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Hong Kong: Strict Fuel Specs & Emissions Standards Help Improve Air Quality

The island territory of Hong Kong is one of the most densely populated areas in the world with about seven million people. Its extensive urbanization has resulted in two air pollution issues: local street-level pollution mostly caused by motor vehicles, and regional smog from vehicles, and power generation and industrialization in the Pearl River Delta. As a special administrative region of the People's Republic of China, the Hong Kong government functions with distinct degree of autonomy. The government gives high priority to controlling both street-level air pollution and its contribution to regional smog formation. The main strategies include:

- Implementing a wide range of measures to control emissions from motor vehicles, power plants, and industrial and commercial facilities locally,
- Establishing strict clean fuel quality standards for use by the transport sector, and
- Working with the Guangdong provincial authorities to implement a joint plan to tackle the regional smog problem.

Table 1: Hong Kong Current Select Gasoline Specifications

Specification Name	Standard	Test Method
RON, min	95	EN 25164
MON, min	85	EN25163
Sulphur, ppm, max	50	ISO 14596
Lead, g/l, max	0.005	EN 237
Benzene, vol.%, max	1	EN 12177
Aromatics, vol.%, max	35	ASTM D1319
Olefins, vol.%, max	18	ASTM D1319
RVP @ 37.8°C, kPa, max	60	EN 12
Oxygen, wt.%, max	2.7	EN 1601
Oxygenates		
Ethers, vol.%, max	15	EN 1601
Methanol, vol.%, max	3 (1)	EN 1601
Ethanol, vol.%, max	5	EN 1601
Tert-butyl alcohol, vol.%, max	7	EN 1601
Others, vol.%, max	10	EN 1601
(1) Must contain stabilizing agents.		

Source: International Fuel Quality Center, Hong Kong Epd, 2010

The Hong Kong Environmental Protection Department (EPD) sets fuel and emissions specifications for the area. For the most part, Hong Kong has adopted standards that are based on European Union fuel quality requirements. The specifications are among the most stringent in the region. Since Hong Kong has no refinery industry or oil reserves itself, fuel supply is met by imports from multinational oil companies. Select current gasoline specifications for Hong Kong are given in Table 1.

Hong Kong was one of the first countries in the region to introduce unleaded gasoline to its market in 1991, and then to ban the sale of leaded gasoline from April 1999. Scientific investigations have demonstrated the dramatic drop in lead exposures as a result of its removal from the gasoline supply.

Hong Kong also began to control sulphur limits in fuels from an early timeframe. Between 1992 and 2001, sulphur limits were gradually reduced to 150 parts per million (ppm). The benzene content limit was also reduced to 1 vol.% max starting April 2000. In January 2005, Hong Kong implemented Euro IV-equivalent gasoline requirements. The sulphur content limit was further reduced to 50 ppm. In addition, the aromatics specification was lowered to 35 vol.%, and olefins were limited to 18 vol.% max. Oxygenates to help benefit fuel quality and performance are allowed up to 2.7 oxygen weight % blending. The market provides only one grade of gasoline (RON 95).

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U.S. EPA Issues Long-Awaited Revised RFS Rule

After months of delay, the U.S. Environmental Protection Agency (EPA) issued in early February the long-awaited final regulations for the updated and expanded National Renewable Fuels Standard Program, known as "RFS-2." The initial program was established by law in 2005. The Energy Independence and Security Act of 2007 (EISA) drastically modified the existing program to mandate more than triple the use of renewable fuels in transportation fuel up to 36 billion gallons (136 billion liters) per year by 2022. The regulations also set provisions for what biofuels meet the standards. The final regulations also modify definitions and criteria for feedstocks and renewable fuels made from them, and establish greenhouse gas (GHG) emissions reductions thresholds as determined by lifecycle assessments for these fuels.

The RFS-2 regulations apply to "obligated parties" that are domestic and foreign producers and importers of transportation fuels used in the U.S. (certain small refiners are exempted until the end of this year). These regulations also establish the 2010 RFS volume standard (RVOs) for each obligated party within the four categories of renewable fuels set in the EISA (see Table 2). These four categories are:

- conventional renewable fuel;
- advanced biofuel;
- biomass-based diesel fuel; and
- cellulosic-based biofuel.

This final rule is effective on July 1, 2010, and the percentage standards apply to all gasoline and diesel fuel produced or imported in 2010.

GHG EMISSIONS LIFE-CYCLE ASSESSMENTS

The major change under the RFS-2 program is the requirement for renewable fuels to achieve specific GHG emissions reductions compared to 2007 baseline gasoline and diesel fuel. EPA conducted life-cycle assessments (LCA) of various renewable fuels to determine if they would meet the required GHG reductions of at least 60% below baseline for cellulosic-based biofuels, 50% below baseline for biomass-based diesel and other advanced biofuels, and 20% below baseline for corn-based ethanol facilities that started construction after the law was signed in 2007. EPA's original LCAs on biofuels production pathways proposed last year were highly criticized, including by members of Congress, and extensive public comments were submitted challenging the agency's methods to incorporate indirect land use changes required by EISA. Based on new information and data, EPA made adjustments to the LCAs that resulted in improved outcomes for most biofuels.

RENEWABLE BIOMASS REGISTRATION

Another significant change in the RFS-2 rule is the requirement that all renewable fuel producers must maintain written records from their feedstock suppliers for each feedstock purchase that identify the type and amount of feedstocks and where it was produced and that are sufficient to verify that it qualifies as renewable biomass defined under EISA. Specifically, renewable fuel producers must maintain maps and/or electronic data identifying the boundaries of the land where the feedstock was produced, product transfer documents (PTDs), or other verification tracing the feedstock from the land to the renewable fuel production facility. These requirements also apply to foreign renewable fuels producers and will require registration as currently required for domestic producers.

EISA expanded the RFS program to include transportation fuels beyond just gasoline, thus both highway and non-road diesel fuels are used in calculating the RVOs. EPA has designated diesel fuel to include 'motor vehicle, non-road, locomotive and marine diesel fuel (MVNRLM) in the determination of the RVO under the RFS-2 rule. Residual or distillate fuels used to power ocean-going vessels, natural gas, propane, and electricity that are used as part of transportation are excluded from the renewable fuels standards.

IMPACTS OF INCREASING VOLUME REQUIREMENT UNDER RFS-2

The EPA recognizes that the displacement of gasoline and diesel fuel with renewable fuels has a wide range of environmental and economic impacts. EPA's Regulatory Impact Analysis has determined the following major impacts of the RFS-2 final rule.

- Increase emissions of hydrocarbons, nitrogen oxides (NOx), and acetaldehyde depending on region.
- Overall emission changes projected to lead to increases in population-weighted annual average of particulate matter (PM) and ozone levels.
- Overall emission increases are anticipated to lead to up to 245 cases of adult premature mortality.
- Corn exports are expected to decrease by 8%.
- Soybean exports are expected to decrease by 14%.
- Increase the cost of food by $10 per person.

EPA notes that the air quality modeling results presented in the final rule do not constitute the anti-backsliding analysis required by section 211(v) of the Clean Air Act. EPA plans to conduct this analysis separately from this final action.

Table 2: Renewable Fuel Standard for 2010

Fuel Category	Percentage of Fuel Required To be Renewable	Total Volume of Renewable Fuel (in billion gal)
Cellulosic biofuel	0.004%	0.0065
Biomass-based diesel	1.10%	1.15*
Advanced biofuel	0.61%	0.95
Renewable fuel	8.25%	12.95

Source: USEPA Final Rule on Renewable Fuels Standard, 2010

JARI Manila Roundtable Addresses Air Pollution Reduction & Energy Policies

In early February, the Japan Automobile Research Institute (JARI) sponsored a meeting to discuss and exchange information and viewpoints on air pollution reduction and energy policies for the transportation sector in the Philippines. Held in Manila, the event took place in cooperation with the Transportation Science Society of the Philippines (TSSP), the Philippine Automotive Federation Inc. (PAFI), and the Center for Automotive Technology Corporation (CATC). Attendance at this technical and policy program included government officials, industry representatives, researchers, and policy makers. Some of key presentations are summarized as follows.

Mr Kiyohiko Eino, Japan Ministry of Economy, Trade and Industry, Manufacturers Industries Bureau, presented the keynote address on the views and policies of Japan's automobile industry. He examined the current status of the industry in the context of the economic downturn, and summarized market situations in various regions around the globe. He noted that emerging markets growth will continue to lead the way for vehicle sales, particularly due to demand potentials in China and India and other ASEAN countries. He further reviewed Japan's proposal on achieving compatibility between environmental protection and economic growth that accompanies motorization in emerging countries.

Mr Rudy Caña, director of special programs department, Board of Investments, provided an "Overview of the Philippines Auto Industry Policy." He summarized development programmes by the auto industry structures in compliance with government requirements. Various programs include used vehicle importation, restructuring of tariff rates, excise tax policies, export incentives and investment priorities.

Ms Zenaida Monsada, director of Oil Industry Management Bureau, Department of Energy, presented on "Philippines: Energy Policy on Transport Fuels." Her talk focused on the challenges to the industry to provide cleaner fuels, including fuel quality standards, implementation, monitoring and enforcement, supply availability and accessibility, fuel compatibility during storage, handling and distribution, vehicle compatibility, price stability, and investment needs during difficult economic times. She reviewed the Clean Air Act's standard setting mechanism and work of the joint government/industry Technical Committee on Petroleum Products and Additives. An important element of this work is Quality Standards Harmonization, noting that fuels and vehicles are both critical to air quality improvements. She concluded with Philippines path forward for Euro IV-equivalent fuel standards now targeted for the 2015/16 timeframe (Figure 1).

Ms Anneli Lontoc, undersecretary of the Department of Transportation and Communications, spoke about "Harmonization of Vehicle Standards and Regulations." She highlights efforts by the Philippines to harmonize national vehicle emission and fuel quality requirements with international standards with the framework of the ASEAN Economic Community Blueprint for transforming the region into a unified market and production base. Ms Lontoc presented details on the Committee on Harmonization of Vehicle Standards and Regulations that is coordinating the development and implementation of these improvements (Figure 2).

Mr Bert Fabian, with CIA-Asia Center, examined fuel quality issues and their impacts on vehicle emissions. He highlighted the success of the Philippines' adopting Euro II-equivalent standards that significantly reduced emissions, and urged the country to continue its efforts to complete implementation of Euro IV and then Euro V-equivalent standards as soon as possible.

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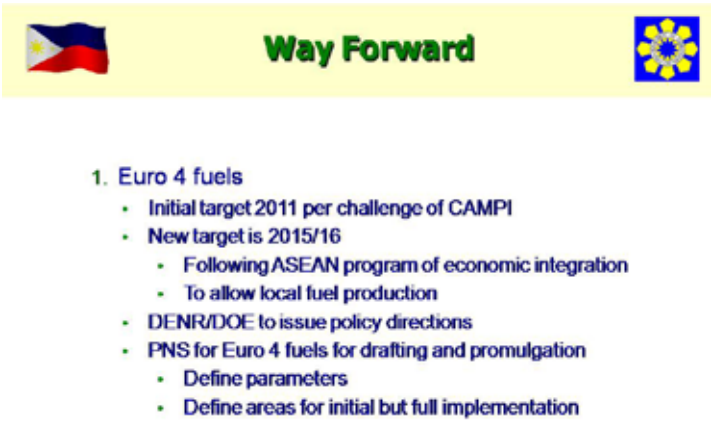
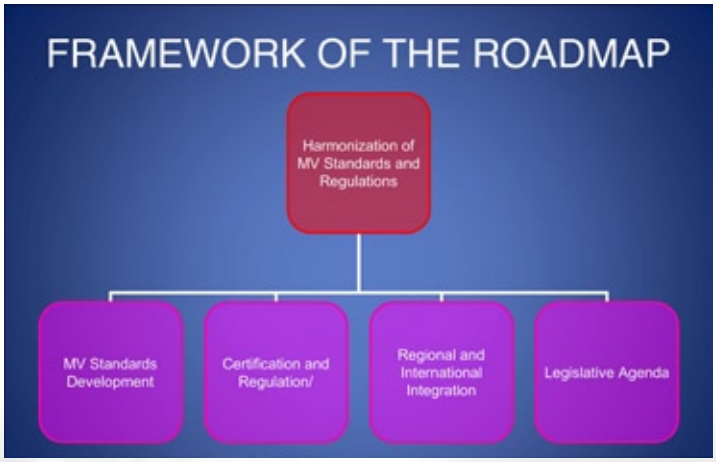
Figure 1 – Philippines Quality Standards Harmonization



Source: Z. Monsada, Philippines Department of Energy, JARI-Philippines Roundtable, 2010-02-03

Figure 2 – Harmonization of Vehicle Standards & Regulations



Source: A.Lontoc, Philippines Department of Transportation & Communications, JARI-Philippines Roundtable, 2010

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Hong Kong: Strict Fuel Specs & Emissions Standards Help Improve Air Quality

(continued from p1) The Hong Kong EPD is currently in consultation with local fuel companies to develop a timetable for introducing 10 ppm sulphur content gasoline. Once the availability and reliable supply of 10 ppm sulphur gasoline is established for the region, Hong Kong expects to reduce its specification on sulphur limit, although no firm date has been set at this point.

Hong Kong was the first country in Asia to introduce ultra low sulphur diesel (ULSD) fuel to the market with a maximum sulphur limit of 50 ppm starting April 2002. Similar to gasoline, Hong Kong plans to move to 10 ppm sulphur limit for automotive diesel fuel, however final timelines are not yet set. In the meantime, fiscal incentives are being used through a new concessionary duty rate to bring 10 ppm sulphur diesel fuel to the market, with nearly full penetration now taking place.

Vehicle emissions standards in Hong Kong are also quite strict to complement the tight fuel quality specifications. Currently, Euro IV-equivalent emission standards apply to gasoline and diesel vehicles since January 2006. Emission standards for motorcycles are presently at Euro III-equivalent levels. The Hong Kong EPD is in the process of implementing Euro V-equivalent standards for new heavy-duty vehicles this year, and for light duty-diesel vehicles by 2011. It should be noted that private cars make up about two-thirds of registered vehicles in Hong Kong, with heavy-duty and goods vehicles and motorcycles making up most of the rest.

Hong Kong has also been setting strong Air Quality Objectives (AQO) levels since the Air Pollution Control Ordinance was passed in 1983. Hong Kong's has established AQOs for 1-hour, 8-hour, 24-hour and 1-year periods on major air pollutants, including sulphur dioxide (SO2), particulate matter (PM), nitrous dioxide (NO2), carbon monoxide (CO), ozone (O3), and lead. In June 2007, the EPD commissioned a study to review the AQOs and develop a long-term air quality management strategy. The government advisory panel guiding the study is currently completing the recommendations.

The Hong Kong EPD and government fully recognize the importance of integrating vehicle emissions standards with clean fuel quality specifications to combat air pollution problems. The significant progress on fuel and vehicle standards and improvements in air quality levels provide a model for other cities in the region to consider when addressing their own regulatory programs.

JARI Manila Roundtable Addresses Air Pollution Reduction & Energy Policies

(continued from p3) Mr Antonio Gimenez, at the Center for Automotive Technology Corp., talked about "The Automotive Industry at the Crossroad." He reviewed the industry statistics for the Philippines and the growing demand for transportation access and flexibility. He indicated that the industry and the consumer must make choices on efficiency, safety, environmental protection and costs. The industry needs continual improvements to maintain competitiveness and meet consumer needs and governmental requirements.

The JARI-Philippines Roundtable provided the opportunity for experts and policy-makers to learn about progress on clean vehicle and fuel programs, and to engage in networking to exchange ideas.

Upcoming Conferences & Events

3rd Indo Oil, Gas & Power Conference
3-4 Mar 2010
Indonesia

16th Fuels & Lubes Asia Conference
3-5 March 2010
Singapore

13th ARTC Annual Meeting
9-10 March 2010
Singapore

Energy World Expo 2010
10-13 Mar 2010
Mumbai, India

15th Asia Oil Week 2010
19-23 Apr 2010
Singapore

7th Middle East Refining & Petrochemicals Conference
24-26 May 2010
Bahrain

Fuels Industry Updates

CHINA CREATES NEW MINISTRY TO COORDINATE ENERGY POLICY

In late January 2010, the Chinese central government officially announced the formation of the National Energy Commission (NEC) to be headed by Premier Wen Jiabao and comprised of 22 other high-level government officials, including ministries of environmental protection, land and resources, finance, and foreign affairs. This senior membership on the NEC indicates the central government's commitment to improve internal communications and cooperation among government agencies and state-owned energy companies to encourage initiatives on clean energy to sustain China's economic growth.

THE NEC will be charged with formulating energy development strategy, reviewing energy-security policies and coordinating international cooperation. The NEC will work closely with and oversee the National Energy Administration on drafting and implementing energy plans, industrial policies and standards. NEC decisions must still gain approval of the State Council.

Two areas where the NEC will likely create an immediate impact are renewable and clean energy and fuels, and energy security. Recently, China has issued a series of policies and regulations to help boost the country's renewable and clean energy sector. Also, given China's concern about reliance on energy imports, the NEC is expected to help spur development of domestic energy projects.

ROAD TRAFFIC EMISSIONS WORSENS CHILDHOOD ASTHMA

The Health Effects Institute (U.S.) released in January findings of a new report that shows exposure to air pollution caused by road traffic emissions increased the severity of asthma in children. The report evaluated more that 700 scientific studies that looked at the health effects from air pollution exposures along roads and highways. The assessment found that asthmatic children living within 300 to 500 meters of roadways were more likely to experience difficulty breathing than children not near such roads.

The report also found proximity to roads was associated with other asthma-related symptoms, such as cough and irritation. It further indicates that living near such roadways increased the likelihood of new asthma case onsets. While the scientific evidence was not as strong, the report indicates that respiratory symptoms in children without asthma may also be increased. The Health Effects Institute noted from its analyses that action to reduce air pollution from vehicles continues to be of major importance, especially as rapid urbanization and vehicle use increased the number of people exposed to emissions. The report can be found at: http://pubs.healtheffects.org/view.php?id=334

REGIONAL HARMONIZATION OF FUEL PROPERTIES AND STANDARDS PROMOTED

During recent technical industry meetings held in the Asia-Pacific region, the Japan Automobile Manufacturers Association's fuel, certification and regulation experts advocated continued coordination of efforts for harmonization of fuel properties and emissions standards, despite the economic downturn that has slowed progress. Members of the technical groups noted challenges with meeting targeted schedules for improved fuel quality standards, including having fuels available to meet Euro IV-equivalent standards. As an optimum measure, the industry members recommend adequate preparation time for implementing the Euro IV-equivalent rules to ensure compatibility with vehicles. The JAMA also proposed using recommended biofuel specifications for biodiesel and ethanol that follow the Worldwide Fuel Charter's biofuels guidelines, taking into account the tropical climate in many parts of the region. The fuels and technical experts are reviewing the recommended specifications and plan to indicate viewpoints at their next meeting.

INDIA'S REFINERS STRUGGLING TO MEET EURO-III FUEL QUALITY DEADLINES

India's state refiners are struggling to achieve Euro III-equivalent (350-ppm sulphur) fuel supplies throughout the country, but expect to meet the Euro IV-equivalent (50-ppm sulphur) timeline of April 1st for the 13 "mega-cities." The cities include Delhi, Mumbai, Kolkata, Chennai, Bangalore, Hyderabad, Pune, Surat, Ahmedabad, Kanpur, Agra, Solapur and Lucknor. As recent meeting of refiners with ministry officials, the phased launch of Euro III-compliant fuel would be completed by October this year. Several refiners indicated that they have started producing the Euro IV-equivalent standards gasoline and diesel fuel, and would begin introducing the fuel to the marketplace soon. The Indian refinery industry has been working intensely to upgrade facilities to produce fuel meeting the stricter standards. These improvements in fuel quality are necessary to help combat increasing emissions and worsening air pollution due to even expanding vehicle fleets throughout the country.