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**PROGRESS REPORT ON THE IMPLEMENTATION OF THE PAN-EUROPEAN  
STRATEGY TO PHASE OUT LEADED PETROL<sup>1</sup>**  
(Executive summary)<sup>2</sup>

**Introduction**

1. This summary provides a review of the state of progress of the Pan-European Strategy to Phase out Added Lead in Petrol. The Strategy was adopted at the fourth "Environment for Europe" Ministerial Conference held in June 1998 in Aarhus, Denmark, and recommends a phase out by year 2005.
2. The review was launched by DANCEE in late 2001. It has been prepared by COWI A/S with the assistance of Dr Yoncho Pelovski from The Balkan Science and Education Centre of Ecology and Environment (Bulgaria) and COWI's representative office in Moscow (Russia), both of whom have assisted in the collection of data.
3. A questionnaire based survey has been a key input for this review. Questionnaires were submitted to key experts in selected countries. The high quality of the responses received has contributed substantially to the quality of this review.

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<sup>1</sup> Submitted by the Ministry of Environment of Denmark

<sup>2</sup> This document was not officially edited

## **Background and study purpose**

### Background

4. The Pan-European Strategy on the Phase Out of Added Lead in Petrol was presented and adopted at the fourth "Environment for Europe" Ministerial Conference held in June 1998 in Aarhus, Denmark. Today, the Strategy has been signed by a total of 33 signatories<sup>3</sup>.

5. The strategy recommends the signatories:

- By January 2005, leaded petrol will not be marketed in the European countries

6. Furthermore, it recommends that countries commit themselves

- to obtain a market share of unleaded petrol of at least 80% by 1 January 2002 at the latest, and
- to setting a limit for the content of lead in leaded petrol of maximum 0.15 g/l by 1 January 2000 at the latest, while the lead content of unleaded petrol should not exceed 0.013 g/l.

7. An open-ended UN/ECE Task Force established by the CEP (UN/ECE Committee on Environmental Policy) had been responsible for conducting the analysis leading up to the strategy. The members of this Task Force came from most of the European countries. Furthermore, WB, EBRD and US-EPA also contributed actively to the work of the Task Force. The work of the Task Force was documented in three main reports, viz. a Main Report, a Country Assessment Report and a Regional Car Fleet Study. 7. These reports provide: Detailed motivations of the strategy, assessments of its feasibility and overviews of instruments and options in pursuit of it.

### Purpose

8. This review aims to provide an overview of the progress of implementation of the strategy. The review considers all signatories to the Strategy as well as other European countries, acknowledging though that not all countries have signed the strategy. Thereby, the review facilitates not only an assessment of the feasibility of the Strategy in relation to the signatories, but also the feasibility and constraints with regard to obtaining a complete phase out of added lead in petrol in Europe.

The review identifies and discusses the main issues of concern in regard to attaining the ultimate objective of the strategy, viz. the complete phase out by 2005.

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<sup>3</sup> Austria, Belgium, Bulgaria, Canada, Croatia, Cyprus, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Netherlands, Norway, Poland, Portugal, Republic of Moldova, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Ukraine, United Kingdom and United States.

## Study methodology

9. The review has been prepared in three consecutive phases:

a) **Desk study review** to assess country specific developments since 1998 in the European countries. In conducting the review, the Consultant made use of newer studies and other relevant literature and consulted the internet home pages of the Environmental Ministries of the various countries. Further, UN/ECE kindly assisted as did also the SILAQ coordinating unit. Based upon the review, a list of countries was drawn up for which further information was necessary in order to provide a more consistent and up-to-date review of the state of progress since 1998.

b) **Questionnaire based survey.** A questionnaire was framed and submitted to key contact persons in the selected countries<sup>4,5</sup>. A total of 19 questionnaires were submitted, and 14<sup>6</sup> responses received. The latter includes 9 responses to the questionnaire plus another 5 orally provided feedbacks. In assessing this, it should be noted though that many of those from whom the Consultant has not been able to obtain the requested information are not signatories to the Strategy and they are countries for whom it was difficult to provide similar information when the Strategy was prepared in 1996-1998.

c) **Analyses and conclusions.** Based on the desk study and the results of the questionnaire survey, the review provides an overall status as regards progress of the Strategy and perspectives for realisation of its objectives before the set deadline of 1<sup>st</sup> January 2005. A preliminary presentation of results of the study was done by DANCEE in connection with the 9<sup>th</sup> session of CEP in November 2002.

10. This review has aimed to assess the status and perspectives from a Pan-European perspective. It is thus not delimited to considering only the signatories of the strategy. In this regard, it is however important to take note of the fact that the countries who have not signed the Strategy are not per se committed to fulfilling its objectives. That being said, there are several other international agreements in place that pull in a similar direction. In particular, the Protocol on Heavy Metals and the EU Directive 98/70/EC, which obligates Member States to phase out added lead in petrol by 2000 and 2005 at the latest.

## Status for lead phase out

11. The table overleaf provides key information as regards the status of the strategy. For a more detailed discussion and assessment of the data contained in the table, the reader is referred to the report.

12. The picture that emerges from the table is one of considerable progress in virtually all countries compared to the situation in 1996 (which was the latest year for which similar information was provided in the strategy). A considerable number of countries have phased out added lead in petrol already, and quite a few aim to do so by 2005 or even earlier.

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<sup>4</sup> The countries were: Cyprus, Malta, Turkey, Moldova, Albania, FYROM, FR Yugoslavia, Bosnia-Herzegovina, Croatia, Belarus, Bulgaria, Romania, Croatia, Ukraine, Russia, Moldova, Azerbaijan, Kazakhstan, Turkmenistan, Uzbekistan, Kyrgyzstan, Tajikistan.

<sup>5</sup> The questionnaires were sent to key contact persons identified by the Consultant in the countries concerned. These key persons kindly filled in the questionnaire and consulted with the relevant Ministry in doing this.

<sup>6</sup> Filled in questionnaires were received from Bulgaria, Romania, Albania, Turkey, Azerbaijan, Ukraine, Russia, Uzbekistan and Kyrgyzstan. Other information was provided orally by contact persons in Belarus, Cyprus, FYROM, Bosnia-Herzegovina, and FR Yugoslavia.

13. The table contains information on market shares for a total of 45 countries, and out of those 34 have indicated that they have already phased out added lead in petrol. This corresponds to 3 out of 4 countries. The similar proportion at the time of framing the Strategy was less than 1 out of 3<sup>7</sup>. By 2005, the majority of the listed countries will have phased out added lead in petrol.

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<sup>7</sup> Noting however that the two surveys do not include exactly the same countries, that the Strategy contained information for a total of 40 countries, and that the information of the Strategy in most cases related to 1996.



**Table 1. Status on Implementation of the Strategy  
 (Countries in bold have signed the Strategy)**

Country (categorised according to market share)	Maximum lead content g/l		Market share of unleaded petrol, %						Phase-out plans bans in force or planned bans
	Leaded	unleaded	94	95	96	00	01	02	
<b>Market share in 2001 (or latest year for which data have been available) &lt; 80%</b>									
Cyprus		0.013	5	7	11				2005 (latest)
Bulgaria <sup>*)</sup>	0.15	0.013	5	7	6	38			2004
Malta						40			
Romania <sup>*)</sup>	0.15/0.32	0.005/0.01 3		13	5			40	2005/2008
Uzbekistan <sup>*)</sup>	0.15/0.17	0.013					30	41	2008
Turkey <sup>*)</sup>	0.15	0.013	8	8	18		48	52	2005
Croatia <sup>*)</sup>	0.15/0.50	0.013			30	63			2005
Moldova <sup>*)</sup>	0.17	0.013			50	>50			
Albania (rough estimate) <sup>*)</sup>	0.15	0.013			100	75			2005
Greece <sup>*)</sup>	-	0.005	43	32		63	69	100	-
<b>Market share in 2001 (or latest year for which data have been available) ≥ 80%</b>									
Kazakhstan		-		80	80	85			2005
<b>Latvia</b>	0.15	0.005			60		99.5	99.5	
<b>Liechtenstein<sup>*)</sup></b>								100	-
Kyrgyzstan	0.17	0.01/0.013						<10 0	-
<b>Italy<sup>*)</sup></b>	-	0.005	36	39	46	69	81	100	2002
<b>Spain<sup>*)</sup></b>	-		22			63	86	100	2002
<b>Portugal</b>	-	0.005	34	35	42		100	100	ban
<b>Slovenia<sup>*)</sup></b>	-		36	45	54		100	100	ban

<b>Czech Republic<sup>*)</sup></b>	-	0.013	37	48	55	71	100		ban
<b>Poland<sup>*)</sup></b>	-	0.013	26	35	48	78		100	ban
<b>Ukraine<sup>*)</sup></b>	-	0.013	86	81	84	83	100		2003
<b>Ireland</b>	-	0.005	58	57	65	98	100	100	ban
<b>France<sup>*)</sup></b>	-	0.005		50	56	99	100	100	ban
<b>Luxembourg</b>	-	0.005					100	100	ban
<b>Iceland</b>	-						100	100	
Armenia	-	0.013	0	0	0	100	100		ban
Russian Federation	-	0.01/0.013			47	100	100	100	2003
Azerbaijan	-				57	100	100	100	ban
Hungary <sup>*)</sup>	-	0.005		49	64	100	100	100	ban
Monaco <sup>*)</sup>	-				67		100	100	ban
<b>United Kingdom<sup>*)</sup></b>	-		58	63	68	100	100	100	ban
<b>Belgium</b>	-	0.005	65	69	74		100	100	ban
Estonia <sup>*)</sup>	-	0.013		77	81	100	100	100	ban
<b>Switzerland<sup>*)</sup></b>	-	0.005		85		100	100	100	ban
<b>Netherlands</b>	-	0.005	80	82	92		100	100	ban
Belarus	-		61	79	97	100	100	100	ban
<b>Lithuania</b>	-	0.013	41	78	98		100	100	ban
Georgia	-			75	98	100	100	100	ban
<b>Germany</b>	-	0.005	92	95	98	100	100	100	ban
<b>Norway</b>	-	0.005		92	100	100	100	100	ban
<b>Slovakia</b>	-	0.005	81	100	100	100	100	100	ban
<b>Sweden</b>	-	0.005		100	100	100	100	100	ban
<b>Austria</b>	-	0.005	100	100	100	100	100	100	ban
<b>Denmark</b>	-	0.005	100	100	100	100	100	100	ban
<b>Finland</b>	-	0.005	100	100	100	100	100	100	ban
<b>Countries with no available information on market/production share</b>									
FYR Macedonia	0.60	?0.002							2008
Turkmenistan									2005
FR Yugoslavia <sup>*)</sup>	0.4/0.6	0.02							

Note: Please refer to Annex 3 for further specification of countries marked with <sup>\*)</sup>

14. Information has not been obtained for Malta, but being a Candidate for EU Membership, Malta is likely to adhere to the EU regulation in this area and thus to phase out by 2005 at the very latest. Information has not been obtained on phase-out dates for Tajikistan, Moldova, Bosnia-Herzegovina and FR Yugoslavia. Moldova however imports all its petrol and unofficial statements do indicate that leaded petrol is not used today. A phase out should thus be feasible in particular as the supplying countries accomplish this. In the latter two countries representing the Western Balkan region, the ability of the refineries to produce unleaded petrol of a sufficient RON is likely to be the main critical factor.

#### Europe

15. All Western European countries have today phased out added lead in petrol. The same goes for the majority of the accession countries even though the picture exhibits more variation compared to the Western European countries. For Romania and Bulgaria, the recent information indicates that market shares are in the order of 40% (a considerable progress compared to the 1996 market shares of about 5%). Both countries indicate a national commitment to accomplish the phase out by year 2004 (Bulgaria) and 2005/2008 (Romania). Turkey is well underway having reached a market share of 52% and aiming at a complete phase out by 2005. In all these countries, these important accomplishments can be attributed to a targeted effort towards the overall objective of lead phase out and overall improvements of fuel quality. These efforts involve also the refining industry, which needed to undertake major investments, together with supporting national interventions such as information campaigns, the tightening of fuel quality standards, and the use of economic instruments (fuel taxes).

16. It remains beyond doubt that the process of EU approximation has been and still is a major driving force in these countries. However, the strategy, and not least the process of preparing it, has also played a major role in identifying and analysing constraints and remedies to overcome those constraints, and in bringing the issue up on the agenda at an early stage. This goes in particular for Bulgaria and Romania. For Cyprus, consultations with local experts indicate that Cyprus will phase out in accordance with the EU Directive 98/70/EC.

#### Western Balkan

17. For the Western Balkan countries<sup>8</sup>, the Consultant has not been able to obtain much information. However, the little information that has been obtained indicates that leaded petrol is still produced and consumed in significant amounts, and that the technology and state of the refining industry is the major issue to address to improve this. Thus, the limit for the content of lead in leaded petrol is still 0.6 g/l in FYR Macedonia and ranges between 0.4 and 0.6 g/l in FR Yugoslavia.<sup>9</sup> FR Yugoslavia considers extensive capital investments to be an important component of the necessary prerequisites for a lead phase down, and actions in this field could be connected to its overall actions for EU approximation. Furthermore, there is scope of enhancing the awareness and knowledge about the health implications of lead, and the possible actions to take to meet this in the region.

18. It is noteworthy however that Croatia has been able to increase the market share of unleaded petrol to 63% in 2000 compared to 30% in 1996. As a signatory to the strategy, Croatia has also recently confirmed its intention of phasing out added lead in petrol by 2005 to the UN/ECE.

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<sup>8</sup> The Western Balkan countries are Albania, Bosnia-Herzegovina, Croatia, FYR Macedonia and FR Yugoslavia.

<sup>9</sup> According to Minutes of the SILAQ workshop 2001.



## NIS

19. Armenia, Azerbaijan, Belarus, Georgia, Russia and Ukraine all have market shares of unleaded petrol of 100% today. The first four countries have already implemented a ban. In Ukraine, a ban on leaded petrol will enter into force in 2003 and the same is expected for Russia. Further, Kyrgyzstan has also indicated that its market share of unleaded petrol is close to 100%. The leaded petrol that is used in the country mainly originates from the small domestic refinery, and is solely low octane petrol. In Uzbekistan, the current market share is 41%, and Uzbekistan plans to ban leaded petrol in 2008, and has developed a comprehensive plan in pursuit of this. The refinery in Turkmenistan, Turkmenbashi is currently under revamp, and it has been estimated that by 2005 this refinery will be able to produce sufficient amounts of unleaded petrol to satisfy the domestic demand plus an additional 1,000,000 t/year for export. Kazakhstan is a major producer of oil products, although apparently not completely self-sufficient as regards petrol, and unleaded petrol accounts for about 85% of the production in the country. Kazakhstan is reported to aim at 2005 as the phase out date.

### **Enabling factors and critical constraints**

20. The positive status and trend that emerges from this review is attributable to a number of developments and trends that have pulled in the same direction. Basically, they may be categorised under three headings, viz:

- International agreements
- Market developments in Europe
- Privatisation and restructuring

### International agreements

21. International agreements and commitments play an important role. Equally important though, they need to be backed up by the commitment of the individual countries and their ability to turn this commitment into realised actions. In this regard, the Pan-European Strategy, and maybe not least, the path towards its final presentation, has had an impact. The process assisted to shed light on the environmental and health gains to be achieved from a lead phase out as well as on the technical and financial feasibility of addressing the issue (not disregarding the important obstacles to be overcome as well). Similarly, the SILAQ focus on experience sharing in the field of phase out of added lead in petrol is likely to have assisted in building up national commitment and shedding light on possible policy options<sup>10</sup>. Lastly, the Strategy was framed at a time, where a significant number of quite different countries had actually attained a phase out. For example Denmark, Slovakia and USA had phased out at that time. Experience and knowledge from these countries could thus be brought into the process thereby illustrating the factual feasibility and important conditions for the phase out.

22. Another very important factor is the EU Directive 98/70 which obligates Member States to phase out added lead in petrol in 2000 and 2005 at the latest. While some of the current EU Member States had not accomplished the phase out in 1996<sup>11</sup>, lead in petrol is today phased out of the EU market. In the Candidate Countries, the Directive has also come to play an increasing role, along with the process of EU approximation. This goes for the CEE Candidate Countries as well as for Turkey. The latter has made considerable progress since the framing of the strategy, and now aims to phase out by 2005. This target year was not considered feasible by Turkey at the time of the strategy.

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<sup>10</sup> SILAQ held its last workshop on the lead phase out issue in 2001, and now focuses attention more on other issues.

<sup>11</sup> Greece, Italy, Spain, Portugal, France, Ireland and UK all had market shares below 75% in 1996.

23. Many countries have pursued their international commitments through national strategies and plans. For example, Bulgaria, Romania, and Turkey have elaborate national strategies, and the rapid phase out in Russia is also a result of such a national strategy. The same goes for a wide range of other countries including for example the Ukraine, Armenia, Azerbaijan and Uzbekistan.

24. The following table provides examples of the contents of national strategies for some selected countries. The table presents this information for countries that are still in the process of phasing out, and for which recent information on the progress and contents of national strategies and plans has been obtained. In addition, the table includes this information on Russia and Ukraine. Russia and Ukraine are two major oil producing NIS countries that have managed a substantial acceleration of the lead phase out process compared to their past expectations to a possible lead phase out date. It should be noted that the table should not be seen as exhaustive. Rather it illustrates the key contents of national strategies and actions that the contact persons of the countries have seen as the major factors to support the process of lead phase out.

#### Market developments

25. Market developments in Europe also strongly point to unleaded petrol as the future dominant petrol type. This situation applies in the EU and very soon to the enlarged EU. Furthermore, a number of countries that expect to be EU Members in the foreseeable future are on the same path, as it is illustrated by the status table 1. Lastly, even other European countries are on quite a similar path. Consequently, refineries need to adjust to these developments in order to remain competitive, and to maintain a flexible position where their products can be sold in many countries. These market developments are for example mentioned by Russia as one of the driving forces behind the accelerated lead phase out.

#### Privatisation and restructuring

26. At the time of framing the Strategy, the progress of the process of privatisation and restructuring was quite different among the various CEE and NIS countries. While there is still substantial differentiation among countries in this respect, much progress has nevertheless been made since that time. This has been a major factor in for example Poland's move from a market share of 48% in 1996 and to the current complete phase out, and it is a major contributor also to the progress made in Bulgaria, where the launched privatisation programme is designed in such way that it is bound to the national programme of phase out of added lead in petrol.

Table 2. Examples of Contents of national programmes.

Country	Use of additives	Phase out date	Investment programmes	Economic instruments	Awareness building	Regulatory instruments	Car fleet aspects
Armenia	No	2002	No - no production in Armenia of petrol	No	Yes - Information on the ban	Ban on leaded petrol and focus on standards Enhanced control over benzene and aromatics	-
Bulgaria	No	2004	Yes - implementation in progress	Yes	Yes - extensive general campaigns	Gradually tighter fuel standards	Requirements for catalytic converters on new cars
Romania	Yes	2005/2008	Yes - ability to raise finance is still a critical issue	Retail price 10% lower for unleaded petrol. Differentiation in favour of environmental-friendly vehicles	-	Gradual reduction of allowed lead content in petrol	Requirements for catalytic converters phased in Ability of old cars to use unleaded petrol
Russian Federation	Yes - use is limited	2003	Reconstruction and modernisation of fuel industry sub-programme	No	Yes - general information campaigns	Gradually tighter fuel quality standards have been the main policy instrument	-
Turkey	No	2005	Yes	Yes	Dialogue between refining industry, and government and automotive industry	Gradual reduction of allowed lead content in petrol	Automotive sector to adjust production plans accordingly

Ukraine	No	2003	Yes	No	-	Gradually tighter fuel quality standards have been the main policy instrument	Prohibition of import of cars without catalytic converters from 2003
Uzbekistan	No	2008	Plans for refinery investments need finance - already critical at the initial research phase	Planned to use tax differentiation in favour of unleaded petrol	Awareness campaign is planned on lead's health impacts	It is prohibited to import leaded petrol	-

27. In many of the Western Balkan countries<sup>12</sup>, a major constraint to an accelerated phase out is mentioned to be the ability to raise the necessary finance to enable a major shift towards production of more unleaded petrol and at the same time lowering the limits for the content of lead in leaded petrol.

28. This review has not looked into the issue of enforcement and control. While a ban on the use and production of leaded petrol is the major step towards achieving a phase out of added lead in petrol, enforcement and control are still important remedies in ensuring a 100% factual realisation of this. This issue was raised already at the time of framing the strategy, and the questionnaire survey conducted in relation to this review indicates that this *may be* an issue for further consideration. Also the WB study on Cleaner Transport Fuels for Cleaner Air in Central Asia and the Caucasus indicates that post-refinery blending of lead and lead-like octane boosting additives into the petrol may constitute a problem in some countries. It should however be noted that the amount of actual evidence collected in this area is quite limited.

29. Enforcement and control can be important contributors to ensuring the factual compliance with a possible ban and hence the 100% phase out. The limited amount of evidence collected in relation to the above study also shows some cases of violations of octane numbers and contents of aromatics and benzene. While the order-of-magnitude of possible violations is however very uncertain and can prove to be quite small, enforcement and control has still another important role of providing fair and equal conditions of competition and protection of consumer rights.

## Conclusions

30. Europe is on the path of having phased out added lead in petrol in the foreseeable future, and by 2005 it can be expected that lead will only be added to the petrol in very few countries. Three out of four countries have phased out already. Most of the remaining countries expect to have done so by 2005, and have elaborated comprehensive strategies in pursuit of this. These strategies are under implementation.

31. The overall positive trend towards accomplishment of the targets of the Strategy is attributable to a number of interrelated developments that include the development of the strategy, the strong commitment of involved parties to the contents of the strategy, the process of EU approximation and overall development in the market.

32. The Western Balkan countries however have been affected by the years of war and unrest, and appear to lag substantially behind the rest of Europe in regard to the phase out of added lead in petrol. The need for restructuring of the sector and for upgrade and repair of the refining industry now appears to be urgent, and should go hand in hand with the economic stabilisation programmes initiated in the countries with the support of the IFIs or others donors such as the EU. In addition to the financial needs of the sector in order to upgrade technologies, support could also aim to address the more comprehensive strategic issues including awareness building. In addition to the more country specific and/or project specific assistance in this field, assistance to the possible establishment of an initiative like SILAQ may be of value. The SILAQ initiative focused on facilitating experience sharing and joint actions between the countries concerned in particular, but also vis-à-vis other countries with relevant experience for the forum.

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<sup>12</sup> This issue was raised in oral discussions with key experts from FR Yugoslavia, FYROM and Bosnia-Herzegovina.

33. One of the critical issues to ultimately realise the intended phase out dates relates to the supply side. At the time of framing the Strategy (1996-1998), this was a key critical factor in many countries. Refineries were in need of upgrade and repair to enable the production of unleaded petrol of sufficiently high quality and average octane number. Since that time, much progress has been made in the process of restructuring and privatisation. Consequently, finance has been more available for these modernisations and repairs. Still, supply side developments do constitute possible constraints to a realisation of planned future bans in some countries. This may be a valid concern in some of the NIS countries as well as the Western Balkan countries as mentioned above. While this concern applies mostly to the fuel producing countries, other countries may also be affected. Such countries may namely rely significantly on supplies from countries that continue to need an outlet for leaded petrol.

34. Lastly, attention should also be brought to the issue of enforcement and control. This issue has not been at the core of this review, but it is nevertheless a potential issue of concern in some areas of Europe. First and foremost because effective enforcement and control are important remedies in ensuring full compliance with existing standards including a possible ban. Secondly, the provision of fair and equal conditions of competition in the fuel market enhances consumer's belief in the system and the credibility of government interventions vis-à-vis the public and industry.