

Michael P. Walsh  
3105 N. Dinwiddie Street  
Arlington, Virginia 22207  
USA  
Phone: (703) 241 1297 Fax: (703) 241 1418  
E-Mail [mpwalsh@igc.org](mailto:mpwalsh@igc.org)  
<http://walshcarlines.com>



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# CAR LINES

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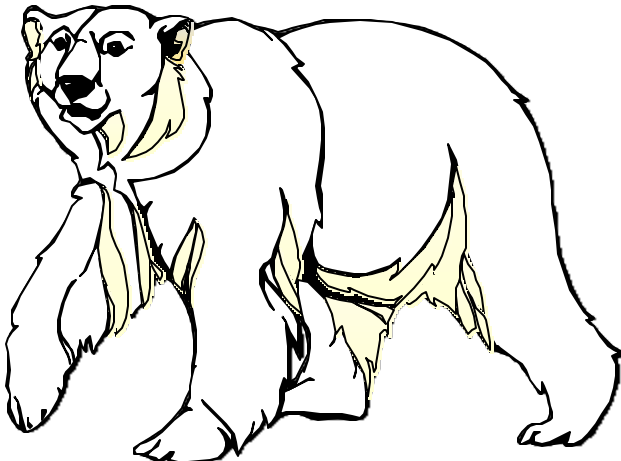
Issue 2000-6



December 2000

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HAPPY HOLIDAYS TO ALL



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EUROPE

1. **EU Consultant Issues Summary Report On Sulfur in Fuel**

The EU consultant was asked to provide an objective and balanced synthesis of the information and opinions presented by respondents to the Commissioner's consultation. The approach taken focused on presenting the information in a way that is easily accessible to both technical and non-technical readers. The main points raised against each of the Commissioner's questions are summarized below.

Question 1

**The magnitude of the additional environmental benefit gained from using petrol and diesel with a sulphur content of less than 50 parts per million. More specifically what are the incremental benefits of using fuels with a sulphur content of (a) 5-10 ppm and (b) 30 ppm relative to fuels containing 50 ppm.**

This question attracted the greatest response both in terms of number of respondents (21 of 25 respondents) and in the weight of information presented. It is clear that the question is complicated since it applies to two fuels and a range of different vehicle types, i.e.

Current fleet of petrol vehicles

Current production of petrol vehicles

Future production of petrol vehicles

Current fleet of light duty diesel vehicles

Current production of light duty diesel vehicles

Future production of light duty diesel vehicles

Current fleet and production of heavy-duty diesel vehicles

Future production of heavy-duty diesel vehicles.

All of these vehicles may be affected by a change in fuel sulphur level since much of the current fleet will still be in use in 2005 and beyond, while current production will account for a significant proportion of the fleet up to 2008-2010. Because the different vehicle groups have different engine and exhaust gas treatment technologies the environmental benefits of lower sulphur fuels also vary. With the current fleet and present day production vehicles the main benefit identified by respondents has been an improvement in the performance of the exhaust gas treatment systems that are fitted to reduce emissions of hydrocarbons (HC), carbon monoxide (CO), nitrogen oxides (NO<sub>x</sub>) and, for diesel vehicles, particulate material (PM). With future production the main benefit identified is a potential improvement in fuel efficiency, stemming from a reduction in the frequency with which the exhaust gas treatment catalysts (NO<sub>x</sub> Storage Traps) need to be regenerated by periodically running engines on fuel rich mixtures. Additionally there is the direct benefit for all vehicles that lower sulphur fuels give lower SO<sub>x</sub> levels in exhaust gases. This is most significant with vehicles fitted with catalysts that oxidize sulphur to sulphate, which is released as ultra fine particulate material (UFPM).

Respondents generally agreed that:

Sulphur had a detrimental effect on exhaust gas treatment technologies and hence on emissions.

Existing and new technologies, with the possible exception of heavy duty diesel vehicles, can function on agreed fuel standards, but that there may be additional benefits to be gained in going to lower sulphur levels.

However, there was no such agreement on the magnitude of these benefits.

For the present vehicle fleet and current vehicle production, lower sulphur fuel will slow the degradation of exhaust catalysts, and for the existing fleet, facilitate a partial restoration of catalyst efficiency. Submissions on the size of these benefits, based on experimental data and field measurements, have ranged from suggesting they are negligible to indicating that they could deliver worthwhile improvements to air quality in urban areas. This diversity of opinion appears to be linked to the sources of information available to the respondents, and to the test methods used to derive this information. For example, it was clear from the information presented that the restoration of exhaust catalysts, to be gained by running vehicles low sulphur fuel, was greater with high total use vehicles (i.e. higher mileage). Other respondents have pointed out that the magnitude of emissions reductions will also depend on the test cycle and the fuel specification used in the test.

With future vehicle production respondents identified improved fuel economy as the main benefit of adopting lower sulphur fuels. Quantitative data, mainly from vehicle manufacturers, estimated this benefit to be 1-5% relative to fuel with 50 ppm sulphur. However, it was not clear from the submissions whether this range reflected variations in the sulphur sensitivity of different technologies, the use of different test methods or an evolving position with the sulphur sensitivity falling as the catalyst technology

undergoes further development.

Recognizing the variability and uncertainties surrounding existing information several of the respondents felt there was a need for further collaborative work to:

Quantify the effects of lower sulphur fuel on the existing vehicle parc.

Quantify the effects of lower sulphur fuel on the fuel efficiency of new engine technologies.

#### Question 2

**Using the sulphur specification of 50 ppm as a reference, what incremental refining costs are incurred to produce petrol and diesel with a sulphur content of (a) 30 ppm and (b) 5-10 ppm.**

18 of 25 respondents addressed this question and generally agreed that the production of fuels with less than 10 ppm sulphur was technically feasible, with such grades already in production in some member states. The costs of doing this consists of capital investment in new plant and some increased running costs. These costs will vary between refineries, reflecting their present configurations and the sulphur content of the crude oils they operate with. It was suggested that southern European refineries generally operate on more sour crude oils and therefore could face higher desulphurisation costs.

Incremental costs of going from 50 ppm sulphur to 5-10 ppm sulphur fuels ranged from about 0.1 to 4.3 Euro cents per liter for petrol and 0.2 to 4.3 Euro-cents per liter for diesel, again reflecting refinery variations.

It was suggested that a short-term move to low sulphur diesel for the full market would

reduce refinery capacity by 10 to 20%. However, a phased move would avoid this, while minimizing costs since the capital investment could be incorporated in normal refinery up grades. Moreover, refinery catalyst suppliers expressed the view that new catalyst developments could reduce the impacts of desulphurisation on both costs and CO<sub>2</sub> emissions.

### Question 3

**Should the up take of new emissions abatement technology or fuel-efficient technology be encouraged in the automotive fleet? If so what type of low sulphur marketing regime would be justified? For example, (i) a proportion of the market sold on a voluntary basis or (ii) a proportion of the market sold on a mandatory basis or (iii) the totality of the market that complies with a sulphur content fixed at a value less than 50 ppm? This should be considered in the context of the advancement of traditional petrol and diesel engine emission abatement technology and looking forward towards the introduction of new vehicle propulsion or power plant technology.**

19 of 25 respondents addressed this question. It was clear from the responses that Internal Combustion Engine technology was expected to be dominant, at least up to 2010, with few submissions considering alternatives such as fuel cells and hybrid systems. However, it was noted that fuel cell stacks were sulphur intolerant and vehicles with on-board production of H<sub>2</sub> from gasoline would need a maximum of 5-10 ppm sulphur in the fuel to avoid poisoning the reformer.

There was general support amongst respondents for encouraging the development and deployment of new emissions abatement

and fuel efficient technologies. However, there was no such consensus on whether low sulphur fuels were part of the measures needed to support these technologies. Fuel suppliers felt that regulation should be limited to setting air quality standards and vehicle emission limits, and that the means of compliance should be left to vehicle manufacturers operating in a competitive market. In contrast the vehicle manufacturers felt that a clear policy on low sulphur fuels would encourage the development of technologies to take advantage of them. They pointed to a move to low sulphur fuels in other world regions, and were concerned that USA or Japanese specifications might diverge significantly from European specifications.

With regard to sulphur level, the submissions suggested that 30 ppm would produce only marginal benefits, and therefore most respondents concentrated on the < 10 ppm sulphur level.

Several respondents noted that the new engine technologies, that could potentially deliver additional fuel savings with low sulphur fuel, were only just entering the market, and therefore the benefits of a full transition to such fuels was not justified before 2008-2010. No information was presented to suggest that low sulphur fuels would yield a significant fuel saving with the current vehicle fleet. However, it was suggested that the effect of low sulphur fuel, in reducing exhaust emissions from the current vehicle fleet with the associated benefits to local air quality, could merit a partial market transition. Consequently some respondents proposed that Member States should be permitted to encourage a partial transition. However, there was concern that such action should be harmonized across the EU, and that Member States should not be left to set separate standards for low sulphur fuels.

## Question 4

**What are the effects on other petrol and diesel fuel quality parameters of environmental relevance as the sulphur content is reduced from 50 ppm to less than 10 ppm?**

14 of the 25 respondents addressed this question. Reducing the sulphur content of petrol may cause a reduction in the octane level. Options for readjusting this include freezing or possibly increasing the aromatics content or adding oxygenates. Either option goes against present targets for fuel standards. However, it was suggested that amendments to the limit on the aromatics content may be justifiable if account is taken of the introduction of improved vapor recovery systems, and the reduction of toxic exhaust emissions that will be delivered by the better performance of engine catalysts when operating with low sulphur petrol. If aromatics or oxygenates are ruled out for restoring the octane level a significant investment in alkylation processes will be needed. It was not clear from the submissions if this investment was included in the cost estimates given under Question 2.

Reducing sulphur in diesel could alter a range of fuel parameters including Cetane number, density and lubricity. Several respondents stressed the importance that other fuel parameters should be frozen when setting a standard for low sulphur. Experiences from countries that have already introduced low sulphur diesel indicate that the lubricity problem can be overcome with appropriate additives.

## Question 5

**What are the logistic impacts and investment implications for the distribution system for petroleum**

**products of introducing petrol and/or diesel with a sulphur content of less than 50 ppm?**

10 of the 25 respondents addressed this question. Two main issues were identified:

Cross contamination between fuels

Availability of forecourt facilities

Contamination cannot be totally avoided, and therefore to meet a 10 ppm sulphur standard fuels would need to be produced with 6-7 ppm. Clearly the potential for cross-contamination would be reduced if all fuels were required to meet a 10 ppm sulphur standard. However, if partial introduction was adopted, contamination could be minimized if the introduction was scheduled to match the general transition to 50 ppm sulphur fuels. Even so the potential for contamination with high sulphur aviation fuel and domestic heating oil would remain. Some respondents suggest that this would require segregation of some fuels for delivery by alternative modes, while others indicated that it would require additional trucking of pipeline interface liquids back to the refinery. Estimates of the cost of returning pipeline interface liquids were of the order of 0.05 - 0.07 Euro Cents per liter.

Partial market introduction of low sulphur fuels will increase the number of grades to be offered on forecourts. This should not be a problem for petrol, for which it has long been the practice to offer a range of grades. For example, low sulphur petrol could be accommodated by timing its introduction to match the withdrawal of Lead Replacement Petrol. The problem is greater with diesel, which has historically been offered at a single grade. One respondent estimated the cost of additional pumps to offer two grades of diesel to be 16,000 Euros per forecourt.

Question 6

**What will be the overall effect on greenhouse gas emissions of moving to petrol and diesel with a sulphur content less than 50 ppm? This should take account of changes in emissions in the refining and distribution systems and in the vehicle fleet through the pursuance of CO<sub>2</sub> efficiency technologies, the so called "well to wheel" life-cycle effect.**

15 of the 25 respondents addressed this question. Responses focused on sulphur free (<10 ppm) fuels.

The "well to wheel" impact on carbon dioxide emissions arising from a move to sulphur free fuels depends on a range of factors including:

The fraction of the vehicle fleet that would benefit from low sulphur fuel in terms of increased fuel efficiency

Size of the fuel efficiency improvement

Rate of introduction of 10 ppm sulphur fuel

CO<sub>2</sub> production associated with sulphur removal

CO<sub>2</sub> production associated with returning contaminated fuel

CO<sub>2</sub> associated with the production or import of inputs to retain fuel properties (e.g. Oxygenates).

Estimates of the fuel efficiency gain for lean burn petrol cars range from 1-5%, efficiency gains are also claimed for those diesel vehicles expected to benefit from low sulphur fuel (i.e. those fitted with NO<sub>x</sub> Storage Traps and Diesel Particulate Filters), but no firm

data have been submitted. No quantitative data on fuel efficiency benefits of sulphur free fuels with existing engine technologies have been submitted, but it seems likely to be less than for the new technologies.

Estimates of the additional CO<sub>2</sub> produced in refineries when reducing the sulphur level of fuels to 10 ppm ranged from about 0.5 to 78 kt per million tonnes of fuel produced. Again this illustrates the wide differences between refineries. One estimate was given for the extra CO<sub>2</sub> emissions caused by trucking contaminated fuel back to the refineries. This was equivalent to 13 kt per million tonnes of fuel produced.

Taking a mean level for the additional CO<sub>2</sub> of 45 kt per million tonnes of fuel produced (covering additional refinery and distribution related emissions), a scoping estimate has indicated that new lean burn technology with NST would have to penetrate over 50% of the petrol vehicle fleet in order to gain a net CO<sub>2</sub> benefit from sulphur free fuel. However, if the much lower refinery CO<sub>2</sub> emissions suggested by some respondents were used in this analysis a much lower penetration of lean burn GDI technology would be needed to yield a positive benefit. With regard to diesel vehicles the market penetration needed to give a positive benefit is more difficult to estimate because it is possible that only heavy cars and Light Goods Vehicles will need to be fitted with NO<sub>x</sub> Storage Trap and Diesel Particulate Filter technology.

Insufficient quantitative data have been presented to enable an estimation of the benefit of sulphur free diesel with heavy duty diesel vehicles.

Some respondents also indicated that emissions of other greenhouse gases (N<sub>2</sub>O and Methane) could potentially be reduced in the current and future fleets by taking

advantage of sulphur free fuel, but the level of this benefit was not quantified.

30 000 km/5 year durability from 2003;  
50 000 km from 2006

## 2. Rapporteur Lange Proposes Tightening Motorcycle Proposal

European Parliament Rapporteur Bernd Lange has proposed several modifications to the EU proposal on motorcycle standards. These include:

Members states obligated to offer fiscal incentives

Members states to promote retrofitting with fiscal incentives

OBD from 2006 for >150 cc bikes

A clause banning cycle-beating

Motorcycles to be subject to same CO<sub>2</sub> reduction and labelling requirements as cars

The Commission are to submit proposals by January 2002 on service life, in-use conformity and cycle beating and to report on the development of the new test cycle (WMTC), and the necessary correlation factors, and progress on OBM and evaporative emissions.

	Class (cc)	Mass of carbon monoxide (CO)	Mass of hydrocarbons (HC)	Mass of oxides of nitrogen (NOx)
		L <sub>1</sub> (g/km)	L <sub>2</sub> (g/km)	L <sub>3</sub> (g/km)
<b>Limit values for motorcycles (two-wheel) for type approval and conformity of production</b>				
A (2003)	all	5,5	12	3
B (2006)	I (≤150)	20	0,8	0,2
	II (>150)	2,3 (2,0)	0,2 (0,3)	0,15 (0,1)
<b>Limit values for tricycles and quadricycles for type approval and conformity of production (positive ignition)</b>				
A (2003)	all	7,0	1,5	0,4
B (2006)	I (≤150)	5,0	1,2	0,3
	II (>150)	2,9	0,25	0,2
<b>Limit values for tricycles and quadricycles for type approval and conformity of production (compression ignition)</b>				
A (2003)	All	2,0	1,0	0,65
<b>Mass of PM L<sub>4</sub> (g/km)</b>		<b>0,10</b>		
B (2006)	I (≤150)	1,4	0,7	0,45
	II (>150)	0.80	0,15	0,65



Mass of PM L <sub>4</sub> (g/km)	0,07
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NB: In the Commission proposal the values in row B are permissive and applicable for tax incentives. Bernd Lange's proposals are in ***Bold and Italics***

For vehicles with a capacity <150 cc tested to the type I cycle the first two complete operating cycles during which no emissions are collected/measured are omitted [i.e. emissions measured from start of test.]

The values for vehicles with a capacity > 150 cc are determined by the type I [car] test in accordance with directive 70/220/EEC as modified in directive 98/69/EC.

### **3. European Shipping Pollution Remains Unchecked According To EU Report**

Belching smoke from Europe's ships is fast becoming the biggest source of acid rain-causing sulphur pollution according to a recently released report. By 2010 ships will account for 30-40 percent of total EU sulphur emissions as land-based polluters are curbed and shipping's contribution to the overall picture increases according to the report to the European Commission by marine consultant BMT.

The report said ships sailing through European waters produce 1.9 million tonnes of sulphur dioxide per year. "Shipping in European waters is the equivalent of 390 power plants of 50 megawatts running continuously," it said.

The bulk of sulphur emissions are produced in the western approaches to the English Channel and in Mediterranean shipping lanes between the Suez Canal and Gibraltar. But efforts by the European Union and shipping's

legislative body the International Maritime Organisation (IMO) to cut air pollution from shipping have been ineffective.

The European Commission issued a directive in July 2000, limiting sulphur content in marine gas oil and diesel to 0.2 per cent but exempting the biggest sulphur pollutant, heavy fuel oil.

About 140 million tonnes of heavy fuel oil is burned by ships each year, nearly seven times the amount of diesel and gas oil consumed.

For its part, the ILO adopted in September 1997 a global cap of 4.5 percent on the sulphur content of fuel oil under Annex 6 of the international maritime treaty governing sea pollution MARPOL. But the cap is considered useless, given that the average sulphur content of marine heavy fuel oil is no more than 2.9 percent. "It will make very little contribution to emissions reduction in European waters," said the BMT report. What will make a difference, however, is an amendment made to Annex 6 in March which puts a 1.5 percent cap on sulphur content of fuel oil burned in the North Sea, English Channel and the Baltic, provided enough countries sign up to it.

Annex 6, which needs ratification by at least 15 states comprising at least 50 percent of the world's tonnage to become law, has only been ratified by Singapore, Sweden and Norway.

In addition, the March amendment does not cover the rest of Europe, notably the heavily trafficked Mediterranean where emissions from ships' smoke-stacks will continue to choke coastal cities.

Although acidification as a result of air pollution is falling in northern Europe, it is still high, says the BMT report, with over 60 percent of Netherlands ecosystems still expected to be suffering excess acidification by 2010.

BMT has considered a combination of measures to bring ships' emissions in check, which would include incentive schemes but would bring the total bill for shipping to about \$3 billion per year.

BMT concluded that a 1.0 percent cap on sulphur in marine fuel oil would be most effective, and would not be prohibitively expensive. The cap should be imposed on fuel oil burned within European waters rather than simply on that sold in European ports, it said.

#### **4. Denmark To Reduce Lead Consumption; Lead Industry Still Optimistic About Future**

Denmark will prohibit the use of lead in a range of products, aiming to reduce annual consumption by one-third over the next few years, the Ministry of Environment and Energy announced in a statement. Environment and Energy Minister Svend Auken signed an executive order to phase out lead as a component in items from roofing materials to cable sheeting and fishing equipment.

Denmark is the first country to prohibit the use of lead, traces of which can damage childrens' learning abilities, intelligence and behaviour, the ministry said. "Denmark will be the first country with rules for cadmium, mercury, nickel and lead and this is in line with our stated objective of reducing consumption of heavy metals as much as possible," Auken said in the statement.

According to official data, Denmark uses

some 18,000 tonnes of lead per year, 12,000 tonnes of which is collected for recycling. The aim of the executive order is to cut annual use to 12,000 tonnes and increase the proportion of recycling to 83 percent. The construction industry accounts for about one third of the amount of lead, fishing equipment and cable makers for one tenth each and the plastics industry for some six percent.

Denmark has no lead mines but imports the metal as a raw material. Processing of lead into finished products, covered by the ban, is mainly done in Denmark which means that adherence to the new rules can be monitored.

In spite of this, analysts and industry sources said that batteries will remain the driving force behind lead demand, and the threat of substitution, due to environmental concerns, has largely receded.

"The niggling effect of bits and pieces of substitution are still going on, but lead has no big vulnerable areas now," said Andrew Keen, analyst at CRU International.

"Substitution has more or less run its course. It is no longer really economic or necessary to get rid of lead," said Dan Smith, at industry consultant Brook Hunt.

"Most end-uses are fairly steady, except batteries, which are more than taking up the slack," said Dr Andrew Bush, technical officer at the Lead Development Association (LDA). Lead consumed in batteries accounts for a massive 74 percent of the total market. The International Lead and Zinc Study Group (ILZSG) put total western demand at 5.429 million tonnes in 1999.

Denmark was the first nation to impose national legislation to ban lead use in general. While the amounts involved would not

represent a significant loss to the lead market, it might have a knock-on effect on other European Union (EU) member states, or prompt a review at the EU level, Bush said.

The consensus among analysts was that lead's use in the global battery market was secure for the medium to long-term, as there was still no viable replacement, mainly for cost reasons.

"Lead-acid batteries are very cheap. There are lots of other technologies out there, but at twice if not five to ten times the cost," said Smith.

Battery consumption growth is linked not only to automobile production, but also to the ever-increasing automobile population, which requires replacement batteries. Analysts and industry sources noted that traditional starter batteries in cars would be replaced in three to four years. A move to higher voltage batteries was needed to cope with the increase in electronic devices in automobiles, they said.

A competitor to lead in these higher voltage batteries was still seen unlikely by most. But CRU's Keen said it was as yet unclear whether it might lose out to nickel metal hydride technology.

The overall potential impact on lead demand was unclear.

Bush said that automobile manufacturers might opt for bigger batteries, but added that developers were also looking at reducing the weight of lead in batteries.

Smith thought it more likely that bigger batteries would require more lead.

Standby batteries were cited as a major growth area for lead, providing back-up for a number of industries, including the

fast-growing computer and telecommunications sectors. Some sectors had seen growth of around 20 percent, said Smith.

The boom in information technology had also boosted demand for lead oxide used in cathode ray tubes in computer screens. Flat screen technology, which used liquid crystal, posed a threat but was currently too expensive, experts said.

Lead's use in gasoline additives had been virtually eradicated, apart from a few niche areas. Offtake was put at around 50,000 tonnes, down from 300,000 tonnes in 1979. Lead was still being replaced by steel and bismuth in shot, but this was a minor end-use, analysts said.

There were also some concerns about the metal's use in PVC stabilisers, one of the more significant of its smaller end-uses. Lead is used in PVC stabilisers to stop the degrading of material during processing and exposure to sunlight. Ultra-violet sunlight could liberate the lead, said Keen. Bush said that the PVC industry had embarked on a voluntary agreement to reduce lead use in stabilisers and some market erosion was possible.

## 5. **Schroeder Sees Slow German Change to Green Energy**

German Chancellor Gerhard Schroeder announced in a recent speech that the country's planned transition towards new, cleaner energy sources would not be quick. The country's present fuel mix, with hard coal, lignite and nuclear energy each contributing major shares towards energy generation, was here to stay for some time, he said during an event organised by car maker DaimlerChrysler.

Germany's established power producers have criticised the red-green governmental coalition for favouring what they say are as yet uncompetitive new energy sources - such as solar and wind power - at the expense of traditional fuel sources.

Schroeder said that Germany, despite deciding to phase out nuclear power by the mid-2020s, must remain self-sufficient in electricity production in the long run, rather than turning into an importer.

For this reason, he saw the need for new large plants to be built, including greenfield coal plant projects, not just small, decentralised cogeneration plants.

Economics Minister Werner Mueller is due to present a new energy policy programme by the end of this year.

Industrial power consumers have demanded the withdrawal of what they say are unfair advantages given to producers of renewable energy and to operators of cogeneration plants.

## **6. Environment Still Key Issue for EU Accession**

Slow progress on making Hungarian environmental codes conform to European Union standards is one of the main hurdles to membership for one of the best accession students, EU officials have noted.

"They have been very slow this year in implementing new laws," said Alain Bothorel, political and economic counselor for the EU Commission office in Budapest.

"They have passed the waste act but this waste act has about 40 implementation decrees and this is what we are looking at very closely," Bothorel said at a news

conference.

Hungary has gone through two environment ministers since the present center-right coalition took power. The ministry's handling of a spill of cyanide earlier this year in the Tisza River which runs through central Hungary was widely criticized.

Bothorel and other EU officials were commenting on the annual progress report on candidate countries recently released by the European Commission.

That report overall was extremely positive, leading EU Ambassador to Hungary Michael Lake to say that Hungary was clearly "meeting targets" for accession.

But the progress report did find fault with Hungary on some economic issues, among them a wide disparity between value added tax (VAT) levels charged in Hungary for some services, such as taxis and transport of goods, and higher average rates in EU member states.

"They have to do some work on this...they have to reach a level of equality regarding indirect taxes, VAT for example," Bothorel said.

But he said the commission report had found no obstacles to prevent Hungary from completing all its pre-accession work by the end of 2002, the deadline that Hungary has set itself, to then begin the final phases of negotiations.

"Basically the timetable is very realistic for Hungary and the commission and it is very likely that Hungary will be ready for the European Commission to accept by the end of 2002," Bothorel said.

Further, Swedish Foreign Minister Anna Lindh

urged countries seeking European Union membership not to seek many lengthy exemptions from EU laws if they wanted to join the wealthy bloc quickly. Lindh, touring applicant countries from eastern Europe, reiterated that enlargement of the 15-nation bloc would be her country's top priority when it takes over the six-month EU rotating presidency, from France, on January 1, 2001.

She confirmed that some candidate countries could complete accession talks before mid-2002, the date predicted by the EU executive body in its recent report, but gave no indication if this meant they could also join more quickly.

"We are looking forward to be able to do as much progress as possible during the Swedish presidency," she said after a meeting with her Polish counterpart Wladyslaw Bartoszewski.

"It would facilitate the process if there are as few and as short as possible transition periods," she added, referring to requests by many applicant countries to be exempted from EU laws and standards for some time after they join.

Sweden, a staunch advocate of strict environment protection standards, is expected to lock horns during EU entry talks with Poland, which is seeking long transition periods for bringing its gas emission and water pollution levels to EU norms.

Other controversial areas where exemptions have been requested include purchase of land by foreigners in new member countries and on veterinary and food safety standards. Poland and many of the other 13 EU applicants hope to join the Union in 2003. But the European Commission's plan to end entry talks in mid-2002 makes that goal virtually impossible since member states' parliaments

are likely to need about 18 months to ratify enlargement treaties.

## NORTH AMERICA

### 7. Changes Approved for Moyer Clean Air Program

The California Environmental Protection Agency's Air Resources Board (ARB) has approved changes to strengthen a highly successful incentive program that has already removed hundreds of tons of pollutants from the state's air. The Moyer Program reduces oxides of nitrogen (NOx), which contribute to ozone, one of the most health-damaging components of smog. A secondary benefit of the program has been particulate matter (PM) reductions, since some of the same strategies that reduce NOx also reduce PM. The program's emission reductions are made by funding the cost of cutting diesel engine NOx emissions below the levels called for by current standards or regulations. The state's local air pollution control districts (APCDs) administer grants from the program with funds provided by the ARB.

The 18 program changes were recommended by the 13-member Carl Moyer Program Advisory Board and ARB staff. Major changes include:

- Establishing a PM reduction goal with a requirement that the San Joaquin Valley APCD and the South Coast Air Quality Management District reduce PM emissions by at least 25 percent from Moyer-funded projects while recommending that other districts voluntarily seek a 25 percent reduction in PM from Moyer projects.

- Making more projects eligible for funding by considering general cost

increases in recent years and increasing the cost effectiveness limit for Moyer projects to up to \$13,000 per ton of NOx reduced from the present limit of \$12,000 per ton.

Under Moyer Program rules, a company may be able to buy a new truck, which meets the state's minimum NOx emission standards, for \$100,000, or buy a truck that beats the minimum NOx standards by 25 percent to 30 percent for \$125,000. Funding through the Moyer Program would pay the additional \$25,000 for the cleaner truck. This framework is also used to determine other Moyer Program grants, including those for off-road and other equipment, large marine vessels, locomotives, forklifts, and airport ground support equipment.

Since its inception in 1998, the Moyer Program has been an overwhelming success. ARB distributed \$24.5 million to 16 local air district during the program's first year. In 1999 Governor Davis and the Legislature approved an additional \$23 million, and \$50 million was approved for the 2000/2001 fiscal year.

During its first year, the program reduced NOx emissions by about 4 tons per day and PM emissions by about 100 pounds per day.

Demand for Moyer grants has been high—far in excess of available funding. In the program's first year, air districts received more than \$80 million in grant applications from public and private sector applicants, more than three times the available funding.

Projects funded to date include: purchase of new natural gas transit and school buses; purchase of new natural gas and dual-fuel trucks; purchase of electric (rather than internal combustion) forklifts; and

replacement of old diesel engines in marine vessels, agricultural pumps, and other off-road equipment with new cleaner diesel engines or cleaner rebuilt engines.

During its first year, the Moyer Program also helped clean up hundreds of other diesel engines by funding:

More than 400 irrigation pumps upgraded with cleaner engines.

More than 300 new natural gas trucks and buses.

New diesel engines for more than 30 tugboats, ferries and fishing boats.

Also included in Moyer projects are purchase of 16 cleaner-burning natural gas buses to transport tourists at Hearst San Simeon State Historical Monument (Hearst Castle) and converting the Napa Valley Wine Train from diesel to natural gas.

The Moyer Advisory Board recently recommended funding of at least \$100 million per year through 2010. The program is named for the late Dr. Carl Moyer, who recommended incentives programs as a way to unite business, government and environmental groups in a common effort to reduce air pollution.

## **8. US Supreme Court Hears Arguments in Air Quality Standards Case**

In one of the most important environmental and business cases in decades, US Supreme Court justices strongly questioned industry arguments that the federal government must consider cost and not just health benefits in setting national air pollution standards.

Attorney Edward Warren, representing industry groups opposed to the standards lowering smog and soot, said the rules would cost businesses nearly \$50 billion a year, a factor never considered by the US Environmental Protection Agency (EPA).

But Solicitor General Seth Waxman, the government's top courtroom lawyer, strongly defended the regulations, saying the law required the EPA only to set standards at a level necessary to protect the public health. He said the clean air law, which Congress first adopted in 1970, created a two-part process in which the EPA sets the standards based on the latest scientific information and then can consider costs in the implementation.

The EPA has predicted that the rules, which have not yet gone into effect, would save lives and billions of dollars in health costs by reducing air pollution. The EPA has estimated that the standards would protect 125 million Americans from adverse health effects caused by air pollution.

During two hours of arguments, a number of justices appeared skeptical of Warren's argument.

Justice John Paul Stevens said Warren's argument boiled down to standards that protect the public health as long as they do not cost too much.

Justice Sandra Day O'Connor asked Warren to summarize in one sentence the standard he would use to define public health. "I've listened to a lot of vague language from you," she said.

Warren said public health "contemplates consideration of competing factors, including cost," to reduce the sickness of the nation's population and to increase longevity.

Justices Ruth Bader Ginsburg and David Souter both expressed concern that adding economic factors would only complicate coming up with the standards.

"It just seems to me ... you are adding something that will create another morass," Ginsburg told Warren, adding that it would add more possible areas to attack. Souter said introducing cost factors would "complicate the analysis."

### **9. Texas Pipeline Bans MTBE**

The Longhorn Partners Pipeline, the future operators of a planned 700-mile (1,130 km) pipeline that will bring gasoline and distillates fuels from the US Gulf to customers in the Southwest, has announced that it has agreed not to ship gasoline containing the additive MTBE. It was the first US pipeline to ban the chemical, which is listed by the US Environmental Protection Agency as a possible human carcinogen.

The pipeline, which will be called Longhorn, should begin shipping fuel from Gulf refineries to El Paso and Odessa, Texas, by early next summer, a company spokesman said.

From a tank farm in El Paso, the Longhorn will connect with other pipelines to bring product into Arizona, taking pressure off California exports to Arizona.

### **10. Virginia Power Agrees To Cut Plant Emissions**

Virginia Electric Power Company will spend \$1.2 billion over 12 years in a deal with the federal government and New York state to clean-up eight coal-fired power plants whose emissions are blamed for causing acid rain and smog in the Northeast, the Environmental Protection Agency announced. The utility, which is a unit of Dominion Resources, also

agreed to pay a \$5.3 million civil fine and perform \$13.9 million in environmental projects as part of the consent agreement, settling charges VEPCO violated the Clean Air Act by refusing to modernize pollution controls at its facilities.

Under the settlement, VEPCO agreed to cut emissions 70 percent from the eight coal plants, all located in Virginia and West Virginia. The \$1.2 billion clean-up cost would be a record for any corrective measure under the Clean Air Act.

EPA Administrator Carol Browner said the deal marked the second such settlement since the agency sued eight utilities last November to get 125 aging coal-fired plants cleaned-up.

All of the coal plants cited in the 1999 lawsuit by EPA for pollution violations are east of the Mississippi River.

Experts say sulfur dioxide and nitrogen oxide emissions from older coal plants, which are not regulated as strongly as newer facilities under the Clean Air Act, drift into the Northeast and endanger public health and natural settings like the Adirondack Mountain chain and Shenandoah Valley.

EPA officials said two-thirds of the nation's sulfur dioxide emissions come from coal-powered utilities and one-quarter of the nitrogen oxide emissions.

Browner, New York Attorney General Eliot Spitzer and Justice Department Assistant Attorney General Lois Schiffer, want other utilities to help end litigation and make a settlement for solving the coal-fired power plant lawsuits.

"This a company-wide settlement, and we would encourage other companies to follow

suit," Browner said.

Spitzer, who originated a state lawsuit against coal-burning utilities last year before the federal government did, said the VEPCO deal was "a model for continuing efforts to save the Adirondack Park from destruction and help address the growing public health threat of pollution-induced asthma and lung disease."

All together, the company agreed to reduce these emissions by 70 percent, or 252,000 tons per year within 12 years. Some actions would start sooner, and include not only modernizing pollution controls, like adding scrubbers, but switching from coal to natural gas as a fuel source at the company's Possum Point plant near Washington D.C.

The deal covers the following coal-fired power plants:

Mount Storm in Mount Storm Lake, West Virginia; Chesterfield in Chester, Va., Bremo in Bremo Bluff, Va., Chesapeake Energy Center in Chesapeake, Va., Clover in Clover, Va., North Branch in Bayard, West Virginia; Possum Point in Dumfries, Va., and Yorktown in Yorktown, Va.

The Justice Department, acting for the EPA, last November sued the following companies for Clean Air Act violations in addition to VEPCO: American Electric Power , FirstEnergy , Illinois Power, Southern Indiana Gas and Electric Company, Cinergy, Southern Company, the federally-owned Tennessee Valley Authority and Tampa Electricity Company(TECO) .

TECO settled in February, agreeing to pay a \$3.5 million fine and spend \$1 billion over the next decade to improve its emissions producing plants. But the other lawsuits continue. Browner said negotiations were



ongoing with some parties in the suit, but would not elaborate.

**11. EPA Launches Voluntary Diesel Retrofit Web Site**

On December 1, 2000, the U.S. EPA's Voluntary Diesel Retrofit Program web site at [www.epa.gov/otaq/retrofit](http://www.epa.gov/otaq/retrofit) went on-line.

The web site is designed to help fleet operators, air quality planners, state and local government officials, and retrofit technology manufacturers to understand the program and to obtain valuable information. The site is an important element of EPA's initiative to promote emission reductions from existing on-road and off-road diesel engines.

**12. EPA Announces a Comprehensive Plan to Reduce Emissions from Nonroad Engines and Vehicles, and Highway Motorcycles**

On November 17, 2000, EPA issued a finding that nonroad SI engines rated above 19 kilowatts (25 hp), recreational land-based SI engines, and certain recreational marine engines contribute to air quality nonattainment for ozone or carbon monoxide in more than one nonattainment area and, as a consequence, should be regulated under the Clean Air Act. In response to that finding, EPA issued a Notice of Proposed Rulemaking seeking public comment on the Agency's plan to propose a national program to control emissions from the following nonroad sources:

Industrial spark-ignition engines rated above 19 kW (25 hp) (e.g., forklifts and generators);

Recreational gasoline engines (e.g., snowmobiles, all terrain vehicles, and off-road motorcycles); and

Recreational marine diesel engines and all stern drive and in-board gasoline engines.

In addition, the ANPRM announced EPA's plan to consider tighter emission standards for on-road motorcycles.

**A. Nonroad SI Engines above 19kW**

EPA estimates that by 2007 large nonroad SI engines will contribute four percent of the NO<sub>x</sub> emissions, three percent of the HC emissions, three percent of the CO emissions and 0.3 percent of the PM emissions of the entire mobile source inventory. EPA estimates that currently 915,678 of these vehicles/engines are in use, and that the number will rise to 1,127,323 by 2007. For large nonroad SI engines, EPA is contemplating proposing standards of 4 g/kW-hr (3 g/bhp-hr) for NO<sub>x</sub> and 50 g/kW-hr (37 g/bhp-hr) for CO to take effect in 2004. EPA states that three-way catalyst technology with electronic controlled fuel systems make the proposed standards achievable.

**B. Nonroad Recreational Vehicles**

EPA estimates that by 2007, SI recreational nonroad engines will contribute 12 percent of the HC emissions and six percent of the CO emissions to the mobile source emission inventory, but will contribute only a small fraction of the NO<sub>x</sub> and PM emissions. EPA estimates that as of 1996 there were 1,743,801 ATV/nonroad motorcycles (19% are 2-stroke), 1,289,302 snowmobiles (100% are 2-stroke), and 413,492 specialty vehicles (43% are 2-stroke) in use and that the

numbers will continue to grow through 2010.

In the ANPRM, EPA states that it will focus on HC and CO emissions -- primarily by reducing these emissions from 2-stroke engines. EPA states that HC emission could be reduced by 70+% through the elimination of scavenging losses, with additional reductions possible through the use of an oxidation catalyst. EPA appears to be considering a 2006-2008 compliance date for regulating recreational nonroad SI engines.

### **C. Recreational Marine CI and SI Engines**

EPA plans to regulate emissions from recreational marine CI engines rated at or above 37kW (50 hp) and SI stern drive or inboard engines. For CI engines, EPA plans to target NOx emissions with the standards taking effect around 2007. The Agency identified a range of engine design improvements already being applied to on-road diesel engines that could be used to achieve reductions from marine CI engines. For SI stern drive/inboard engines, EPA identified several technologies including electronic fuel injection, EGR, and two- and three-way catalyst technology (with closed-loop controls). EPA will consider standards for HC+NOx emissions and for CO emissions. EPA notes that even with a low-efficiency catalyst an HC+NOx standard of 5-7 g/kW-hr may be feasible and with a more efficient catalyst greater reductions may be achievable. EPA is considering the 2005-2006 time frame for implementing standards for marine SI stern drive/in-board engines.

### **D. On-Highway Motorcycles**

EPA estimates that there are 5.4 million highway motorcycles in use and that approximately 411,000 highway motorcycles were sold in 1998. The existing, lenient emission standards for on-road motorcycles

(5.0 g/km for HC and 12.0 g/km for CO) were established over 20 years ago. In 1984, California adopted more stringent standards for all classes of 1988 and later model year motorcycles. In 1998, California adopted a two-phase (2004 and 2008) HC+NOx standard for motorcycles with engines 280 cc and higher. The Air Resources Board (ARB) has identified catalyst technology as one of the compliance strategies available to meet the new California standards. EPA will invite comments on harmonizing with the California standards, as well as setting different standards.

### **13. EPA Issues Final Rule Regarding Heavy Duty Truck Emissions and Low Sulfur Diesel Fuel**

EPA issued the final rule regarding tighter NOx and particulate standards for heavy duty trucks and low sulfur diesel fuel on Thursday December 21<sup>st</sup>. Key provisions are summarized below:

#### **A. Low Sulfur Fuel Requirements**

As proposed, the maximum sulfur level in diesel fuel will be reduced to 15 PPM by July 1, 2006. Within each region of the country (so called PADD) refiners and distributors will be allowed to produce and sell up to 20% of their fuel at the current level (maximum of 500 PPM) to minimize any risk of supply disruptions; this exemption will expire by the end of 2009, by which time 100% of the fuel must meet the 15 PPM requirement.

Small refiners which sell approximately 5% of the diesel fuel across the country are also allowed to delay producing the low sulfur fuel until 2010. However, in order to encourage the small refiners to provide the low sulfur diesel fuel in 2006, EPA will offer them the option of either delaying the low sulfur diesel until 2010

or delaying the production of low sulfur gasoline (which was required by the Tier 2 package a year ago) until 2010; EPA expects that many small refiners will choose the gasoline option.

Overall, EPA expects that about 90% of all diesel fuel sold in the country by mid 2006 will be low sulfur and that this will rise gradually to 100% by 2010.

**B. Heavy Duty Engine Emissions Standards**

As proposed, the particulate standard of 0.01 grams per brake-horsepower hour will go into effect on 100% of new heavy duty diesel engines in 2007. The proposed NOx standard of 0.2 grams per brake-horsepower-hour has also been retained but will be phased in on a

different, more environmentally positive schedule. Instead of 25% in 2007, 50% in 2008, 75% in 2009 and 100% in 2010, the new schedule will require 50% to meet the 0.2 standard in each of model years 2007, 2008 and 2009 and then 100% in 2010. From an air pollution standpoint EPA estimates that over the three phase in years the overall NOx reduction will be about 58,000 tons compared to about 28,000 tons from the original proposal.

A more detailed summary of the standards follows.

**i. FTP Standards**

The emission standards finalized in the Rule for heavy-duty engines are summarized below.

**Full Useful Life Heavy-Duty Engine Exhaust Emissions Standards and Phase-Ins for Incomplete Vehicles**

		Standard (g/bhp-hr)	Phase-In by Model Year <sup>a</sup>			
			2007	2008	2009	2010
Diesel	NOx	0.20	50%	50%	50%	100%
	NMHC	0.14				
	PM	0.01	100%	100%	100%	100%
Gasoline	NOx	0.20	0%	50%	100%	100%
	NMHC	0.14				
	PM	0.01				

<sup>a</sup> Percentages represent percent of sales.

With respect to PM, this new standard represents a 90 percent reduction for most heavy-duty diesel engines from the current PM standard. The current PM standard for most heavy-duty engines, 0.10 g/bhp-hr, was

implemented in the 1994 model year; the PM standard for urban buses implemented in that same year was 0.05 g/bhp-hr; these standards are not changing when other standards change in the 2004 model year

time frame. The new PM standard of 0.01 g/bhp-hr being finalized today is projected to require the addition of highly efficient PM traps to diesel engines, including those diesel engines used in urban buses; it is not expected to require the addition of any new hardware for gasoline engines.

With respect to NMHC and NO<sub>x</sub>, these new standards represent significant reductions from the 2004 diesel engine standard which is either 2.4 g/bhp-hr NO<sub>x</sub>+NMHC, or 2.5 g/bhp-hr NO<sub>x</sub>+NMHC with a cap on NMHC of 0.5 g/bhp-hr. EPA generally expects that 2004 diesel engines will meet those standards with emission levels around 2.2 g/bhp-hr NO<sub>x</sub> and 0.2 g/bhp-hr NMHC. Like the PM standard, the new NO<sub>x</sub> standard is projected to require the addition of a highly efficient NO<sub>x</sub> emission control system to diesel engines which, with help from the PM trap, will need to be optimized to control NMHC emissions.

EPA concluded that a phase-in of the diesel NO<sub>x</sub> standard is appropriate. First, the phase-in will provide industry with the flexibility to roll out the NO<sub>x</sub> control technology on only a portion of their fleet. This will allow them to focus their resources on that half of their fleet being brought into compliance in 2007. This ability to focus their efforts will increase both the efficiency and the effectiveness of those efforts. Second, a phase-in allows industry the ability to introduce the new technology on those engines it believes are best suited for a successful implementation which, in turn, provides a valuable opportunity to refine that technology on only a portion of their product

line prior to the next push toward full implementation.

For gasoline engines, the phase-in will allow manufacturers to implement improved gasoline control technologies on their heavy-duty gasoline engines in the same time frame as they implement those technologies on their Tier 2 medium-duty passenger vehicles (MDPV). Note that the gasoline engine phase-in schedule is the same as but separate from the gasoline vehicle phase-in schedule.

**ii. Supplemental Provisions for HD Diesel Engines (SET & NTE)**

In addition to the new FTP standards for HD diesel engines, EPA is also finalizing supplemental emission standards to help ensure that HD diesel engines achieve the expected in-use emission reductions over a wide range of vehicle operation and a wide range of ambient conditions, not only the test cycle and conditions represented by the traditional FTP. The supplemental provisions for HD diesel engines consist of two principal requirements, the supplemental emission test and associated standards (SET), and the not-to-exceed test and associated standards (NTE). The supplemental emission standards for heavy-duty diesel engines are summarized below.

**Full Useful Life Heavy-Duty Diesel Engine Supplemental Exhaust Emissions Standards**

Supplemental Test	Requirements for NO <sub>x</sub> , NMHC, PM
Supplemental Emission Test	1.0 x FTP standard (or FEL)
Not-to-Exceed Test	1.5 x FTP standard (or FEL)

EPA has made three changes to the NTE engine control zone. First, they have expanded the NTE engine control zone for engines certified to the new 0.01 g/bhp-hr PM standard. The NTE requirements as specified in the regulations for engines certified to the 2004 FTP standards provide specific "PM carve-outs" to the NTE control zone. These carve-outs define an area of the engine operating regime (speed and torque area) to which the NTE does not apply for PM emissions. The PM only carve-outs were specified because, under certain engine operating regions, the NTE requirements for PM could not be met with the technology projected to be used to meet the 2004 FTP standards. However, the advanced PM trap technology that will be used to meet the PM standard contained in the final rule is very efficient at controlling PM emissions across the entire NTE control zone. Due to the high PM reduction capabilities of catalyzed PM traps, there is no need for the PM specific carve-outs. Second, EPA has added a provision which would allow a manufacturer to exclude defined regions of the NTE engine control zone from NTE compliance if the manufacturer could demonstrate that the engine, when installed in a specified vehicle(s), is not capable of operating in such regions. Finally, EPA has added a provision which would allow a manufacturer to petition the Agency to limit testing in a defined region of the NTE engine control zone during NTE testing. This optional provision would require the manufacturer to provide the Agency with in-use operation data which the manufacturer

could use to define a single, continuous region of the NTE control zone. This single area of the control zone must be specified such that operation within the defined region accounts for 5 percent or less of the total in-use operation of the engine, based on the supplied data. Further, to protect against gaming by manufacturers, the defined region must generally be elliptical or rectangular in shape, and share a boundary with the NTE control zone. If approved by EPA, the regulations then disallow testing with sampling periods in which operation within the defined region constitutes more than 5.0 percent of the time-weighted operation within the sampling period.

**iii. Crankcase Emissions Control**

Crankcase emissions are the pollutants that are emitted in the gases that are vented from an engine's crankcase. These gases are also referred to as "blowby gases" because they result from engine exhaust from the combustion chamber "blowing by" the piston rings into the crankcase. These gases are vented to prevent high pressures from occurring in the crankcase. EPA's emission standards have historically prohibited crankcase emissions from all highway engines except turbocharged heavy-duty diesel engines. The most common way to eliminate crankcase emissions has been to vent the blowby gases into the engine air intake system, so that the gases can be recombusted. EPA made the exception for

turbocharged heavy-duty diesel engines in the past because of concerns about fouling that could occur by routing the diesel particulates (including engine oil) into the turbocharger and aftercooler. These concerns are now alleviated by newly developed closed crankcase filtration systems, specifically designed for turbocharged heavy-duty diesel engines. These new systems are already required for new on-highway diesel engines under the EURO III emission standards. Therefore, EPA is eliminating the exception for turbocharged heavy-duty diesel engines starting in the 2007 model year. Manufacturers could potentially discharge

some or all of the crankcase emissions to the atmosphere, but only if they were able to keep the combined total of the crankcase emissions and the other exhaust emissions below the applicable exhaust emission standards.

**C. Heavy-Duty Vehicle Exhaust Emissions Standards**

**i. FTP Standards**

The emission standards for heavy-duty gasoline vehicles are summarized below.

**Full Useful Life Heavy-Duty Vehicle Exhaust Emissions Standards and Phase-Ins for Complete Vehicles<sup>a</sup>**  
(grams/mile)

Weight Range (GVWR)		Standard (g/mi)	Phase-In by Model Year <sup>b</sup>	
			2008	2009
8,500 to 10,000 lbs	NOx	0.2	50%	100%
	NMHC	0.195		
	HCHO	0.032		
	PM	0.02		
10,001 to 14,000 lbs	NOx	0.4		
	NMHC	0.230		
	HCHO	0.040		
	PM	0.02		

<sup>a</sup> Does not include medium-duty passenger vehicles.  
<sup>b</sup> Percentages represent percent of sales.

These NOx standards represent a 78 percent reduction and a 60 percent reduction from the standards for 8,500-10,000 pound and 10,000-14,000 pound vehicles, respectively,

finalized for the 2005 model year. The NMHC standards represent a 30 percent reduction from the 2005 standards for 8500-10,000 and 10,000-14,000 pound vehicles. The PM

standard is 80 percent lower than the CARB LEV-II LEV category PM standard of 0.12 g/mi, which actually applies only to diesel vehicles. Note that the PM standard shown in the Table represents not only a stringent PM level, but a new standard for federal HDVs where none existed before. Both the California LEV II program for heavy-duty diesel vehicles and the federal Tier 2 standards for over 8,500 pound gasoline and diesel vehicles designed for transporting passengers contain PM standards. The PM standard in the Rule is consistent with the light-duty Tier 2 bins 7 and 8 level of 0.02 g/mi.

**D. Heavy-Duty Evaporative Emissions Standards**

The new evaporative emissions standards are shown below. These standards will apply to heavy-duty gasoline-fueled vehicles and engines, and methanol-fueled heavy-duty vehicles and engines. Consistent with existing standards, the standard for the two day diurnal plus hot soak test sequence would not apply to liquid petroleum gas (LPG) fueled and natural gas fueled HDVs.

**New Heavy-Duty Evaporative Emissions Standards <sup>a</sup>**  
(grams per test)

Category	3 Day Diurnal + Hot Soak	Supplemental 2 Day Diurnal + Hot Soak <sup>b</sup>
8,500 - 14,000 lbs	1.4	1.75
>14,000 lbs	1.9	2.3

<sup>a</sup> To be implemented on the same schedule as the gasoline engine and vehicle exhaust emission standards. These new standards do not apply to medium-duty passenger vehicles, and do not apply to diesel fueled vehicles and engines.

<sup>b</sup> Does not apply to LPG or natural gas fueled HDVs.

These new standards represent more than a 50 percent reduction in the numerical standards as they exist today. The Phase 1 heavy-duty rule made no changes to the numerical value of the standard, but it did put into place new evaporative emission test procedures for heavy-duty complete gasoline vehicles. The new standards for 8,500 to 14,000 pound vehicles are consistent with the Tier 2 standards for medium-duty passenger vehicles (MDPV). EPA set slightly higher evaporative emission standards for the over 14,000 pound HDVs because of their slightly larger fuel tanks and for non-fuel emissions related to larger vehicle sizes.

**E. On-Board Diagnostics (OBD)**

The Phase 1 heavy-duty final rule put into place OBD requirements for heavy-duty diesel and gasoline engines weighing 14,000 pounds or less. In that rule, the OBD thresholds for malfunction identification are based on multiples of the applicable FTP emission standards to which the engine is certified. Given the structure of the 2004 FTP emission standards (2005 FTP emission standards for gasoline engines), which are combined NMHC+NOx standards, the OBD thresholds are based on a multiple of the

combined FTP standards. However, the structure of the 2007 FTP standards (2008 for gasoline engines) is not a combined NMHC+NOx standard, but is instead a separate NOx and a separate NMHC standard.

Therefore, the final rule is revising the existing section of the regulations to link OBD thresholds to whatever the appropriate standards are whether they are the combined FTP standards or the new separate FTP standards. This is consistent with the intent of the OBD requirements since inception -- that the OBD thresholds be based on the FTP standards to which the vehicle or engine has been certified.

EPA is also revising the phase-in for the OBD requirements finalized in the Phase 1 rule. For diesel engine OBD systems, EPA has revised the 60/80/100 percent phase-in to 50/50/100 percent beginning in the 2005 model year. In addition, EPA has decided, for gasoline engine OBD systems, to revise the 60/80/100 percent phase-in to 60/80/80/100 percent beginning in the 2005 model year. (For those manufacturers choosing compliance Options 1 or 2 as part of the Phase 1 program, the gasoline engine OBD phase-in will become 40/60/80/80/100 percent beginning in model year 2004.)

#### **F. Incentives for Early Introduction of Clean Engines and Vehicles**

The incentive program permits manufacturers to take credit for diesel engines certified to this rule's final standards prior to the 2007 model year (prior to the 2008 model year for

gasoline engines or vehicles) in exchange for making fewer diesel engines certified to these standards in or after the 2007 model year (2008 for gasoline engines or vehicles). In other words, a clean engine sold earlier than required displaces the requirement to sell a similar engine later. Any early engine credits earned for a diesel-fueled engine would, of course, be predicated on the assurance by the manufacturer that the engine would indeed be fueled with low sulfur diesel fuel in the marketplace. EPA expects this would occur through selling such engines into fleet applications, such as city buses, school buses, or any such well-managed centrally-fueled fleet. Because of the difficulty associated with low sulfur diesel fuel availability prior to mid-2006, EPA believes it is necessary and appropriate to provide a greater incentive for early introduction of clean diesel technology. Therefore, EPA will count one early diesel engine as 1.5 diesel engines later. This extra early credit for diesel engines means that fewer clean diesel engines than otherwise would be required may enter the market during the years 2007 and later. But, more importantly, it means that emission reductions would be realized earlier than under the base program. For gasoline engines and vehicles, the early engine credit will be a one-for-one credit because the gasoline needed by the engine or vehicle will be readily available.

The Table below shows an example for a diesel engine manufacturer and how it might use this incentive provision on an assumed fleet of 100 engine sales growing at one percent per year beginning in the 2004 model year.



**Example Engine Introduction Under Early Incentive Program**

	2004	2005	2006	2007	2008	2009	2010
Total Sales	100	101	102	103	104	105	106
Clean Engines under Base Program	0	0	0	52	52	53	106
Clean Engines under Incentive Program	4	4	4	46	46	47	106

The four engines sold early in each of model years 2004 through 2006 generate a total credit of 18 engines ( $4 \times 3 \times 1.5 = 18$ ). This allows the manufacturer to reduce its compliant engine count in each of model years 2007 through 2009 by six engines ( $18/3 = 6$ ). This helps the manufacturer by reducing total costs through requiring fewer total engines at the low-emitting, clean engine level. But, more importantly, it introduces clean technology engines early and, by 2010 in this example, generates from four to six years of emission reductions that otherwise would not have occurred.

As further incentive to introduce clean engines and vehicles early, EPA is also finalizing a provision that would give manufacturers an early introduction credit equal to two engines

during the phase-in years. This "Blue Sky" incentive would apply for diesel engines meeting one-half of the final NOx standard while also meeting the NMHC and PM standards. For gasoline engines, the same early introduction double engine credit would be available to engines sold prior to 2008 and meeting one-half the NOx standard while also meeting the NMHC, PM, and evaporative emission standards. For gasoline vehicles, the double engine credit would be available to those vehicles certified early to the California SULEV levels and today's PM and evaporative emission standards. The Table below shows the emission levels that would be required prior to the 2007 model year for diesel engines and the 2008 model year for gasoline vehicles and engines to earn any early introduction engine credits.

**Emission Levels and Credits Available for Early Introduction Engines**

Category	Must Meet <sup>a</sup>	Early Engine Credit <sup>b</sup>
Early Diesel PM-only <sup>c</sup>	Phase 2 PM & Phase 1 NOx+NMHC	1.5-to-1
Early Diesel Engine <sup>c</sup>	All Phase 2 Standards	1.5-to-1
Early Gasoline Engine or Vehicle -- Exhaust	Phase 2 Exhaust Standards	1-to-1

Early Gasoline Engine or Vehicle -- Evap	Phase 2 Evaporative Standards	1-to-1
Blue Sky Series Diesel <sup>c</sup> or Gasoline Engine	0.10 g/bhp-hr NOx & All other Phase 2 Standards <sup>d</sup>	2-to-1
Blue Sky Series Gasoline Vehicle	0.02 g/mi PM & California SULEV Level Standards <sup>d</sup>	2-to-1

<sup>a</sup> Phase 1 refers to standards required by 65 FR 59896, October 6, 2000; Phase 2 refers to final standards.

<sup>b</sup> Engine count credits must be earned prior to the phase-in years of 2007 for diesel and 2008 for gasoline.

<sup>c</sup> Early diesel engines must also meet the Phase 2 crankcase emissions requirements.

<sup>d</sup> For gasoline engines and vehicles, these must also meet the Phase 2 evaporative emission standards.

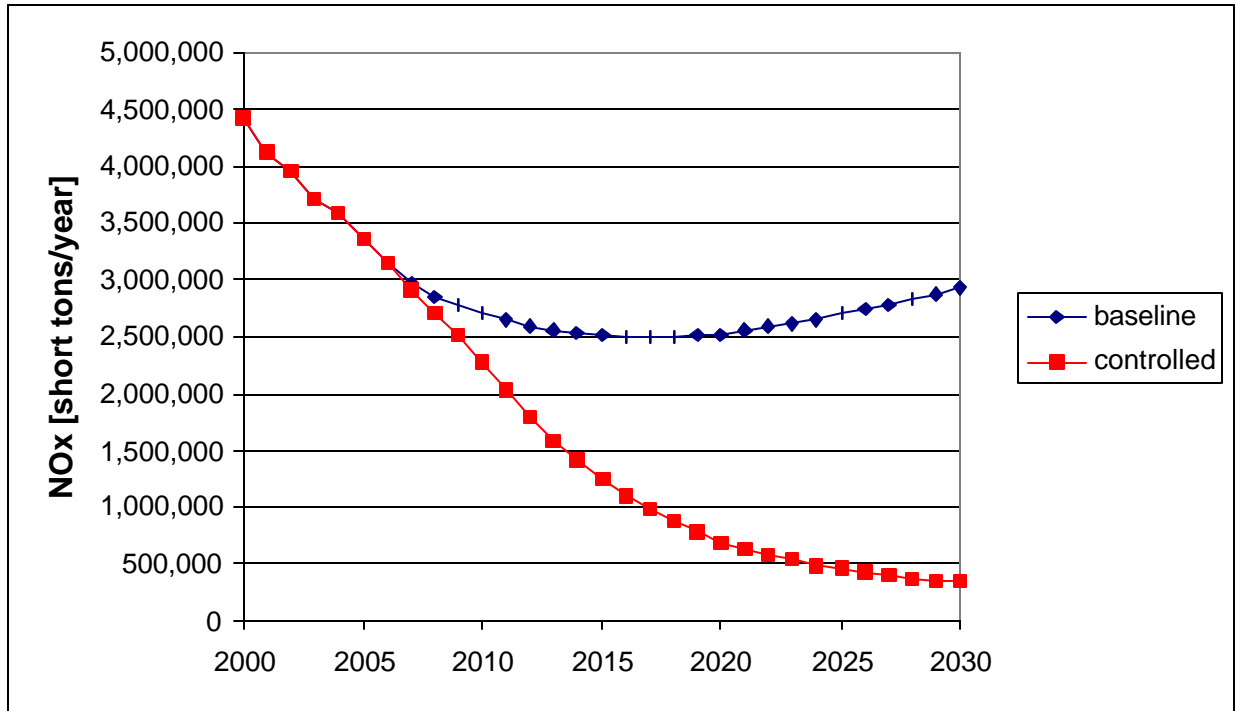
lives per year.

**G. Environmental Impact**

In terms of the overall impact on public health and the environment, this may be the most important mobile source regulation ever adopted by EPA. Compared to the Tier 2 package which EPA estimated to result in Net Benefits of \$24 billion and to save ~3000 lives per year, this package will have net benefits of slightly less than \$70 billion and save ~9000

**i. NOx**

The Figure below shows EPA's national projections of total NOx emissions with and without the engine controls finalized in the Rule. The standards should result in close to a 90 percent reduction in NOx from new engines.



**Projected Nationwide Heavy-Duty Vehicle NOx Emissions**

Estimated Reductions in NOx	
Calendar Year	NOx Reduction [thousand short tons]
2007	58
2010	419
2015	1,260
2020	1,820
2030	2,570

**ii. PM Reductions**

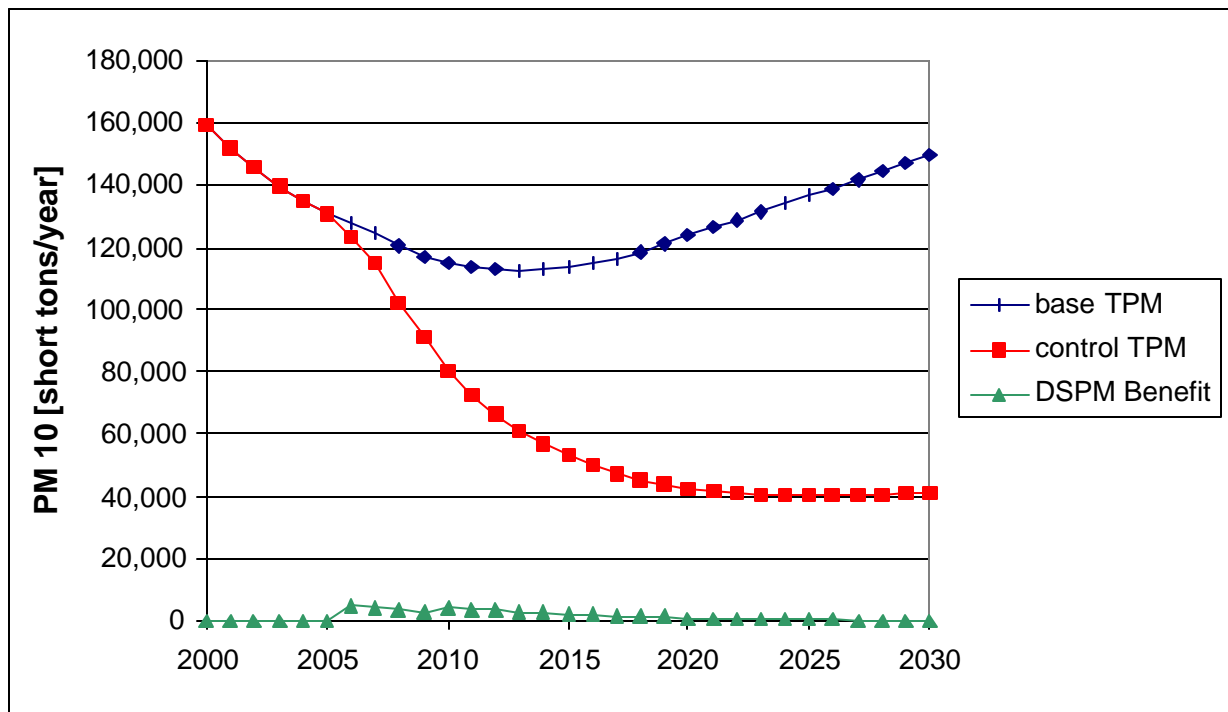
The majority of the projected PM reductions are directly a result of the exhaust PM standard. However, a modest amount of PM

reductions will come from reducing sulfur in the fuel. For the existing fleet of heavy-duty vehicles, a small fraction of the sulfur in diesel fuel is emitted directly into the atmosphere as direct sulfate, and a portion of the remaining fuel sulfur is transformed in the atmosphere

into sulfate particles, referred to as indirect sulfate. Reducing sulfur in the fuel decreases the amount of direct sulfate PM emitted from heavy-duty diesel engines and the amount of heavy-duty diesel engine SOx emissions that are transformed into indirect sulfate PM in the atmosphere. (Sulfate forms a significant portion of total fine particulate matter in the Northeast. Chemical speciation data in the Northeast collected in 1995 shows that the sulfate fraction of fine particulate matter ranges from 20 and 27 percent of the total fine particle mass. Determination of Fine Particle and Coarse Particle Concentrations and Chemical Composition in the Northeastern United States, 1995, NESCAUM, prepared by Cass, et al., September 1999.) For engines meeting the new standards, EPA considers low sulfur fuel to be necessary to enable the PM control technology. Further, once the low sulfur fuel requirements go into effect, many pre-2007 model year engines

would also be using low sulfur fuel. Because these pre-2007 model year engines are certified with higher sulfur fuel, they will achieve reductions in PM beyond their certification levels.

The Figure below shows EPA's national projections of total HDV PM (TPM) emissions with and without the new engine controls. This figure includes brake and tire wear, crankcase emissions and the direct sulfate PM (DSPM) benefits due to the use of low sulfur fuel by the existing fleet. These direct sulfate PM benefits from the existing fleet are also graphed separately. The new standards will result in about a 90 percent reduction in exhaust PM from new heavy-duty diesel engines. The low sulfur fuel should result in more than a 95 percent reduction in direct sulfate PM from pre-2007 heavy-duty diesel engines.



**Projected Nationwide Heavy-Duty Vehicle PM Emissions  
and Direct Sulfate Emission Reductions**

**Estimated Reductions in PM**

Calendar Year	PM Reduction [thousand short tons]
2007	11
2010	36
2015	61
2020	82
2030	109

**H. Technology Review**

The Final Rule does not contain a mandatory technology review at any given date. However, EPA will conduct a biennial progress review to stay abreast of technological developments.

**I. Costs**

EPA projects that the significant environmental benefits of this program will come at an average cost increase of about \$2,000 to \$3,200 per new vehicle in the near term and about \$1,200 to \$1,900 per new vehicle in the long term, depending on the vehicle size. In comparison, new vehicle prices today can range well over \$100,000 for larger heavy-duty vehicles. EPA estimates that when fully implemented the sulfur reduction requirement will increase the cost of producing and distributing diesel fuel by about five cents per gallon.

**J. Events Leading Up To The Decision**

**i. A US Study Highlights The Need To Control PM**

A report, published in the New England Journal of Medicine in early December, reiterated that mortality rates in 20 US cities increased in the 24 hours following spikes in PM levels. The study found that mortality increased steadily with every small increase in pollution, and that higher death rates were seen even when PM levels were nowhere near the maximum allowed under US federal standards.

**ii. American Lung Association Survey Indicates Strong Public Support For Diesel Regulation**

A new nationwide<sup>1</sup> survey by Lake Snell Perry

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<sup>1</sup> The survey reached 800 registered voters nationwide, ages 18 or older, who indicated they voted in the November 2000 general election for President and Congress. The survey was

revealed that voters overwhelmingly favor the production of cleaner diesel fuel and are willing to pay more per gallon for it. Furthermore, voters believe clean diesel fuel will make a significant impact on air quality.

Nearly nine out of ten voters favor requiring the production of cleaner diesel fuel (87 percent), with a plurality strongly in favor of the requirement (46 percent). Just 7 percent of voters oppose requiring cleaner diesel fuel and 6 percent are unsure.

Moreover, 84 percent of voters say it is personally important to them to require the production of cleaner diesel fuel (46 percent very important). Fourteen percent say it is not important to them to require the production of cleaner diesel fuel and 3 percent are unsure. At least seven out of ten voters across every demographic, geographic and political subgroup both favor requiring the production of cleaner diesel fuel and believe it is personally important to do so.

Likewise, more than eight out of ten voters favor requiring 18 wheelers and other big diesel vehicles to use the best available pollution control technology even if it costs them more money, with a plurality strongly favoring the requirement (85 percent favor, 46 percent strongly favor). Only 9 percent are opposed to the requirement and 6 percent are unsure. Equal numbers of voters also say this requirement is personally important to them (85 percent important; 46 percent very important). Just 12 percent say the requirement is not important to them and 3 percent are unsure.

Once again, at least seven out of ten voters across every demographic, geographic and

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conducted between November 8-12, 2000. The total margin of error for this survey is +/- 3.5%.

political subgroup both favor requiring 18 wheelers and other big diesel vehicles to use the best available pollution control technology even if it costs them more money, and believe it is personally important to do so. These numbers are consistent with findings from a nationwide survey in June of this year in which 87 percent of voters agreed that 18 wheelers and other big diesel vehicles should be required to use the best available pollution control technology even though it would cost them more money.

While a solid majority of voters regardless of political affiliation favor requiring 18 wheelers and other big diesel vehicles to use the best available pollution control technology, Democrats are once again most favorable (92 percent favor; 55 percent strongly), followed closely by Independents (86 percent favor; 39 percent strongly) and Republicans (76 percent favor; 39 percent strongly). Additionally, Democrats are the most likely to say it is personally very important to them (89 percent important; 56 percent very), followed by Independents (90 percent; 45 percent very) and then Republicans (77 percent; 37 percent very).

**iii. Broad Coalition Calls on President to Finalize Proposed 2007 HDE Standards and Low Sulfur Diesel Fuel Program by the End of the Year**

In a joint letter, the Manufacturers of Emissions Controls Association (MECA), the Alliance of Automobile Manufacturers, International Truck and Engine Co., Tosco Corp., the California Trucking Association, the Natural Resources Defense Council, U.S. PIRG, the Clean Air Trust, the American Lung Association, Sierra Club, STAPPA/ALAPCO,

and NESCAUM urged President Clinton to finalize EPA's proposed 2007 HDE standards/low sulfur fuel requirement by the end of the year. The initiative marked the first time in the 30-year history of the U.S. mobile source program that representatives from the states, environmental and health communities, the oil industry, the auto industry, the trucking industry, engine manufacturing industry, and the emission control industry joined together to support finalizing a regulatory initiative.

#### **K. Possible Bush Administration Reaction**

The broad public support for the regulation may turn out to be especially critical in light of the initial reaction from the incoming Bush Administration. According to the Washington Post, Bush officials "said that they plan an aggressive review of last minute executive orders and regulations being promulgated by President Clinton in such areas as ergonomics, **clean air**, protecting Hawaii's coral reefs and organic food labeling standards."<sup>2</sup>

#### **14. CARB Staff Proposes Refinement and Enhancement of ZEV Mandate**

California will expand its clean air ZEV requirement to include other technologies such as fuel cells, gas-electric hybrids, and natural gas engines that are progressing more rapidly toward the mass market.

"The staff is proposing that those vehicles all be given total or partial credit toward the ZEV rules depending upon their cleanliness and durability," board spokesman Jerry Martin has

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<sup>2</sup>-"Bush Nominates Ashcroft, Whitman for Cabinet", Washington Post, December 23, 2000.

announced.

"This is not a retreat from the battery technology in any way," Martin said. "It is an acknowledgment that some of these other technologies have been making headway. In 1990, battery technology was the only prospect for zero emissions cars. Now we have a number of others."

The new staff guidelines, which are seen likely to be largely approved by the politically appointed state board on Jan. 25, would amend a 1990 decision requiring 10 percent of vehicles produced for sale in the state be zero emission by 2003.

The new rule would mandate roughly two percent of California cars be pure ZEVs by 2003, while a further two percent be hybrid and fuel cell vehicles and a further 6 percent be "extremely clean" gas and other vehicles.

If approved, the new California guidelines would give auto makers incentives to pursue alternate strategies to battery-powered cars, as well as save the auto industry as much as \$400 million in compliance costs.

The new proposal also calls for expanding the clean air program to require that as many of 16 percent of new cars and vehicles sold in California meet the ZEV standards by 2018, either through battery power or any of the other new technologies available.

The full Board will make a final decision on January 25th.

#### **15. CARB Moves Forward With Several Other Initiatives**

##### **A. Board Approves Guidelines for ZEV Incentive Program**

The California Environmental Protection

Agency's Air Resources Board (ARB) has approved guidelines for the distribution of \$18 million for zero-emission vehicle incentives.

The program is designed to make the price of a full-service electric vehicle comparable to that of a conventionally fueled vehicle, spurring the electric vehicle market in California. This is important to the critical ramp-up period needed for the ZEV rule, requiring 10 percent of new vehicles sold in California to be pollution free starting in 2003.

ARB Chairman Alan C. Lloyd said, "Incentives to purchase zero-emission vehicles are an important part of the path to clean air in California. This commitment of dollars is a reflection of California's belief in the future of advanced transportation technologies."

The Zero-Emission Vehicle Incentive Program is the result of legislation signed by Governor Gray Davis on September 30, 2000. The program will provide a total of \$18 million in grants to reduce the incremental cost of new ZEV purchases or leases over the next three years. Individual grants totaling up to \$9,000 may be provided over a 36-month period. These grants are available to qualified private and public consumers who purchase or lease a new ZEV between October 1, 2000, and December 31, 2002. If each recipient is awarded the full \$9,000, this program would support 2,000 vehicles.

Applications will start being taken as soon as December 15, 2000 with the first grants being distributed by February 1, 2001. The program may only provide grants to individuals, local government, state agencies, nonprofit organizations, and private businesses purchasing or leasing an eligible ZEV.

All of the funds will be used for grants, and none will be used for program administration. Development and administration of the

program will be done by the ARB in conjunction with California Energy Commission.

### **B. Board Starts Clean School Bus Program**

A \$50 million program to reduce harmful air emissions from the state's oldest, highest-polluting school buses was approved by the California Environmental Protection Agency's Air Resources Board (ARB).

"The main goal of the Lower-Emission School Bus Program is reducing children's exposure to cancer causing and smog-forming air pollution," said Dr. Alan Lloyd, ARB Chairman.

The program will do this by helping school districts replace 375 of the oldest, high-polluting buses with new, cleaner diesel or alternative fuel buses, and by paying for filters to reduce emissions from 1,875 existing diesel buses. The program will also help defray the added cost of low-sulfur diesel fuel and will provide funds to help develop alternative fuel infrastructure, as needed.

The state funding is partitioned to allow \$25 million for new alternative fuel buses (primarily natural gas) and fueling facilities and \$12.5 million for new, cleaner diesel buses. School districts will have to provide 25 percent of the cost of a new bus, up to a maximum of \$25,000, while state funds will pay the remainder. School districts in some of the state's neediest regions will only have to provide a 15 percent match to replace pre-1977 buses.

The program's remaining \$12.5 million will go toward installing filters on existing diesel buses that will reduce particulate matter (PM) by at least 85 percent.

Replacing 1976 or older diesel buses first has



the dual benefit of removing older, high-polluting buses from the road, and also eliminating buses that were put into service before federal school bus safety standards took effect in 1977. High emitting, pre-1987 buses are also eligible for funding.

Reduction of PM and NOx are the program's main goals. The state's 24,000-vehicle school bus fleet contributes about 13 tons-per-day (TPD) of NOx and almost one-half TPD of PM to California's air.

New diesel buses purchased through the program and those equipped with filters will be required to use low-sulfur diesel fuel. Excess sulfur contributes to PM formation and degrades the effectiveness of PM filters.

The grant awards will be made at the beginning of July 2001, with new buses and retrofit filters delivered in time for the 2002 school year.

#### **C. California Harmonizes Certain Light-Duty and Medium-Duty Vehicle and HDE Standards with Federal Standards**

On December 7, 2000, ARB adopted regulations that will require auto manufacturers that certify light- or medium-duty vehicles to the Federal Tier 2 standards that are more stringent than the applicable California standard to sell the federal lower-emitting vehicle in California as well. These Tier 2 vehicles sold in California will also be required to meet California's OBD requirements and evaporative emission standards. ARB also aligned California's heavy-duty gasoline standards for 2005 and later model years with the more stringent federal NOx 1.0 g/bhp-hr standard. Like the federal standards, ARB provided manufacturers the option of postponing to

2008 compliance with the 1.0 NOx standard if they agreed to meet an interim 1.5 g/bhp-hr NOx prior to 2005.

#### **D. ARB Implements Revised HDE Certification Procedures Two Years Early**

Over the objections of the Engine Manufacturers Association, the ARB on December 8, 2000 unanimously approved a staff recommendation to implement additional certification testing requirements for HDEs in 2005 – two years ahead of EPA's recently adopted revised HDE certification procedures. EPA, on October 6, 2000 (65 FR 59896), published its Phase 1 on-highway HDE rule which included a requirement that 2007 and later model year HDEs comply with a new certification test procedure that adds the EURO III European Stationary Cycle (ECS) test and a Not-To-Exceed (NTE) test to the existing FTP transient test. The NTE standard would be 1.25 times the 2.5 g/bhp-hr NOx+NMHC standard measured over the existing transient FTP or a 3.125 g/bhp-hr standard.

The majority of the seven HDE manufacturing companies covered by the U.S. Department of Justice NOx consent decree have agreed to produce engines beginning in October 2002 that will meet the applicable NOx+NMHC standard over the expanded certification test procedure. The consent decree requires that these procedures be met for only two years. To fill the gap between 2004 and 2007, ARB staff adopted regulations that include the ECS and NTE tests for 2005 and 2006 model year HDEs certified for sale in California. ARB agreed to conduct a technology review in 2003 to consider whether any adjustments to the NTE requirement are needed.

EMA, Daimler/Chrysler, and Isuzu charged

that ARB's rule failed to give manufacturers the four-year lead-time/three-year stability requirement mandated by the Clean Air Act. ARB legal counsel countered that ARB was not bound by the CAA requirements because the CAA gave ARB the authority to adopt its own standards.

#### **16. US and Canada Sign Clean Air Treaty**

The United States and Canada have signed an agreement to sharply reduce smog-causing pollution emitted mainly by power plants, with the aim of bringing healthier air to millions of people living in both countries by 2010.

In a signing ceremony at the Canadian Embassy, officials said the deal, which was finalized in October, would reduce both nitrogen oxide and volatile organic compounds caused by power plants and commercial and consumer products.

"Canada and the United States broke new ground with the acid rain agreement of the 1980s and today's agreement takes us further in protecting our citizens from the health effects of dirty air," said David Anderson, Canada's minister for the environment, who represented Ottawa at the signing ceremony.

Air pollution currently accounts for about 5,000 premature deaths in Canada and about 60,000 in United States annually.

The agreement specifically takes aim at lung-damaging ground-level ozone in the eastern half of North America, the industrial heartlands of both countries.

The cross-border agreement will require power plants and other industrial sources to cut their nitrogen oxide emissions by 50 percent to 75 percent by 2004.

The United States will reduce nitrogen oxide emissions by 35 percent by 2007, which implies a 70 percent reduction from power plants and major industrial sources. The aim is to reduce U.S. annual emissions by 43 percent by 2010.

Both sides also pledged to cut production of volatile organic compounds. These substances, when combined with nitrogen oxides in sunlight, create ground-level ozone.

Canada also plans to tighten its vehicle emission standards and bring them into line with those in the United States.

Frank Loy, US undersecretary of state for global affairs, said the bilateral ozone pact reflected the two nations' common stance on reducing pollution.

"It's the latest in a long string of thoughtful, generous collaborations when dealing with environmental issues," Loy said.

#### **17. EPA Issues Annual Fuel Economy Report**

This latest annual report summarizes key fuel economy and technology usage trends related to model year 1975 through 2000 light vehicles sold in the United States.<sup>3</sup> Light vehicles include those vehicles that EPA and the U.S. Department of Transportation (DOT) classify as cars or light-duty trucks (sport utility vehicles, vans, and pickup trucks with less than 8,500 pounds gross vehicle weight ratings). The report finds that since 1988 average new light vehicle fuel economy has declined 1.9 miles per gallon (mpg), i.e., more than seven percent, primarily because light truck market share has increased and

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<sup>3</sup>“Light-Duty Automotive Technology and Fuel Economy Trends: 1975-2000” (EPA420-R-00-008)

because fuel economy has been traded off for increased vehicle weight and performance.

The fuel economy values in this report are laboratory data and are significantly higher than the real world estimates used on new vehicle labels and in the *Fuel Economy Guide*. The fuel economy values in this report are similar to those used by the DOT for compliance with fuel economy standards, but because the values in this report exclude correction factors for alternative fuel capability and test procedure adjustments, they are always lower than those reported by DOT.

#### **A. Importance of Fuel Economy**

Fuel economy continues to be a major area of public and policy interest for several reasons, including:

Fuel economy is directly related to carbon dioxide emissions, the most prevalent pollutant associated with global warming. Light vehicles contribute about 20% of all U.S. carbon dioxide emissions.

Light vehicles account for approximately 40% of all U.S. oil consumption. Crude oil, from which nearly all light vehicle fuels are made, is considered to be a finite natural resource.

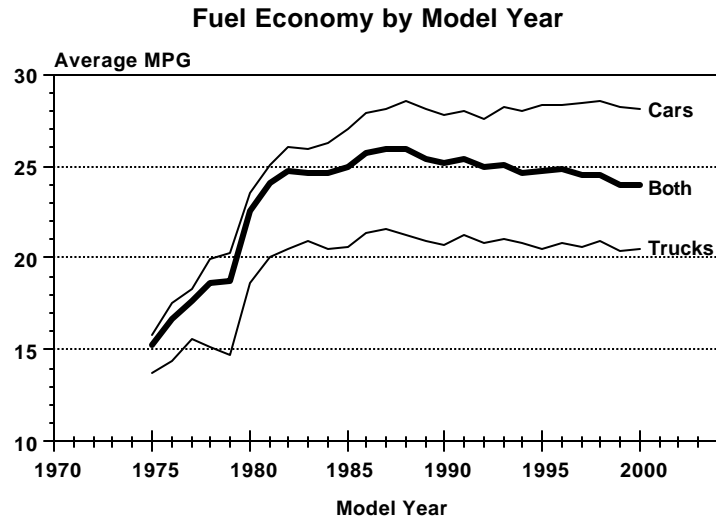
Fuel economy is directly related to

the cost of fueling a vehicle and is of greater interest when oil and gasoline prices rise, as has happened recently.

#### **B. Highlight #1: Fuel Economy Remains at a 20 Year Low**

There has been an overall declining trend in light vehicle fuel economy since 1988. The average fuel economy for all model year 2000 light vehicles is now 24.0 mpg, the same as in 1999, and is as low as it has been at any time since 1980. This value is more than 1.9 mpg (about seven percent) lower than the peak value of 25.9 mpg achieved in 1987 and 1988. Within the light vehicle category for model year 2000, average fuel economy is 28.1 mpg for passenger cars and 20.5 mpg for light trucks.

All of the fleet-wide improvement in new light vehicle fuel economy occurred from the middle 1970s through the late 1980s, but it has been consistently falling since then. Viewed separately, the average fuel economy for new cars has been essentially flat over the last 15 years, varying only from 27.6 mpg to 28.6 mpg. Similarly, the average fuel economy for new light trucks has been largely unchanged for the past 20 years, ranging from 20.1 mpg to 21.6 mpg. The increasing market share of light trucks, which have lower average fuel economy than cars, accounts for much of the decline in fuel economy of the overall new light vehicle fleet.



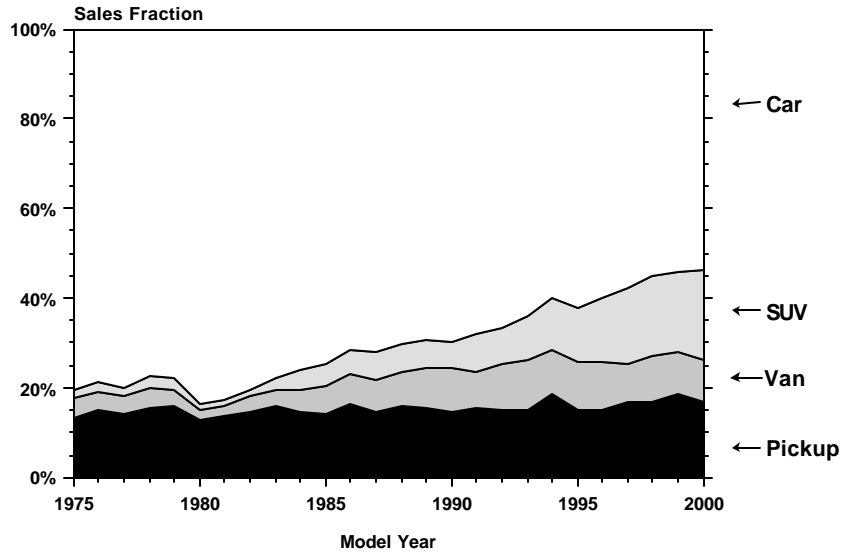
**C. Highlight #2: Trucks Represent Nearly Half of New Vehicle Sales**

Sales of light trucks, which include sport utility vehicles (SUVs), vans, and pickup trucks, have risen steadily for over 20 years and now make up 46% of the U.S. light vehicle market—more than twice their market share as recently as 1983.

Growth in the light truck market has been led recently by the explosive popularity of SUVs. SUV sales have increased by more than a

factor of ten from less than 190,000 in 1975 (less than 2% of the overall new light vehicle market) to over 3.2 million in 2000 (20% of the market). Over the same period, the market share for vans doubled from 4.5 to 9%, and for pickup trucks, grew from 13 to 17%. Between 1975 and 2000, market share for new passenger cars and wagons decreased from 81 to 54%. EPA estimates that the new light trucks sold in 2000 will consume, over their lifetimes, about 56% of the fuel used by all of the new light vehicles sold in 2000. For model year 2000, cars average 28.1 mpg, vans 22.5, pickups 20.1 and SUVs 20.0.

Sales Fraction by Vehicle Type

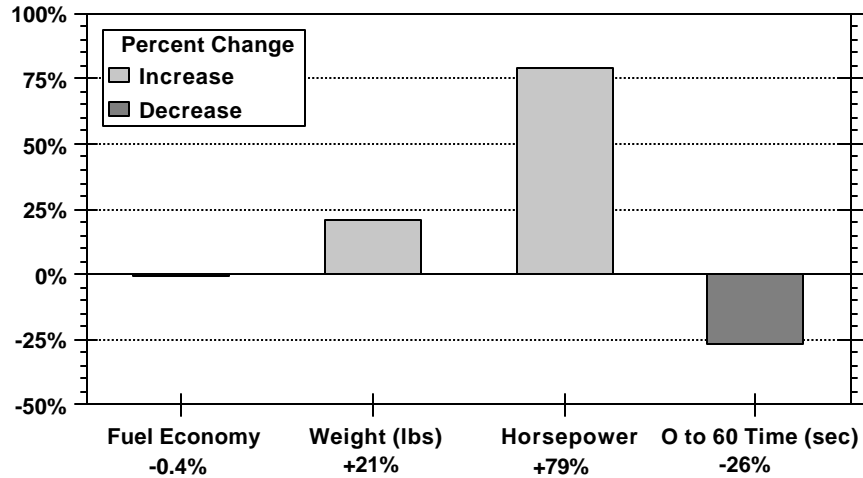


**D. Highlight #3: Fuel Economy is Being Traded for Weight and Power**

More efficient technologies continue to enter the new light vehicle fleet and are being used to increase light vehicle weight and acceleration rather than fuel economy. This year's light vehicles will have about the same average fuel economy as those built in model year 1981. Based on accepted engineering relationships, however, had the new 2000 light vehicle fleet had the same average weight and performance as in 1981, it could have achieved 25% higher fuel economy.

More efficient technologies—such as engines with more valves and more sophisticated fuel injection systems, and transmissions with lockup torque converters and extra gears—continue to penetrate the new light vehicle fleet. The trend has clearly been to apply these new technologies to increase average new vehicle weight, power, and performance while maintaining fuel economy constant. This is reflected by heavier average vehicle weight (up 21% since 1981, up 1% since 1999), rising average horsepower (up 79% since 1981, up 3% since 1999), and lower 0 to 60 mile-per-hour acceleration time (26% faster since 1981, 2% faster since 1999.)

**Percent Change from 1981 to 2000  
in Average Vehicle Characteristics**



**E. Highlight #4: Ford and General Motors are Pledging to Increase Fuel Economy**

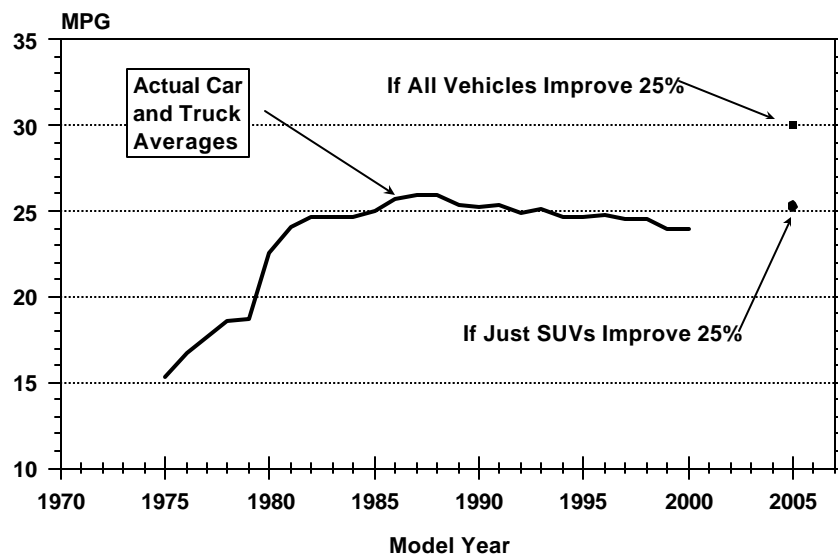
Ford Motor Company recently pledged to increase the fuel economy of its entire line of sport utility vehicle sales by 25 percent by the 2005 model year. General Motors pledged to remain the truck fuel economy leader. If all manufacturers were to voluntarily increase the average fuel economy of their entire light vehicle fleets by 25 percent by 2005, average new light vehicle fuel economy would increase from 24 mpg to 30 mpg.

Ford's pledge would result in an increase in

the laboratory fuel economy of Ford's SUVs from about 18 mpg to about 23 mpg. General Motors, whose SUVs average around 19 mpg, pledged to remain the truck fuel economy leader.

If all manufacturers chose to match Ford's commitment to increase SUV fuel economy by 25 percent by 2005, then average SUV fuel economy would increase from 20.0 mpg to 25.0 mpg, and overall light vehicle fuel economy would increase from 24.0 mpg to 25.2 mpg. Further, if all manufacturers chose to voluntarily increase the average fuel economy of all of their light vehicles by 25 percent, then the average fleetwide fuel economy would rise from 24.0 mpg to 30.0 mpg.

**Effect if Fuel Economy is Improved 25% by 2005**



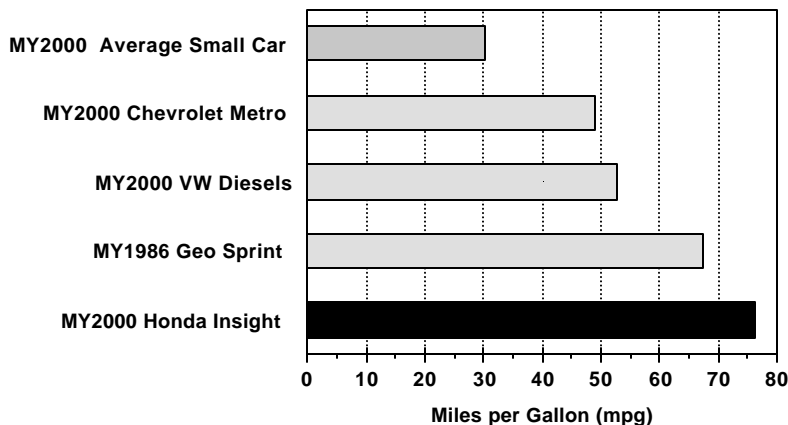
**Highlight #5: The Honda Insight Hybrid is the Most Fuel Efficient U.S. Vehicle Since 1975**

The model year 2000 Honda Insight two-seater is the most fuel efficient vehicle sold in the United States since 1975 and likely the most fuel efficient vehicle ever sold in the U.S. market.

A major development in model year 2000 was the introduction of a gasoline/battery hybrid vehicle. The Honda Insight is the first hybrid car ever sold in the U.S. market. It has a manual transmission and its drivetrain includes a gasoline-fueled engine, a battery used for traction, a regenerative braking system, and an electric motor/generator. The two-seater Insight has a laboratory fuel economy rating of 76.3 mpg, and *Fuel Economy Guide*/label ratings of 61 mpg city and 70 mpg highway.

The Insight's laboratory fuel economy value is about 9 mpg higher than the second most fuel efficient vehicle sold in the United States since 1975, a 1986 Geo Sprint mini-compact. The Insight's fuel economy is also about 25 mpg higher than that for the next most efficient model year 2000 vehicles, the Volkswagen Beetle/Golf/Jetta diesels and a gasoline-powered Chevrolet Metro. Like the Insight, all of these values are for models equipped with manual transmissions. The introduction of the Insight may be the start of a trend towards increasing use of hybrid vehicle technology. For model year 2001, Toyota is introducing in the U.S. market a hybrid vehicle, the Prius. This compact car has a laboratory fuel economy rating of 57.6 mpg, and *Fuel Economy Guide*/label ratings of 52 mpg city and 45 mpg highway.

**Comparison of the Honda Insight with Other High Fuel Economy Vehicles**



**18. US President Elect Bush Likely To Bring US Energy Policy Changes**

President-elect George W. Bush is expected to push for changes in US energy policy that would affect consumers as well as oil and natural gas companies. The highlights of his energy plans include:

**A. Oil and Gas Drilling/Production**

\* Open 1.5 million acres or 8 percent of Arctic National Wildlife Refuge to "environmentally responsible" drilling. Bush said the amount of oil that could be profitably produced from that portion of the Alaska refuge was roughly equal to the 750,000 barrels per day that Iraq ships to the US market.

\* The plan would allocate \$1.2 billion paid by energy companies for federal drilling rights in ANWR to fund research into alternative energy

resources.

\* Bush would also order the Energy Department to review other restricted federal lands and assess which ones could be opened to natural gas drilling.

\* Seek "wake up" legislation for the Energy Department to notify Congress when oil inventories fall below normal levels.

**B. Low Income Energy Funds**

\* Seek legislation to increase funding to help low-income families pay their heating bill whenever oil rises above \$30 a barrel and natural gas prices jump above \$3 per thousand BTU. The additional funding would come from royalty payments energy companies must already pay to the government for production from federal lands.

**C. Emergency Oil Supplies**



\* Modify the newly established 2-million-barrel Northeast home heating oil reserve to be privately managed by distributors instead of by the federal government. The Bush plan would also use the Strategic Petroleum Reserve, which holds some 553 million barrels of crude oil, only for "major supply disruptions."

\* Work with Canada and Mexico to improve cross-border energy trade and pipeline projects. The plan would also "restore credibility" with OPEC nations in the Gulf to ensure an adequate supply of foreign oil, and promote new oil sources from non-OPEC countries in the Caspian Sea bases and western and southern Africa.

#### **D. Alternative Energy**

\* Support tax credits for electricity produced from renewable and alternative fuels such as wind power, biomass and solar power at a cost of \$1.4 billion over 10 years.

#### **E. Environment**

\* Provide "more regulatory certainty" to US refiners seeking environmental permits to expand operations. The plan would also propose legislation requiring electric utilities to reduce emissions of sulfur dioxide, nitrogen oxide, mercury and carbon dioxide.

#### **F. Coal/Nuclear**

\* Fund \$2 billion of research into "clean coal" technologies over 10 years. The plan would also establish tax rules for future decommissioning costs of nuclear

power plants being purchased by other companies.

### **LATIN AMERICA**

#### **19. Bogota Approves Innovative Plan To Ban Private Cars During Peak Hours**

On Sunday, 29 October 2000, after long and careful preparations, the Mayor of Bogota, Enrique Peñalosa, called a referendum to gain citizen support and to establish a long term legal context for a new transportation program which promises to change the face of the city as well as to provide a new model for organizing transport in many world cities.

This was the first such public consultation ever called in the city, and the mayor and many others called it "an outstanding exercise in popular democracy, which give the citizens of Bogota an opportunity to make their voice heard about the destiny of their own city".

The main measure put before the public consultation was a proposal of banning car use during six peak hours daily beginning January 1st, 2015. All cars except taxis will be off the streets from 6:00 a.m. to 9:00 a.m. and from 4:30 p.m. until 7:30 p.m. during work days. The proposal received 51% of the voters' support, against 34% negative votes (the rest cast blank ballots).

#### **A. Annual Car Free Day also approved**

Bogotanos also approved at the same time a second measure establishing an annual Car Free Day, to be held the first Thursday of February of every year beginning the year 2001. In this case, the vote was 63% for versus 26% against. The exceptionally strong support for this measure can be traced to last February 24, when the city held its first

complete Car Free Thursday in which the 98% of the city's activities functioned normally. The Stockholm Challenge Prize for the environment was awarded for this unique community effort.

Mayor Enrique Peñalosa says that with only 30% households presently owning cars in his city, it is still possible to avoid the advanced cities' fate of becoming spaces dedicated to cars rather than people. He emphasizes the futility of trying to solve congestion problems by continuing to build ever more new roads and highways, which it is now well known only bring on yet further traffic increases and urban sprawl. He points to the United States example, where "more than cities with highways there are highways with cities, and yet time lost in traffic jams is doubling every five years".

#### **B. A new transportation model**

The proponents of a car free Bogota during peak hours argued that a society in which most of its members drive dozens and even hundreds of kilometers daily burning non-renewable fuel is not sustainable. They believe that Bogota's new model will not only bring considerable environmental advantages, but significant economic rewards as well. Saving billions of dollars of unnecessary taxes for excessive road construction and maintenance, as well as on fuel and cars, Bogotanos should be better able to attend to priority education, health, culture and other more humanly enriching investments.

Peñalosa believes that the city's mild temperature, averaging 15 °C (57 °F) all year round, high population density (210 inhabitants per hectare) and as-yet low car ownership, are advantages on which this entirely new model of city life can be built.

With 800,000 cars already on the city streets,

traffic would already be at a total standstill if it were not for the traffic restraint program "Pico & Placa" (Peak & License Plate) and new transport projects. There is no way that the city would be able to accommodate the additional 40,000 - 60,000 vehicles that are being added each year and still have a city which respects its architectural and historic traditions and is safe and livable.

The measures that have now been approved by the public consultation and are entering into effect can only be changed by new referendum, which for the moment seems hardly likely to be won by the proponents of unrestricted car use. In the meantime, the city administration is hard at work completing hundreds of kilometers of new cycle paths and pedestrian facilities for daily transport, a new high capacity busway system that is to crisscross the city (Transmilenio), and other programs which constitute the core of the new transportation system which is already in operation.

### **ASIA - PACIFIC**

#### **20. Japan Air Quality Committee Recommends Accelerated Standards**

A report, "Future Policy for Motor Vehicle Exhaust Emission Reduction (Fourth Report)" was issued by the Air Quality Committee of the Central Environmental Council on November 1. Upon completion of this report, the chairperson of the Central Environment Council submitted on the same day a recommendation to the Director-General of the Environment Agency.

The following is the gist of the recommendation. The Environment Agency is scheduled to advance proceedings required for strengthening the standards in accordance

with the Recommendation.

Furthermore, it is scheduled that the Central Environment Council will continue its deliberations on "Future Policy for Motor Vehicle Exhaust Emission Reduction."

**[Main Points of Recommendation]**

**o Achievement of New Long-Term Target for Diesel-Powered Motor Vehicles by Year 2005**

With regard to the new long-term target which was scheduled to be achieved by around the year 2007 in the third Recommendation, the time allowed for achievement will be shortened by two years. That is to say, the new long-term target is scheduled to be achieved by 2005. In respect to specific target values of the new long-term target, which was believed to be approximately half of the new short-term target, they will be decided by the end of fiscal year 2001 as the target time. When determining these target values, taking into consideration the assessment results of risk of diesel exhaust particles, we are studying to further reduce particulate matter to a point below its half level.

**o Reduction of Target Value for Permissible Limit of Sulfur Content of Diesel Fuel from Current Level (500ppm) to 50 ppm by End of Year 2004**

It is scheduled that the target value for permissible limit of sulfur content of diesel fuel be reduced from the current level (500ppm) to 50ppm by the end of 2004. Moreover, request shall be made that the sulfur content will be further reduced in the future. Furthermore, as for other fuel properties, if improvements in fuel properties are necessary for exhaust emission control technologies for motor vehicles.

**o Achievement of Reduction Target for Special Diesel-Powered Motor Vehicles by Year 2003 and Achievement of Revised Target Value of Diesel Smoke of 40% by the Same Time**

As regard the reduction targets of nitrogen oxides, hydrocarbons, carbon monoxide and particulate matter, the time allowed for achievement will be shortened by one year. That is to say, the reduction target is scheduled to be achieved by 2003. In addition, the target value of smoke to be achieved by the same time is revised to 40%.

**21. Japan's Mitsubishi Links With Daimler Chrysler On Fuel Cell Cars**

Mitsubishi Motors Corp , Mitsubishi Heavy Industries Ltd and DaimlerChrysler AG plan an alliance on development and mass production of fuel cell vehicles according to a Japanese newspaper. The three companies are expected to sign an agreement early next year for the joint development of fuel cell vehicles, the business daily Nihon Keizai said. The three would share development cost of more than 100 billion yen (\$931 million) and aim to jointly develop and mass produce the vehicles within four or five years, the daily said.

DaimlerChrysler holds a 34 percent stake in Mitsubishi Motors.

**22. Following Riots In Delhi, Government Backs Down On Pollution Ban**

Authorities in the Indian capital ordered schools to shut for two days after rampaging mobs of industrial workers protesting against pollution controls sparked widespread violence according to state radio. One person

was killed while 75 people, including 35 policemen, were injured in the violence that shook several parts of the sprawling capital Delhi, All India Radio said.

Traffic ground to a halt as thousands of angry demonstrators protested a government order to close polluting industrial enterprises in the city's residential areas and relocate them in response to a Supreme Court order.

Police fired on violent mobs and used batons to control the protesters. Authorities deployed anti-riot police to control arsonists who set fire to public property.

The protest was spearheaded by the Small Industries Action Front against the Supreme Court order which called for the sealing of polluting factories in residential areas and cancellation of their licences.

There are an estimated 50,000 industrial units in Delhi spewing huge clouds of smoke into the city which is considered one of the most polluted in the world.

The protests, which mainly hit industrial areas in the north-east and north-west quarters of the city of more than 10 million people, blocked traffic across the capital after a general strike call given by several industry associations.

Protesters deflated tires, burned vehicles and pelted security men with stones. They torched a fire engine and damaged two others which had been called to two government offices set ablaze by a mob, fire brigade officials said.

Eight buses were burned, police said.

Shortly afterward, India's federal government backed off, announcing changes that could give hundreds of firms a reprieve from closure.

"The government has agreed, in principle, subject to observance of safeguards in respect of pollution norms, to redefine household industries," Indian Urban Development Minister Jagmohan told the upper house of parliament. Any move to allow smaller factories to continue operating out of residential areas could save as many as 60 per cent of factories slated for closure under pollution regulations, Business Standard quoted Vijay Kumar Malhotra, a senior politician with the ruling Bharatiya Janata Party, as saying.

The minister did not detail the changes, but earlier the Business Standard newspaper said the government would change the definition of "household industry" in the Delhi Master Plan to allow units with less than 10 people to operate in residential areas.

"These (pollution) norms pertain to the number of persons who can work in a household industries, the power that can be sanctioned and the area that can be used," Jagmohan said.

The Supreme Court rejected a request from the city government to go-slow on implementing its orders and said the capital could not be held to ransom by hooligans.

Jagmohan said the government would amend the master plan if necessary to acquire more land for relocation of industries to industrial areas. He said the federal government would ask the Supreme Court to give a little more time for relocation.

### **23. Nepal To Ban Old Vehicles To Check Air Pollution**

Nepal's cabinet has approved a move to ban pre-1980 vehicles from the streets of the Himalayan kingdom next year to combat growing air pollution, a government official has

announced. "All vehicles manufactured before 1980 will not be allowed to run in the Kathmandu Valley and other towns of Nepal from November 15 next year," according to Sherjung Karki, an environment ministry official. The pristine air in the impoverished landlocked nation has become increasingly polluted from vehicle emissions, authorities say.

Nearly a quarter of the 160,000 vehicles in Nepal are estimated to be more than 20 years old, officials said. Last year Nepal banned cheap auto rickshaws in Kathmandu because of pollution from diesel exhaust fumes. Now, many sleek Japanese and Chinese "micro buses" ferry passengers in the capital of Nepal. Nepal does not make vehicles and imports them mainly from India and Japan.

#### **24. China Threatens To Shut Polluting Firms By Year-end**

China is threatening to shut down up to 16,600 firms if they fail to meet environmental standards by the end of the year, a State Environmental Protection Administration official announced. But the official said the environmental body had little power to enforce the standards and local governments were responsible for halting production at companies which failed to comply. The central government frequently has problems getting local governments to carry out policy decisions, especially when companies they own, and collect crucial taxes from, are the targets.

"Governments will close those firms not meeting standards after December 31 according to the law and ask them to upgrade their equipment," the environment official said. "Once they reach the standards, they can open again."

In 1996, the State Council decided to give

238,000 firms producing industrial pollution four years to clean up their acts, the official said. By the end of September, 93 percent had met the standards, which cover sulphur dioxide emissions and other air pollution such as smoke and dust, as well as various types of water pollution, he said.

Some 17,925 of the firms were classified as "serious polluters", responsible for 65 percent of China's air pollution, the official said. "Most of these firms are involved in heavy industry in the western part of the country, such as the metallurgical, coal and chemical industries," he said. "China's west has long been regarded as a heavy industry base and most of the firms were established during the 1950s and 1960s. Their equipment is old-fashioned."

China put the air pollution standards into law on September 1, giving the government more teeth to punish violators, the official said.

#### **25. Automotive Developments in China**

A new, compact Buick model, Sail, rolled off the assembly line at the Shanghai-GM Automobile Co., Ltd. in early December. Powered by a 1.6 liter engine and a five-speed manual transmission, the SL model comes with four-wheel ABS and dual safety air bags with a projected base price of around ¥10,000 (\$12,000). The Sail consumes 6 liters of gasoline for every 100 km and the fuel injection and catalytic converter systems ensure that it meets the Euro II emission standards. The Sail, a transliteration from the Chinese characters Sai Ou, which literally means "better than Europe," is based on GM's Opel Corsa. Shanghai-GM will offer three different models of the Sail: SL, SLX and SLXAT. Up to now the company has already received more than 10,000 orders. Over 50 contracted dealers in China are now taking

orders.

The automotive joint venture between Shenyang Aircraft Industry Group Corp. and Hino of Japan has been approved and licensed by the Ministry of Foreign Trade and Economic Cooperation, to produce large luxury and mid-level buses. The new joint venture plans to start production in 2003, with an annual capacity of 3,500 units of buses and 5,000 chassis.

The development goal for the "Tenth Five-Year Plan" of Changchun, China's "auto city," is to attain an annual production capacity of 1 million motor vehicles by 2005 and a sales income of 100 billion yuan of automotive products.

Of the 50 richest entrepreneurs in mainland China, three are in the automobile industry, according to a recent Forbes magazine report. The three entrepreneurs are Li Shufu, ranked No. 32, president of Geely Group Corp. in east Zhejiang Province; Lu Hanzhen, No. 47, Jinlong Group Corp., also in Zhejiang Province; and Yin Mingshan, No. 50, president of Lifan Honda Co. in Chongqing. All of the three made their fortunes in motorcycle manufacturing. Li Shufu has entered into car manufacturing earlier this year.

The first 100 units of "Lingyang (Gazelle)-Century Star" rolled off the assembly line at Chang'an-Suzuki. The Lingyang is powered by a Suzuki engine and equipped with double air bags and ABS system. The base price of the new model is 119,000 yuan.

The Santana 2000GSI-AT, Shanghai-VW's new model with automatic transmission, was released to the market earlier last month. The 2000GSI-AT has a national retail price of 187,500 yuan and will be distributed through the newly formed Shanghai Volkswagen

Automobile Sales Co., Ltd.

The Dongfeng Cummins B-series 6BTAA diesel engine was recently developed jointly by the DMC Technical Center and the Dongfeng Diesel Engine Factory and will be introduced to the market soon. The 200 horse power engine is to be used on 10-, 12- and 15-ton trucks as well as on 9-10 meter buses.

The municipal government of Yantai in east Shandong Province will build four propane gas stations in support of public transportation. The city plans to convert public buses in the inner city districts into propane-propelled by April 2001. All large and medium diesel buses and long-distance buses between districts will be converted into propane propelled and put into operation by the end of October next year.

## **26. China To Spend \$24 Billion On Environment Over 5 Years**

China will invest 200 billion yuan (\$24 billion) in environmental protection efforts in the next five years, the official Xinhua news agency has announced.

Two decades of breakneck economic development have ravaged China's environment. Five of the world's 10 most polluted cities are located there, and acid rain falls on a third of the nation.

Director of the State Environmental Protection Administration Xie Zhenhua was quoted as saying China would fund 1,200 key environmental projects during the period from 2001 to 2005.

He said plans included reducing emissions, improving environmental quality and reining in ecological deterioration.

China has spent around 346 billion yuan on

environmental protection during the last five years, accounting for 0.93 percent of gross domestic product, the agency said. (\$1=8.277 Yuan).

**27. Japan Government and Residents Reach Agreement Over Pollution Lawsuit**

The government and victims of air pollution in a western Japanese city have agreed to settle a 12-year-long lawsuit out of court with the state promising to take steps to curb diesel gas emissions, according to a government official.

Residents of Amagasaki had filed a lawsuit with a local court in 1988 seeking cash compensation and a cutback in poisonous gases emitted by diesel vehicles. In January this year, the court ordered the central government to pay damages of 210 million yen (\$1.90 million), saying the residents' health problems were caused by diesel gases. Both sides appealed the verdict.

Under the agreement, the residents will abandon their damages payment and instead agree to have the state take specific steps to curb emission of diesel gases, a Construction Ministry official said.

"We were looking for ways to reduce such emissions and that was in line with what the

residents wanted," the official said. "We were able to settle this in a good fashion."

The residents also hailed the agreement as a step forward in resolving the issue of air pollution.

"I think the settlement recognizes the victims' situation and told the government to take effective steps," said Mitsuko Matsu, the representative of the plaintiffs.

The development comes just days after another local district court in the central Japanese city of Nagoya ordered the central government and 10 companies to pay more than \$2 million in compensation to local residents who reported damage to their health from air pollution.

With pressure to alleviate pollution mounting, Japan's Environmental Agency said in September it would introduce by 2005 new rules aimed at sharply cutting pollutant emissions from diesel vehicles.

**28. Recent Developments in India**

**A. Current Air Quality Situation**

Air pollution levels in India are among the worst in the world for particulate as indicated in the following tables.

Percentage Violation of National Ambient Air Quality Standards in Delhi					
Parameter	1995	1996	1997	1998	1999
Sulfur Dioxide*	7.0%	2.4%	0.4%	0.0%	0.0%
Nitrogen Dioxide*	21.0%	35.5%	21.8%	20.7%	14.8%

Suspended Particulate Matter*	95.1%	97.2%	98.4%	97.0%	96.0%
Respirable Particulate Matter (PM-10)*	-	-	89.0%	88.0%	86.7%
Carbon Monoxide **	70.8%	86.0%	94.3%	86.3%	87.4%

\* = based on a 245 hour standard

\*\* = based on an 8 hour standard

Annual Average Concentration of Particulate in Various Cities In India ( $\mu\text{g}/\text{m}^3$ )				
State	City	PM10	SPM	% PM10 in SPM
Gujarat	Ahmedabad (R)	165	312	53
Andra Pradesh	Hyderabad (R)	106	223	48
	Hyderabad (I)	164	370	44
	Vishakhapatnam (R)	74	193	38
	Vishakhapatnam (I)	69	145	48
Tamil Nadu	Chennai (R)	75	77	97
Uttar Pradesh	Kanpur (R)	342	337	72
	Dehradun (R)	152	340	45
Delhi	Delhi (R)	206	351	59
	Delhi (Traffic Intersection)	216	418	52
Maharashtra	Mumbai (R)	115	247	47
West Bengal	Calcutta (R)	138	268	52
NAAQS	Industrial Area	120	360	
	Residential Area	60	140	



**B. Vehicle Population**

well as in the capital, Delhi, is dominated by two wheeled vehicles as shown below.

The vehicle fleet in the country as a whole as

Vehicle Type	Number of Vehicles (Millions)	
	India	Delhi
Two Wheelers	18	1.824
Cars, Jeeps, Taxis	3.6	0.688
Buses	0.4	.029
Goods Vehicles	1.9	.139
8-Wheelers, Tractors, Other3.1		
Autorickshaws		.080
Total	27	2.76

**C. New Vehicle Standards**

Category	Standards Effective			
	1991	April 1, 1996	1997	April 1, 2000
<b>Petrol Vehicles (gms/Km)</b>				
<b>Two-Wheelers</b>				
CO	15-35	4.5		2
HC	36079	3.6#		2.0#
<b>Three-Wheelers</b>				
CO	40	6.8		4
HC	15	5.40#		2.0#
<b>Passenger Cars</b>				
CO	14.3-27.1	8.68-12.40	4.34-6.20	2.72

Category	Standards Effective			
	HC	2.0-2.9	3.0-4.36#	1.5-2.18
<b>Diesel Vehicles (g/kWh)</b>				
<b>GVW&gt;3.5t</b>				
CO	14	11.2		4.5
HC	3.5	2.4		1.1
NOx	18	14.4		8
PM				0.36
<b>GVW&lt;3.5t</b>				
CO	14	11.2		4.5 or 2.72 g/km
HC	3.5	2.4		1.1
NOx	18	14.4		8
or				
HC+NOx (g/km)				0.97
PM				0.61 or 0.14 g/km

# = HC+NOx

**D. Fuels Requirements**

The current plans with regard to fuels' requirements are summarized below.

FUEL	METROS	TAJ TRAPEZIUM	STATE CAPITALS	ENTIRE COUNTRY
<b>Low Sulfur Diesel</b>				
Up to 0.5%	April 1, 1996	April 1, 1996		
Up to 0.25%		September 1, 1996		September 1, 1999

FUEL	METROS	TAJ TRAPEZIUM	STATE CAPITALS	ENTIRE COUNTRY
<b>Low Sulfur Diesel</b>				
Up to 0.5%	April 1, 1996	April 1, 1996		
<b>Low Lead Petrol (0.15 g/liter)</b>	June 1, 1994	September 1, 1995		December 1996
<b>Unleaded Petrol (0.013 g/liter)</b>	April 1, 1995	April 1, 1995	December 31, 1998	March 31, 2000

### E. In Use Vehicles

With regard to in use vehicles, all 4-wheel petrol fueled vehicles are required to meet a standard of 3.0% CO when measured at idle; 2 and 3 wheel vehicles must meet a standard of 4.5% CO. With regard to diesel vehicles, all but agricultural tractors must meet a smoke density requirement of no more than 75 Hartridge Smoke Units (HSU) when tested at full load, 70% maximum RPM or 65 HSU when tested by the Free Acceleration test.

Recent steps to reduce vehicle emissions include the following:

**Unleaded Petrol** - As of September 1998, only unleaded gasoline has been sold in Delhi with the result that there has already been a reduction of lead in the air by more than 60%. Industry has also been asked to assure that benzene emissions do not increase and to constrain the benzene content in unleaded fuel to 5%, the level proposed for leaded gasoline in 1996. By 2000 the level should be reduced to 3%. Leaded petrol was banned throughout the country by April of 2000.

**Other Fuel Parameters** - The Supreme Court of India has directed the Ministry of

Petroleum and Natural Gas (MoP&NG) to ensure that the National Capital Region of Delhi (which includes the national capital city of Delhi and bordering districts of adjoining states) is supplied with

- petrol with a maximum sulphur content of 0.05 % by 31<sup>st</sup> May, 2000
- petrol with a maximum benzene content of 1% by 31<sup>st</sup> March 2001
- diesel with a maximum sulphur content of 0.05% by 30<sup>th</sup> June 2001

Another debate is focused on introducing CNG on the existing fleet of buses since the Supreme Court has ordered that all buses more than 8 years old are to run on CNG in Delhi from April 1, 2000. From 2001 expectations are to run the entire fleet on CNG.

### Emission Standards For New Vehicles -

The Ministry of Surface Transport (MoST) of the Indian Government has extended the "Bharat Stage II" emission standards (equivalent to Euro II) for passenger cars to the other metro cities. It may be recalled that the Euro II equivalent emission standards for passenger cars were enforced in Delhi under an order of the Supreme Court from 1<sup>st</sup> April 2000. According to the notification, the dates

of enforcement will be

- Mumbai from 1<sup>st</sup> January, 2001
- Calcutta from 1<sup>st</sup> July, 2001
- Chennai from 1<sup>st</sup> July 2001

The date of enforcement for Mumbai is in keeping with the order of the Mumbai High Court.

However, for Calcutta, the Department of Environment of the West Bengal Government has issued an order advancing the date of implementation of the "Bharat Stage II" standard to 1<sup>st</sup> November 2000 for the Calcutta Metropolitan Area. Since the availability of fuels of desired quality is a prerequisite for complying with the new standards, the West Bengal notification confirms that both petrol and diesel with a maximum sulphur content of 0.05% will be available in Calcutta from 1<sup>st</sup> November 2000.

**2-T Oil For 2 Stroke Engines** - Premixed oil dispensers have been installed in all the petrol filling stations of Delhi and the sale of loose 2T oil has been banned since December 1998. Further, the Ministry of Environment and Forests has required the use of low smoke 2T oil since April 1, 1999.

**Phase Out of Old Vehicles** - Since December 1998, commercial vehicles older than 15 years have been phased out.

Steps taken to date have begun to reduce pollution in Delhi although with the exception of ambient lead, the reductions have been very modest. Therefore additional control measures are under discussion, including:

- Improvement of public transport
- Optimization of traffic flow and improved traffic management

Upgraded I/M system

Phase out of gross polluters

Additional fuel quality improvements including lower benzene and aromatics in gasoline, reformulated gasoline, lower sulfur in diesel fuel

Euro 4 standards by 2005

Restrictions on 2 stroke engines, OBD introductions

Stopping fuel adulteration

Stage 1 Vapor Recovery systems

**SIAM road map** - Earlier, the Society of Indian Automobile Manufacturers (SIAM) submitted to the Government a road map for progressive reduction in emissions.

-Bharat Stage II compliant four wheeled non-commercial vehicles, light commercial vehicles and city buses in nine principal cities within six months of notification if fuel with 0.05% sulphur is made available.

-Passenger cars meeting Euro III equivalent standards from 1<sup>st</sup> April 2004 and Euro IV equivalent standards from 2007. This would be subject to availability of petrol with a maximum sulphur content of 150 ppm and diesel with a maximum sulphur content of 350 ppm.

-For commercial vehicles, SIAM has offered to comply with Bharat Stage II standards from 1<sup>st</sup> April 2003 for the whole country subject to availability of diesel with 0.05% sulphur. It has proposed to skip the Euro III stage and go directly to Euro

IV stage by 2008 provided diesel with a maximum of 50 ppm sulphur is available.

-For two wheelers, SIAM has proposed emission standards of 1.5 g/km for CO and 1.5 g/km for HC+NO<sub>x</sub> from 2005 (a 25% reduction from the current 2000 standards). It has suggested targets of 1.25 g/km for both of the pollutants in 2009 but wants a review of these standards in 2005. Similar levels of reduction are proposed for three wheelers.

**Alternate Fuels** - In July 1998, the Supreme Court had ordered the replacement of all 3 wheeled auto-rickshaws, registered in Delhi before 1990, by new ones running on CNG. The auto-rickshaw is a popular form of public transport and is used as a 'flag-down taxi' in most of the Indian cities. Bajaj Auto Ltd., the largest manufacturer of these vehicles in India, has launched a new CNG operated 3 wheeled vehicle in Delhi. Over 2,500 of these vehicles are already on the road and the company expects to replace all the 18,000 pre-1990 vehicles by end of March 2001. The new auto-rickshaw is powered by a 175 cc single cylinder, air cooled, four-stroke engine as against a 150 cc two-stroke engine used in the older petrol versions. Thanks to the low price of CNG in Delhi ( Rs. 11.35 per kg against Rs 28 per liter of petrol) and superior fuel efficiency of the four-stroke engine, the fuel cost of the new vehicle is less than one third that of its petrol two-stroke predecessor.

As per the Indian Motor Vehicles Act, use of LPG as an automotive fuel has, so far, not been legally allowed. The main reason for this is that it is sold at a subsidized price primarily as a kitchen fuel by the government controlled oil industry. A few years ago, the LPG sector was opened to private operators to import,

bottle and sell the gas to industrial and commercial users without any subsidy. Since LPG is considered as an environmentally cleaner fuel, the Indian Parliament has recently passed a bill seeking to remove any restrictions on use of LPG as an automotive fuel. The Government is now expected to issue the necessary notifications and safety standards.

## 29. Tokyo Continues To Push Hard on Diesels

The ordinance dealing with diesel emissions in Tokyo is now being discussed at the municipal assembly. The main contents are

1. Prohibition against driving diesel vehicles which do not satisfy Tokyo Metropolitan Government (TMG) emission standards for PM (see Table below). This will essentially require existing vehicles to install diesel particulate filters (DPF).
2. Require an automobile management plan for the environment. This will require companies using 30 or more vehicles to submit an automobile management plan for the environment and to report the results. The plan includes reducing the excessive use of automobiles, substituting lower emission vehicles, and so on.
3. Require automobile dealers to prepare information which explains to car purchasers the environmental performance information of the car including the state of emission, noise, and so on.
4. Require drivers to stop idling engines when parking and stopping

the cars. Require parking managers to disseminate "stop idling" for users.

lower emission vehicles such as CNG for more than 5% of total vehicles.

5. Require large companies using 200 or more vehicles to introduce

6 Prohibit the use the fuel containing heavy oil for on and off road use.

Vehicle type	Testing mode	Emission standards	
		From: Oct 2003 To: 2005	From 2005
Diesel Vehicles --GVW 1700kg or less	10-15 mode	0.08g/ km	0.052g/km
Diesel Vehicles --GVW 2500kg or less more than 1799kg	10-15 mode	0.09g/km	0.06g/km
Diesel Vehicles --GVW more than 2500kg	Diesel 13 mode	0.25g/kg	0.18g/km

**GENERAL**

most vulnerable developing countries.

**30. United Nations, World Bank Approve Environment Grants**

The United Nations and World Bank's Global Environment Facility (GEF) have approved \$153.7 million in grants for 14 environmental projects ranging from assessing the impact of climate change to harnessing wind power in China. Other projects included in the package include reducing shrimp trawling's environmental damage and reducing greenhouse gas emissions. Along with other financing, the 14 projects will cost about \$461.2 million.

GEF, jointly run by the United Nations Development Programme, the United Nations Environment Programme and the World Bank, provides grants aimed at helping developing countries protect the global environment.

Among the projects approved was a \$7.85 million grant to scientifically assess climate change impacts and adaptation options for the

The GEF also agreed to help China, the world's third largest energy consumer, to harness wind power and reduce greenhouse gas emissions into the atmosphere. The \$12 million grant to China is part of a larger a \$98 million project. The remaining funds will be provided by the Asian Development Bank, and provincial power companies and banks in China.

**31. Climate Clippings**

Negotiators are struggling in The Hague this week to hammer out rules on implementing a pact sealed in Kyoto, Japan, three years ago that set targets for cutting greenhouse gases such as carbon dioxide implicated in climate change. This has focused attention on the issue leading to the release of several reports.

**A. IEA Sees CO2 Emissions Rising Well Above Targets**

Carbon dioxide (CO2) emissions which contribute to climate change will grow at a

rate of about two percent a year from now to 2020, despite efforts to reduce them, the International Energy Agency has announced.

The IEA presented its World Energy 2000 Outlook at the current United Nations Climate Change conference held in the Hague.

World energy use is expected to grow at a similar rate, with fossil fuels providing 90 percent of the world's primary energy, the IEA said.

"These projections show how much more needs to be done in the energy sector if developed and transition countries are to meet their commitments to limit greenhouse gas emissions under the terms of the Kyoto Protocol," the Agency said.

Most of the increases will come in developing countries, which will account for more than two thirds of the rise, while power generation itself would contribute for one third of total CO2 emissions rise, it said.

The IEA's forecasts also showed that at current growth rate, North American emissions would be 42 percent higher than the Kyoto targets by 2010, while in the OECD-Pacific region they would be 29 percent higher, and 18 percent above target in Western Europe, the IEA said.

Industrialized nations committed to cut their emissions under a plan agreed in Kyoto in 1997, but none of them have yet legally bound themselves to the targets.

On emissions trading, proposed as a means of encouraging nations to cut CO2 emissions, the IEA said that trading could lower the cost of meeting Kyoto obligations by between 29 and 63 percent, depending on each country's domestic circumstances.

"Trading would produce major revenue flows for Eastern Europe and the Former Soviet Union which would be the main sellers of emission credits," it said.

Under the system proposed, each nation which had emissions below target, could sell a "credit" representing the difference between emissions target and actual emission levels, thus earning money for being below target.

The IEA added that a concentrated effort in the transport area could stabilize transport emissions after 2010 but not before, while in the power sector, only small reductions could be achieved by introducing emission reduction programs.

"Because of the long term nature of the power sector, none of them can be put in place rapidly," it said.

### **B. Global Warming Seen Doubling Heat Deaths by 2020**

Deaths from heat waves in big cities worldwide are expected to double over the next two decades if nothing is done to curb global warming, the United Nations weather agency announced.

Small increases in global temperatures due to growing amounts of "greenhouse gases" are amplified in big cities, it told a news briefing on the sidelines of U.N. negotiations to reach a global strategy against climate change.

In the 15 biggest US cities an average of 1,500 people collapse and die from heat waves each year, a significant increase over the past decade, it said, without giving previous comparative figures.

Last year, several hundred people alone died in one US heat wave in the northeast and

Midwest.

The death toll from heat waves in those big US cities is expected to balloon to 3,000 to 4,000 by 2020, it said.

Other cities around the world expected to see burgeoning deaths from heat include Toronto, Shanghai, Athens and Madrid, it said.

The problem is expected to be more acute in sprawling so-called mega-cities in poor countries, which have more difficulty informing people about how to prevent heat stroke and where infrastructure is lacking.

In the United States, deaths from hurricanes have been slashed drastically due to early warning systems and evacuation procedures, but in poor countries the effects can be devastating, leading to hundreds or thousands of deaths.

Researchers fear the same equation would hold true with respect to heat waves, it said.

Carbon dioxide and other gases, scientists say, will boost global temperatures by 1.5 to 6.0 degrees Centigrade (2.7 to 10.8 degrees Fahrenheit) during this century.

U.N. scientific experts say a warmer world is likely to spread disease in tropical regions, cause sea levels to rise and increase the rate of severe storms.

Land surface temperatures are showing the highest rises in winter and at latitudes greater than about 50 degrees, the WMO said.

Globally, the 1990s was the warmest decade on record and 1998 the hottest year.

### **C. Climate Talks May Be Moot Amid Green Power Advances**

Judging from the sound and fury emanating from the global climate talks in the Hague this week, the world's politicians may be living up to their reputation for being ten years behind the times.

While their concerns about global warming are justified, advances by private business in making fuel cells and other green technologies financially viable could make all the political hand-wringing redundant before too long, analysts say.

"If some of the thinking about technological advancements is even approximately correct, its going to absolutely swamp the levels of carbon reductions talked about at the Hague," said Thomas Feiler, director of the environmental think-tank Rocky Mountain Institute (RMI) in Colorado.

Experts say that emissions are already set to slow down as the majority of new power generation being installed in the US, the leading polluter in the world, uses cleaner-burning natural gas, instead of notoriously dirty coal.

But more radically, fuel cells, a developing technology which produces clean energy using hydrogen, should be powering homes within three years and could be commonplace in automobiles by the end of the decade.

These, and other technological advances were unforeseen three years ago when industrialized nations made their first concerted effort tackling global warming in the Kyoto Protocol.

And while they may not sweep the globe as dramatically as some predict, they could put enough of a dent in carbon emissions to help countries leap frog the proposed cutbacks, and avoid the whole hurdle of attaining



consensus.

The Hague talks have stalled, largely because of massive differences between the European Union and the United States whose chief negotiator was hit in the face with a custard pie in protest against the US' hard-line

And only 30 of the 185 industrialized countries that agreed to cutbacks under Kyoto have legally bound themselves to the treaty.

While world leaders appear to be balking in the climate change talks, private businesses are showing signs they may pick up the slack.

"The fact that we've got negotiations going on here sends a signal to business," said Robert Watson, chair of the United Nations sponsored Intergovernmental Panel on Climate Change. "And the fact is, business may lead."

Those businesses include manufacturers, power and automobile companies, and any industry that is energy intensive enough to gain from increased efficiency.

"It is surprising, but there are times when business and environmental interests align," said Mary McNutt, spokeswoman for Greenpeace in Washington.

Energy analysts point to companies like Southwire Corp., Dow Chemicals, International Business Machines, Polaroid. Johnson & Johnson which made efforts in recent years to improve their energy efficiency not for the good of the environment but because they know it makes business sense.

Southwire, a leading manufacturer of rod, cable, and wire, roughly halved its energy use per pound of product in six years, while Dow began reducing improving its energy efficiency at a number of chemical plants in

Louisiana as far back as the 1980s.

The push toward more efficient energy remains, due in part to a nearly two-year spike in crude oil prices, which has trickled down in the form of higher heating, manufacturing, and transportation bills.

"The leading companies are beginning to understand that eliminating waste will not mean sharing sacrifice, but will mean distributing dividends," said Feiler. "Every dollar saved in waste goes directly to the bottom line."

And businesses are more willing to invest in developing newer trends that promise even more efficiency.

Fuel cell technology, which dates back to a Scottish inventor in the 1800s, has been held back in its development stage as research work was stymied by a lack of investment due to widespread acceptance of fossil fuels.

But recently, fuel cell companies like Ballard Corp., which is making advancements in automobiles, and H Power Corp., which is focusing mostly on power generation, have come into the limelight as they bring forward products that emit little to no waste.

Fuel cells are already being tested by power companies for use in homes, and could be available within two years, analysts say.

Stationary fuel cells are able to tie into the existing electrical grid, powering homes and feeding excess power into the system, reducing demand on power plants.

There remain however, some engineering hurdles which make it unlikely that fuel cells will be able to crack the automobile market any sooner than seven to 10 years, experts say.

"We're going to see a real washout of the garage scale fuel cell companies, and we're going to start seeing world class manufacturing organizations starting to take a leadership role in the industry," said Feiler of RMI.

#### **D. EU To Propose "Generous" Aid For Renewable Energy**

European Union Competition Commissioner Mario Monti has announced that he will put forward proposals to allow generous state aid and tax incentives to promote renewable energy schemes.

"Renewable energy is a priority for the (European) Community," Monti told the European Parliament's Economic and Monetary Affairs Commission. Under his proposals, he said, investors would have a guarantee that their full investment would be recovered.

The proposals, which still have to be approved by the EU's executive Commission, would take effect from January 1 for a seven-year period.

Monti generally backs strict limits on the aid that EU governments can give to industry. But EU Energy Commissioner Loyola de Palacio has said she considers financial support to

renewable energies of the utmost importance. The recent surge in oil prices has also highlighted the advantages of diversifying energy sources.

Monti said his proposals would permit EU governments to grant aid to investment in renewable energy schemes at a rate of 40 percent of admissible cost, with a further 10 percent permissible for small and medium businesses.

Member states would also be able to grant aid to cover the difference between the cost of producing renewable energy and the market price for electricity, he said.

"This aid will be allowed until the whole investment is amortized," he said.

Member states could also grant aid to running costs of renewable energy projects for five years, decreasing every year.

"These are very generous terms in terms of state aid but the objective is justified because we wish to promote renewable energies," he said.

Monti also held out the possibility that EU governments could offer temporary tax cuts or exemptions to foster renewable energy schemes.