

Figure 12. Simulation of PM concentration caused by traffic emission in Beijing in a winter night

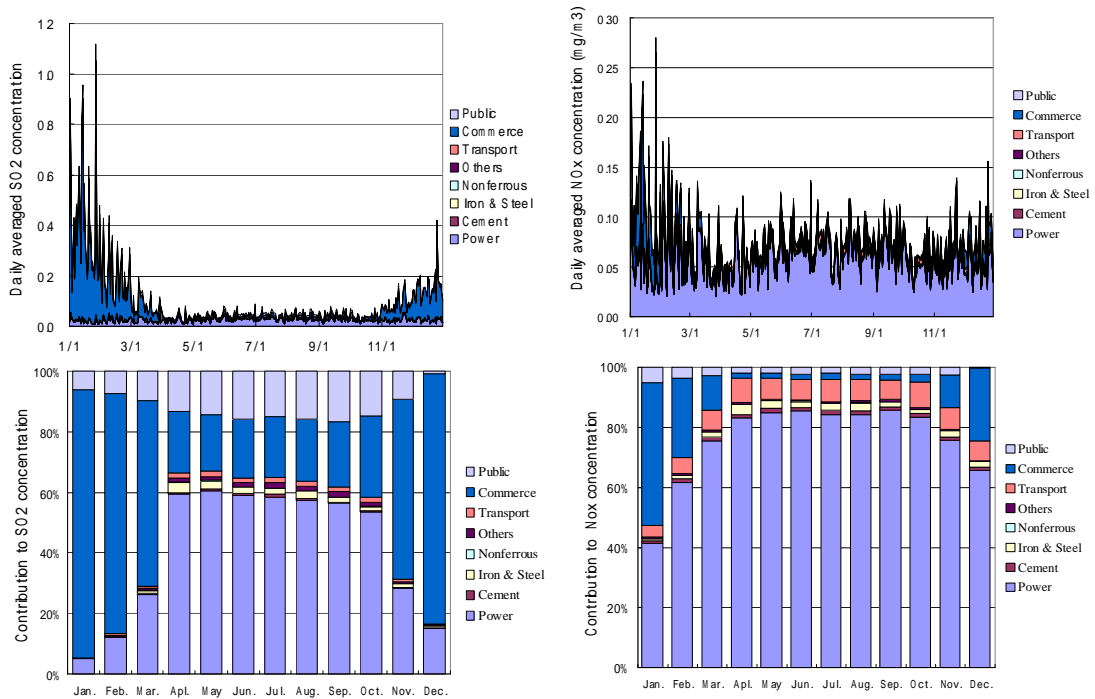


Figure 13. Seasonal variations in SO₂ and NO_x concentrations in Beijing

2.6 Capacity-building initiatives by the IEA sub-project in selected Asian countries

A capacity-building workshop was held in November 2004 to train researchers from China, India, and Thailand in the use of the AIM/Material model for environmental policy analysis at the country level. After the workshop, a team from each country carried out analysis using the model and presented its results. Figure 14 shows a result from the application of the AIM/Material model to China. Four scenarios to assess the impacts of SO₂ policies were developed — business as usual with no special SO₂ policy (BAU), investment and sulfur tax imposition (INV), investment and emission cap imposition (INV+CAP), and enhanced investment and emission cap imposition (EINV+CAP). For the majority of economic sectors, the minimum decline in output is expected to occur under the last scenario involving enhanced investment and a cap on SO₂ emissions. SO₂ emissions are expected to decline more under the last two scenarios (i.e., the ones involving investment together with an emission cap) than under the scenario with investment and sulfur tax. This shows that an innovative policy involving a combination of regulations imposing a limit on emissions together with enhanced supply-side investments in various sectors can achieve the dual objectives of mitigating emissions and economic costs.

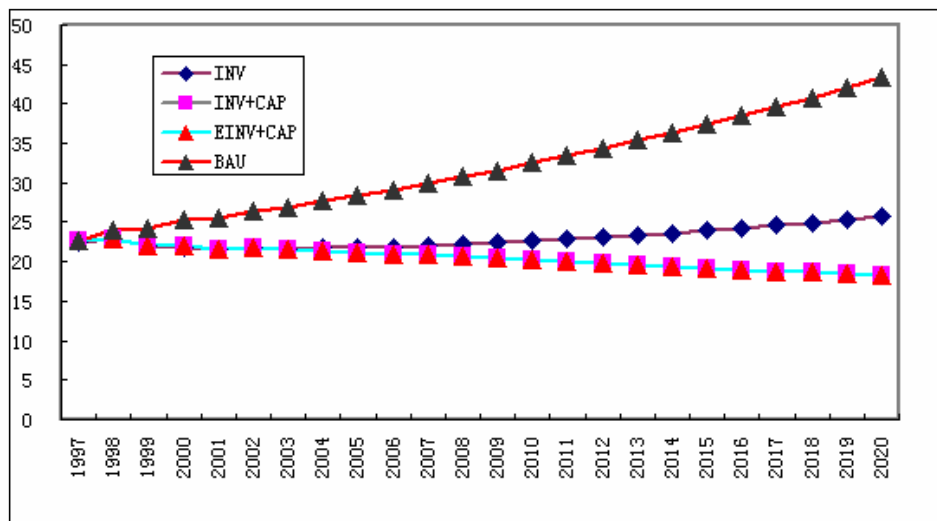


Figure 14. Assessment of SO₂ policies in China using AIM/Material

3. Application of APEIS-IEA activities

3.1 How can the APEIS-IEA products be used for policy formulation / implementation work?

APEIS-IEA tools have been directly used for providing input to policy analysis and implementation in selected Asia-Pacific countries. For instance, the use of IEA tools to analyze Beijing's air pollution contributed to the National Report on Climate Change in China. Local air pollution analyses carried out by IEA collaborating teams in India and Thailand have also been providing inputs to their national policy forums.

Another key area in which IEA tools have contributed to policy is the assessment of clean development mechanisms (CDM). CDM is one of the flexibility mechanisms of Kyoto Protocol that allows emission trading reduction projects creating sustainable development in developing countries to generate certified emission reductions for use by the investors. Analysis using IEA tools by collaborating teams in China, India, Thailand, and Korea has provided robust estimates of marginal costs of mitigation in various sectors in those countries. These estimates have been useful in deciding benchmarks for CDM projects.

3.2 What has APEIS contributed to the scientific community?

Each of the IEA tools is a new model developed to assess certain environmental issues and answer a specific set of policy questions. These tools have been designed to be used both independently and complementarily. Various combinations of these tools provide a comprehensive framework to assess multiple dimensions of environmental problems. Such dimensions could include technologies, institutions, policy instruments, regional scope, time horizon, GHG emissions and other environmental pollutants. For instance, the SDB and AIM/Material can be used together to design business-as-usual and intervention scenarios and assess their impacts on emissions of various gases, costs, macro-economic indicators such as changes in GDP and capital formation, health and other developmental indicators. The AIM/Energy and AIM/Material models can be used together to assess impacts of policy measures such as emission constraints, carbon taxes, or permit trading, on technology mix, fuel mix, and macro-economic indicators. Such analyses can be undertaken over short or long runs and at the level of city, country, or region.

The IEA models and database are especially suitable for application to developing countries where, on the one hand, collecting extensive and reliable data is difficult but, on the other hand, innovative options are expected to play an extremely critical role, since those countries are witnessing rapid socio-economic transitions. IEA tools are designed to facilitate estimation, storage, and use of relevant data for environmental assessment in such contexts. This characteristic is not adequately present in other existing models. This is one of the reasons why IEA tools are already being extensively used by researchers in major developing countries of the Asia-Pacific region, such as China, India, and Thailand, and are providing inputs to their policy discussions. IEA tools have helped in the scenario development processes in these countries.

3.3 Cooperation with international organizations

The APEIS-IEA sub-project has been actively contributing to several international projects, such as CAPaBLE, UNEP/SEFII, and UNEP/GEO3 & GEO4. APEIS-IEA tools are providing useful analyses in the CAPaBLE project for assessing mitigation options and sustainable development opportunities in developing countries. In the UNEP/SEFII Great Mekong project, IEA tools such as the SDB/Water Management Model and AIM/Air are proving useful for contributing to the database and for analysis of countermeasures for assessing regional environmental problems of water, air, waste, and forests. IEA tools have also contributed to the construction of future scenarios for emissions of CO₂, SO₂, and NO_x and generation of municipal solid waste in the UNEP/GEO3 project. Figure 15 shows the APEIS session in progress at the CAPaBLE Workshop at Asian Institute of Technology, Bangkok, in 2004, and the participants of the UNEP/SEFII Workshop held in Hanoi in 2005.



Figure 15. The APEIS session at the CAPaBLE Workshop (top), and participants at the UNEP/SEFII Workshop (bottom)

APEIS-IEA has been continuously collaborating with a network of organizations in the Asia-Pacific region in order to develop tools to suit the diverse social, institutional, and economic contexts of the region, and to carry out assessments useful to its policy making processes. The list of participating organizations and details on the Asia-Pacific Integrated Model can be accessed at <http://www-iam.nies.go.jp/aim/>.

Plan of APEIS-IEA Phase II

In APEIS phase II, the IEA sub-project aims to continue its work of enhancing tools and their application to environmental assessment in the Asia-Pacific region. New work on tool enhancement and application is expected to include:

- (i) Building a comprehensive inventory of innovative institutional and management options in the SDB.
- (ii) Development of country-specific innovation scenarios supported by the SDB.
- (iii) Extension of AIM/Material and other AIM tools to assess land use, material stock balance, and options to achieve national environmental and developmental goals.
- (iv) Enhancement of feedback linkages between the SDB and AIM/Material for more integrative assessment of environmental and national development goals.
- (v) Development of feedback between the SDB and other IEA models in order to make the models more interactive and relevant for policy making processes in Asia-Pacific countries.
- (vi) Extensive capacity building through use of IEA tools and making them accessible to researchers and policy makers in the Asia-Pacific countries.
- (vii) Continuation of contribution to international activities such as UNEP/GEO4, IPCC, and UNEP/SEFII.

Figure 16 shows the proposed interlinkages among the SDB, AIM/Material, and other IEA models to be developed in APEIS phase II. The SDB engine will be developed to interface with other IEA models. For instance, service demand drivers for SDB will be provided directly by AIM/Material. AIM/Material will, in turn, take relevant data from other IEA tools, such as efficiency, emissions, and cost parameters from the SDB and the rate of technological improvement from AIM/Energy. The SDB engine will supply basic technology characteristics and estimates of technology shares to AIM/Energy for calculation of optimal investment trajectories in various sectors. Thus, the new interface enhancements will enable all IEA tools to be used together for a more integrative environmental assessment and scenario development for a country.

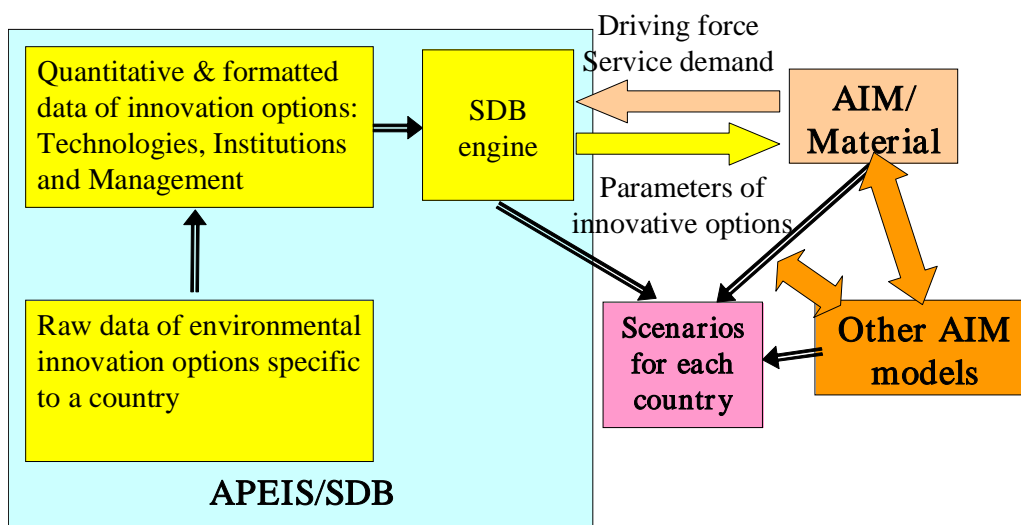


Figure 16. Proposed interlinkages between the SDB, AIM/Material model, and other IEA tools