



CONCEPT PAPER

For Workshop on Partnership for Clean Fuels and Vehicles for East Asia

Organized by

Partnership for Clean Fuels and Vehicles,
United Nations Environment Programme, and
Regional Resource Center for Asia and Pacific (RRC.AP)

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I. Background

At least 1 billion people are exposed to outdoor air pollution that exceeds WHO standards. The health cost of urban air pollution in developing countries is estimated to be around 5% or more of GDP, as air pollution is connected with increased cases of asthma, chronic obstructive pulmonary disease, cardiovascular disease, and lung cancer. Poor air quality in urban areas has been directly linked to almost 0.8 million premature deaths annually.

Much of the urban air pollutants come from the transportation sector. Vehicles, both gasoline and diesel, emit significant quantities of nitrogen oxides, sulphur oxides, ozone, particulate matter (PM), carbon monoxide, hydrocarbons and, where leaded fuel is still in use, fine particles of lead compound, all of which are harmful to the environment and human health. Hydrocarbons and nitrogen oxides form ground-level ozone which can irritate the respiratory system, reduce lung function and make it difficult to breathe deeply, and inflame and damage the lining of the lungs, which may lead to permanent changes in lung tissue. Carbon monoxide reduces the delivery of oxygen to the body's organs and tissues when it enters the bloodstream through the lungs. Fine particles of lead compound are especially harmful to children under age six, interfering with the developing brain and other organs and systems. Sulphur oxides, especially when present as particulate sulphates, have impacts on respiratory health and asthma, result in acidification of the local environment, damaging buildings and urban greenery, and decrease the life of the vehicle's engine.

A combination of high-sulphur diesel with older vehicle technology leads to the worst scenarios, emitting unsafe levels of smoke, soot, and PM. PM from vehicles is mostly fine and ultra-fine in size, and can be inhaled deep into the lungs. These are associated with aggravation of respiratory and cardiovascular disease, asthma, acute respiratory symptoms, increased risk of lung cancer and premature death. Projected vehicle growth in urban areas will further exacerbate air pollution problems unless steps are taken.

These air pollutants can be significantly reduced by the use of clean (unleaded and low-sulphur) fuels, improved engine technology and after-treatment devices. For example, lead phase-out from gasoline immediately reduces the emission of fine lead particles, and makes it possible for lower-emitting engine and vehicle technologies (e.g. catalytic converters) to be applied, which further decreases air pollutants. Fortunately, lead has been eliminated from gasoline in most countries worldwide today.

Lowering sulphur in fuels also contributes directly to the reduction of air pollutants, such as sulphur dioxide (SO₂) and sulphate PM from all vehicles, and decreases maintenance costs, as high sulphur levels cause corrosion of fuel injector and piston rings, oil acidification and overall engine wear. Cleaner fuels also allow the introduction and increased effectiveness of vehicle emission control technologies, resulting in less vehicle emissions of carbon monoxide, hydrocarbon, nitrogen oxide and PM. For example, exhaust gas recirculation technique, which is a widely used engine modification to reduce nitrogen oxides emission, needs less than 500 parts per million (ppm) sulphur levels in fuel, because the control valve of the system corrodes with higher sulphur levels. Diesel oxidation catalysts, the most common emission control technology found in current diesel vehicles, also require less than 500 ppm sulphur levels to avoid the occurrence of sulphate-related smoke. Diesel particulate filters for PM reduction and selective catalytic reduction for lessening nitrogen oxides can only be introduced when there is very low sulphur levels (below 50 ppm).

As fuel quality and vehicle emission standards becomes more stringent, a variety of engine modifications (direct injection, high-pressure injection, computer controls, multiple injections, exhaust gas recirculation, and aftercooling, etc.) and emission control technologies (diesel oxidation catalyst, diesel particulate filter, advanced catalytic converters, flow-through filter, NOx absorbers, selective catalytic reduction, etc.) can be applied.

In addition to the fuel's lead and sulphur levels, other important fuel properties should also be targeted for improvement. For gasoline vehicles, other fuel properties which can reduce significantly the amount of air pollutants emitted from the vehicles are: RVP (Reid Vapour Pressure), benzene,

aromatics and olefins level. The presence of oxygenates in gasoline will enhance combustion, resulting in lower exhaust emissions and a higher octane fuel will improve engine efficiency resulting in better mileage. For diesel vehicles, a high cetane number fuel is desirable together with lower density and low levels of polyaromatics (PAN).

A global effort to deal with the above mentioned issues was launched at the World Summit for Sustainable Development in 2002 through the formation of the Partnership for Clean Fuels and Vehicles (PCFV). The PCFV, whose clearing house is based at the United Nations Environment Programme (UNEP) in Nairobi, has over 100 member organizations including governments, international organizations, industry groups, and non-governmental organizations. The PCFV assists developing countries to phase-out leaded gasoline and to promote low sulphur fuels and cleaner vehicles.

Eliminating lead from gasoline has made great progress worldwide. The global campaign deadline was the end of 2008; only 14 countries remain with leaded fuel and many are on track to go unleaded in the next couple of years. The PCFV is now focusing more on phase-down of sulphur levels in fuels and promoting cleaner, more efficient vehicle fleets and standards. To this end, the Sulphur Working Group of the PCFV finalized its report: *Opening the Door to Cleaner Vehicles in Developing and Transition Countries: The Role of Lower Sulphur Fuels*. (For more information or to obtain a copy of the report, please visit: www.unep.org/pcfV).

At the 4th annual Global Partnership Meeting of PCFV in 2005, partners agreed on the long-term global target: *"To reduce sulphur in vehicle fuels to 50 ppm or below worldwide, concurrent with clean vehicles and clean vehicle technologies, with roadmaps and timelines developed regionally and nationally."* This was followed by other declarations: at the first governmental¹ meeting on Urban Air Quality in Asia in December 2006 in Indonesia, it was recommended to countries to *"develop roadmaps for fuel quality and vehicle emission standards for new vehicles"*. In November 2008 in Thailand, the second meeting encouraged countries to *"prepare a national long term vision statement for urban air quality and urged members to make good use of the different international initiatives such as the PCFV"*.

In addition, Resolution 16 from the 20 November 2007 ASEAN² Declaration on Environmental Sustainability, Singapore declared the intention: *"To intensify cooperation on the joint research, development and deployment of low emission technologies for the cleaner use of fossil fuels, recognizing that fossil fuels will continue to play a major role in our energy mix"*.

From the Ministerial Conference on Global Environment and Energy in Transport (MEET)³, a Ministerial Declaration was issued on 16 January 2009 that states in paragraph 4: *"We share a long-term global vision of realizing low-carbon and low-pollution transport systems, and we commit ourselves to working effectively and collaboratively with international organizations and individual countries in order to fulfil this vision. In this light, we welcome the ongoing efforts by... international initiatives such as the United Nations Partnership for Clean Fuels and Vehicles..."*

Global levels of sulphur in fuels differ greatly, by country, by region, and by fuel type. Sulphur levels in gasoline range from below 10 ppm to as high as 1,000 ppm, and those in diesel range from 10 ppm to more than 10,000 ppm. In Europe, the US, and Japan sulphur levels are being reduced to below 10-15 ppm, and many countries around the world are lowering the limits of allowable sulphur in fuels and adopting tailpipe emission standards to further reduce vehicle pollution.

¹ The First Governmental Meeting on Urban Air Quality in Asia was jointly organized by CAI-Asia, UNCRD, UNEP and Ministry of Environment Indonesia and was attended by representatives of Bangladesh, Bhutan, Brunei Darussalam, China, Cambodia, India, Indonesia, Japan, Korea, Lao PDR, Malaysia, Mongolia, Myanmar, Nepal, Pakistan, Philippines, Sri Lanka, Singapore, Thailand and Viet Nam as well as representatives from a number of international organizations, including ADB, World Bank, UN-ESCAP, SEI, WHO.

² ASEAN member countries are Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand and Vietnam.

³ MEET countries represented were Australia, Brunei Darussalam, Cambodia, Canada, France, Germany, India, Indonesia, Italy, Japan, Republic of Korea, Lao People's Democratic Republic, Myanmar, Philippines, Russian Federation, Singapore, Thailand, United Kingdom, United States, Vietnam, and the European Commission.

According to information available as of January 2009, the following countries have the sulphur levels in diesel as below: Cambodia 1,500ppm; China 2,000ppm nationwide and 50ppm in Beijing; Indonesia an average of 4,600ppm; Japan 50ppm; Lao PDR 2,500ppm; Malaysia 500ppm; Mongolia 5,000ppm; Myanmar unknown; Philippines 500ppm; Republic of Korea 50ppm; Russia; Thailand 350ppm; and Vietnam 500ppm. Some of these countries have Roadmaps to phase-down sulphur levels in fuels to 50ppm, while others have announced plans to lower current sulphur levels.

The PCFV and RRC.AP plan to hold a one-day workshop focusing on 'clean fuels and vehicles' for East Asia countries to be held on 15th May 2009, immediately following the Capacity Building Workshop for EANET on 13th – 14th May, with logistical support from RRC.AP located in Thailand.

Through this workshop, possible regional and national initiatives focusing on vehicle emission reduction in participating countries is expected and that builds upon and strengthens implementation of the various regional resolutions that include the 1st and 2nd Governmental Meeting on Urban Air Quality in Asia, ASEAN declaration No 16 of 2007 Minister's meeting and the MEET January 2009 Statement.

II. Objectives & Expected Outcomes

The meeting will serve as a significant step in engaging participating countries and assessing their needs with respect to implementation at the national level, the regional resolutions and declarations, including those from ASEAN and MEET meetings, all of which aim to achieve better air quality. It is expected that this meeting will provide further impetus to existing national plans and the creation of new plans, where needed, for the better implementation of a programme for clean fuels and vehicles.

Specific objectives include:

- (1) Better understanding of the current state of fuels and vehicles emissions and challenges in participating countries on this issues as well as ongoing initiatives and plans, regionally and nationally;
- (2) Creating an awareness of PCFV's work and the technical support available to countries for national clean fuels and vehicles programs;
- (3) Building up the knowledge base of policy and decion makers on clean fuels and vehicles and their health and environmental benefits;
- (4) Developing national level contacts for follow up on the implimentation of national action plans;

Expected outputs are:

- Improved understanding of the current situation and national plans with respect to fuels and vehicles emission and other related issues;
- Increased awareness among policy makers in the region on the importance of clean fuels and vehicles for the improvement of air quality, urban health and environmental protection, and the available support by PCFV for national level implementation;

III. Organisation of the Workshop

The workshop will be held on May 15 2009 at, Pathumthani, Thailand, immediately following the EANET Capacity Building Workshop on 13-14 May. PCFV will be responsible for the implementation of the this workshop in collaboration with RRC.AP. in Thailand. Financial and in-kind support will be provided by PCFV and RRC.AP.

Target participants will be around 40 people from a broad range of relevant sectors and institutions. Invitations to be made in each country will include delegates from ministries of Environment/ Oil/ Energy/ Transportation (preferably senior to middle level managers / policy makers) and industry groups (including local refineries and oil companies, vehicle manufacturers / retailers

IV. Correspondence and Inquiries

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