PHASING OUT LEAD FROM GASOLINE IN CENTRAL AND EASTERN EUROPE pdf

1: World Bank recommends Global Phase-Out Of Leaded Gasoline - World Bank

IMPLENTING THE ENVIRONMENTAL ACTIONPROGRAMME FOR CENTRAL AND EASTERN EUROPE Phasing Out Lead From Gasoline in Central and Eastern Europe Health Issues, Feasibility, and Policies.

Key facts Lead is a cumulative toxicant that affects multiple body systems and is particularly harmful to young children. Lead in the body is distributed to the brain, liver, kidney and bones. It is stored in the teeth and bones, where it accumulates over time. Human exposure is usually assessed through the measurement of lead in blood. Lead in bone is released into blood during pregnancy and becomes a source of exposure to the developing fetus. There is no known level of lead exposure that is considered safe. Lead exposure is preventable. Its widespread use has resulted in extensive environmental contamination, human exposure and significant public health problems in many parts of the world. Important sources of environmental contamination include mining, smelting, manufacturing and recycling activities, and, in some countries, the continued use of leaded paint, leaded gasoline, and leaded aviation fuel. More than three quarters of global lead consumption is for the manufacture of lead-acid batteries for motor vehicles. Lead is, however, also used in many other products, for example pigments, paints, solder, stained glass, lead crystal glassware, ammunition, ceramic glazes, jewellery, toys and in some cosmetics and traditional medicines. Drinking water delivered through lead pipes or pipes joined with lead solder may contain lead. Much of the lead in global commerce is now obtained from recycling. Young children are particularly vulnerable to the toxic effects of lead and can suffer profound and permanent adverse health effects, particularly affecting the development of the brain and nervous system. Lead also causes long-term harm in adults, including increased risk of high blood pressure and kidney damage. Exposure of pregnant women to high levels of lead can cause miscarriage, stillbirth, premature birth and low birth weight. Sources and routes of exposure People can become exposed to lead through occupational and environmental sources. This mainly results from: An additional source of exposure is the use of certain types of unregulated cosmetics and medicines. High levels of lead have, for example, been reported in certain types of kohl, as well as in some traditional medicines used in countries such as India, Mexico and Viet Nam. Consumers should therefore take care only to buy and use regulated products. Young children are particularly vulnerable to lead poisoning because they absorb 4â€”5 times as much ingested lead as adults from a given source. This route of exposure is magnified in children with a psychological disorder called pica persistent and compulsive cravings to eat non-food items , who may, for example pick away at, and eat, leaded paint from walls, door frames and furniture. Exposure to lead-contaminated soil and dust resulting from battery recycling and mining has caused mass lead poisoning and multiple deaths in young children in Nigeria, Senegal and other countries. Once lead enters the body, it is distributed to organs such as the brain, kidneys, liver and bones. The body stores lead in the teeth and bones where it accumulates over time. Lead stored in bone may be remobilized into the blood during pregnancy, thus exposing the fetus. Undernourished children are more susceptible to lead because their bodies absorb more lead if other nutrients, such as calcium or iron, are lacking. Children at highest risk are the very young including the developing fetus and the impoverished. Health effects of lead poisoning on children Lead exposure can have serious consequences for the health of children. At high levels of exposure, lead attacks the brain and central nervous system to cause coma, convulsions and even death. Children who survive severe lead poisoning may be left with mental retardation and behavioural disorders. At lower levels of exposure that cause no obvious symptoms, and that previously were considered safe, lead is now known to produce a spectrum of injury across multiple body systems. Lead exposure also causes anaemia, hypertension, renal impairment, immunotoxicity and toxicity to the reproductive organs. The neurological and behavioural effects of lead are believed to be irreversible. There is no known safe blood lead concentration. But it is known that, as lead exposure increases, the range and severity of symptoms and effects also increases. Encouragingly, the successful phasing out of leaded gasoline in most countries, together with other lead control measures, has

resulted in a significant decline in population-level blood lead concentrations. There are now only 3 countries that continue to use leaded fuel 1. More, however, needs to be done regarding the phasing out of lead paint: The highest burden was in low- and middle-income countries. IHME also estimated that in , lead exposure accounted for WHO response WHO has identified lead as 1 of 10 chemicals of major public health concern, needing action by Member States to protect the health of workers, children and women of reproductive age. WHO has made available through its website a range of information on lead, including information for policy-makers, technical guidance and advocacy materials. WHO is currently developing guidelines on the prevention and management of lead poisoning, which will provide policy-makers, public health authorities and health professionals with evidence-based guidance on the measures that they can take to protect the health of children and adults from lead exposure. Its broad objective is to promote a phase-out of the manufacture and sale of paints containing lead and eventually eliminate the risks that such paints pose. The phasing out of lead paint by is one of the priority actions for governments included in the WHO Road map to enhance health sector engagement in the Strategic Approach to International Chemicals Management towards the goal and beyond. The elimination of lead paint will contribute to the achievement of the following Sustainable Development Goal targets: By substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water, and soil pollution and contamination; and By , achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment.

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2: - NLM Catalog Result

In terms of implementation, lead phase-out objectives should be separated from dealing with other vehicular emission control issues, and policies that rely on a combination of incentives and mandatory phase-outs may be more appropriate choices in the region.

World Bank recommends Global Phase-Out Of Leaded Gasoline Eliminating Leaded Gas Reduces Health Risks The World Bank is calling for a worldwide phase out of leaded gasoline to reduce health problems such as neurological damage, high blood pressure and heart disease linked to lead in the urban environment. Most of the 1. The challenge is to change the incentives to petroleum refineries and gasoline users. The World Bank can help with the conversion by assisting governments in designing a feasible lead phase-out schedule and incentive policy framework; facilitating inter-governmental cooperation; and brokering financial packages through loans, guarantees, and attracting private investments. About 15 to 18 million children in these countries may suffer permanent brain damage due to lead poisoning. Leaded gasoline causes about 90 percent of airborne lead pollution in cities. The remaining 10 percent comes from factories and power plants. Other sources of lead exposure include lead pipes or lead-based solders in water supply systems, lead-based paint and ceramics. Using unleaded gas makes sense. Countries can save five to ten times the cost of converting to unleaded gas in health and economic savings, the World Bank says. Leaded gasoline, because it contains lead salts and halogen acids, causes greater corrosion of automobile exhaust systems and requires more frequent oil and spark plug changes. Shifting from the production of leaded to unleaded gasoline is technically simple. Modern refineries do not need to make extensive investments. Old refineries, however, often have obsolete technology that cannot produce unleaded gasoline. Many of these refineries run at a loss and should be either modernized or closed down. A successful lead phase-out program depends on whether these difficult measures are taken. Refinery modifications necessary to phase out lead typically pay for themselves in terms of improved productivity and profitability. If governments allow refineries to earn a reasonable return on their investment, financing is usually available for commercial sources. This requires appropriate price, tax and import policies. Government policies can smooth the conversion to unleaded fuels by pricing unleaded gasoline cheaper than leaded to encourage its wider use, and educating the public on the economic and health benefits of using unleaded gasoline. The exposure to benzene from gasoline mainly comes from evaporation of gasoline fumes, which occur with or without catalytic converters. The use of unleaded gasoline without catalytic converters therefore need not increase health risks. Benzene evaporation should be controlled in all cases. Health Risks Lead is a heavy metal that has long been known as a neurotoxin, a substance that adversely effects the nervous system even at low levels of exposure. Recent studies indicate that no safe level of lead exists. Children are especially susceptible to lead because their digestive systems have fast absorption rates for heavy metals. Because lead particles settle on surfaces, children ingest contaminated dust and soil simply by putting their fingers in their mouths or by chewing on contaminated toys. Poor children are most at risk because malnourishment or physical stress intensifies disabilities caused by lead absorption. For adults, even low levels of lead absorption â€” occurring usually through inhalationâ€” causes hypertension, high blood pressure, and heart disease. In Bangkok, excessive exposure to lead causes , â€” , cases of hypertension, resulting in some deaths per year in the late s. Jakarta has , cases of hypertension each year due to lead. Lead contamination and exposure in cities is typically 3 to 4 times higher than in the suburbs and 10 times higher than in rural areas. The result is that children living in the inner cities may suffer as much as a 4 point IQ loss compared to those in the suburbs. When leaded gasoline was banned in the United States, lead exposure dissipated quickly. Leaded Gas Use Increasing Because of soaring increases in automobile use worldwide, the problems will only worsen if leaded gas continues to be used. In , there were some million cars and trucks worldwide. By that number will grow to million, with most of the growth occurring in developing countries and Central and Eastern Europe. Not only is automobile use increasing in developing world cities, but because

urban populations typically have higher concentrations, larger numbers of people are being exposed to deadly lead pollution. With World Bank support, Thailand banned leaded gasoline in after converting its petroleum production to unleaded fuel. In many parts of the world, however, lead additives are still used in alarmingly large quantities in gasoline. In Africa, only high lead content gasoline is used â€" in some cases as high as 0. In many parts of the Middle East, Asia, Latin America and Eastern Europe, high lead content gasoline is the standard, with only limited quantities of unleaded gasoline used. It is urging countries in Africa, the Middle East, Asia, Latin America and Eastern Europe that still use large amounts of lead in gasoline to take the first step by reducing the lead content of their gasoline to 0. Bank studies in different parts of the world have shown that lead is one of the most serious environmental health hazards affecting growing urban populations. Lead impairs the mental development of young children, and increases the risk of high blood pressure, heart attacks, and premature death for adults, even at levels of exposure previously considered safe. Recognizing the damaging effects of lead on human health and its cost to societies, the Bank has been working with the governments of its client countries to tackle the main sources of lead exposure. As part of this effort, the Bank strongly supports the global phase-out of leaded gasoline, as a measure that reduces serious health risks at relatively low cost. In many industrialized countries, improvements in car technology through the introduction of catalytic converters on new cars was the driving force for phasing out leaded gasoline. However, growing medical evidence of the dangers of lead should urge policy makers to phase-out lead from gasoline faster and sooner than replacing all cars with new ones. The Bank is urging countries, therefore, to pursue the total phase-out of leaded gasoline independently from the use of catalytic converters. Countries could get rid of leaded gasoline within five years if they committed themselves to pursue a comprehensive phase out program and set the right policies, such as fiscal incentives. When political commitment exists and the right economic incentives are in place, leaded gasoline can be phased out easily and rapidly, as recent examples in Thailand and Slovakia have shown. The Bank has been assisting governments to increase public awareness of the problem, designing lead phase-out strategies, setting in place supporting fiscal policies, and mobilizing financing for refinery modifications.

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3: Countries possibly still to ban leaded petrol as at 20th Oct

Phasing out lead from gasoline in Central and Eastern Europe: health issues, feasibility, and policies. Phasing out lead from gasoline in Central and Eastern Europe.

Health Effects of Lead Emissions Lead is a hazardous, heavy metal that has a damaging impact on human health. It is regarded to be one of the most serious health problems facing populations, particularly children. Common symptoms include IQ loss, reading and learning difficulties, hearing loss, difficulties in concentration, adverse effects on kidney function, blood chemistry, and the cardiovascular system as well as adverse reproductive effects for women. The negative impacts of lead pollution on human health are well documented. Exposure is primarily caused by airborne lead. In congested urban areas, exhaust fumes from vehicles using leaded gasoline typically account for some 90 percent of airborne lead pollution. Lead emissions in the SILAQ countries have been declining since , both in terms of total and vehicle-related emissions. Vehicles account for a major percentage of lead emissions, although there are significant country variations. Slovakia has the lowest total lead and vehicle-based emissions, along with the lowest per capita levels, owing to the rapid phase-out of leaded gasoline completed in Slovenia has the highest per capita emissions. It is unclear, however, as to whether this trend in the SILAQ countries is due to the increasing use of unleaded gasoline, or because of the decline in emissions from stationary sources. The health benefits from reducing human exposure to lead can be grouped into three categories: Significant health benefits may be anticipated particularly in congested urban areas with high population densities. When comparing estimates, the benefits of lead removal may exceed the costs by times. Regulatory Instruments Strong political commitment is required to introduce and enforce the necessary measures for reducing human exposure to lead. With the exception of Romania, where the maximum lead content stands currently at 0. Some countries have also introduced regulations for other components. The mandatory use of catalytic converters on new cars is an effective instrument for controlling vehicle-related air pollution. Catalytic converters in Slovakia have been required for both imported and domestically produced cars since Similar requirements have been introduced in Slovenia , in Poland and in Hungary , and are forthcoming in Bulgaria , and in Romania for imported cars, and for those produced domestically. Most SILAQ countries require the periodic technical testing of vehicles, which should also include the measurement of exhaust emission levels. Some SILAQ countries have introduced roadside spot-checks for vehicle emission levels using portable equipment. The Unleaded Gasoline Market The consumption of unleaded gasoline varies substantially in the surveyed countries, ranging from only percent in Bulgaria and Romania to percent in Slovakia, where leaded gasoline has been completely phased out. Relatively high shares for the use of unleaded gasoline above 50 percent are reported for the Czech Republic, Hungary and Slovenia. By the end of , all gasoline stations in Hungary, Slovakia and Slovenia sold unleaded gasoline. In Bulgaria, the Czech Republic, and Poland, most stations offered unleaded gasoline, while in Romania only about a third sold unleaded gasoline. Overall, the distribution system is clearly not a significant obstacle to the phase-out of leaded gasoline. Hungary and Slovakia are well-positioned to produce sufficient quantities of unleaded gasoline to meet domestic demand. Bulgaria, through domestic production, is able to cover about 45 percent of the market need for unleaded gasoline, while Romania could produce enough unleaded gasoline to satisfy domestic demand completely. In Poland, one third of its unleaded gasoline is imported, while Slovenia imports 90 percent of that used. Poland is planning also to increase production, but it is unlikely to meet the demand based on domestic production alone. Interestingly, the production of unleaded gasoline has been increasing in most countries at a rate much faster than its domestic consumption. Vehicle Fleet Considerations There are over On average, 94 percent of those are passenger cars and light duty vehicles. The share of diesel-driven passenger cars is small - between 6 and 12 percent. Poland and the Czech Republic have the highest total number of vehicles, followed by Bulgaria, Hungary and Romania. Slovenia has the lowest total number of vehicles, but the highest number per capita.

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On average, passenger cars are considerably older approximately Bulgaria, the Czech Republic and Slovakia have the oldest passenger car fleets. Domestically manufactured cars or those from the other former Eastern bloc countries are the prevailing makes of cars. The share of cars made in Western Europe and Far East countries is still low, at fewer than 30 percent. The share of passenger cars equipped with catalytic converters is even lower in all the SILAQ countries, and does not exceed 15 percent. A large percentage 40 to 60 percent of car fleets in the SILAQ countries are made up of older cars equipped with engines containing soft exhaust valve seats, which are believed to require leaded gasoline for its lubricant properties. The structure of the vehicle fleet is often cited as a major obstacle to lead phase-out. However, research shows that the amount of lead required for lubrication is much lower than the currently applied standards of 0. Secondly, lubrication can be provided by commercially available potassium and sodium-based lubricant additives. There is also evidence that suggests many cars previously thought to need leaded gasoline can operate using unleaded gasoline. The cost of replacing lead as a lubricating additive has been estimated at approximately USD 0. From a technological point of view, there are no obstacles to the phase-out of lead from gasoline, however, the removal of lead will lead to increased production costs as the refinery will need to compensate for the resulting octane loss. For the purpose of this Report, three types of refineries were distinguished: Slovakia and Slovenia have one refinery each. Bulgaria and Hungary have two, while the Czech Republic has four refineries. Poland and Romania operate a larger number of refineries: The prevailing type of refinery is Type 2, followed by Type 3. Crude distillation and conversion processes are the norm, with the upgrading and the use of organic and lubricating additives practiced in some refineries. Poland and Slovakia present the highest usage, at 89 percent and 80 percent, respectively. Romania and Bulgaria utilize their refineries to 69 percent and 65 percent, respectively. Only 55 percent of the refinery capacity is utilized in Slovenia. Ownership of the refineries is mixed: In Slovakia, the sole refinery is in private hands. In Romania and Slovenia, ownership is shared by the state with private interests. In Bulgaria, two out of the three refineries are privately owned. A significant obstacle to the phase-out of lead is the need for investment in modernizing existing gasoline production units. Worldwide experience and estimates indicate that annual investment expenditures and added operating costs associated with the removal of lead from gasoline are typically in the range of USD 0. Preliminary estimates as to the cost of removing lead from gasoline in Romania did not exceed the range of USD 0. Policy Approaches Most authorities note that the need for significant investments in modernizing existing production units is the major obstacle to lead phase-out, and all other problems encountered tend to be related to public support and policies used by governments. Therefore, while lead phase-out is a highly cost-effective measure, a strong commitment to the appropriate policy intervention is required. The core aspects that need to be addressed include: Three general approaches may be considered, including: The key measures adopted by those countries which have already phased out leaded gasoline, tended to include the maximum permissible lead content in gasoline of 0. Considering the current conditions in most SILAQ countries, the technology-based approach alone would require a lengthy transition period because of the large numbers of old cars within the vehicle fleet. It appears that combining the incentive and rapid phase-out approaches, a more suitable way of dealing with vehicle-related lead exposure problems in the SILAQ countries can be found. Bulgaria, Hungary, Poland and Slovenia have followed the incentive approach, combined with regulations to reduce the lead content of gasoline, and support the use and import of cars with catalytic converters. Tax incentives have been applied in all the SILAQ countries, but with the exception of Slovakia and Slovenia, the difference in the consumer price of gasoline is relatively small. The phase-out strategy should also include a realistic schedule with clearly defined and well-communicated objectives and time-lines. The timely introduction and enforcement of corresponding regulations would accelerate the lead phase-out process. Such an approach would provide a sufficient adjustment period for the refineries and reduce the adjustment costs. The phase-out of lead is technically and economically feasible. The key issues needing to be addressed include the: Ability of domestic refineries to supply unleaded gasoline; Use of unleaded gasoline by local vehicles; Awareness of the public as to the applicability of unleaded gasoline.

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Modernization of existing refineries in order to produce unleaded gasoline is technically feasible, especially since most refineries are of the more advanced type, but the process requires significant investments. If a proper combination of tax incentives and stricter regulations can be introduced, refineries will have to look more actively for the necessary funding. The problems related to the high share of vehicles with soft exhaust valve seat engines, believed to require lubrication provided by lead, can be solved by the application of commercially available alternative non-lead lubricants. For instance, Slovakia completely phased out lead in despite the fact that more than half of the car fleet carried engines with soft exhaust valve seats. This is particularly important for that segment of the vehicle fleet which can use both leaded and unleaded gasoline. Mass media information campaigns and brochures available at gasoline stations and vehicle technical control centers are possible means to increase awareness of the rationale and benefits from the phase-out of lead in gasoline. To implement some of these actions, external assistance must be sought. Under the aegis of the SILAQ Working Group, and with the coordination provided by the Regional Environmental Center, small joint-expert teams could be established to facilitate the exchange of experiences and to help accelerate the lead phase-out process. Exchanges of experience could focus on successful programs and case studies, and would address the major constraints to the implementation of lead phase-out activities. The SILAQ countries might also initiate country studies on how best to address technical problems resulting from the characteristics of vehicle fleets. Work could also focus on the implementation of effective emission control systems and the periodic technical inspection of vehicles. Such joint activities would help facilitate Task Force initiatives realize the pan-European strategy for the phase-out of leaded gasoline. The follow-up to the Sofia Initiative for Local Air Quality, organized as a multi-country regional cooperation project open to new participants would not only accelerate the phase-out of lead, but also contribute to the European integration process.

4: REC: Phase-out of Leaded Gasoline: Executive Summary

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5: Lead poisoning and health

Phasing out lead from gasoline in Central and Eastern Europe: health issues, feasibility, and policies (English) Abstract. The major emphasis of this study is on lead exposure from the exhaust of vehicles using leaded gasoline in Central and Eastern Europe.

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