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Australia Fuel Quality Policy and Standards

The Commonwealth of Australia is ranked as the world's 13th largest economy and is comprised of 22 million people mostly (over 60%) living in the major urban centers. This "island continent" with an area covering 7.6 million km² encompasses diverse terrain and habitats, climate, and natural resources. Australia's economy has grown at an average annual rate of 3.6% over the past 15 years, higher than the OECD average, providing the country with the 11th highest per capita GDP.

The Australian Department of Environment, Water, Heritage and Arts develops and implements national policy and programs on fuel quality standard through the Motor Vehicle Environment Committee. The Australian fuel quality standards mostly align with those of the European Union set in 2006. Two gasoline grades are generally marketed, unleaded petrol (ULP) with RON91, and premium unleaded petrol (PULP) with RON95. Lead replacement petrol (LRP) is being phased-out with less than 5% market share. Gasoline consumption is presently just over 325,000 barrels per day.

The current sulphur limit for ULP is set at 150 ppm max. Since January 2008, the sulphur limit for PULP was reduced to 50 ppm max. At this time, the Motor Vehicle Environment Committee does not plan to further lower gasoline sulphur levels.

The state governments retain responsibility for the control of gasoline vapour pressure to take account of regional, climatic and seasonal conditions. The cities of Perth, Adelaide and Brisbane limit summer gasoline Rvp to 67 kPa. In Melbourne, the specification is set at 62 kPa limit. The Sydney metropolitan region established in 2004 a summer monthly volumetric average volatility limit of 62 kPa, with a maximum limit of 64 kPa for any individual batch production of gasoline. Other gasoline standards for Australia are given in Table I.

The majority of Australia's oil production is from mature fields located in New South Wales and Queensland. Imports are 25% of the total petroleum demand, and are expected to grow to over 35% by 2015. There are seven major refineries in operation that produce about 590,000 barrels per of gasoline, diesel and jet fuel and other refined products. While upgrades will

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take place as fuel quality standards advance over time, refining capacity expansions are unlikely.

Ambient air quality standards in Australia are implemented through the National Environment and Protection Measure (NEPM). The air standards are set for six criteria pollutants: carbon monoxide, nitrogen oxides, ozone, sulphur dioxide, lead and particulate matter. These standards generally conform to international guidelines. The NEPM includes requirements to monitor and report performance in meeting the criteria pollutant standards. Except for particulate matter and occasional ozone exceedances, most cities meet the standards. A review of the NEPM is currently underway.

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Table I – Current Select Gasoline Standards for Australia

Specification Name	Standard	Test Method
RON, min (two grades)	91/95	ASTM D 2699
Sulphur, ppm, max	150/50	ASTM D 5453
Lead, g/l, max	0.005	ASTM D 3237
Benzene, vol.%, max	1	ASTM D 5580
Aromatics, vol.%, max	45	ASTM D 1319
Olefins, vol.%, max	18	ASTM D 1319
RVP @ 37.8°C, kPa, max	(Each state sets limit)	
Oxygen, wt.%, max	2.7	ASTM D 4815
Oxygenates, Ethanol vol.%, max	10	ASTM D 4815
Oxygenates, Ethers vol. % max	1	ASTM D 4815
Distillation		
T ₁₀ ^{°C} , max	No standard	
T ₅₀ ^{°C} , max	No standard	
T ₉₀ ^{°C} , max	No standard	
FBP, °C, max	210	

Source: International Fuel Quality Center, 2010
Australia Motor Vehicle Environment Committee

CLEAN AIR THROUGH CLEAN FUELS

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SPECIAL REPORT

Fuel Ethers Outlook Robust

Global fuel ethers demand is projected to grow over the next five years, largely driven by expansion in the Asia-Pacific region, according to a recent study by Hart Energy Consulting's World Refining and Fuels Service. Following market declines after the peak in 2002, demand for fuel ethers, including methyl tertiary butyl ether (MTBE), ethyl tertiary butyl ether (ETBE), tertiary amyl methyl ether (TAME), and tertiary amyl ethyl ether (TAE), has rebounded the past several years as the need for clean-burning, high performance octane components expanded along with higher quality gasoline specifications. Growing demand has also occurred in the Latin America and Middle East regions. Some market shift, notably in Europe, has occurred from MTBE to ETBE to accommodate expanding biofuels mandates. The Hart Energy assessment shows that ether demand is expected to remain stable over the next decades, with some further shifts toward ETBE and TAE.

GLOBAL ETHER DEMAND AND OUTLOOK

Global ether demand, including MTBE, ETBE, TAME and TAE, in 2009 was 16.5 million tons per year (385 thousand barrels per day). The ethers made up 1.7% of gasoline supply. Europe and the Asia-Pacific are the largest ether demand markets, with 26% and 25% market share, respectively, followed by Latin America and the Middle East. Figure 1 shows the breakdown of ethers demand by region.

REGIONAL OUTLOOK

Ether demand is projected to increase by 1.8 million tons per year between 2009 and 2015, largely driven by growth in the Asia Pacific region. While demand will continue to grow in this region and in the Middle East, the Latin America volume will be replaced with bioethanol.

The ether market currently consists of 78% MTBE, 14% ETBE and the remainder is TAME and a small volume of TAE (Figure 2). In Europe, a majority of MTBE/TAME will be transition to ETBE/TAE to help meet European Union biofuels targets. The CIS and Latin America will also see a shift to ETBE and ethanol, and Japan began to introduce ETBE blends last year. By 2030, the MTBE share of the ether market will decrease to 64%, and ETBE and TAE will account for 32%.

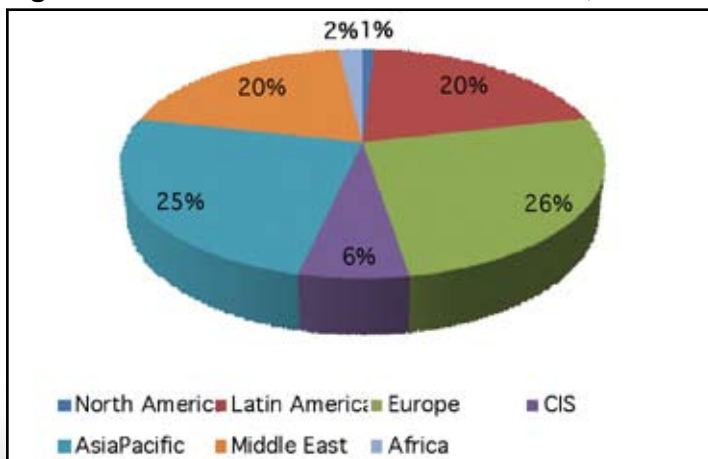
Asia-Pacific ether demand is 4.1 million tons per year. Demand is projected to increase 41% by 2015, driven by a significant increase in China's demand and introduction of ETBE in Japan. Ether demand will remain close to the 2015 level through 2030. Asia-Pacific imports 13% of its supply, and about 31% of the increase in demand through 2030 will come from imports, primarily from the Middle East.

The Middle Eastern MTBE demand is 3.2 million tons per year. Demand will steadily increase through 2030, with an 18% increase from 2009 to 2030. The Middle East exports 9% of its production. Production is projected to increase to meet growing local consumption with a small increase in exports to the Asia-Pacific.

Ether use in the Commonwealth of Independent States (CIS) is 1 million tons per year. Demand will increase about 18% between 2009 and 2030. Like in Europe, there is a projected shift to ETBE from 8% of the market in 2009 to 43% in 2030. Essentially all demand is supplied from indigenous facilities.

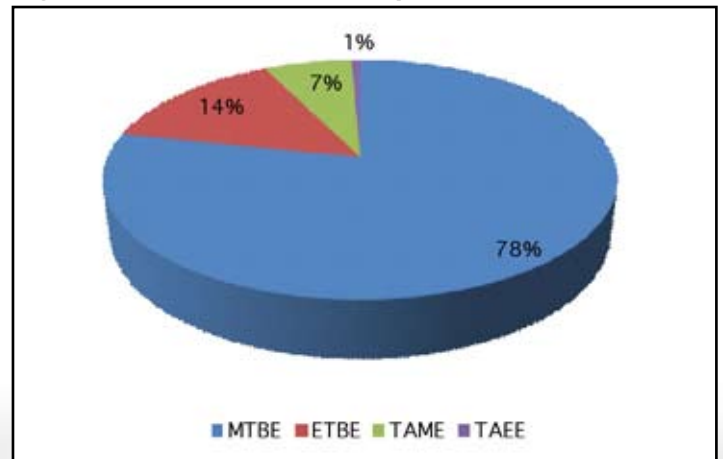
Ether supply will not change significantly in the future, but will continue to play an important role in the gasoline market. Ethers will account for about 1.5% of global gasoline supply by 2030. The contribution will be higher in the growth markets of the Middle East and the Asia-Pacific, where gasoline quality improvement and octane needs will be greatest.

Figure 1 – Global Ether Demand Market Share, 2009



Source: Hart Energy Consulting, 2010

Figure 2 – Ether Demand by Type



Source: Hart Energy Consulting, 2010



FEATURE

Philippines Sets Stricter Vehicle Emissions Standards

The Philippines' Department of Environment and Natural Resources (DENR) last month issued Administrative Order No. 2010-23 that revises the hydrocarbon (HC) plus nitrogen oxides (NOx) emission limits for new gasoline vehicles, and sets limits for in-use, rebuilt and imported used vehicles. These revisions are the first since July 2007, and generally follow the Euro-4 equivalent emissions standards. The requirements will come into effect starting January 2016, depending on the availability of comparable fuel quality standards.

The new vehicle emissions requirements will be achieved through a Certificate of Conformity (CoC) issued by the Environmental Management Bureau. The CoC will be issued by the DENR through the EMB to a vehicle manufacturer, assembler or importer certifying that a particular new vehicle or vehicle type meets the requirements provided under the Clean Air Act (Republic Act 8749). The CoC is valid for six years from the date of issuance.

For rebuilt, imported second-hand or used vehicles and pre-registered vehicles retrofitted with used engines, the vehicle importer or owner is also required to secure a Certificate of Compliance to Emission Standards (CCES) from the Land Transportation Office (LTO) for the same purpose.

New passenger and light-duty vehicles have been required to meet the Euro-II equivalent emission standards with 500 ppm sulphur limits in gasoline since January 2008.

Table I shows the emission limits for new passenger and light-duty vehicles. The significant changes to the emissions standards are:

- For light-duty vehicles in category class II, reduction in the HC + NOx limit to 0.6 g/km; and
- For light-duty vehicles in category class III, reduction in the HC + NOx limit to 0.7 g/km.

The Administrative Order No. 2010-23 also states that starting in January 2016, all new passenger cars and light-duty vehicles will be required to meet Euro 4 emission standards, subject to 50 ppm sulfur fuel availability. The government plans to enforce these requirements by the 2015 to 2016 timeframe.

In August 2010, DENR announced plans to reduce total suspended particulates (TSP) the Metro Manila area by 30% in 2011. DENR made this decision because reports have shown that the 2009 TSP level in Metro Manila registered an average of 130 micrograms per normal cubic meter ($\mu\text{g}/\text{Ncm}$). Under the Clean Air Act National Ambient Air Quality Guidelines for Criteria Pollutants, the TSP is not to exceed 90 $\mu\text{g}/\text{Ncm}$. DENR monitoring shows that more than 50% of vehicles are registered without actual testing by accredited Private Emission Testing Centers (PETCs). As a result, DENR is coordinating with the LTO to step-up enforcement of emission testing prior to vehicle registration.

Table I – Emissions Limits for New Passenger Vehicles & Light-Duty Vehicles

Category	Class	Reference Mass, RW (kg)	CO (g/km)		HC + NO _x (g/km)	
			Gasoline	Diesel ⁽¹⁾	Gasoline	Diesel ⁽¹⁾
M ⁽²⁾	-	All	2.2	1.0	0.5	0.7 (0.9)
NI ⁽³⁾	I	RW ≤ 1,250	2.2	1.0	0.5	0.7 (0.9)
	II	1,250 < RW ≤ 1,700	4.0	1.25	0.6	1.0 (1.3)
	III	1,700 < RW	5.0	1.5	0.7	1.2 (1.6)

Notes:

1. Until January 2011, limits for vehicles fitted with diesel engines of the direct injection type are indicated in parentheses.
2. New passenger vehicles, except those designed to carry more than 6 occupants (including driver), and vehicles that exceed maximum weight of 2.5 tons.
3. Light-duty vehicles, including those designed to carry more than 6 occupants (including driver), and above maximum weight of 2.5 tons.

Source: Philippines Department of Environment and Natural Resources

Australia Fuel Quality Policy and Standards

(continued from p1) In August 2010, the Automotive Australia 2020 Roadmap was released. Commissioned by the Australian Automotive Industry Innovation Council and supported by the federal government, this roadmap outlines long-term opportunities for the country's automotive industry to address technological needs, capabilities and economic and environmental sustainability. The opportunities are built on existing innovation development for vehicle electrification, fuels, light-weighting of vehicles, and advanced data and communications systems.

Australia's economic stability and environmental responsibility have resulted in competitive opportunities for its industries and its people.

Upcoming Industry Events	
International Conference on Energy & Automotive Technologies 5 November, Istanbul, Turkey	Refineries Asia Conference 18-21 January 2011, Singapore
Asia International Methanol Conference 2-4 November, Singapore	12th European Fuels Conference 8-11 March 2011, Paris, France
	17th Annual Fuels & Lubes Asia 9-11 March 2011, Singapore



Asia MTBE and Gasoline Additives Summit Highlights

The 2010 Asia MTBE and Gasoline Additives Summit recently took place in Chengdu, China. This important forum was well placed given the growing demand for transportation fuels in China, and the need for gasoline quality and performance improvements, especially as more vehicles enter the roadways. China is in the process of developing its improved gasoline specifications for Euro-IV equivalent emissions performance for nationwide implementation. These specifications will lower sulphur levels to 50 ppm around 2013, and even further reduction to 10 ppm for the 2016 timeframe. This summit helps to maintain a dialogue among fuel producers and distributors, clean fuel component producers, vehicle manufacturers, government officials and other stakeholders engaged in gasoline supply issues. Several key presentations are highlighted below.

Ms Joanne Sofia Chong, communications manager for the Asian Clean Fuels Association, was a keynote speaker at the summit. Her presentation, titled "MTBE in Asia & Middle East: A Sunrise Industry," examined the importance of using sound science in the assessment of gasoline and clean-burning components, and highlighted the expansion of fuel ethers use in the growing marketplaces and economies of Asia-Pacific and the Middle East.

Ms Chong gave details of the European Union's 3-year long risk assessment process for MTBE, which resulted in findings that the product is a safe and beneficial gasoline component, and proper environmental management of gasoline can ensure continued safe storage, delivery and use. She reviewed the performance properties of the product, such as air quality improvements, vapour pressure control, high octane number, blending flexibility and fungibility, ready supply and cost effectiveness. Important benefit of oxygenates use are emissions reductions, as illustrated in Figure 1.

Ms Chong presented key information about the challenges in the Asia-Pacific region to meet international air quality standards, and ensure adequate transport fuel supplies. She noted that the region is experiencing personal income growth resulting in more vehicles on the road and greater fuel demand. China is expected to expand to

over 400 million vehicles in use by 2035, and similar growth patterns projected for other countries. Although air quality improvements are occurring, most major cities are still far above World Health Organization standards. Additional challenges exist in the diversity of fuel specifications in the region, which impact market adjustments as supplies and costs vary. She concluded by noting for the Asia-Pacific and Middle East regions:

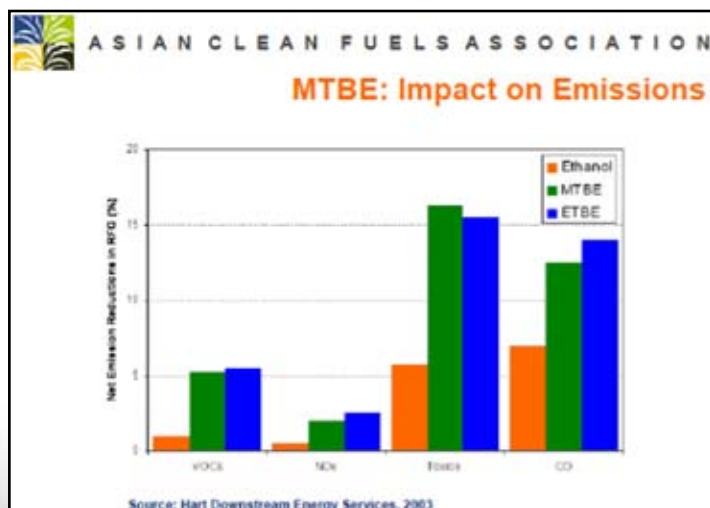
- Drive for cleaner fuels is inevitable and succeeding
- Conventional petroleum-based fuels will remain the primary supply
- Vehicle and fuel demands dramatically increasing
- Challenges remain to optimize conventional and alternative fuels for energy sustainability

Dr Luo Yantuo, with China Petroleum Planning and Engineering Institute (CPPEI), gave a presentation titled "Consumption of High-grade Gasoline and Outlook on Supply and Demand in China." She examined three aspects of gasoline output for China: current supply, demand and quality; forecast and expansion; and technology development and additives. Steady growth of domestic gasoline production shows an average annual rate of 5.8%, to reach over 68 million tons in 2009. More significantly, high-grade RON 93 gasoline has reached over 74% of production by last year. Domestic gasoline consumption has averaged 7.1% during the decade.

Dr Luo summarized the national standards and policy for gasoline in China. Economic and transportation development, including vehicle engine designs, are key factors determining and implementing standards. Consumer knowledge and behaviour also impact gasoline grade being used. As higher grade (RON93 and RON97) gasoline increase market share, refinery capacity to produce the needed octane components will expand.

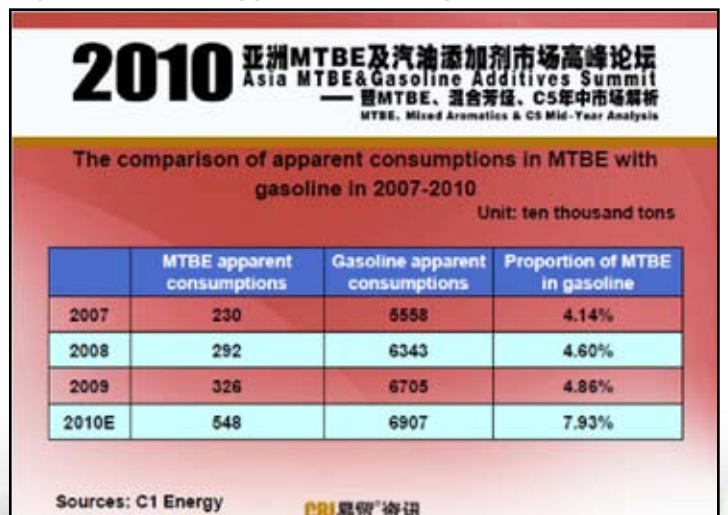
Ms Yun Zhu, market analyst with C1 Energy, spoke on the "Summary and Prospect of China MTBE Market from 2007 -2010." Her analysis indicates that gasoline demand in China has helped
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Figure 1 – Oxygenates Emissions Benefits



Source: ACFA, 2010

Figure 2 – MTBE Apparent Consumption in China





Fuels Industry Updates

AIR POLLUTION REPORT ISSUED IN INDIA

The India Minister of State for Environment and Forests has responded to questions raised by the Lok Sabha, the lower house of the Indian Parliament, regarding air quality across the country. The Indian Central Pollution Control Board (CPCB) and the State pollution control agencies have been monitoring ambient air quality in 175 cities as part of a national programme. The monitoring takes place at 424 stations in these cities, and results for 2009 were reported by the Minister.

The highest air pollution levels were reported in Jharia in Jharkhand, where particulate matter (PM10) levels were over 200 µg/m³, nearly 40% higher than the National Ambient Air Quality Standard (NAAQS). For major cities, Mumbai was shown in 37th place with average PM10 level of 109 µg/m³. Pune was in 69th place with average PM10 levels at 82 µg/m³. The standard for respirable suspended particulate matter (RSPM) is at 60 µg/m³. According to the data released by the CPCB, northern India has higher air pollution levels than in the south. Some southern cities, however, are beginning to show rising trends in air pollution levels, most notably, Hyderabad, Bangalore and Coimbatore. In addition to higher PM10 readings, nitrogen oxide (NO₂) emissions are also rising in a number of cities. The highest levels reported were in Howrah at 81 µg/m³, Kolkata at 56 µg/m³, and Delhi at 49 µg/m³. The increases in NO₂ pollution are mainly due to greater numbers of vehicles on the roads.

VIETNAM READY TO INSPECT OLDER MOTORBIKES TO CURB EMISSIONS

Vietnam is the world's most motorbike-dominated country, with estimated 26 million motorbikes for a population of 86 million people. Last year, the government announced plans to begin inspections of motorbikes to help enforce tightening air quality standards that come into effect in 2011. A successful trial motorbike inspection programme was conducted in 2009. This month the Vietnam Vehicle Registration Agency is to issue plans for a full inspection programme that will include limits of 6% carbon dioxide (CO₂) emissions and 2.0 parts per million (ppm) of hydrocarbon (HC) emissions.

Under the plan, in the first year, exhaust emissions will be checked on motorbikes that are in use for 10 years or more. In the second year, all vehicles that are seven years or older will be checked. In the third year and forward, all motorbikes in use for three or more years will be inspected. An exhaust verification sticker showing the test results will be adhered to each motorbike. Owners will have to repair the motorbikes to meet the standards or could be subject to fines of 300,000 dong (about US\$17) for exceeding the limits.

The emissions checks will start in Hanoi and Ho Chi Minh City, and then progress to other larger cities before implementing country-wide. The agency estimates that only half of the motorbikes on the road presently meet the emissions standards.

CHINA TO HAVE QUARTER OF GLOBAL AUTO SALES THIS YEAR

China's consumers will purchase 15.8 million passenger vehicles this year, nearly one-quarter of all global light-duty sales, according to the latest JD Power forecast. China's automotive ownership rate so far is only 50 vehicles per 1,000 adults. Another trend being seen is car buying in second-tier cities that are propelling rising sales, following earlier buying waves in Beijing, Shanghai and other megacities.

Car buyers in these other regions are more price-conscious and could offer automakers an opportunity to sell other car models with different equipment and features. According to the JD Power survey, China's automotive sales are likely to rise another 20% this year, easily surpassing all other world car markets. In contrast, the U.S. car sales market continues to limp along. Retail sales in the U.S. for the first half of 2010 were only 11% better than the same period a year ago, but still well below historic levels as continued consumer worries about the economy persist.

INDIA NOW LARGEST PETROLEUM PRODUCTS EXPORTER IN ASIA

India has surpassed South Korea to become the largest exporter of products in Asia, according to recently reported Platts data. With the commissioning of a new refinery by Reliance Industries at Jamnagar and Essar Oil increasing output at Vandinara, India became the regional leader by the end of 2009.

With current refining capacity of 3.69 million barrels per day (b/d), India is the third-largest refiner in Asia after China and Japan, with 9.6 million b/d and 4.64 million b/d, respectively. India's gross exports currently average just over 1 million b/d, passing South Korea's average of 0.9 million b/d.

India's petroleum product exports will expand next year when Reliance Industries 144,000 metric ton MTBE plant in Hazira (Gujarat) comes on-stream in June 2011. The plant is currently under construction at the company's petrochemical complex. According to Platts reports, the company expects to export up to 90% of the MTBE output, or up to 130,000 metric tons when the plant reaches full capacity.

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Fuels Industry Updates

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RESEARCH INDICATES VEHICLE EMISSIONS MAY AFFECT CIRCULATORY SYSTEM

Researchers in the United States find emerging evidence that inhaled air pollutants from vehicles may affect the systemic vasculature (circulatory system). The investigation, conducted at the Lovelace Respiratory Research Institute, sought to examine the relative impact of various pollutants on specific markers of vascular toxicity. Findings reported in the journal *Environmental Health Perspectives* (2010; 111(7): pp 921-7) indicated that in direct comparison of the inhalation exposures to combustion emissions important contributions to vascular toxicity from bioavailable carbon monoxide and volatile hydrocarbons were observed. The researchers note that these data support a role for traffic-related pollutants in driving cardiopulmonary illness and death. Reducing the emissions of CO and hydrocarbons would consequently reduce risks of such exposures.

MALAYSIA DELAYS BIODIESEL BLEND MANDATE TO MID-2011

The Malaysia Minister of Plantations and Commodities has delayed a proposed plan to mandate biodiesel blends until at least June 2011, several years after the original plan was devised. Government price supports on conventional diesel fuel have made biodiesel uncompetitive in the world's second largest producer of palm-oil feedstock (after Indonesia). The Malaysia Palm Oil Board information indicates that only 137 metric tons of biodiesel production occurred in July, down from 12,640 metric tons earlier in the year. The government is looking to reduce the conventional diesel fuel price support to provide incentive for increased biodiesel production. Rising palm oil prices make biofuel manufacturing costs higher. The Malaysia government is working to set up biodiesel blending facilities to also help encourage use.

EUROPEAN COURT UPHOLDS MMT LIMIT

The High Court of Justice of England and Wales, in referral of the European Court of Justice (ECJ), recently issued its ruling that rejected a challenge on the limit on methylcyclopentadienyl manganese tricarbonyl (MMT) in the revised fuel quality standards, Directive 2009/30/EC – Article 1(8) and Directive 98/70/EC – Article 8a. The court indicated that the limit does not violate European Union (EU) statutes on equal treatment and proportionality. MMT is a metallic-based additive used to boost gasoline octane level.

The ruling states that, when the Fuel Quality Directive was adopted, “no public body or independent entity had undertaken a scientific assessment of risk” of MMT. The court noted that the directive “provides for the development of test methodologies and the presentation of conclusions before the Parliament and the Council by 31 December 2012.” Further, it stated “(t)he limit for the MMT content of fuel was accordingly set pending the development of such test methodologies. It is therefore temporary and is capable of amendment according to the results of developments which may be observed.” With regards to the health risks and risks of damage to vehicle engines, the court went on to state that “a restrictive measure such as a limitation on the presence of MMT in fuels does not go beyond what is necessary to meet the objectives” of the directive, and is a “correct application of the precautionary principle.”

The court also rejected the complaint against the requirement that fuel containing MMT include a label indicating that it “contains metallic additives.” The court found that to ensure consumer protection the label requirement was an “appropriate means of pursuing that objective.”

To obtain the court ruling, [click here](#) or search at <http://curia.europa.eu/jurisp/cgi-bin/form.pl?lang=en>.

Asia MTBE and Gasoline Additives Summit Highlights

(continued from p4) improve MTBE consumption to 3.26 million tons in 2009, and forecasts that it will reach 5.48 million tons in 2010. This expansion corresponds to the increase in overall gasoline demand in China, and represents about 7.9% of the gasoline pool, as shown in Figure 2.

Ms Yun presented data on the rapid MTBE production capacity expansions in China, which are expected to be over 10% as the gasoline quality standards are implemented. Domestic capacity is projected at 640,000 tons per year as of 2010. As a result of domestic

market changes, the import and export situation for MTBE is also changing to reflect pricing dynamics relative to gasoline. In summary, Ms Yun demonstrated the growing use and importance of MTBE to China's gasoline supply.



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