ECE/BELGRADE.CONF/2007/24

ENVIRONMENT FOR EUROPE
UN ENVIRONNEMENT POUR L'EUROPE
ОКРУЖАЮЩАЯ СРЕДА ДЛЯ ЕВРОПЫ
ЖИВОТНА СРЕДИНА ЗА ЕВРОПУ

BELGRADE, 10-12 October 2007

SIXTH MINISTERIAL CONFERENCE

"ENVIRONMENT FOR EUROPE"

BELGRADE, SERBIA
10-12 October 2007

PUBLIC-PRIVATE PARTNERSHIP FOR REDUCED AIR POLLUTION FROM VEHICLES THROUGH NO-LEAD AND LOW-SULPHUR FUELS

submitted by

the Regional Environmental Center for Central and Eastern Europe and
UNEP-based Partnership for Clean Fuels and Vehicles

through the Ad Hoc Working Group of Senior Officials

UNITED NATIONS

UNITED NATIONS

E

Economic and Social Council

Distr.
GENERAL

ECE/BELGRADE.CONF/2007/24
22 August 2007

ENGLISH
Original: ENGLISH, FRENCH and RUSSIAN

ECONOMIC COMMISSION FOR EUROPE

Sixth Ministerial Conference
"Environment for Europe"
Belgrade, 10-12 October 2007
Item 6 (b) of the provisional agenda

PARTNERSHIPS

PARTNERSHIPS TO SUPPORT THE IMPLEMENTATION OF ENVIRONMENTAL POLICY

PUBLIC-PRIVATE PARTNERSHIP FOR REDUCED AIR POLLUTION FROM VEHICLES THROUGH NO-LEAD AND LOW-SULPHUR FUELS[1]

CONTENTS

[1] The text in this document is submitted as received from the authors.

CONTENTS (continued)

Summary

Objective and scope

Through the example of the United Nations Environment Programme (UNEP)-based Partnership for Clean Fuels and Vehicles (PCFV), the report explains that a partnership between public and private sectors is an efficient tool for achieving concrete goals: in this case, phasing out lead from petrol, reducing sulphur in fuels, and adoption of cleaner road vehicle standards and technologies. The report also highlights the importance of cleaner fuels coupled with cleaner vehicles for improving urban air quality and achieving significant health benefits in South Eastern Europe (SEE) and Eastern European, Caucasus and Central Asian (EECCA) countries. It asks senior officials at the Environment for Europe (EfE) meeting to endorse the global PCFV end 2008 deadline for phasing out leaded petrol and intensifying discussions with refineries, oil companies, and car producers and importers to reduce sulphur levels in fuels and establish cleaner vehicle standards and technologies in EECCA countries.

Main findings

The PCFV works in developing and transition countries to promote lead-free, low sulphur fuels along with cleaner road vehicle standards and technologies that, when introduced as a system, have the potential to significantly reduce pollutant emissions. It is a successful model for public-private partnership for the achievement of global, regional, and national cross-sectoral targets. The PCFV's mission and work complements and builds on past EfE initiatives and declarations related to the environment in Eastern European and EECCA countries, specifically the Sofia Initiative on Local Air Quality (SILAQ) process.

Implementing cleaner fuel and road vehicle standards and programs is one of the most cost-effective and efficient ways of addressing vehicle emissions and air quality. Fuel quality directly affects vehicle emissions because the vehicle and its fuel form an integrated system. The vehicle-fuel system determines the quality and amount of emissions and the extent to which emission control technologies will be able to reduce them. Leaded petrol and high sulphur fuels, combined with ageing vehicles and a lack of emission controls, adversely affect this system, leading to higher vehicle emissions.

During the last five years, countries worldwide have made a significant progress in phasing out lead. Approximately 18 countries in the world still sell leaded petrol, with six of them in SEE and EECCA. However, high sulphur levels in fuels and older vehicle fleets also need to be addressed to lower urban air pollution in these countries.

The experience of the PCFV has shown that barriers to cleaner fuels and vehicles can be overcome through partnership and consensus between all sectors, in particular the governing and industry sectors.

Recommendations

High-level commitment and support is needed to cleaner fuels and vehicles in SEE and EECCA countries. Regional, subregional and national dialogues and action plans should be initiated or continued discussions between government, the private sector and other relevant stakeholders in order to:

(a) Phase out leaded petrol by end 2008 and require emission control technologies (i.e. catalytic converters) for petrol vehicles;

(b) Reduce sulphur levels in fuels - especially in diesel fuels. Countries should move toward reducing sulphur in vehicle fuels to 50 ppm or below, concurrently with clean vehicles and clean vehicle technologies, with roadmaps and timelines developed regionally and nationally;

(c) Support and promote standards for cleaner vehicles and vehicle fleets, including, but not limited to, import and new vehicle standards, in-use vehicles programmes (e.g. retrofit for heavy-duty vehicles), fleet renewal schemes and incentives, inspection and maintenance programmes, and consideration of alternative fuels and vehicles.

Implementation of these recommendations will require increased attention to fuel quality and vehicle technology and standards as a cost-effective means of attaining better air quality in SEE and EECCA countries. Cross-sectoral support for regional, subregional and national-level activities for cleaner fuels and vehicles, awareness raising among decision makers and consumers, development of national action plans, policies and standards, assessment of investment and technology needs, and clear and accurate information on the status of fuel quality and vehicles in SEE and EECCA countries is also needed.

I. INTRODUCTION

1. The Environmental Strategy for EECCA countries acknowledges that "urban air pollution, particularly from mobile sources, has a major impact on human health" and that one of the main problems for reduction of urban air pollution is the "inadequacies of regulation of road transport emissions." Two of the planned actions in this respect were the "optimization of standards, accounting for environmental and combined health impacts (based on World Health Organisation (WHO) criteria)" and "introduction of standards for products that directly affect the environment in the course of their use (road vehicles, fuel, etc.)". The strategy also confirms that "the continuing expansion of transport demand, heavily dominated by road transport (further exaggerated by worn-out, high fuel-consuming and environmentally unfriendly vehicle fleet and transport infrastructure) raises serious concerns about the long-term sustainability of present mobility trends." Continuation of current transport trends in the region will aggravate environmental and health problems, particularly those related to air pollution, noise and land use.[2]

2. Implementing cleaner fuel and vehicle standards and programs is one of the most cost-effective and efficient ways of addressing vehicle emissions and air quality. Fuel quality directly affects vehicle emissions because the vehicle and its fuel form an integrated system. The vehicle-fuel system determines the quality and amount of emissions and the extent to which emission control technologies will be able to reduce them. Leaded petrol and high sulphur fuels, combined with ageing vehicles and a lack of emission controls, adversely affect this system, leading to higher vehicle emissions.

3. A 2006 report by the European Environment Agency (EEA) states that decreased transport emissions in EEA member countries since 2003 are "mainly due to innovations in exhaust gas treatment in road vehicles and improved fuel quality."[3] European Union vehicle emission standards and fuel quality requirements are now among the strictest in the world, with countries in other regions (e.g. Latin America and Asia) using EU directives to develop their own policies for cleaner fuels and vehicles.

4. As Europe moves toward "zero-sulphur" fuel in 2009 at 10 parts per million (ppm) and stricter vehicle emission standards, some Central and South Eastern European states are also moving in step with European directives on fuels and vehicles. After new EU Member States, Bulgaria and Romania, harmonized their legislations with the EU, Croatia also adopted EU Directives 98/70/EC[4] and 1999/32/EC[5] as of June 1, 2006 together with 2000/71/EC[6], 2003/17/EC[7] and 2005/33/EC. However, leaded petrol and high-sulphur fuel of 2,000 ppm and above is still in use in Europe today.

---

[2] Environmental Partnerships in the UNECE Region: Environment Strategy for Countries of Eastern Europe, Caucasus and Central Asia, UNECE, Kiev, 2003.

[3] Transport and environment: facing a dilemma, page 19, <http://reports.eea.eu.int/>.

[4] Directive 98/70/EC of the European Parliament and of the Council of 13 October 1998 relating to the quality of petrol and diesel fuels, amending Council Directive 93/12/EC.

[5] Council Directive 1999/32/EC of 26 April 1999 relating to a reduction in the sulphur content of certain liquid fuels and amending Directive 93/12/EEC.

[6] Commission Directive 2000/71/EC of 7 November 2000 to adapt the fuel quality measuring methods as annexed in Directive 98/70/EC.

[7] Directive 2003/17/EC of the European Parliament and of the Council of 3 March 2003 amending Directive 98/70/EC relating to the quality of petrol and diesel fuels.

5. Greater effort is needed to move all countries in the subregion and in EECCA countries toward lead-free and low sulphur fuels as vehicle ownership rises and transboundary trade and movement increases. The trend of increasingly cleaner fuels and advanced vehicle technologies in developed countries is attainable in all developing and transitional countries, and must be promoted and assisted as part of an overall strategy for better air quality.

6. The UNEP-based Partnership for Clean Fuels and Vehicles (PCFV) works in developing and transition countries to promote lead-free, low sulphur fuels along with cleaner vehicle standards and technologies that, when introduced as a system, have the potential to significantly reduce pollutant emissions. The PCFV brings together all relevant sectors, including government, the private sector, international organizations and non-governmental organizations (NGOs), to develop consensus-based targets and develop national action plans and activities that further the introduction and use of cleaner fuels and vehicles for lower emissions and better air quality.

7. As a public-private partnership founded at the World Summit on Sustainable Development (WSSD), the PCFV relies on the input and participation of all relevant sectors, but particularly government and private industry, in developing and implementing its targets for phasing out lead and reducing sulphur in fuels. The strong participation of both in PCFV decision-making, activities at regional and national levels, funding, and technical guidance on fuel and vehicle issues ensures the relevance and political influence of the PCFV, its mission and work.

8. The PCFV, along with the Regional Environmental Center for Central and Eastern Europe (REC) and the United States Environmental Protection Agency (USEPA), has actively supported these goals in Europe, and more recently in EECCA, since 2005. It has successfully brought together government, industry, and NGO interests at the regional level in Hungary and at the national level in Bulgaria, Serbia, Turkey, and Bosnia and Herzegovina for open debates and planning. The major objective is to end the use of leaded petrol in Europe and EECCA countries by the end of 2008, and to include targets of 50 ppm or lower in national policy on fuel production and import that allow for the use of efficient, low-emission vehicles and vehicle after-treatment technologies.

9. The growing demand for very low sulphur fuels worldwide, and in the European and surrounding markets, has significant and potentially serious implications for the competitiveness of refiners still operating without desulphurization technology, cross-border trade and traffic, and the ability of countries still using high sulphur fuels to fully utilize imported Euro 5 vehicle technology beginning in September 2009.

II. THE POVERTY AND HEALTH CONNECTION: ECONOMIC AND SOCIAL COSTS OF DECREASING AIR QUALITY

10. Urban air pollution is a serious threat in many developing and transition countries, aggravating poverty as emissions caused by transport and industry affect the health of urban residents. The transport sector (often affected by meteorological and geographic factors) is the main source for urban air pollution in most cities and also a major source of greenhouse gases. WHO estimates that air pollution causes around 2 million premature deaths worldwide per year, with more than half in developing countries.[8]

11. Cities serve as the economic and industrial centres of developing and transitional countries. As traffic grows, the health and economic toll of poor air quality continues to mount on the most vulnerable of residents: disadvantaged women, children, and the elderly who live, play, walk and work on or close to congested urban highways.

12. The concentrated negative health effects of urban air pollution have large repercussions on the economic and social progress of a country. These costs are seen in lost working days, increased morbidity and mortality, decreased productivity, damage to property, reduced agricultural output, and loss of tourism revenue – not to mention the irreparable developmental damage to children caused by lead poisoning, a main source being the use of leaded fuel. According to the World Development Report 2003, in many developing countries these costs can be as high as 4 to 6 percent of urban income.

13. Yet, despite the seriousness of these problems, political and technological solutions exist. Regional and national decisions to use unleaded, low sulphur fuels in combination with more efficient vehicles fitted with emission control technologies result in drastic reductions in vehicular pollution and significant improvement in air quality, thereby improving the liveability of cities and the health of citizens.

Box 1

According to a report on Air Quality and Health in Eastern Europe, Caucasus and Central Asia, drafted by WHO and presented at a Workshop in St. Petersburg, Russian Federation, October 13-14, 2003:

(a) An analysis of emissions indicated that the six mentioned cities are the most polluted ones, and Yerevan is the most polluted city of Armenia. Incidence of bronchial asthma and congenital malformations in children up to 14 is higher in Yerevan compared to the republic as a whole. It is possible that air pollution has contributed to this increase.

(b) An analysis of the general incidences of disease in Bishkek has shown a strong increase from 1999-2002. General disease of adults increased by 25 percent and for children of an age up to 14 years by 6.2 percent. The growth of morbidity indicates poor environmental conditions in the city. Population mortality figures are also an indicator for unsatisfactory environmental conditions. The major reasons for population mortality in Kyrgyzstan are cardiovascular and respiratory diseases as well as malignant neoplasms.[9]

[8] <http://www.who.int/mediacentre/news/releases/2006/pr52/en/index.html>.
[9] Air Quality and Health in Eastern Europe, Caucasus and Central Asia, Report on the WHO Workshop St. Petersburg, Russian Federation, 13 – 14 October 2003.

III. UNLEADED PETROL

14. Reducing emissions from motor vehicles is an important component of an overall strategy for reducing air pollution. Through more stringent emission standards, the elimination of leaded petrol is a major step in requiring the use of lower-emitting engine and vehicle technologies (e.g. the catalytic converter) that can be enabled by lead removal.

15. The elimination of lead additive in petrol drastically reduces the concentration of airborne lead and blood lead levels in both children and adults. There is no "safe" level of exposure to lead. Decades of research have shown that lead in petrol is directly correlated to higher blood lead levels in children and adults, leading to lower cognitive skills and other developmental problems. Children are particularly vulnerable to the effects of lead, due to increased absorption and exposure. In addition, the use of leaded fuel prevents the use of cleaner vehicles equipped with catalytic converters. This technology can decrease exhaust pollutant emissions by over 90 percent.

16. In 1989, researchers estimated that the health benefits of reducing the US population's blood lead level by just 1 µg/dl equalled USD 17.2 billion annually.[10] The United States Environmental Protection Agency (U.S. EPA) estimates that the benefits of phasing out leaded petrol exceeded the costs by more than ten times in the country.[11] Similar cost/benefit calculations in Mexico City showed a net gain of over USD 1 billion.[12]

17. On January 1, 2006, all of sub-Saharan Africa banned the import and production of leaded petrol, and by the end of 2007 over 90 percent of the world's countries will have banned leaded petrol. The remaining 10 percent yet to go unleaded includes countries in SEE and EECCA.

18. These countries can reach unleaded status by end of 2008 through political support for a ban on leaded petrol and technical support and awareness-building at the national level to build appropriate options for a quick transition.

19. Banning leaded petrol and the exclusive use of unleaded petrol translates into a healthier population; better cars because lead corrodes engines, sparks plugs and exhaust systems; cleaner air through the use of catalytic converters; and cost savings resulting from less frequent vehicle maintenance and the wider availability of lower-priced unleaded petrol on the world market. The PCFV, made up of over 90 partners from all sectors, has successfully supported national transitions to lead-free fuel since 2002, working in over 25 countries to date.

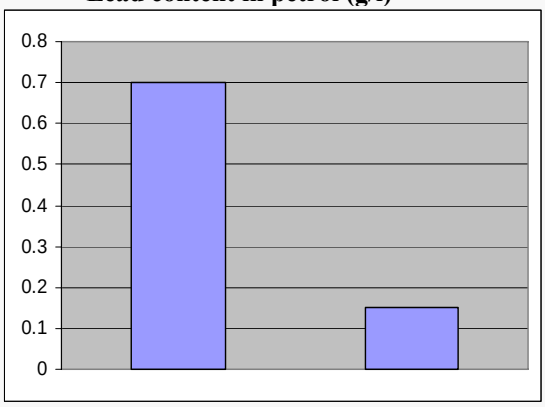
[10] Schwartz. "Societal Benefits of Reducing Lead Exposure", *Environmental Research*, No. 66, pp. 105-124. 1994a.
[11] US EPA. *Costs and Benefits of Reducing Lead in Gasoline: Final Regulatory Impact Analysis*. EPA-230-05-85-006. Office of Policy Analysis, U.S. Environmental Protection Agency, Washington, DC. 1985.
[12] US EPA, Implementer's Guide to Phasing Out Lead in Gasoline, 1999.

Box 2.

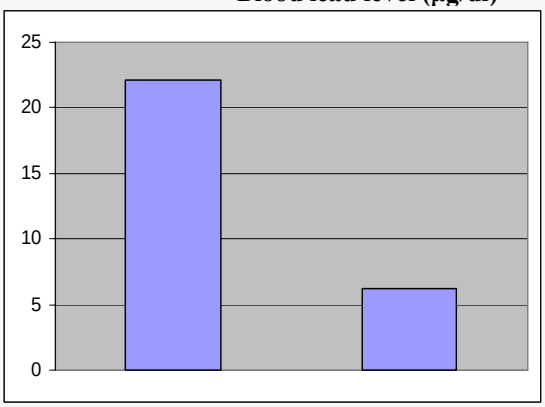
Hungary: declining blood lead levels after leaded petrol phase out (1985 – 2000)

The following graphs show how close the interrelation is between lead content in petrol and blood lead level. Logically, lead phase-out brings about corresponding health gains.

Lead content in petrol (g/l)



Blood lead level (µg/dl)



Lead levels in petrol in Hungary:

1985: 0.7 grams per litre

1995: 0.15 g/l

Current EU level: .005 g/l

Source:<http://www.mem.dk/aarhus-conference/download/lead.pdf.>

IV. LOW SULPHUR FUELS

20. Lowering sulphur levels in vehicle fuels is an essential step in lowering vehicle emissions, especially particulate matter. In addition to allowing for immediate reduction in emissions from current vehicles, low sulphur fuel is necessary in enabling the use of improved catalytic converters, filters, and other technologies that can remove a large part of the pollution from today's petrol and diesel-fuelled vehicles. Yet as the EU is quickly moving toward 10 ppm (or "zero") sulphur in diesel and petrol fuels, many countries in South Eastern Europe and EECCA countries use fuels with sulphur levels above 2,000 ppm, with levels as high as 10,000 ppm allowed. (For detailed information on the fuel quality in each country please consult Annex I).

21. Sulphur levels of 500 ppm and below open the door to an assortment of emission control technologies for both new and existing vehicles.[13] This quality of diesel fuel is the upper threshold at which certain older heavy duty diesel vehicles may be retrofitted with emission control technology. Even greater reductions can be achieved by going to very low (below 50 ppm) sulphur levels after which diesel particulate filters can be introduced in new vehicles, and in existing heavy duty vehicle fleets. In Europe, diesel particle filters will be required for all

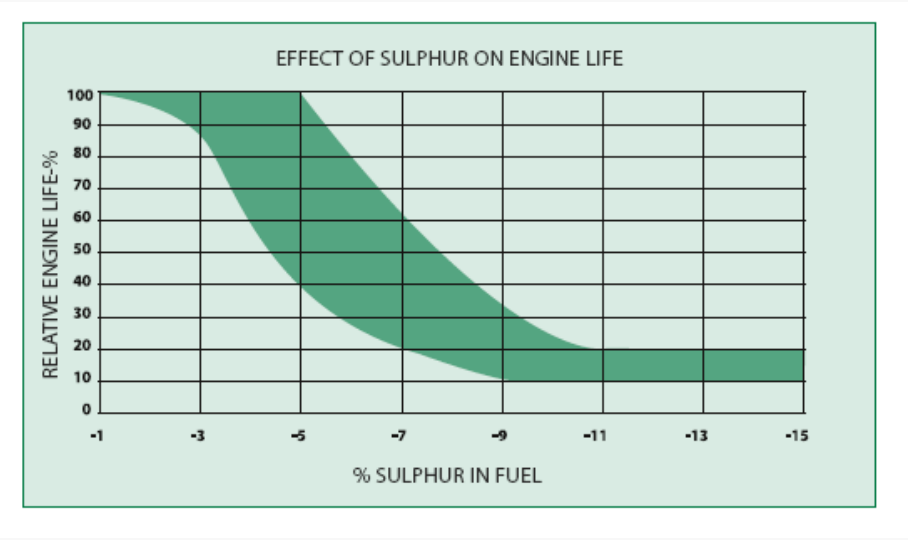
[13] Opening the Door to Cleaner Vehicles in Developing and Transition countries: the Role of Lower Sulphur Fuels, PCFV, UNEP, 2007 < http://www.unep.org/pcfv/PDF/SulphurReport.pdf>.

Euro 5 standard vehicles as of September 2009 in conjunction with the 10 ppm sulphur fuels (both petrol and diesel). High sulphur levels in fuels adversely affect an assortment of vehicle systems and technologies (including advanced emission controls)[14]. In the case of filters, high levels of sulphur can render them ineffective, and studies show that diesel particle filters achieve greater efficiency when combined with fuel sulphur levels of 15 ppm or less. The US, EU, and Japan have decided to limit sulphur in diesel to 15 ppm or less to ensure optimal functioning of these filters. Particulate filters have demonstrated reduction of over 95 percent in particulate emissions (fine and ultrafine), in addition to providing effective control of carbon monoxide and hydrocarbon emissions, reducing these emissions by 90 to 99 percent and 58 to 82 percent respectively.

Box 3

Engine life and sulphur levels[15]

The presence of sulphur in fuel significantly reduces the life of vehicle engines. This is especially the case at higher (above 2,000 ppm) sulphur levels. The graph below shows an increase in engine life as a result of reducing sulphur levels in fuel. Reducing sulphur in fuel from 1.5 percent (15,000 ppm) to 0.1 percent (1,000 ppm) is estimated to increase engine life by 80 to 90 percent.



22. Resolution No. 2003/2 on Sulphur-Free Fuels of the European Conference of Ministers of Transport (ECMT) states that "…reducing sulphur in diesel and petrol is a simple method for reducing emissions of all major pollutants from the whole vehicle fleet by increasing the efficiency and especially the durability of exhaust emissions control systems."[16]

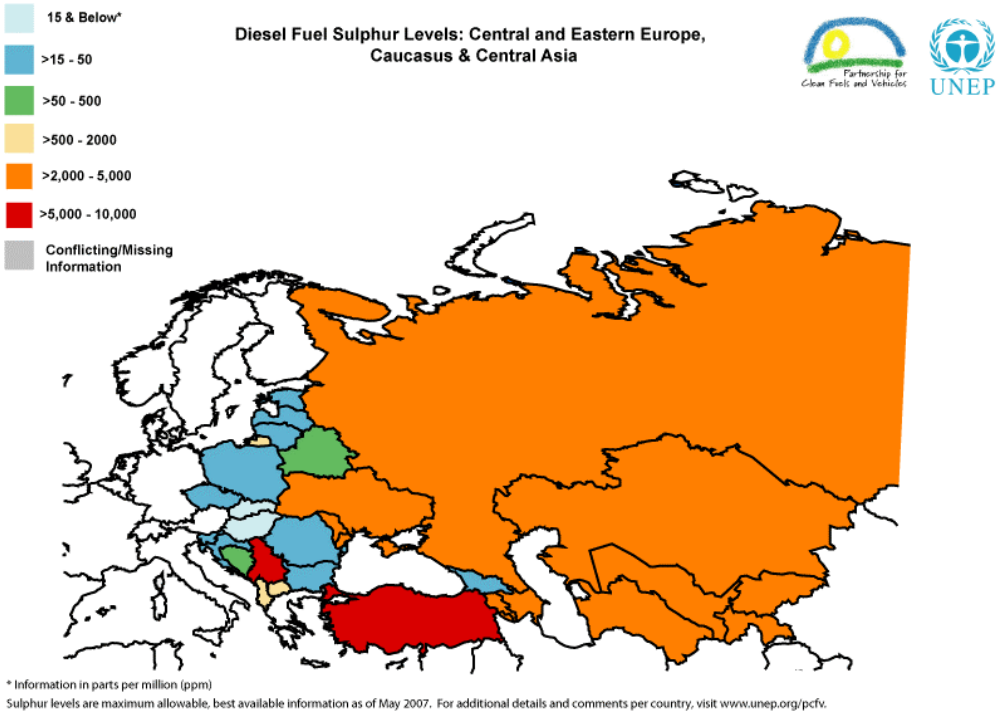
[14] Ibid.
[15] <http://www.fleetwatch.co.za/supplements/SADiesel/DieselFactsFictionS.htm>, originally Detroit Diesel Corporation Fuel and Lubrication Service Bulletin.
[16] Resolution No. 2003/2 on Sulphur-Free Fuels, European Conference of Ministers of Transport <http://www.cemt.org/resol/env/Env032e.pdf>.

23. Globally, developed and emerging economies such as India and China are moving toward low sulphur fuels, while the picture in developing and transition countries is mixed. In considering reductions in sulphur levels, policymakers in each country must weigh several factors, including the importance of the vehicle emission contribution to urban air pollution as well as the comparative costs and benefits of cleaner fuels and vehicles relative to other available strategies. However, cost-benefit analyses of fuel sulphur reductions performed in the US, Canada, Europe, Mexico, China, Brazil (included incremental costs of fuels and vehicles) have all concluded that benefits of reducing sulphur from fuels far outweigh the refinery investment and distribution costs.

24. The lack of availability of low sulphur fuels in SEE and EECCA countries stands to affect transboundary trade and tourism with surrounding countries already using cleaner fuel and vehicle technology, and will affect import of Euro 5 technology from September 2009. ECMT Resolution No. 2003/2 recommends that "…in Member countries where there is no general requirement for the introduction of sulphur free fuels from 2005: Ministers take steps to ensure sulphur free fuels are made available in sufficient quantities for the needs of international trade and tourism at strategic locations on parts of their trunk road networks that carry significant amounts of international trade or tourist traffic."[17]

25. The same resolution also states that "…early decisions on providing incentives for low sulphur and sulphur-free fuels or mandatory sulphur limits will help refiners contain costs by enabling them to plan investments and plant outages for refurbishment on an optimal path…" and encourages all ECMT member countries to use "…cost-effective strategies for the introduction of low sulphur and sulphur-free fuels in the interests of environmental protection and facilitating international freight and passenger transport by road, and in particular the use of clean vehicles in international traffic."[18]

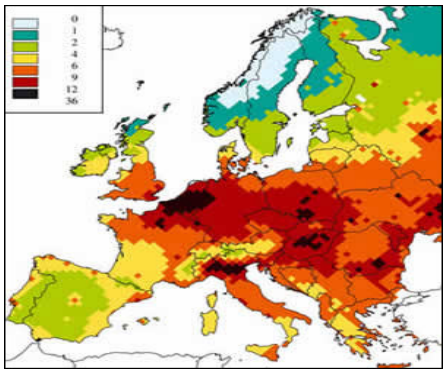
[17] Ibid.
[18] Ibid.



26. In addition to the economic and technological reasons listed above, the significant health impacts of particulate matter have been extensively documented; with increasing attention being paid to ultra fine particles rated PM 2.5 or less. Along with premature death, particulate matter (PM) results in aggravation of respiratory and cardiovascular disease, aggravated asthma, and acute respiratory symptoms. The image below illustrates that the cost of particle pollution in Europe amounts to an average of 9 months of life expectancy lost; the European Commission estimates that 4 million life years are lost annually, along with 386,000 premature deaths and 110,000 serious hospital admissions per year. In monetary terms, the damage to human health alone is estimated at between EUR 189-609 billion per annum in 2020. In view of these costs, taking no further action is not an option. WHO air quality guidelines do not specify a lower limit for PM; estimates show that reducing levels of fine particles (PM 10) can reduce deaths in cities by as much as 15 percent each year. [19]

[19] <http://www.who.int/mediacentre/news/releases/2006/pr52/en/index.html>.

Sulphur, health effect of PM 2.5: Loss in average statistical life expectancy in months due to identified anthropogenic PM 2.5[20]



27. High sulphur concentrations in petrol and diesel fuels increase emissions of harmful pollutants from mobile sources, including particulate matter. Combining high-sulphur (particularly diesel) with older vehicle technology leads to unsafe levels of smoke, soot, and fine PM emissions that are extremely harmful to human health. Addressing sulphur in fuels and vehicle technology can yield significant results in improved air quality and avoided healthcare costs, in addition to other environmental benefits. Ultra-fine particulate matter emissions are reduced on average by 33.4 percent when going from 500 ppm diesel to 50 ppm diesel.[21] Reducing sulphur levels from even higher levels to 50 ppm and lower will result in even more significant reductions of emissions.[22]

V. PCFV AS A SUCCESSFUL MODEL FOR PARTNERSHIP WITH THE PRIVATE SECTOR

28. The Partnership for Clean Fuels and Vehicles (PCFV) was established in 2002 at the WSSD as a type II public-private partnership. Its clearing-house, hosted by UNEP in Nairobi, Kenya, works to bring national governments, the oil and vehicle industries, non-governmental organizations, and international organizations including UNEP, together in a global effort to improve air quality through cleaner fuels and vehicles. The PCFV is focused on working with all sectors to eliminate leaded petrol worldwide by the end of 2008, and to reduce sulphur in vehicle fuels to 50 ppm or lower, concurrent with clean vehicle technologies, with roadmaps and timelines for sulphur reduction to be set at subregional and national levels. Notable achievements to date include the complete phase-out of leaded petrol in Sub-Saharan Africa as of January 1, 2006 (for which it received the UN 21 Award); initiation of discussions and action plans on cleaner fuels and vehicles in over 25 developing and transitional countries; and raising over USD 4 million for this global work.

29. The PCFV is the first entity to specifically address vehicle pollution for improved air quality in developing countries, including the specific problems of diesel vehicles. Moreover, by including key members of every important stakeholder group under the neutral umbrella of the United Nations, it has become a forum for many traditionally adversarial stakeholders to meet and debate their views away from other policy and political debates. Partners from all sectors

[20] <http://europa.eu.int/comm/environment/news/efe/20/article_2434_en.htm>.
[21] < www.bp.com/products/fuels/bp_ecoultra/ulsd_faq.pdf.>
[22] Ibid.

also pool their financial, technical and networking resources to promote the mission and goals of the PCFV. Industry groups work side by side with governments, NGOs and international organizations to develop consensus guidelines through PCFV working groups. Regardless of financial contribution, all partners have an equal voice in PCFV activities and management through the advisory group representative of all sectors and the annual global partnership meetings.

30. Since the PCFV's foundation, industry groups (in particular, vehicle, fuel, and after-treatment technology representatives) have been essential to the promotion of PCFV goals. For example, the private sector and governments have provided the technical expertise and industry support through both resources and knowledge to make the Sub-Saharan unleaded petrol campaign a success. Without the broad-based consensus on the fuel and vehicle targets achieved by all PCFV partners, including the private sector, this would not have been possible. The PCFV uses this approach in its global activities.

31. Public-private partnerships (PPP) such as the PCFV can only work when all relevant sectors, but in particular governments and the private sector, come together, bringing their respective resources, expertise, and perspectives to reach a set of common objectives, jointly agreed on and promoted. By providing the neutral ground in which to discuss and reach consensus, the United Nations Environment Programme plays a crucial role as the PCFV Clearing-House, compiling and disseminating PCFV information, implementing activities, and moderating PCFV discussions. At the same time, it participates equally with government, private industry, international organizations and NGO sectors in the governance of the PCFV through the advisory group.

32. As one of the most important outcomes of the 2002 WSSD, public-private partnerships for sustainable development have become one of the most successful tools for implementing the Johannesburg Plan of Implementation. Within the mechanism of the PCFV, this type of collaboration has meant:

(a) the acceleration of reaching agreed global targets for cleaner fuels and vehicles;

(b) raised profile of cleaner fuel and vehicle issues through use of the partnership network;

(c) efficient use of resources by pooling partners' resources and efforts on these specific goals;

(d) direct involvement of private sector partners with technical knowledge and experience (for example, on refinery upgrades, technical progress in the vehicle and fuel sectors, costs and means of financing improvements) in delivering advice and technical assistance to industry and government in developing countries seeking to improve fuel quality and vehicle fleets for improved air quality;

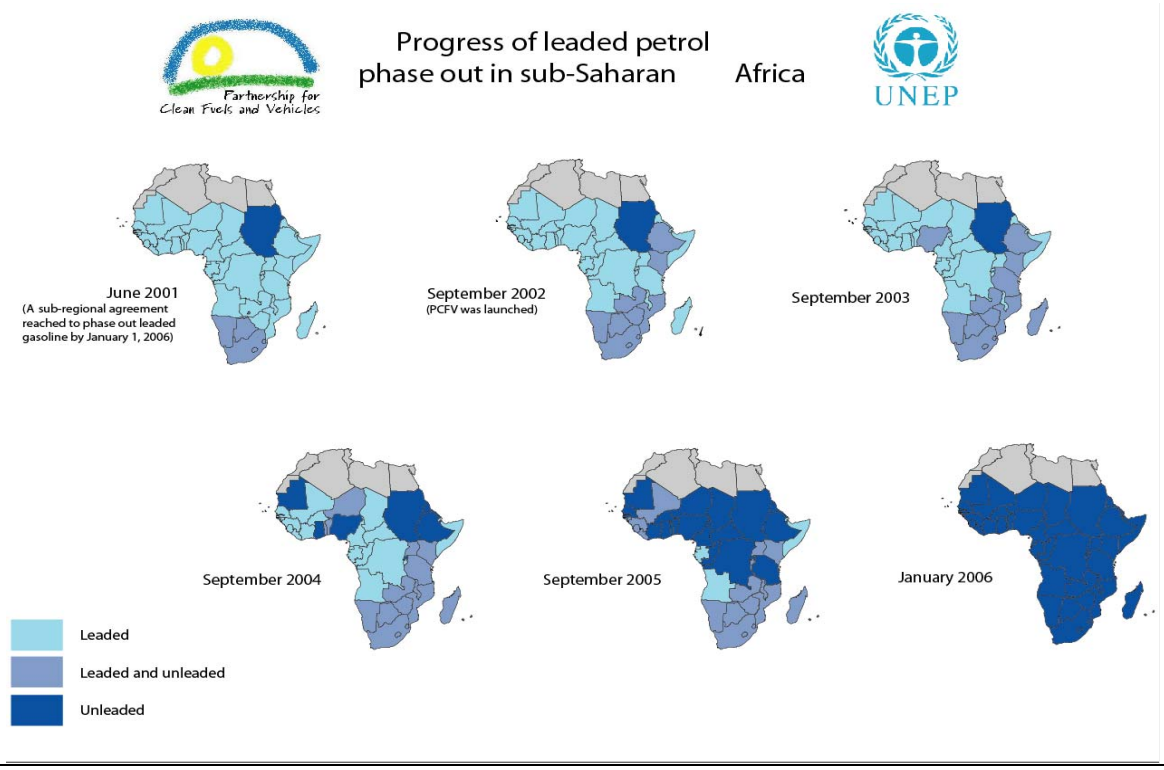
(e) increased political participation of all PCFV partners and resonance of PCFV objectives at the national level; and

(f) opportunities for private industry to contribute to improved air quality through technology and best practice transfer on a global scale.

33. Dr. Klaus Töpfer, the United Nations Environment Programme's former executive director, called the PCFV "the most successful partnership emerging from the WSSD."

Box 4 Case Study: Successful Lead Phase-out in sub-Saharan Africa

The successful PCFV campaign to end the use of leaded petrol in Sub-Saharan Africa (SSA) by 2006 is just one example of the effectiveness of its multi-sectoral and multi-stakeholder approach. In 2002, only one country in SSA (Sudan) was unleaded, whereas as of January 1, 2006, all countries have banned the importation and production of leaded petrol. International press coverage was extensive, with one newspaper stating: "Lead is banned from petrol throughout Africa from today, in a virtually unheralded victory for international environmental diplomacy."[23]



34. Building on this success, the PCFV is now working to phase out leaded petrol by the end of 2008 worldwide along with the global introduction of catalytic converters in vehicles; and to reduce sulphur in vehicle fuels to 50 ppm or lower worldwide, concurrent with clean vehicles and clean vehicle technologies, with roadmaps and timelines developed regionally and nationally.

VI. PCFV LESSONS LEARNED

35. There are currently over 95 PCFV partners. These include the US and Canadian governments; the governments of Italy and the Netherlands; the International Petroleum Industry Environmental Conservation Association (IPIECA); the Alliance of Automobile Manufacturers (AAM); the American Petroleum Institute; the Association des Constructeurs Européens d'Automobiles (ACEA); the Association for Emissions Control by Catalysts; BP America; Exxon Mobil; the Engine Manufacturers Association; International Truck and Engine

[23] "UN hails green triumph as leaded petrol is banned throughout Africa", The Independent Online, 1 January 2006.

Corporation; the Natural Resources Defense Council; and TNT courier services, to name but a few. In addition, UNEP, UNIDO, the United Nations Department of Economic and Social Affairs (UNDESA), and the REC contribute to the realization of PCFV goals.

36. The PCFV was recently featured in the IPIECA publication Partnerships in the Oil and Gas Industry (2006), which showcases how the oil and gas industry is using partnerships to respond to challenges of meeting global energy demand and to contribute to sustainable development. The publication's study of the PCFV states that "from each stakeholder's point of view, the PCFV offered a means to advance goals that could not be achieved individually…The experience of establishing and maintaining the PCFV has shown that voluntary partnerships can be an effective way to implement environmental and health initiatives."[24]

37. The same publication gives the following key factors for the PCFV's success:

(a) Strong motivation for working in partnership whereby partnering organizations recognize that no single member could accomplish individually the cleaner fuel and vehicle targets otherwise attainable through partnership with all sectors involved;

(b) The specificity of its goals and well-defined mission (e.g. lead phase-out, sulphur reduction);

(c) Simple, definitive governance rules and principles, agreed to at its inception, illustrating that operational rules must ensure the balanced representation of partners and should include a process for resolving disputes;

(d) The establishment of a secretariat/clearing-house, preferably on "neutral ground," to take the lead in organizing the partnership and implementing its activities, with UNEP's diplomatic skills and its role as a neutral partnership facilitator proving invaluable to the PCFV;

(e) Flexibility from all partners and willingness to seek compromise and consensus on contentious issues;

(f) Use of the "Chatham House Rule of Confidentiality" at PCFV meetings in order to enable partners to openly offer ideas and share information anonymously;

(g) Guidance in partnership through a board representative from each participating sector, as the PCFV advisory group is comprised of representatives from each major region and each stakeholder group to ensure balanced representation on all issues; Providing guidance through working groups on technical issues to help partners resolve differences and reach consensus, allowing the PCFV to effectively communicate to policymakers in individual countries; and

(h) The PCFV's annual meeting for all partners, during which everybody reviews the prior year's activities and develops a work plan for the following year.[25]

[24] <http://www.ipieca.org/activities/partnerships/index.html.>.
[25] Ibid.

VII. CEE AND EECCA CHALLENGES AND THE ROLE OF THE REC FOR CENTRAL AND EASTERN EUROPE, REC CAUCASUS AND REC CENTRAL ASIA

38. The main challenges for cleaner fuels and vehicles in the CEE and EECCA region, as part of sectoral strategies and planning for lower transport emissions and better air quality, include:

(a) Completing phase-out of leaded petrol by the end of 2008 in the remaining six countries;

(b) Reduction of sulphur content in vehicle fuels from existing high levels of 1,000-5,000 ppm to EU-standard levels of 50 ppm or below; and

(c) Establishment of corresponding vehicle emission standards along with promotion of vehicle emission control technologies (e.g catalytic converters, retrofit programs for heavy-duty diesel vehicles).

39. These challenges may seem even more difficult to overcome given the fact that all these countries are economies in transition. Most refineries are still state-owned and therefore funds for reconstruction are not always available. Whenever countries embark on the road to privatizing refineries, there is a lack of willingness to modify the legal basis and standards before finalization of the privatization procedure, which may take years. The vehicle fleet is relatively old, with the majority of cars between 10 and 20 years or more. There is a lack of understanding and misinformation as to the impact of unleaded fuel on these cars; for example, a strong misconception that older cars can only run on leaded petrol prevails, and there is a general lack of information on the negative health effects of lead and sulphur.

Box 5
Unleaded Petrol and Older Vehicles: Myth vs. Fact
One persistent belief in dual use countries (where both leaded and unleaded petrol is sold) in SEE and EECCA region is that lead phase-out will increase the valve seat wear and subsequently lead to valve seat recession (VSR) in older cars. VSR is thought to occur in some older vehicles, as the valve seats are made of materials more susceptible to excessive valve wear.[26] The VSR working group within the PCFV, including a wide variety of stakeholders, has studied the issue. Its study found that "[i]n real world conditions, virtually no evidence of excessive valve wear has been found in vehicle or engine operation in normal everyday use, and several studies that monitored vehicles in actual daily service in countries that eliminated lead found no excessive valve wear. Experience in a number of countries that switched to unleaded petrol demonstrates that virtually all types of fleets can operate successfully on unleaded petrol without experiencing more valve wear than occurs with leaded petrol."
Countries and regions studied include the US, Canada, Japan, Brazil, France, Central America, Thailand, China, India, Vietnam, the Philippines, Egypt, South Africa and Australia.

40. The PCFV, with the support of REC headquarters, launched its activities in Central and Eastern Europe in 2005 and has since supported activities and events in Hungary, Bulgaria, Turkey, Serbia, and Bosnia and Herzegovina, bringing together government, fuel, vehicle, academic, and civil society sectors to develop plans and projects for cleaner fuels and vehicles in these countries. REC country offices in these countries have been instrumental in mobilizing the private sector and other stakeholders to reach consensus on the issues, while the PCFV has

[26] Eliminating Lead from Petrol: Report on Valve Seat Recession, Report of the Valve Seat Recession Group to the PCFV, available from <http://www.unep.org/pcfv/publications/Publications.htm>.

provided technical, financial and networking support, including international experts.

41. At the moment, targeted activities to promote leaded petrol phase-out in Serbia and Bosnia and Herzegovina are ongoing. Along with the Former Yugoslav Republic of Macedonia and Montenegro, these two countries are the last remnants of leaded petrol use in Europe. In addition, areas of high-sulphur diesel use are still common in South Eastern Europe. The EECCA states of Tajikistan, and Turkmenistan have yet to eliminate leaded petrol. In some cases, although legislation exists for the elimination of lead additives in fuel, there is lack of implementation and fuel adulteration, which allow leaded petrol to exist on the market.

42. In 2007, the PCFV will launch activities in the EECCA subregion, bringing governments and industry together to address the continued use of leaded fuel and the very high sulphur levels in diesel, along with older vehicle technology still in use.

EU legislation

43. In all SEE countries, there is a strong political will to align national legislation with the European Union acquis. Concurrently, most countries have already adopted standards in compliance with EU Directive 98/70. According to this directive, “no later than January 1, 2000, Member States shall prohibit the marketing of leaded petrol within their territory.” The 'Euro IV' standard entered into force in 2005, requiring sulphur content of petrol and diesel of 50 ppm maximum. The 'Euro V' standard for 10 ppm sulphur as of January 1, 2009, is now under negotiation in the European Parliament and Council. Each EU fuel quality amendment is implemented with its corresponding Euro II-VI vehicle emission standard designed to match vehicle technology with the required fuel quality.

Petrol				
	EN 228: 1993/95 Euro II	Dir 98/70 2000 Euro III	Dir 98/70 2005 Euro IV	Dir 98/70 2009 (EP/Council)
Sulphur, ppm, max	1,000/500	150	50 (10)	10
Lead, g/l, max	0.013	None	None	None
Diesel				
	EN 590: 1993/96	Dir 98/70 2000	Dir 98/70 2005	Dir 98/70 2009 (EP/Council)
Sulphur, ppm, max	2,000/500	350	50/10	10 ppm (review)

Dates of Leaded Petrol Phase-Out in CEE region

VIII. THE PCFV AND UNECE PROCESSES

44. The PCFV's mission and work complements and builds on past EfE initiatives and declarations related to the environment in Eastern European and EECCA countries, specifically the SILAQ process, the Pan-European Strategy to Phase out Leaded Petrol and its subsequent progress report, and the implementation of the Environmental Strategy for Countries of Eastern Europe, the Caucasus and Central Asia. The PCFV Global Campaign to Phase-out Leaded Petrol by end 2008 supports the promotion of cleaner transport and better air quality through improved fuels and technology in the remaining SEE and EECCA countries still using leaded fuel for road transport.

45. SILAQ was launched in 1995 by ministers of environment from the UNECE region at the third "Environment for Europe" conference in Sofia. With financial support from the U.S. EPA, SILAQ focused on the promotion of unleaded petrol and on the reduction of sulphur and particulate emissions in highly polluted urban areas. Bulgaria, Croatia, the Czech Republic, Hungary, the former Yugoslav Republic of Macedonia, Poland, Romania, Slovakia and Slovenia participated in SILAQ activities. REC hosted the secretariat. SILAQ was a part of the EAP Task Force CEE Subprogramme between 1998 and 2003.

46. The PCFV builds on and continues the lead phase-out focus of SILAQ in the remaining South Eastern Europe and EECCA countries as part of its campaign to phase out leaded petrol worldwide by the end of 2008. Its promotion of low sulphur fuels and updated vehicle standards and technologies support decisions taken by the European Conference of Ministers of Transport (ECMT) concerning low sulphur fuels, along with the 1958 UNECE Geneva agreement and relevant addenda.

Phasing out lead in CEE region

Box 6 Case study MOL

	<1993	1993	2000	01.07.2005
Petrol	0.2%	0.05%	0.015%	10 ppm

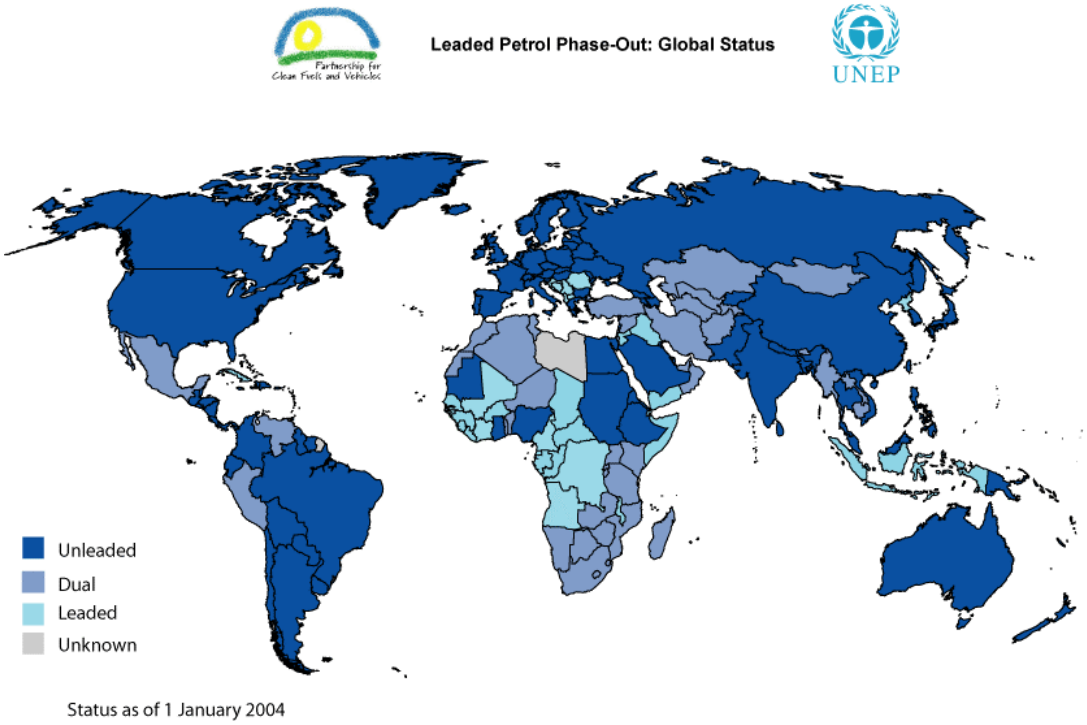
	<1993	1993	1997	2000	01.07.2005
Diesel	0.5%	0.2%	0.05%	0.035%	10 ppm

47. In 2004 in MOL's main refinery in Százhalombatta a new 2.2 Mt/year capacity gasoil desulphurising plant was built as well as a new hydrogen plant of a capacity of 40,000 cubic meters per hour, converting gasoil blending plant and auxiliary facilities. In 2004 in Bratislava a new 1.7 Mt/year capacity gasoil desulphuriser was built and in Százhalombatta a new petrol desulphuriser was built. The total value of the above-mentioned investments is approximately USD 350 million. MOL's investment in facilities upgrade was based on prevailing market and legislative trends, and the company decided to invest directly into 10 ppm sulphur technology, skipping the 50 ppm interim level. As a result of these measures, sulphur emission from motor fuels sold by MOL in Hungary has decreased from 730 tons per year to less than 30.[27]

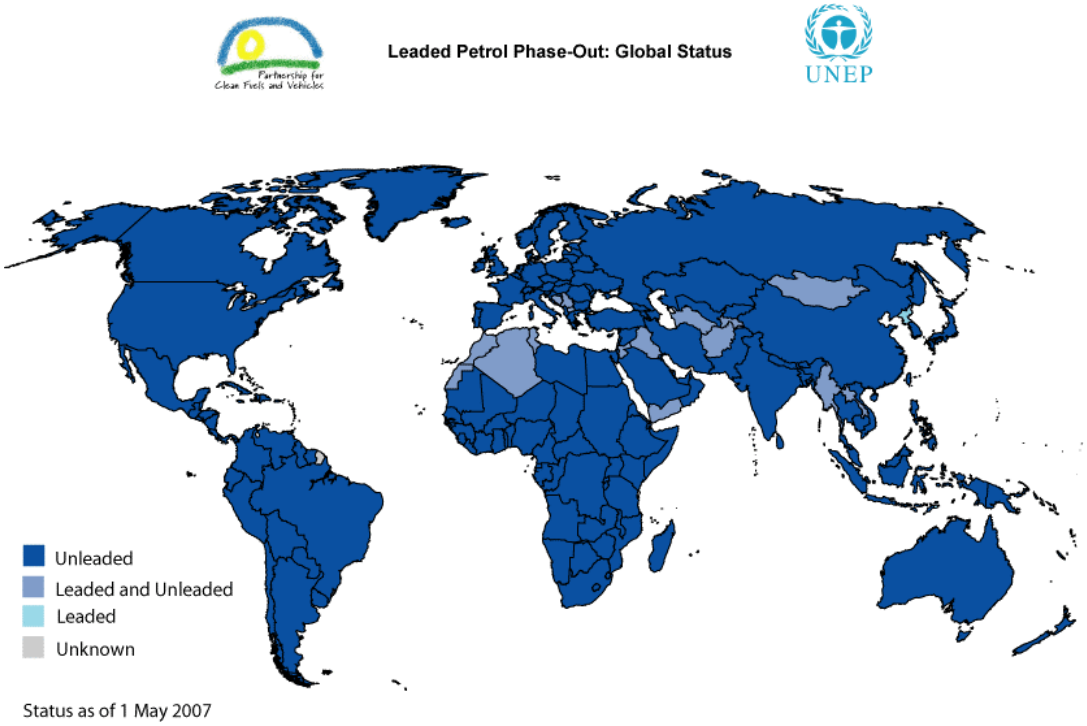
IX. LEAD PHASE-OUT PROGRESS IN THE WORLD

48. In the 1950s, scientists concluded that there are negative health effects from lead. The US phased out lead in the 1970s while leaded petrol was eliminated from most developed countries in the 1990s. In 1992, the Rio Earth Summit called for total phase-out of leaded petrol, and in 2001 the Dakar Declaration called for an African ban. In 2005, the PCFV set a global target for lead elimination by the end of 2008. During the last four years, there has been significant progress in the number of countries that went unleaded. The following maps illustrate this trend.

[27] The MOL case study is just an example of the investments needed for a refinery upgrade and the authors are in no way promoting the company.



Sub-Saharan Africa went unleaded on January 1, 2006 and modified the world map of unleaded countries.



The most notable success of 2006 was the phasing out of leaded petrol in Indonesia.

X. LEAD AND SULPHUR IN FUELS IN CEE AND EECCA

49. Earlier in the text, it was seen that Central European countries (New Member States) phased out lead between 1995 (Slovakia and Slovenia), 2004 (Bulgaria and Romania), and 2006 (Croatia). As of March 2007, in SEE and EECCA still sell leaded petrol: Bosnia and Herzegovina, Georgia, Montenegro, Serbia, Tajikistan, the former Yugoslav Republic of Macedonia, and Turkmenistan.

Box 7

Case study Croatia:
Croatia is the latest country to phase out lead in CEE since June 1, 2006. The country transposed EU Directives 98/70/EC, 1999/32/EC together with 2000/71/EC, 2003/17/EC and 2005/33/EC.

From January 1, 2008 all suppliers of liquid oil fuels will be obliged to put on the market petrol and diesel fuel containing less than 10 ppm of sulphur, equally represented on the whole territory of Croatia. Such fuels are already available at some gas stations. Permanent quality control for all types of liquid fuels on terminals, petrol stations and ships will be introduced from 2008.

Actions have also been undertaken to renew the Croatian vehicle fleet. Application of Euro III motors started on April 1, 2007 as the import limit for used vehicles. Discounts and benefits are given to persons who give back their old vehicles when buying new ones. Euro IV standards apply to new imported vehicles.

It has been estimated in the modernization plan for the two refineries that by the end of 2008 only low-sulphur fuel will be produced.

50. There are seven countries where diesel containing 5,000 ppm of sulphur is still available on the market: Armenia, Kazakhstan, Kyrgyzstan, Moldova, Russia, Serbia, and Tajikistan. Sulphur in petrol varies between 50 ppm in EU New Member States and Croatia and 1,000 ppm in Armenia, Azerbajdjan, Kazakhstan, Kyrgyzstan, Russia, Serbia, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan.

51. Most EECCA countries use the Russian GOST 305/82 Standard for diesel fuel, which allows 2,000 ppm sulphur and 5,000 ppm grades. The exceptions are: Belarus, which is at maximum allowable 350 ppm as of September 1993; and Georgia which phased out lead in 2000 and set norms of less than 50 ppm of sulphur in petrol and diesel since the beginning of 2007. Georgia also has limited quantities of 50 ppm on the market. The majority of diesel fuel in Russia is 2,000 ppm and below, with 5,000 ppm still sold, and 50 ppm sulphur diesel is available in Moscow and St. Petersburg. For petrol these countries generally follow GOST 2084/77, max. lead .013 g/l and 1,000 ppm sulphur . Russia's petrol is 500 ppm and below, as is Belarus. In SEE, Serbia, Montenegro and Albania continue to use high-sulphur fuels.

52. For more comments and information on the current status of lead and sulphur content in petrol and diesel, please see Annex I.

XI. RECOMMENDATIONS

(a) High-level commitment is needed to phase out leaded petrol by the end of 2008, in line with the PCFV global deadline, in countries in SEE and EECCA where it is still produced and/or imported or where legislation exists but is not implemented. Subregional and national plans should be developed, adopted, and implemented through the institution of national bans on the production and import of leaded petrol, awareness and education campaigns for distributors and consumers, and, in countries with refining capacity, the undertaking of technology investments (if required) as part of overall refinery upgrades.

(b) Phasing out lead in petrol can be accomplished quickly and effectively, as already demonstrated throughout the world. It is an essential step for better air quality in SEE and EECCA countries, enabling the use of vehicle emission control technology (i.e. catalytic converters) for significant reductions in pollutants. However, it requires that governments and industry actively together to develop and implement an appropriate timeline and strategy and to adopt necessary legislation and standards. Industry representatives include refineries, car producers, car dealers, fuel distributors, etc.

(c) Concurrently, catalytic converter technology should be promoted by the adoption of national standards requiring its use on all newly produced and imported vehicles.

(d) In order to reduce increasing vehicular emissions of fine particulates and to allow for the use of advanced emission controls, it is essential to reduce sulphur levels in fuels - especially in diesel fuels. Countries should move toward reducing sulphur in vehicle fuels to 50 ppm or below, concurrently with clean vehicles and clean vehicle technologies, with roadmaps and timelines developed regionally and nationally. Consultation between all sectors is essential in this process.

(e) The role of all sectors involved in cleaner fuel and vehicle decision making, including the governmental, civil society, and private sectors, should be strengthened; public-private dialogue should be intensified to promote commitment and actions for cleaner fuels and vehicles and to ensure adequate implementation and participation by all involved.

Annex I

Current status of lead and sulphur in petrol and diesel in CEE and EECCA countries, as of March 2007

Countries	Lead		Sulphur		
	Current Status	Comments	Diesel	Petrol	Comments
Albania	Unleaded	Imports of leaded petrol banned 07/ 2005. National legislation limit is 0.005 g/l for lead.	2,000/350	150	2000 ppm domestic refinery production (20 percent market share), 350 ppm diesel imported.
Armenia	Unleaded	Lowered the lead limit to 0.15 g/l effective March 2000.	5,000	1,000	Follows GOST** 305/82 standard for diesel fuel (2,000 ppm and 5,000 ppm grades), GOST 2084/77 for petrol (max. lead .013 g/l and 1,000 ppm sulphur)
Azerbaijan	Unleaded	Has not produced leaded petrol since 1997.	2,000	1,000	Follows GOST standards. Reduction of diesel sulphur content to 500 ppm by 2015.
Belarus	Unleaded	Ban since 1998.	350	500	Adopted EN 228:1993 since 09/1993 but fuel does not yet fully comply. As its industry is gradually modernized, Belarus expects to be able to produce low sulphur fuel from 2008.
Bosnia and Herzegovina	Dual	Leaded petrol to be banned as of January 1, 2010. Imports some unleaded.	350	150	Over 97 percent of fuel imported from neighbouring countries, including Serbia. National specification is 350 ppm.
Bulgaria	Unleaded	Ban since 2004.	50	50	
Croatia	Unleaded	Ban since 2006. Ongoing investments to bring fuels to EU standards by 2009.	50	50	New regulation adopted May 2006 transposing 98/70/EC and 1999/32/EC. Rijeka and Sisak refinery upgrades have started, will continue to 2012 and will cost EUR 750 million.
Cyprus	Unleaded	Ban since May 2004.	50	50	
Czech Republic	Unleaded	Ban since 2001.	50	50	
Estonia	Unleaded	Ban since May 2001.	50	50	
Georgia	Unleaded	Ban since 2000.	50	50	Since 01.01.2007.
Hungary	Unleaded	Ban since 1999.	10	10	

Countries	Lead		Sulphur		
	Current Status	Comments	Diesel	Petrol	Comments
Kazakhstan	Unleaded		5,000/2,000	1,000	Follows GOST standards.
Kyrgyzstan	Unleaded	Ban since 2002.	5,000/2,000	1,000	Follows GOST standards.
Latvia	Unleaded	Ban since 2001.	50	50	
Lithuania	Unleaded	Ban since 2001.	50	50	
Montenegro	Dual	Imports from Serbia.	10,000	1,000	Imports from Serbia.
Poland	Unleaded	Ban since 2003.	50	50	
Moldova	Unleaded	Ban since 2003.	5,000/2,000	1,000	Follows GOST standards.
Romania	Unleaded	Ban since 2004.	50	50	Petrom and Rompetrol already produce diesel as low as 10 ppm. National legislation harmonized with 98/70/EC (50 ppm).
Russia	Unleaded	Ban since 2000.	5,000/2,000	500	The majority of diesel fuel is 2,000 and below, although 5,000 ppm is still sold. Lukoil has launched Euro 4 diesel production (50 ppm) in Moscow and St. Petersburg. Follows GOST standards.
Serbia	Dual	Optimistic forecast for a leaded petrol ban according to the National Environmental Action Programme is 2015. Business as usual is 2020.	10,000	2,000	Domestic refineries produce 10,000 ppm diesel and a 350 ppm 'EKO' diesel grade, with very small quantities of 50 ppm diesel produced at Pancevo refinery. Lower sulphur diesel is imported in limited quantities.
Slovakia	Unleaded	Ban since 1995.	10	10	
Slovenia	Unleaded	Ban since 2001.	50	50	
Tajikistan	Dual		5,000/2,000	1,000	Follows GOST standards.
The former Yugoslav Republic of Macedonia	Dual	77 percent of market unleaded. As of December 2004, the lead content of leaded petrol was decreased from 0.6 g/l to 0.15 g/l, while the lead content in unleaded petrol was decreased from 0.02 g/l to 0.013 g/l.	2000	500	Diesel 2000 ppm grade is mainly imported.

Countries	Lead		Sulphur		
	Current Status	Comments	Diesel	Petrol	Comments
Turkey	Unleaded	Ban since 2006. Phase-out began in 2002.	7,000/350	150	National legislation limits diesel sulphur levels at 350 ppm (75 percent market share in 2005), but allows marketing of diesel as high as 7,000 ppm to 2007. 50 ppm also available at pump. Refinery upgrades planned to produce only 50 ppm by 2007, 10 ppm for both petrol and diesel by 2009.
Turkmenistan	Dual		5,000/2,000	1,000	Follows GOST standards.
Ukraine	Unleaded	Ban since 2001.	5,000/2,000	1,000	Follows GOST standards.
Uzbekistan	Unleaded		5,000/2,000	1,000	Follows GOST standards.

* Please note that some of this information, especially for countries in the Former Soviet Union, are based on the most readily available information on existing conditions and are thus subject to correction or change. Email elisa.dumitrescu@unep.org with updates.

** Russkie Gosudarstvennye Standarty (Russian State Standards).

References

1. Air Quality and Health in Eastern Europe, Caucasus and Central Asia, Report on the WHO Workshop St. Petersburg, Russian Federation, October 13-14, 2003.

2. Eliminating Lead from Petrol: Report on Valve Seat Recession, Report of the Valve Seat Recession Group to the PCFV Environmental Partnerships in the UNECE Region.

3. Environment Strategy for Countries of Eastern Europe, Caucasus and Central Asia, UNECE, Kiev, 2003

4. EU Thematic Strategy on Air Pollution, European Commission, 2005.

5. EU Thematic Strategy on Urban Environment, European Commission, 2006.

6. Opening the Door to Cleaner Vehicles in Developing and Transition countries: the Role of Lower Sulphur Fuels, PCFV, UNEP, 2007.

7. Phase-out of Leaded Petrol, Synthesis Report, REC, May 1998.

8. Refinery and Product Developments of MOL, presentation by Dr. Marta Kramer at the Conference on Clean Fuels and Vehicles, October 2005, Szentendre, Hungary.

9. Resolution No. 2003/2 on Sulphur-Free Fuels, European Conference of Ministers of Transport.

Abbreviations

AAM – Alliance of Automobile Association
ACEA – Association des Constructeurs Européens d'Automobiles
CEE – Central Eastern Europe
EC – European Commission
ECMT – European Conference of Ministers of Transport
EEA – European Environmental Agency
EECCA – Eastern E urope, Caucasus and Central Asia
EfE – Environment for Europe
IPIECA – International Petroleum Industry Environmental Conservation Association
NGO – Non-governmental Organisation
PCFV – Partnership for Clean Fuels and Vehicles
PM – Particulate Matter
ppm – parts per million
PPP – Public-Private Partnership
REC – The Regional Environmental Center for Central and Eastern Europe
SEE – South Eastern Europe
SILAQ – Sofia Initiative on Local Air Quality
SSA – Sub-Saharan Africa
UNDESA – United Nations Department of Economic and Social Affairs
UNECE – United Nations Economic Commission for Europe
UNIDO – United Nations Industrial Development Organisation
UNEP – United Nations Environment Programme
USEPA – United States Environmental Protection Agency
VSR – Valve Seat Recession
WHO – World Health Organisation
WSSD – World Summit on Sustainable Development

*****