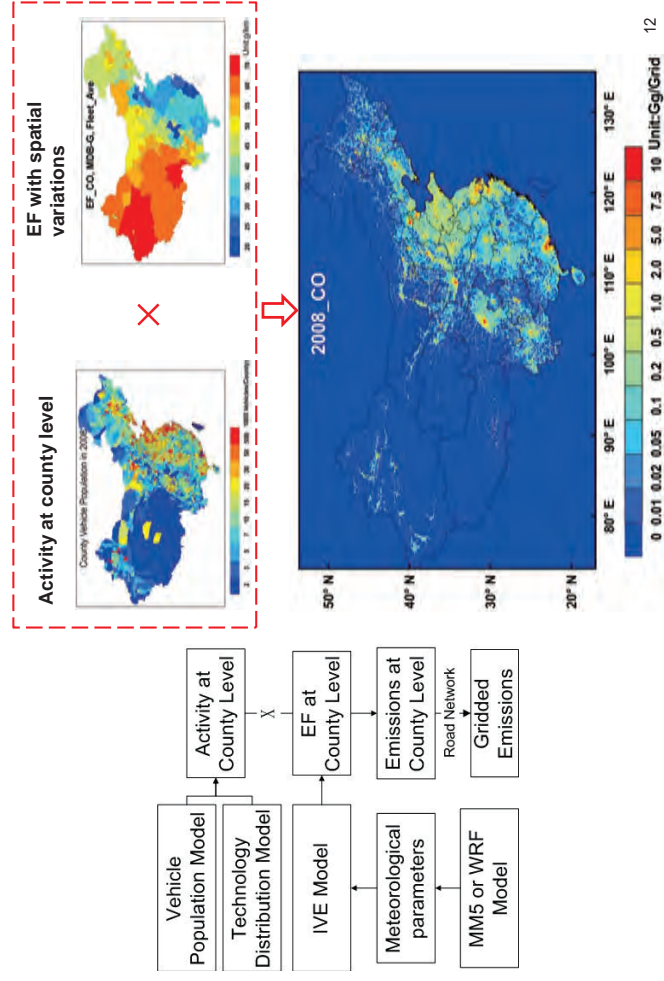
SO<sub>2</sub>

## Emissions data in MEIC database

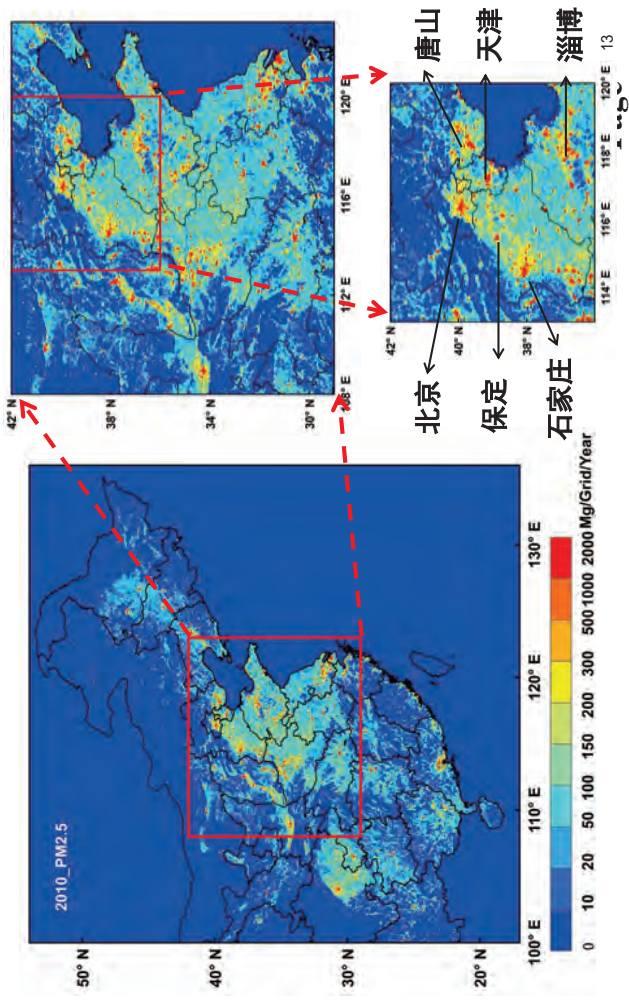
- **Years:** 1990-
- **Spatial domain:** Mainland China
- **Categories/Sectors:** ~800 anthropogenic sources, aggregated to four sectors (Power, Industry, Residential, Transportation)
- **Species:** SO<sub>2</sub>, NO<sub>x</sub>, CO, NMVOC, NH<sub>3</sub>, BC, OC, PM<sub>2.5</sub>, PM<sub>10</sub>, and CO<sub>2</sub>
- **VOC specification:** ~600 individual species, lumped to five mechanisms (SAPRC99, SAPRC07, CB05, CBIV, and RADM2)
- **Spatial resolution:** user defined

**Contact:** [qiangzhang@tsinghua.edu.cn](mailto:qiangzhang@tsinghua.edu.cn)

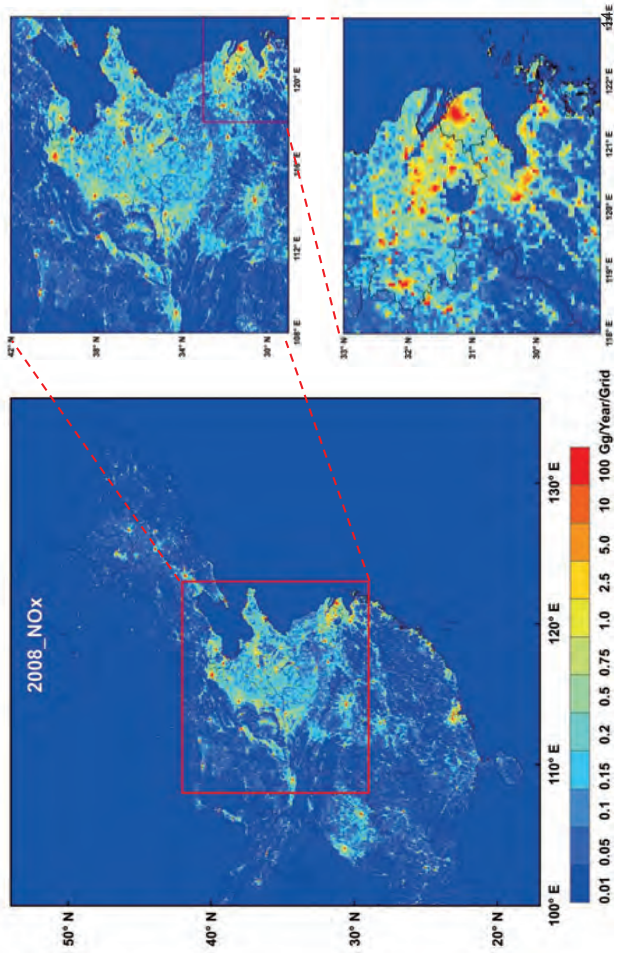
## Approach for a high spatial resolution vehicle emission inventory



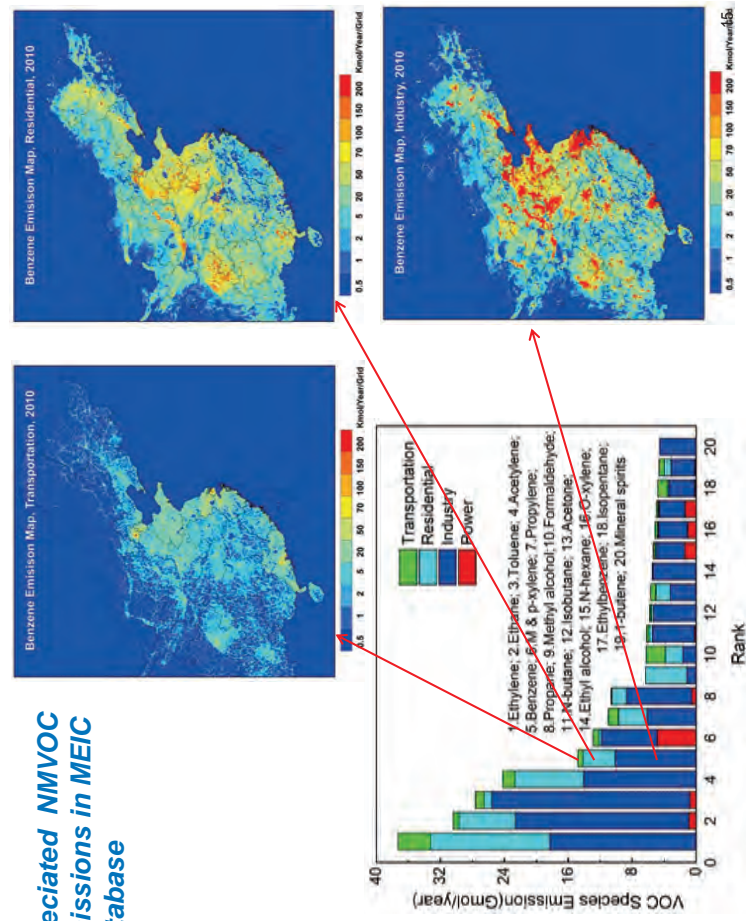
High resolution data in MEIC database: 2010 PM2.5 emissions at 0.05 x 0.05 degree (Not every species can get such high resolution!)



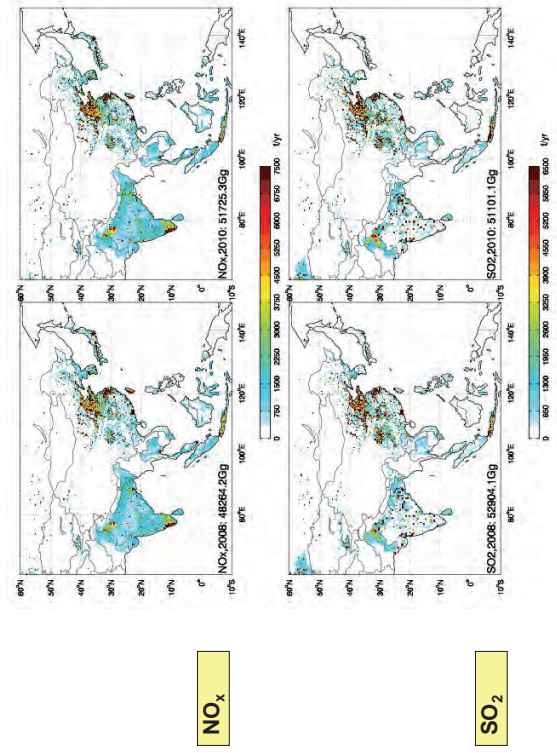
High resolution data in MEIC database: 2008 NO<sub>x</sub> emissions at 0.05 x 0.05 degree (Not every species can get such high resolution!)



**Speciated NMVOC emissions in MEIC database**



**MEIC emission data in MICS-Asia and HTAP**



**MICS-Asia inventory:** mosaic of national emission inventories: China (MEIC), India (ANL), Korea (CPASS), and other countries (REAS)

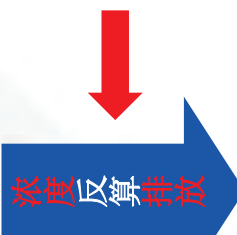
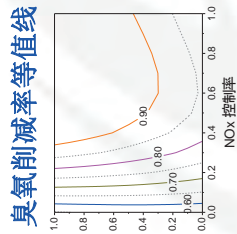
It will be then implemented into HTAP v.2 global emission inventory



# 珠三角地区多污染物协同控制策略的优化

目标	SO <sub>2</sub>	NO <sub>2</sub>	PM <sub>2.5</sub>	O <sub>3</sub>
国家三级	100	80	75	200(1h)
国家二级	60	80	50	200(1h)
WHO IT-1	125(24h)	40	35	160(8h)

所有污染物同时达标

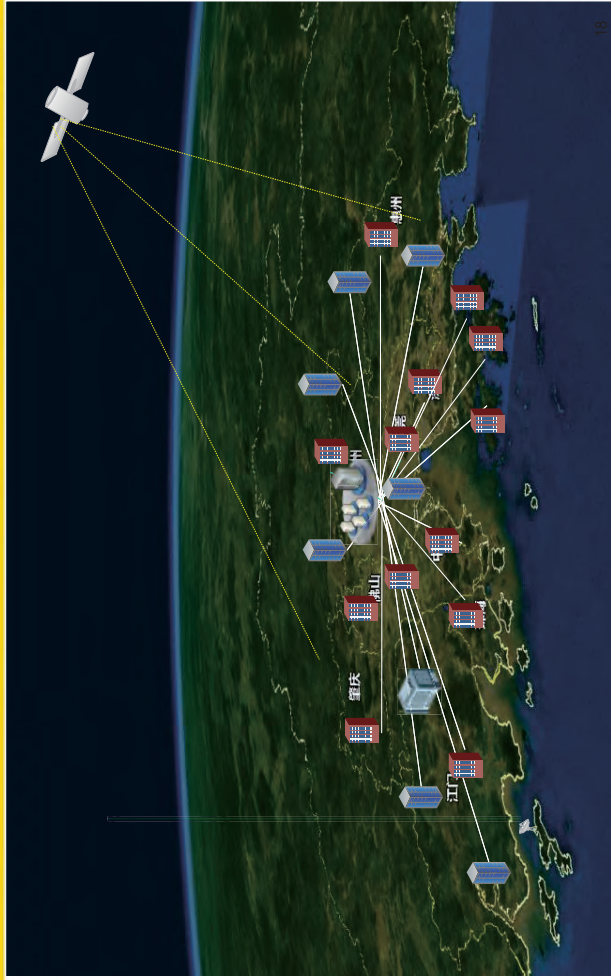


浓度反算排放

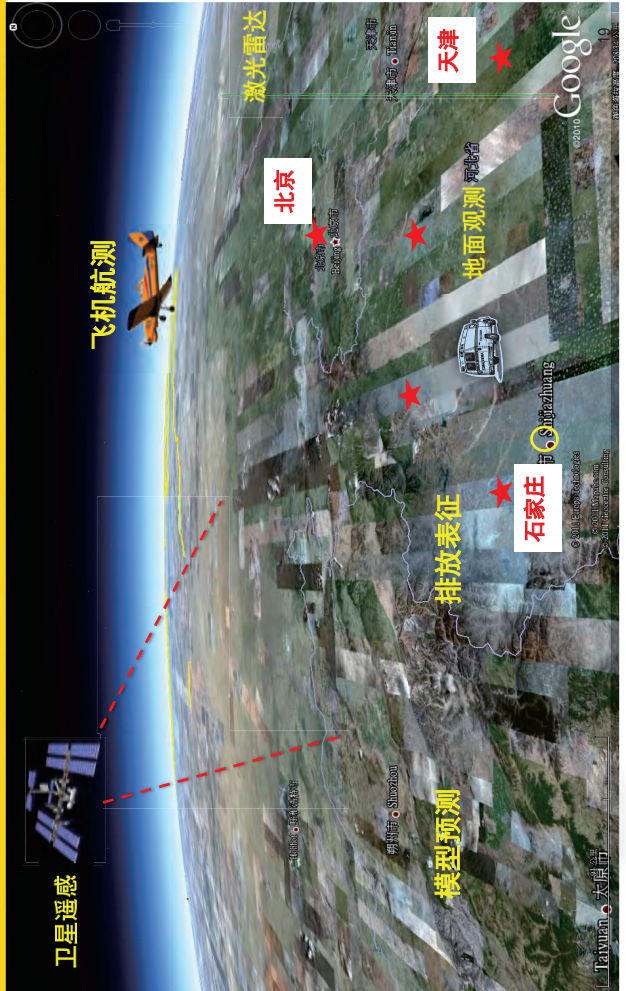
目标	排放削减率(%)			费用(亿元)
	SO <sub>2</sub>	NOx	VOC	
国家三级	0%	50%	25%	6-12
国家二级	30%	40%	40%	60
WHO IT-1	50%	55%	50%	90

多目标-多污染物协同控制  
Tsinghua University

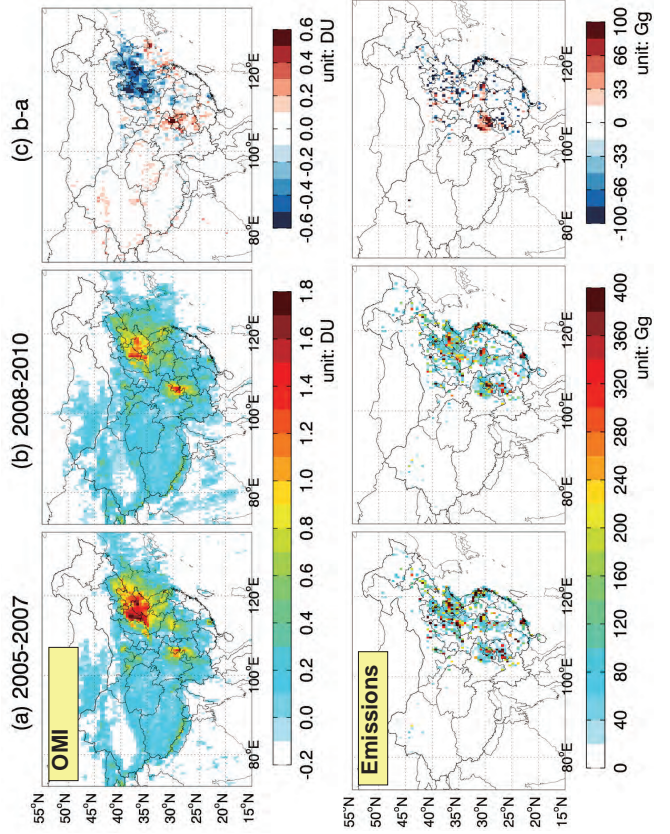
# Monitoring Network System



# Observation Network System



# OMI proved the decreases of SO<sub>2</sub> over Central Eastern China after 2007





## OPINIONS ON PROPOSAL FOR ASIA SCIENCE PANEL FOR AIR AND CLIMATE (ASPAC)

**Noppaporn Panich, D.Eng**  
Environmental Research Institute,  
Chulalongkorn University, Thailand

March, 2014

*The contents of this presentation are the opinions of the author  
and do not reflect the views of IGES.*

## The Proposal for ASPAC

- The Proposed objectives of Asia Science Panel on Air and Climate (ASPAC) are :
  - to synthesize scientific knowledge on air pollution and its relation to climate in the Asian region to reach a common understanding among scientists and policy makers,
  - to develop an international initiative for an integrated approach to air pollution and climate change mitigation.

### **Comment:**

- Should include "coordinate" in addition to synthesize, because the lack of coordination, or coordinating body, appears to be a major problem in SE Asia.

2

## Existing Status

- Southeast Asian countries need scientific capacity building starting from building up university programs.
- ASEAN countries need more public awareness. Existing efforts are not sufficient.
- ASEAN needs a stronger science policy interface. Some previous efforts to develop the science policy interface were not very successful (from APMA 2004 report).

3

## Strategic Move to Link ASPAC and Policy Makers

- Starting with **expected outcome**, strategies and the role of ASPAC are recommended.
- ASEAN will be unified in 2015 as economic cooperation.
- Note that **SE Asia Countries are geographically close together** with the exception of the Philippines and Brunei, so **air pollution can be a transboundary problem**. ASPAC can address this in a number of ways.

4

**Desirable Outcome 1:** The environmental regulation in ASEAN countries to become more unified, especially for the industrial and vehicle emissions:

- **Reasons:** It is beneficial to have unified, or similar level of standards and implementation among the countries with joined boundaries, so that **movement of vehicles and goods can be made within the region** without the guilt that some countries may have lower production cost due to weaker air pollution control.
- International activities and trades will require that **no country can benefit from having lower environmental standards.**

5

- **Opportunities:** Unified ASEAN's vehicles and emission standards, as well as industrial emission standards can be realized.

- **Economic Benefits:** Removal of different social and environmental costs which can eventually become barrier to effective free trade.

- **Environmental Benefits:** Better air quality with no "dumping" of pollutants in less developed countries.

6

**Desirable Outcome 2:** Improvement of Air Pollution Research Capability in ASEAN countries

- **Reasons:** SE Asia has limited number of researchers, capability and resources.
- It is necessary to view the present scientific community which are supposed to be rational, but they may have communication problem when presenting ideas to policy makers whose perception of rationality is different from them because the policy makers are there to make sure that the social and economic well-being of the country stay there, so anything that does not translate to socio-economic conditions shall be secondary.

8

- **Role of ASPAC and Scientists:** Must work together with environmental economists and political scientists. The report to policy makers must be professional and not over-exaggerate.

- **ASEAN's Role:** If ASEAN adopts a directive on this, then the member countries will follow.

- **Threats:** Since this will prevent inequality among nations in the unified ASEAN, and will actually promote economy and images, **there should be no threat.**

7

- **Opportunities:** In order to win policies in air pollution in Southeast Asia, scientists under ASPAC's coordination must work closer with economists and political scientists and will get realistic reports/proposals which represent co-benefit.
- **Economic Benefits:** Coordinated researches reduce cost, and resources can be shared and utilized more effectively.
- **Environmental Benefits:** Better air quality with effective policies accepted and implemented by politicians.

9

- **Role of ASPAC and Scientists:** The objective in policy must be set and efforts spent to achieve that. SE Asia learns that there have not been enough researches in air pollution that can be combined to make effective results to convince policy makers in the past, so there should be certain organization acting as research coordinator. The research coordinator will be able to control research direction if it has policies-direct as the objective.
- **ASEAN's Role:** If ASEAN is presented with sufficient information and backed up by quality researches, it will support the policies, then the member countries will follow.

10

- **Threats:** It is also most likely that scientists in other ASEAN countries will agree to the ASPAC proposal.
- However it is probably only Singapore, Indonesia, the Philippines, Vietnam, Malaysia and Thailand which have experienced air pollution and have stronger research capability will be able to do extensive research in this area.
- Any agreements must first have a willing host and must have clear objectives.

11

## Other Recommended Actions

- ASPAC can act on coordinating research in air pollution with inter-disciplinary approach. This is limited to supporting and directing researches in specific area which will lead to policy. No direct funding for research itself.
- There are large difference between the air pollution geography and policy making in SE Asia in comparison to the NE Asia, it is recommended that research topics should be focused differently even though the main coordinating body will cover both regions.

12

## Opinions on Structures of ASPAC

- Look at Intergovernmental Panel on Climate change (IPCC):
  - The IPCC states that “it is a scientific body. It reviews and assesses the most recent scientific, technical and socio-economic information produced worldwide relevant to the understanding of climate change. It does not conduct any research nor does it monitor climate related data or parameters.”
- Thousands of scientists from all over the world contribute to the work of the IPCC on a voluntary basis. Review is an essential part of the IPCC process, to ensure an objective and complete assessment of current information. IPCC aims to reflect a range of views and expertise.

13

- The useful topics for SE Asia should include air pollution modeling, which had not been done in depth because of the lack of surface and upper quality meteorological data. This problem can now be partially solved by the use of regional meteorological models but verification and validation are needed.
- This will help in haze reduction strategy for Indonesia, Malaysia, Singapore, Thailand and Myanmar as well as supporting acid rain watch in the region from south China to Thailand, Myanmar and Laos PDR.

## Analysis of IPCC's Strategy

- Analysis of IPCC's strategy and results indicates that. policy makers will be more positive if the scientific researches involve international cooperation with experts from prominent scientific community and developed countries
- In similarity to IPCC, ASPAC should review, coordinate and assess scientific, technical and socio-economic information and review them to ensure an objective and complete assessment of current information for East Asia.

15

- In short, the policymakers in SE Asia will likely support the strategy as long as they
  - a) are supported by prominent international scientific communities,
  - b) are parts of international commitments and,
  - c) are going to support economic and well-being of the people.
- Asia Science Panel for Air and Climate (ASPAC) would fit well for these roles and objectives.

16

## Funding

### Purposes

- To create a forum and assists in symposiums, workshops and publications.
- To provide ample opportunity for the regional scientists to present their findings.

### Sources

**Initial Stage:** International organizations and developed countries.

**Long Term:** - From the countries in the region.  
Funding for air pollution research for policy should be mainly from the government.  
- From private sector linkages.

17

- The involvement and coordination of international organizations such as ESCAP or UNEP to ASPAC will depend on whether they feel confident that all countries involved will be eager to participate and will yield desired results.

- The ASPAC and scientists probably have to do systematic research for a few years, with the scientific panel and build from there towards international acceptance.

99

## Key Points That Should be Considered by ASPAC

- Cobenefits should focus on environment and economy. Economic analysis should be prioritized.
- ASPAC needs to include economists and policy scientists to assess cost effectiveness and political feasibility.
- ASPAC should provide research direction (and coordination, if possible).
- ASPAC needs to consider differences between Northeast and Southeast Asia.

19

## Key Points That Should be Considered by ASPAC

- New research should be supported as necessary to fill the gaps, ASPAC should not just assess existing researches.
- ASPAC should consider cost effective strategy to operate. For example, modeling research, organizing its own online journal, and focus group workshops can be very effective.

20

**THANK YOU FOR YOUR ATTENTION**



## Some personal thoughts about ASPAC

My takes from involvement in  
LRTAP, IPCC, SLCPC/CCAC, EU, etc. processes

Markus Amann, IIASA

1

101

- ‘Opportunities and benefits for all’ instead of ‘blame matrices’
  - Beyond a description of the transboundary nature of pollution transport
  - Integrative, interdisciplinary composition of ASPAC
  - Involvement of health, ecological, economic, social and development sciences
- Focus on policy questions from decision makers, action-oriented
  - SLCPC report: (Benefits from) 16 measures instead of uncertainties of BC
- Setup of ASPAC will be important for success
  - Supra-institutional - not linked to a single policy framework, but involving scientists from all science panels?
  - Internationally inclusive (joint ownership of results)
  - Strong scientific leadership to force (scientific) integration

3

ASPAC:

GREAT IDEA!

2

ASPAC

*A necessary,  
but not sufficient*

condition for solving the air pollution  
problem in Asia

Politics and policy will remain decisive

4



## List of Participants

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