# Appendix 4

# Proceedings of the 2nd Workshop

March 2009

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Appendix 4: Proceeding of the 2nd Workshop

Workshop of ERIA Research Project

on

"Project toward the
"Sustainable Automobile Society" in East Asia"

Economic Research Institute for ASIAN and East Asia (ERIA), Indonesia

Bangkok, Thailand
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## 1. Presentation from ERIA WG Leader "Sustainable Development and Economic Valuation"

University of Indonesia LPEM-FEUI
Arianto A. Patunru
ERIA Leader for Working Group on Sustainable Automobile Society

Economics and the environment are not supposed to be independent one another. In fact, economic activities take place in environment and their outcomes are both affected and affecting the environment. This is true particularly because both consumption and production - the two basic economic activities - use resources from the nature as their inputs. Furthermore, those activities generate both output and waste. The capacity of the environment to assimilate waste will determine the future condition of the environment and hence its ability to support economic activities. Finally it should be mentioned that economic activities end up at the provision of utility to economic agents. Here too, the environment can have direct impact. That is, amenity may or may not enter directly into one's utility function. Recognizing the interrelationship between environment, natural resources, consumption, production, and utility is necessary to put economics into the realm of sustainable development, i.e. development that strikes the balance between economic activities and environmental preservation as well as between generations.

In order to appreciate the role of the environment and natural resources in economic context, one needs to have a framework. This framework would preferably be able to lend itself into the widely used cost-benefit analysis. Here the problem lies: it might be easy to calculate the cost of improving the environmental condition (e.g. building up a giant air purifier, water treatment, etc). But that is just half of the materials to come up with sensible cost-benefit assessment. To justify spending of public money for say, cleaning up the air, there has to be a justification to the proposed costs. That is, we need to calculate the expected benefit of such action. Alas, this is no easy task. Measuring the economic benefits of consuming food or clothes is easy, for they are 'market goods': goods traded tangibly and have price tags on them. The direct proxy of their benefits is simply their market price. But for environmental goods, this is not the case. One needs to apply a particular technique to attach a value to such 'non-market' goods as a proxy of the benefit that later can be contrasted against the cost. That is the objective of economic valuation.

Economic valuation can be based on two different sources of data. First, stated data set. This information is collected via direct question to respondents. Second, revealed data – information is obtained by observing what an economic agent does. There was a time when economists tend to be skeptical on the former, as economics is a 'science of observation'. However, experience has dictated that not every time and for every case historical data are available. This is particularly true for the cases of non-market goods such as environmental quality. Therefore, economists have to rely on stated data: surveys, questionnaires, interviews are employed. Recently, there has been an increasing amount of researches using both resources in combination. One message from these studies is that whatever data resource is employed, what matters is how one can come up with a sensible measure of the value of improving the quality of the environment. The principle here is that, you cannot preserve the environment if you have no idea what it is worth. To know

the value, you need to calculate how much benefit people will enjoy on top of the cost of the improvement. That again is the use of valuation.

## 2. Keynote Speech: "Sustainable Transportation in Asia"

CAI-Asia Center
Sophie Punte

The Clean Air Initiative for Asian Cities (CAI-Asia) was established as by ADB, WB and USAID in 2001 as a multi-stakeholder initiative to improve the air quality in Asian cities through sharing experiences and building partnerships. In 2007, the CAI-Asia Center began operating as an independent organization with headquarters in Manila, Country Networks in 8 Asian countries and over 120 partner organizations.

Trends in transport for developing Asian countries are pointing in the wrong direction: the number of vehicles is growing exponentially between now and 2035, vehicles on the road will become bigger and more powerful, and as it takes about 15 years for the vehicle fleet to turn over the options to do something about improving fuel quality and greenhouse gas and air pollutant options are limited. Furthermore, the share of public transport and non-motorized transport compared to that of private vehicles is going down in virtually all developing Asian cities.

As a result, $CO_2$ emissions that cause climate change are rising steeply. While average urban air pollution levels will reduce until about 2025 due to stricter vehicle emission and fuel standards, pollution levels are set to rise again after 2025 due to the exponential increase in vehicle numbers and the uncertainty of additional policies. This adds to health costs associated with air pollution. A key barrier to fuel efficiency and emission reduction is the fuel subsidies that are still available in several developing Asian countries, especially for diesel, although some countries have or are eliminating these.

A sustainable transport framework is needed that includes actions at the individual and government/policy levels, with 4 components: transport planning and demand management; inspection and maintenance, cleaner fuels; and emission standards and vehicle technologies. The "Road Map for Cleaner Fuels and Vehicles in Asia" provides a good starting point for government agencies that want to address transport issues. Case studies show that many measures to improve the fuel economy and reduce the emissions from vehicles are cost effective. Some of the key trends relate to electric bikes/vehicles, mass rapid transit systems, alternative fuels (e.g. NGV), and transport demand management.

For policies to be effective, three things must be considered. First, policies and fuel pricing need to be managed hand-in-hand. Second, policies that combine addressing $CO_2$ and air pollution at the same time are more effective and cost-efficient because both emissions show a strong correlation in growing Asian cities (and thus it is important to catch cities before they grow!). Third, transport measures in cities should be considered in the context of sound urban planning, and take into account the ability to scale the adoption of measures up from a few cities to many cities in Asia.

### 3. Keynote Speech : " Air Pollution Reduction”

Pollution Control Department
Supat Wangwongwatana

With respect to Emission standards, ASEAN Countries in general Adopted the European Standards. Representatives of ASEAN countries met in a workshop in Singapore in 1992 in an effort to harmonize standards related to air pollution. It was decided to adopt European emission standards for new vehicles as reference standards for ASEAN countries. Implementing date of emission standards might be different from one country to another.

For introduction of emission standard, it is very important to give oil refineries field a lead time before emission standard introduction. It is also important to promote stakeholders an achievable level of emission standard.

Reviewing fuel economy and greenhouse gas emission standards around the world is important. Collecting fuel economy data from light duty diesel vehicle and passenger vehicle, discussion about fuel economy value, test method and implementation with car manufacturer and other government agency (Current status) are some of the efforts towards managing auto-exhaust emissions.

### 4. Keynote Speech: "Technology for Air-Quality Improvement in Thailand"

The Automotive Industry Club, The Federation of Thai Industries
Thanawat Koomsin

To reduce pollution from automobile, following items are essential:

- Driving behavior improvement
- Proper maintenance of vehicle as recommended in owner booklet.
- Improve tailpipe emission by implementing ECE standard, step by step.
- Improve fuel quality especially Lead and sulfur content. (Emission level and Fuel quality must match)

The purpose of the World Wide Fuel Charter is to promote greater understanding of the needs of motor vehicles for fuel quality that minimizes emissions and obtains the best vehicle performance. The sulfur and emission standards are reviewed due to the recent progress of engine and emission control technologies. The Charter recommends fuel specifications for four categories of vehicle technologies, emissions standards and markets around the world. The quality upgrades would be associated with fuels targeted for markets with minimal, stringent, advanced and further advanced requirements for emissions control. Category 4 has been defined as 10 ppm sulfur fuel to meet the needs of advanced and future vehicle technologies. With respect to effect from ethanol and biodiesel, normally ethanol and biodiesel will be less harmful than gasoline and diesel fuel. However, cost and technology on both of them need to be further studied and need continued development. Ethanol needs to be viewed in relation to food & energy balance. Biodiesel – if more than 5% mix, the need to consider using 2nd generation biodiesel (GTL or BHD).

As next step, new automobile technology should improve emission and reduce $CO_2$. FFV vehicles, which can fill-up with E85, Hybrid car which can use both fuel & electric

Plug-in or EV, which only powered by electric should be promoted. It is necessary to target ZEV in the future.

## 5. Country Report : Korea "Policies for Air Quality Improvement in Korea"

Seoul National University
Seung-Young Kho

Energy consumption of Korea in 2007 was 236,454 thousand toe (Tonnage of Oil Equivalent) and had increased 214% since 1988. 84.5% of the total energy consumed is fossil energies. Transport sector consumed 37,068 thousand toe, which is 20.4% of the total energy consumption of Korea in 2007. 78.8 % of the transport sector's energy consumption is from road transport sector. No electric- and Bio-energies are used for road transport and special effort s should be given to introduce and propagate the use of these energies in Korea.

$CO_2$ emission of Korea in 2006 was 599.5 million $CO_2$-eq tons and had been more than doubled the emission in 1990. 18% of $CO_2$ emission comes from the transport sector. Even though the $CO_2$ emission of Korea is quite substantial, Korea was classified as a Non-Annex I country in 1997 Kyoto Protocol. But, post Kyoto, it is expected for Korea to be inevitable to avoid to reduce GHG mandatorily. In spite of some measures to reduce GHG in Korea, especially in Seoul Metropolitan Area, further efforts should be given to adopt effective and mandatory measures to reduce GHG.

## 6. Technical report: India "Air Pollution Reduction Policy in India"

National Environmental Engineering Research Institute (NEERI-CSIR)
Nitin Labhsetwar

Indian automobile industry is steadily growing and produces a variety of vehicles (more than 10 million vehicles produced during 2007-08), while the Government policies do not allow the import of re-conditioned / used vehicles. Production of two-wheelers still dominates with more than 75% share. The Central Motor Vehicle Rules (CMVR) defines four different categories of vehicles and other rules including that for fitness of commercial and non-commercial vehicles, taxation etc.

The estimated and projected vehicle km/distance suggest continued growth for taxis and personalized transport, while Delhi shows some impact of introduction of metro (mass transportation). There exists good scope for improved mass transportation in many Indian cities.

Fuel quality management is done by the related Ministry and Oil companies, while local Government is also responsible for enforcement issues. Use of CNG is steadily increasing in National Capital Region and also being introduces in other areas. Other alternative fuel options are mostly at demonstration stage.

An "Automotive Mission Plan 2006-2016" has been prepared, while an ambitious I&M project called NATRIP is also being implemented, which will prove useful to improve I&M issues in India.

Considerable efforts are being made in India, an integrated approach and effective implementation will be important to meet future challenges related to automobile pollution management.

## 7. Technical report: China "Air Pollution Reduction Policy in China"

Tsinghua University
Lixin Fu

Since 1999, Beijing has been working hard to push forward stricter emission standard for new vehicles sold and used in Beijing, from Euro 1 implemented in 1999 to Euro 4 in 2008. Fuel quality standards in Beijing have also been set in parallel with emission standards following the EU specifications, with 50 ppm sulfur in both gasoline and diesel in 2008. Starting from 2001, Beijing has introduced a loaded test for the application in I/M program. Scrap page of old dirty vehicles are also largely achieved by restricting their use in city center, together with a fiscal incentive to encourage earlier retirement. Beijing has already set up a CNG bus fleet of 3750 by 2008, diesel hybrid bus and hydrogen fuel-cell bus has been operated in pilot program. The subway system is planned to be significantly expanded in the future, from 200 km in 2008 to 560 km in 2015. The fleet average emission factors in Beijing have decreased by 23% to 76% for various vehicular pollutants after 10 years effort. However, due to the effect of motor vehicle number increase, the total emissions are almost stabilized during this period. Ambient air quality has been improved by 10-30% for vehicular pollutants. A whole package of air pollution control measures have been implemented during the 2008 Beijing Olympic Games period, with special focus on traffic control. All yellow-labeled vehicles (dirty vehicles) are not allowed to drive, while other vehicles have to follow odd/even numbers of their license plate to reduce half driving days. A 32% reduction of traffic volume and an increase of average speed from 25 to 37 km/h are observed. From monitoring campaign at roadside during different period in 2008, air pollution reduction related to traffic emission are reduced by 21% to 75%, as a fact of all control measures and favorable meteorological conditions.

## 8. Technical report: Malaysia "Health Effects in Malaysia"

National University of Malaysia
Mazrura Sahani , Er Ah Choy

Among the various environmental risk factors, indoor smoke from burning biomass fuels or coal for cooking and heating is the most significant risk factor in the Western Pacific Region, causing some 500,000 deaths every year. The second significant risk factor is urban air pollution attributing to some 370,000 deaths. The third one is unsafe water and poor sanitation with an estimated 77,000 deaths annually.

The WHO (2002) estimated that urban air pollution contributed to approximately 800,000 deaths and 6.4 million lost life-years worldwide in 2000, with two-thirds of these losses occurring in rapidly urbanizing countries of Asia.

A study on 'The Health Effects of the Ambient Air Pollution, in Klang Valley, Malaysia' aims to build a statistical model that could predict the risk of daily criteria air pollutants variation to mortality in Klang Valley. From preliminary result, it is found that

the total mortality and the natural mortality produced excess risk of 0.0031 and 0.0038 respectively for every 10ug/$m^3$ increment in PM10 at lag 1. This indicate that the effect of today's every increment of 10ug/$m^3$ PM10 could lead to the excess in 0.31% and 0.38% of tomorrow's total and natural mortality.

## 9. Result of Supporting Study

Japan Automobile Research Institute
Kiyoyuki Minato

Concerned with the increasing levels of air pollution caused by motor vehicles in Asia's major cities, JARI initiated a project on reducing vehicle emission in 2004. In supporting study, based on vehicle type, traffic volume, average speed, and emission factor, air concentration is estimated. This estimation method is applied in Bangkok. There is still room for improvement, but it is applicable for research for next year.

## 10. Result of the Database

ERIA coordinator
Keiko Hirota

The results of database were shared with all the members. With respect to vehicle category, more popular vehicle type, more detail category exists. In general vehicle type is categorized by engine displacement, vehicle model and use purpose. With respect to I&M, commercial vehicle is inspected with top priority. In some countries, inspection for private vehicle is applied after certain vehicle age. All member countries have FQM, but sometimes the problem is operation and implementation. There is still lack of information from several countries. It is necessary to improve the quality and quantity of database. Following operation problem, a seminar of FQM needs to be organized to share information.

## 11. Proposal for Next Year

Japan Automobile Research Institute
Kiyoyuki Minato
ERIA coordinator
Masahiko Hori

ERIA WG secretariat explained overview of research collaboration and a forum. Budget is not decided yet so that scale of research could not be explained. As soon as the budget is decided, ERIA WG secretariat will select some candidate country. For the improvement of database, it is necessary to request submission of data, which was not collected this time. Next forum would be held in November or December of 2009. Considering the economic recession, the forum aims to share the future projection by Mr. Okuda, (Toyota Motor), Mr. Tata (TATA Motor) and ASEAN secretariat. FQM and other issues will be discussed in the proposed forum.