



OPPORTUNITIES, ISSUES & BARRIERS IN THE WESTERN HEMISPHERE

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Partnership for Clean Fuels and Vehicles

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BACKGROUND

The Partnership for Clean Fuels and Vehicles was launched at the World Summit on Sustainable Development in September 2002 to reduce vehicular air pollution in developing countries through the promotion of clean fuels and vehicles. At the Partners' request, the UN Environment Program (UNEP) has set up a Clearing-House at UNEP Headquarters in Nairobi to help implement the Partnership. More information about the partnership is available at: <http://www.unep.org/pcf/main/main.htm>.

An ad-hoc meeting of the Partnership, focusing on western hemisphere partners and issues, was held in conjunction with the 5th International Urban Air Quality Forum, which was part of the Air & Waste Management Association Annual Convention and Exhibit held in San Diego, California in June 2003. (<http://www.awma.org/ACE2003/UrbanForum/default.asp>).

The goals of this ad hoc meeting of Western Hemisphere Partners were to:

- (1) Explain the Partnership to potential new Partners;
- (2) Bring Partners in the region together to discuss the Partnership's status and applicable issues; and
- (3) Begin to map out a strategy for next steps and working together in the region.

This report provides a brief overview of the discussions held and the recommendations being put forward for consideration by the full partnership.

OVERVIEW

About thirty participants attended the meeting and the discussion followed the detailed agenda enclosed as Attachment A. A complete list of all participants is provided as Attachment B.

The agenda centered on discussing progress made in the past six-months; reviewing the status of activities in Latin and Central America; scoping out ideas for cooperation and actions in the region; and compiling recommendations for future activities and for the next meeting of all Partnership participants.

This meeting was not a formal meeting of the Partnership and no firm decisions were taken. All the recommendations presented are subject to further consideration by all the PCFV Partners.

The list below represents a summary of the discussion points and observations raised throughout the meeting. Further details on the issues raised during the general discussion and steps suggested for planning the next Partnership meeting are provided in the respective sections of this report.

Summary of Observations

- ❖ There is a need for better emission factors that are representative of mobile source emissions in different regions/cities of the world;



- ❖ Technical guidance on comparability of emission measurements systems and appropriate testing protocols are required for proper interchangeability of measurement data;
- ❖ In Latin America, measurement data are needed for emissions from diesel fueled passenger cars (to augment continuous monitoring data collection supported by CIDA and Environment Canada for gasoline vehicles);
- ❖ Fuel adulteration issues should be addressed together with an evaluation of regional fuel harmonization and the elimination of incentives for adulteration and mis-fuelling;
- ❖ The linkage between refinery CO₂ emissions and new fuel/vehicle requirements should be investigated (well-to-wheel analysis);
- ❖ In all regions of the world where regional initiative are already operational the PCFV should attempt to work through these on-going activities in order to avoid redundancy.

It should be noted that although the focus of the meeting was on the Western Hemisphere, the participants observed that there are many global similarities, as the same issues seem to surface in different parts of the world. Thus, the added value of the Partnership would be to ensure that this knowledge is properly transferred among regions and success stories are shared with all countries.

PRESENTATIONS HIGHLIGHTS

To set the stage for further discussions, brief presentations were made as outlined below. Complete copies of all presentation materials will be made available on the PCFV website.

Global Context

Kathleen Abdalla –

United Nations Department of Economic and Social Affairs (UNDESA)

Reviewed the recent meeting of the United Nations' Commission on Sustainable Development (CSD-11, 28 April – 8 May 2003) and the discussion on the multi-year work program for the Johannesburg Plan of Implementation, agreed upon at the conclusion of the World Summit on Sustainable Development (WSSD) in September 2002. A feature of CSD-11 was the Partnership Fair that was organized in order to highlight the role of Partnerships in the implementation process, with the PCFV featured prominently among them. The UN CSD is also looking at new tools such as a Learning Center and a compilation of case studies to facilitate capacity building and knowledge transfer.

Jane Armstrong –

United States Environmental Protection Agency (US EPA)

Discussed partnership initiatives the US administration brought to Johannesburg for signature of other partners in the general area of energy. The US approach consists of three main programs, delegated to different departments or agencies, which carry a substantial financial commitment with them. The US Agency for International Development (US AID) is part of the Global Village Energy Partnership (GVEP) that aims to provide access to energy in rural areas.



The US Department of Energy (US DOE) is leading a partnership on Energy Efficiency for Sustainable Development that aims to improve the efficiency of energy production and manufacturing worldwide. The US EPA is leading a program called Healthy Homes and Communities, which encompasses a partnership on improving Indoor Air Quality by reducing exposure to indoor smoke from cooking and heating and Outdoor Air Quality via the Partnership for Clean Fuels and Vehicles (PCFV).

Rob de Jong –

United Nations Environmental Programme (UNEP)

Referred to the decision taken at the organizing meeting of the PCFV (13-14 November 2002) at the UN HQ in New York where the partners agreed that the UN Environmental Program (UNEP) would set up a clearinghouse for the partnership at its Nairobi, Kenya headquarters. During the first half of 2003 primary activities included organizing the clearinghouse and the recruitment of new governmental and non-governmental partners with their respective commitments to underwrite the PCFV objectives. Activities for the second half of 2003 are expected to include awareness raising and information dissemination campaigns to be spearheaded by the launch of a quarterly newsletter to the PCFV.

Wendy Jackson –

United Nations Environmental Programme (UNEP)

Demonstrated the new PCFV website that was launched in early May 2003 and discussed the role of the website as well as other venues of communication, especially for areas that do not have easy access to the Internet. She also emphasized the need to document the current baseline in order to be able to provide an information resource on the website documenting status of fuels and vehicles requirements along with future plans, country by country, and to track progress. In the discussion that ensued, partners' highlighted the need to differentiate between consensus documents produced by the partnership and information or publications provided by partners. It was concluded that this is part of the whole issue of governance structure for the partnership. However, for the time being a disclaimer statement should be posted on the website designating information provided directly by partners.

Partnership's Six-Month Progress

Sulfur Working Group Report –

Dale McKinnon of the Manufacturers of Emissions Control Association (MECA) is the new coordinator for the WG, as has been agreed by the members during their last conference call. Dale outlined the steps leading to the development of a consensus document on Fuel-Sulfur and its role in lowering vehicle emissions. The WG met by teleconference a number of times and agreed on an outline for the document, aimed at providing factual and objective information on the topic, to be used by decision makers in developing their action plans. Mike Walsh was hired as a consultant through the UNEP Clearinghouse and was given the task of developing such a document. It is expected that the first Draft of the document will be released by mid-August 2003 for WG members' review. Comments would be sought by mid-September with a target completion date of November 2003.

Octane Enhancement Working Group Report –

Kristine Klavers of the International Fuel Quality Center (IFQC) represented Fred Potter, who is the coordinator of the group. IFQC has done some preparatory activities on the subject and would plan on convening the WG by teleconference in the near future. No specific details on progress to-date were provided.

Valve Seat Recession (VSR) –

Wendy Jackson reported on behalf of John Mooney (EETPI) who is the coordinator for the group. The WG held a couple of teleconferences, with the next one scheduled for early July 2003. The main issues discussed were the extent to which additives are needed, and whether they are helpful, and the quality of the additives. The WG is sorting through what kind of specific guidance would be most useful to countries and how to best provide the methodology needed for countries to assess the risk of VSR in their car fleets. The WG expects to have a final document by October 2003.

Africa Activities –

Rob de Jong (UNEP) and Rob Cox (IPIECA) discussed the two planned back-to-back sub-regional workshops. The first, scheduled for 6-7 October 2003 is a workshop for the Southern Africa Development Commission (SADC), while the second one, scheduled for 8-10 October 2003 is a workshop for sub-Saharan Africa Refiners. Both Workshops are to be held near Cape Town (in Somerset West), South Africa. An additional workshop for the Central African sub-region is planned for the end of 2003. Africa activities are aimed at supporting the development of National Action Plans for Lead phase-out. It is also expected that a Dakar + 2 ministerial meeting will be convened in the spring of 2004 to review overall progress.

Clean Air Initiative (CAI) – Asian Cities

Cornie Huizenga of the Asian Development Bank (ADB) announced that they are considering joining the PCFV. CAI-Asian Cities is initiating a study to look at the linkage between emissions and health effects. They hope to have preliminary results for presentation at the Better Air Quality (BAQ) for Asia Conference in December 2003. The study will use the Urban Air Quality Tool-Kit developed by the International Petroleum Industry Environmental Conservation Association (IPIECA) to estimate the effect of lowering sulfur in fuels on emissions.

Latin and Central America Activities

Regional Association of Oil and Natural Gas Companies in Latin America and The Caribbean (ARPEL) –

Miguel Moyano (ARPEL) reviewed the status of the harmonization of fuel quality specifications in the region as initiated in collaboration with the World Bank (WB) in 1997. By the end of 2003 he expects that 27 countries in the region will be lead-free, with a total of ~ 29 countries having phased-out lead by the end of 2004. He emphasized the impact of vehicle technology on vehicle emissions, and the fact that increased control levels could be achieved with different fuel standards. He indicated, however, that, “real world” emissions are impacted by conditions of use and I/M programs in addition to fuel quality and vehicle technology. Also, governments and cities can impact use conditions by traffic planning. This is called a systemic approach to the control of vehicular emissions.



The components of ARPEL's Atmospheric Emissions Project that overlap with part of the overall plan for the CAI for Latin America Cities (CAI-LAC) are going to be developed collaboratively by ARPEL / CAI-LAC. Its goal is to develop 'in-use' vehicle emissions factors that could be used in urban air quality management plans.

Canada's International Development Agency (CIDA) is providing support and Environment Canada is providing both support and equipment that allows for direct measurements of CO and THC in vehicle exhaust. Phase 3 of the project will entail measurements of 20 vehicles in each of four cities selected (the current budget allows only for four cities to be studied). Various petroleum companies will support the activities in each of the cities, as follows: Santiago de Chile (ENAP), San Paulo (PETROBRAS), Lima-Callao (PETROPERU), and Buenos Aires (ExxonMobil, Repsol/YPF). A fifth city, Bogotá (EcoPetrol), was interested in participating, but it had to be dropped due to security considerations.

The measurement team will spend a week in each city and will aim to include representative cars and service conditions which will be selected in coordination with CAI. The deliverables from the project will be emission factors for gasoline-fuelled vehicles under various driving and service conditions. The IPIECA Tool-Kit will be used to generate emissions estimates for diesel vehicles. This will allow for modeling the impact of variations in fuels specifications on air quality in the studied cities.

A study that was recently completed is the WB-OLADE Refinery Study, which provides cost information on retrofitting the 77 Latin American refineries. In addition, CAI-LAC is undertaking other projects, including:

- (1) Fieldwork on the International Vehicle Emissions (IVE) model, conducted by Jim Lents of the University of California Riverside (UCR). This study will use vehicle-tracking technology to determine driving habits and help in surveying in-use vehicle emissions.
- (2) Training and establishing of 'best practices' for I/M programs.
- (3) Epidemiological studies in Mexico and Rio de Janeiro.

US EPA Projects in Latin America -

Jane Metcalfe discussed the US EPA commitment to obtain more and better data from various cities. As part of this commitment the US EPA is helping to design a pilot diesel retrofit program in Mexico City and a study of health impacts and benefits also in Mexico City. The retrofit study may include approximately 30 vehicles, as follows: 10 older vehicles, 10 mid-90's diesel vehicles with diesel oxidation catalysts (DOC), and 10 new vehicles with diesel particle filter (DPF). The test vehicles would be using 15ppm-S diesel supplied from the US. All the vehicles will be tested before and after the retrofits. The US EPA may also work with PEMEX and Semarnat on cost-effectiveness aspects of improving fuel quality. Other diesel retrofit work may also be done on the US-Mexico border pending the selection of appropriate test communities.

The US EPA is also working with the Pan-American Health Organization (PAHO) on health benefit issues, raising awareness of these issues in the region.



Natural Resources Defense Council (NRDC) US-Mexico Border Initiatives -

Adrianna Quintero-Somani (NRDC) described her organization's interest in getting involved with existing projects in the US-Mexico border region to address the issue of increased cross border emissions caused by increased truck traffic that came about with NAFTA. Emphasis is placed on retrofit programs and new standards to improve performance of smaller fleets and the impact of the transportation corridors into the US on air quality management plans in US non attainment areas adjacent to the Mexico border. On the US side, they are looking at increased emissions testing to identify candidates for retrofits using funding from the North American Development Bank (NADB) and I/M programs for smaller fleets.

Summary of Regional Discussion: Issues & Barriers

An open discussion followed on the main issues facing the Latin and Central America regions in implementing clean fuels and concurrent clean vehicle requirements. During the discussion there was no attempt to prioritize the issues for the region but rather to provide a listing of issues and current activities.

Lead Phase-Out Issues –

- Paraguay and Uruguay – ‘to go’ Unleaded by the end of 2003
- Peru, Panama and Dominican Republic – ‘to go’ Unleaded by the end of 2004
- Venezuela and Cuba – expected to continue to use Leaded gasoline after 2005
- Markets are an important driver in Latin American changes in fuel specifications

Fuel Sulfur Issues –

- WB 2001 study on sulfur in fuel has the following targets: 400ppm-S in gasoline and 2,000ppm-S in diesel to be made available in the region by 2005
- There are preliminary discussions of 500ppm-S in diesel by 2015, but this is not an established objective yet,
- Personal cars in Chile, Peru, Uruguay and Argentina are 50% diesel, indicating that increased usage of diesel is expected in Latin America,
- Smaller refiners in the region may not be able or wish to make the investments needed to revamp facilities (15 out of the existing 77 refineries are considered large and produce ca. 65% of the refined throughput). This might lead to the creation of regional refinery centers with area-wide distribution

Latin America Priorities –

- Development of enhanced I/M programs and reliable emission inventories based on “real-world” vehicle emission factors;
- Development of cost/benefit assessment tools that can be used in conjunction with national action plans and for public information and outreach;
- Implementation of cost-effective approaches to improve air quality;
- Introduction of financing approaches, including proper incentives, for reducing vehicle emissions;
- For the USA-Mexico border, introduction of incentives and appropriate policies to ensure reduction of emissions emanating from the main trucking routes.

Technical and Policy Issues

There are some common technical and policy issues that transcend regions. The discussion during the meeting focused on three such topics, as summarized below.

CD-ROM Resource Guide for Lead Phase-Out -

Rob Cox (IPIECA) presented the newly developed IPIECA CD-ROM that is designed to be a resource guide to implementers. The Draft report was circulated to the PCFV members for review and comments, as discussed at the organizational meeting in New York City in November 2002. Comments received by August 1st will be considered prior to finalizing the document.

Comments received to-date on the document include:

- Some of the details on VSR should be removed with new text to be added on risk analysis;
- Special emphasis ought to be placed on providing guidance to countries in which manufacturers' car models might pose a VSR risk in order to conduct proper risk analysis;
- Language and complexity of the document should be suitable for developing countries;
- There needs to be a glossary;
- The discussion on MMT needs to be balanced and factual, though the use of the additive is still controversial and may require additional discussion in order to reach a solution that is acceptable to all.

IPIECA is offering to provide a link to the final document on the PCFV website. It is also offering this document as a "seed" document for further deliberation by the partners. The goal would be to create a PCFV Consensus Document in a Q&A format similar to that of the forthcoming Sulfur and VSR documents.

Fuel Sulfur Effects on Vehicle Emissions -

Dale McKinnon (MECA) provided a presentation about the importance of fuel sulfur compounds in all catalyst based control technologies. Determining the appropriate sulfur limits in fuel is dependent on the level of the emission standard, test cycle used, and durability requirements. Low emissions are achieved through an integrated system that includes advanced engines, advanced emissions control technologies and high quality fuels and lubricants. The main effect of sulfur and its compounds is through inhibition and sulfating effects that are not reversible.

Emerging and future technologies include: diesel oxidation catalysts (DOC), diesel particulate filters (DPF), NO_x adsorbers for diesel and lean-burn gasoline, and selective catalytic reduction (SCR) for diesel. Fuel quality is an integral part of a complete emission control system with 95% filtration achieved at 3ppm-S, and 74% at 30ppm-S. There is also more recent information on the impact of higher-S gasoline on new 3-way catalysts (TWC) while new data exist on catalysts that are tolerant to higher sulfur levels.

Fuel Sulfur Issues –

Brian Harney (ExxonMobil) provided a presentation on the integrated systems approach for improving air quality, which includes vehicle emission limits, fuel specifications and Air Quality



modeling to assess impacts of strategies considered. EURO-1 and EURO-2 have achieved large emission reductions from mobile sources and all the Auto/Oil studies have concluded that the {Vehicle + Fuel} need to be viewed as a system, with fuel specifications to be matched to vehicle emissions control.

Recent National Petroleum Council study data indicates that as gasoline sulfur is reduced costs will rise rapidly. In addition, EU Auto/Oil data have shown that the priority order of actions needed to control vehicle emissions is effective I/M programs, vehicle technologies, and fuel technology. Some of the findings indicate that manufacturing of low-S fuels requires more processing leading to higher energy intensity and increased CO₂ emissions from refineries. Therefore, the EU is stretching the phasing-in of 10ppm-S fuels to 2009.

GENERAL DISCUSSION

The main issues facing all cities and regions that want to undertake a systemic air quality management approach revolve around the lack of appropriate data. Three of the most widespread data gaps are:

- (1) City-specific or region-specific emission factors that can be used for modeling air quality impacts and assessment of cost and benefits associated with various strategies,
- (2) Comparability of testing protocols including the assessment of continuous tail-pipe measurements vs. discreet testing of vehicles over pre-determined test cycles, and
- (3) Better information and understanding of "real world" emissions from vehicles worldwide and their regional variability.

When focusing on the issues, barriers, and opportunities associated with the final phase-out of lead in Latin American countries, the most prominent topics noted were:

- The differences, within the region, between countries with no refineries vs. those that impose restrictions on national oil companies due to energy security considerations,
- The importance of Lead phase-out in order to enable emissions control technologies taking into account economy of scale and increased regional commerce,
- The cost of Lead additives is getting higher (given the ever-shrinking market) and may provide additional incentives for final elimination of lead in motor fuels, and
- The contribution of lead phase-out to reduced population exposure and associated health implications.

Summary of Observations

The following summary of observations is based on the myriad of topics discussed during the general discussion period and is provided here in order to enable further consideration by all the Partners:

- (1) Better emission factors that are representative of mobile source emissions in different regions/cities of the world are needed
- (2) Technical guidance on comparability of emission measurements systems and testing protocols is required for proper interchangeability of measurement data



- (3) In Latin America, measurement data is required for emissions from diesel fueled passenger cars (to augment continuous monitoring data collection supported by Environment Canada for gasoline vehicles)
- (4) Strategies to minimize or eliminate fuel adulteration needs to be addressed, including the evaluation of the role of regional fuel harmonization in eliminating incentives for adulteration and/or misfuelling
- (5) The linkage between refinery CO₂ emissions and new fuel/vehicle requirements should be investigated (well-to-wheel analysis)
- (6) In all regions of the world where regional initiatives and organizations are already operational the PCFV should attempt to work through these on-going activities in order to avoid redundancy

In addition, there were specific recommendations from individual Partners about the desirability of considering the creation of new working groups, such as:

- (1) A work group to evaluate I/M issues and their impact on Air Quality
- (2) A work group to address harmonization of emission factors and comparability of emission measurements
- (3) A work group to focus on fuel adulteration issues
- (4) A work group to assess regional activities and identify countries that need/want support

The summary of observations above and the suggestions on creating new work groups do not represent a consensus and are provided here to highlight the issues discussed and to allow for their consideration by the full Partnership.

Next Meeting

In recognizing the need for a meeting of all the Partners, members took upon themselves to develop specific recommendations on how to proceed towards the next Partnership meeting:

- (1) Establish an ad hoc group to set time, place & agenda for the next general partnership meeting (suggested composition: 1 international organization (UNEP to coordinate), 1 auto, 1 petroleum, 1 government, and 1 NGO).
- (2) Charge the ad hoc group with the task of developing a “straw” proposal for governance structure, in preparation for the meeting.
- (3) Evaluate potential sites for a full Partnership meeting, including, as an example, Africa in late 2003, and Asia in 2004.
- (4) Assess World Bank funding, and leveraging opportunities from other donor institutions, to inform the Partners on sources of financing that could be available for government owned companies that need to install technological upgrades.
- (5) Investigate and present at the next meeting what options are available for broader support to partners’ initiatives in developing countries.