



# China - After Decade of Growth, What's Next for Transport Fuels?

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China has rebounded rapidly from the global economic recession that engulfed most countries and drove down industrial, consumer and energy demand. China's decade (and longer) of vigorous growth appears to be returning to lead this regional road to recovery. As improved economic conditions bring greater personal well-being, China's consumers will help drive the transportation sector and consequently, the refining industry to meet transport fuel needs. Some of the indicators are:

- Recent consumer surveys show that over half (60%) of respondents plan to buy cars within the next five years – major reason cited is “convenience” of owning a car.
- By 2020, over 200 million motor vehicles will be on China's roads, according to projections by the Ministry of Industry and Information.
- New policies and accelerated implementation on energy efficiency and vehicle technology are being developed.
- As the motor fleet expands, greater volumes, and improved and cleaner-burning, transportation fuels are needed.
- Emissions controls, for traditional pollutants as well as for greenhouse gases (GHG), must be tightened.

## MOTOR FLEET

China's relentless growth in car and truck sales is expected to continue in 2011 with projects of another 20% increase – including 14 million units in car alone. So far in 2010 (October data), over 11 million car sales have occurred, up 35.5% on the year, and making China the world's largest auto market since 2009 when it surpassed the United States. For 2010, industry forecasts expect car sales to reach over 13 million.

## AIR QUALITY

The rapid development of the automobile industry has promoted social and economic progress and improved the quality of life – but it has come at the cost of air quality impacts. The Ministry of Environmental Protection notes that about 20% of China's cities presently have serious air pollution concerns, and about one-third of 113 major cities do not meet the national secondary standards for air quality. Vehicle emissions have become the main source of air quality impacts, according to the Ministry. Furthermore, the trends indicate continued challenges to address air quality. However, improved vehicle emissions standards, and strict implementation and enforcement of fuel quality specifications can help mitigate some of the problem.

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## GASOLINE SPECIFICATIONS – MOVE TO EURO IV-EQUIVALENT

This past summer, the Standardization Administration of China (SAC) solicited public comments to amend the national gasoline specifications (GB 17930-2006), that would basically meet the Euro IV-equivalent emissions standards. Table I presents select gasoline standards being proposed. The main changes from the current gasoline specifications being (Continued on p4)

**Table I: Proposed National Gasoline Standards for China**

Specification Name	Standard			Test Method
RON, min	90	93	97	GB/T 5487
Sulphur, ppm, max	50	50	50	SH/T 0689
Lead, g/l, max	0.005	0.005	0.005	GB/T 8020
Manganese, g/l, max	0.012	0.012	0.012	SH/T 0711
Benzene, vol.%, max	1	1	1	SH/T 0713
Aromatics, vol.%, max	40	40	40	GB/T 11132
Olefins, vol.%, max	28	28	28	GB/T 11132
RVP @ 37.8°C, kPa, min	40 (s) / 42 (w)	40 (s) / 42 (w)	40 (s) / 42 (w)	GB/T 8017
RVP @ 37.8°C, kPa, max	68 (s) / 85 (w)	68 (s) / 85 (w)	68 (s) / 85 (w)	GB/T 8017
Oxygen, wt.%, max	2.7	2.7	2.7	SH/T 0663
Distillation				
T <sub>10</sub> , °C, max	70	70	70	GB/T 6536
T <sub>50</sub> , °C, max	120	120	120	GB/T 6536
T <sub>90</sub> , °C, max	190	190	190	GB/T 6536
FBP, °C, max	205	205	205	GB/T 6536

Source: IFQC, SAC June 2010

CLEAN AIR THROUGH CLEAN FUELS



## FEATURE

# COP-16 Concludes With New Agreements - But Issues Remain

The 16th Conference of the Parties (COP-16) to the United Nations Framework Convention on Climate Change concluded two weeks of climate talks held in Cancun, Mexico, with adoption of a series of agreements, collectively referred to as the “Cancun Agreements.” Representatives from 194 countries negotiated agreements that recognize the need for greater cuts in greenhouse gases (GHG) emissions, establish a foundation for greater forest protections, help developing nations adapt to climate change, and improve verification of emissions and emission reduction initiatives. The talks did not result in details on how greater emissions reductions would be achieved, nor identify how countries are cutting their emissions. Various leaders at the talks pronounced advances were made, however, the path to extending the Kyoto Protocol commitments that expire at the end of 2012 is still unclear.

The Cancun Agreements call for limiting the global temperature increase to 2°C (3.6°F) over the pre-industrial levels, with a review of this goal and possible lower figure starting in 2013. The agreements also include a collective goal of GHG emissions reductions of 25% to 40% by 2020 compared to baseline 1990 levels. This “shared vision” in the text, however, does not obligate specific countries to set reduction targets. Most significantly, the text recognizes the need for countries to “raise the level of the emissions reductions” to be able to achieve these goals.

## GREEN FUND

The Cancun Agreement established a “Green Fund” to disburse the US\$100 billion a year expected to be collected by 2020 to help developing countries with low-carbon development adapt to the impacts of climate change, such as rising sea levels. The agreements formalized the language for the Green Fund that appeared in last year’s Copenhagen Accord.

## EMISSIONS VERIFICATION

The Ad-Hoc Working Group on Long-Term Cooperative Action (AWG-LCA), a parallel track of negotiations, contributed language on implementing a registry for developing nations to record pledges to reduce GHG emissions. Under the agreements, developing countries, such as China and India, would measure and report GHG emissions and submit actions for reductions to independent verification, with understanding that the rate of growth would be curtailed. The agreements call for verification supported by international assistance to have progress reports every two years. Domestic efforts that do not receive technical or financial help from outside sources could be verified internally.

## REDD PROGRESS

The Cancun Agreements include the first step to create a formal forest protection program, identified as Reducing Emissions from

Deforestation and Degradation (REDD). The agreements forged consensus to slow, halt and reverse forest cover and carbon loss, and set policies to develop national strategies to protect forests, especially to help developing countries like Indonesia and Brazil that are heavily forested.



The policy also set the stage to allow for sub-national actions to protect forestland. These would include actions at the state, provincial and other local government level to be accredited “as an interim measure” to the nation’s overall efforts on forest protection.

## NO DECISION ON CARBON CAPTURE

The COP-16 did not resolve the issue of whether to allow carbon capture technologies to receive credits under the Kyoto Protocol’s Clean Development Mechanism (CDM). Oil, gas and coal producing countries have advocated for acceptance of carbon capture and sequestration (CCS) technologies to be included in CDM – a position opposed by environmentalists that fear resources would be diverted away from other favored technologies. Further decisions on CCS allowance will likely require that technologies and rules for CCS be set on an international level, and that environmental and social impacts be considered.

## CONTROVERSY

The talks extended for one extra day as efforts to complete agreements language was often held up by objections by officials from Bolivia. The Bolivians argued that the steps being taken were too weak to avoid the catastrophic effects of climate change. The country also objected to allowing industrialized countries to purchase carbon emissions credits from forest protection programs instead of cutting their own emissions. The United Nations rules for the talks require consensus from member states before the policy is agreed. In response to the Bolivian dissent, the COP-16 presiding official noted that consensus does not require unanimity.

## FUTURE EFFORTS

The COP-16 talks demonstrated that multi-lateral negotiations could still yield results. Nonetheless, the agreements included few changes that would have direct impacts on energy producers. The Ad-Hoc Working Group on the Kyoto Protocol agreed to continue negotiations to ensure that no gap occurs upon expiration of the first emissions reduction commitment period that expires after 2012. A binding agreement to succeed the Kyoto Protocol is still a long way off, however enough progress was made in Cancun to hope for significant advances in November 2011 when the COP-17 convenes in Durban, South Africa.



# Asia-Pacific Events Highlight Need for Regional Refining

The Asia Pacific region is the largest petroleum-consuming region in the world and will experience the highest level of product demand growth in the future. Projections show that overall demand in the region will increase by an average of 2.3% per year between 2009 and 2030, including the impact of lower growth expected in industrialized countries.

To keep up with this demand growth, a very aggressive pace of refining expansion is needed. Most of the existing spare refining capacity has been absorbed in recent years, despite the global economic downturn. Significant capacity investments must be planned and implemented over the next decade, however, structural issues in the region may present challenges to achieving this expansion. Furthermore, this demand will bring greater dependence on imported crude oil and for some time refined petroleum products, including clean blendstocks as transport and other fuel qualities improve throughout the region.

The Downstream Asia 2010 Conference, recently held in Singapore in conjunction with the Singapore International Energy Week, gathered more than 100 delegates to examine the role of technology and innovation, and prospects for the downstream industry. A major focus of the event was to address the impact of China, India and the Middle East on the Asian downstream petrochemicals and refining sector. The annual Singapore International Energy Week provides a platform for policymakers, business leaders and academics to exchange ideas, strategies and best practices that help shape regional and global energy industry agendas.

Ms Lisa Hannant, managing director, World Refining Association, provided the opening address to the conference and noted the importance for the region to address downstream energy and sustainability issues.

Mr Satvinder Roopra, head of downstream oil, Wood Mackenzie, chairman of the conference gave opening remarks ahead of the first-day plenary sessions on the future of Asian downstream sector and opportunities for investment and growth.

Day one of the conference included separate focus session on refining or petrochemicals. Sessions on strategy looked at competitive refining in challenging business environment or insights into best practices to achieve operational excellence and efficiencies. Sessions on technical operations examined asset reliability and integrity, effective maintenance and advanced process technologies. An interactive roundtable was conducted following the breakout sessions.

The second day involved general sessions on operational excellence and asset optimization, energy efficiency, and case reviews for refinery and petrochemical integration. Once again, a roundtable session was held for presenters and delegates to discuss issues and exchange viewpoints.

Fuels Summit Day was held on the last day of the conference. Two of the leading presentations are summarized below.

Ms Joanne Chong, communications manager with the Asian Clean Fuels Association, presented on “State of Play for Clean Fuels in Asia.” She noted that oil will remain a vital and dominate resource for energy and transport fuels for decades to come, even as alternative fuel sources are developed. Chronic air pollution problems persist in many Asian metropolitan areas, pushing the need for cleaner fuels to meet emissions standards and vehicle efficiency.

Ms Chong reviewed the key drivers for air quality improvements and the unique situation in each country, such as vehicle park, engine technologies, emissions controls and refining capabilities and technologies. Because fuel quality in the region is not harmonized, various challenges remain to address standards such as sulphur content and aromatics levels. She compared fuel quality specifications for some countries in the region to demonstrate this variance (Figure 1). She also reviewed evolving biofuels policies in the region and noted limitations that exist to wide-scale development here.

**Figure 1: Gasoline Standards in Southeast Asia Countries**

GASOLINE (selected specification)		Vietnam (01/2007)	Indonesia (2006)			Thailand (2009)	Philippines (2005)	Malaysia (2009)	Singapore
RON	-	90/92/95	88	91	95	91/95	81/93/95	95/97/99	92/95/98
Aromatics	vol%, max	40	no limit	50	40	35	35	no limit	report
Olefins	vol%, max	38	no limit	no limit	no limit	no limit	no limit	no limit	report
Benzene	vol%, max	2.5	no limit	5.0	5.0	3.5	2.0	5.0	report
Oxygen	wt%, max	2.7	2.7	2.7	2.7	11*	2.0	no limit	report
Sulphur	ppm, max	500	500	500	500	500	500	500	500
Lead	g/l, max	0.005	0.3	0.013	0.013	0.013	0.005	unleaded	0.013
RVP	kPa	43-75	69 (max)	45-60	45-60	62	85/62	65	report

\* Oxygenates content vol% maximum 11

Source: J.S. Chong, ACFA, Downstream Asia 2010

She concluded by presenting some of the challenges facing refineries in the region, including changes in fuel properties, tighter credit markets and ability to recover costs, and ever increasing environmental requirements. Collectively, she observed that cleaner fuel specifications should be viewed as business opportunities that refineries can successfully address.

Mr Bert Fabian, transport program manager, Clean Air Initiative for Asian Cities, presented on “Automotive Fuel Quality and Impact on Desulphurisation and the Roadmap for Cleaner Vehicles in Asia.” The explosive growth in vehicle fleets in Asia is creating significant impacts on resources, air quality and public health. He reviewed air quality levels in Asian cities and summarized studies on health effects caused by air pollution. He outlined the structure for achieving sustainable transport (Figure 2), observing that an integrated approach is essential to handling the growth taking place in the region.

Mr Fabian reviewed the roadmap process taking place to address air quality and transport issues. He identified the impact of fuels on vehicles and engines, production of cleaner (Continued on p4)

## Asia-Pacific Events Highlight Need for Regional Refining

(Continued from p3) fuels, and policy issues, such as pricing, taxation and incentives for clean fuels. Within the roadmap approach, he examined flexibility for setting fuel specifications and the potential to leapfrog from Euro-2 equivalent to Euro-4 equivalent emission standards, and comparable fuel quality specifications.

### ASIA REFINERY MARKETS

One of the issues that came up during the conference was that of open markets and deregulation for refined products and petrochemicals. Concerns about continued fuel subsidies can discourage incentives for investments to expand refining. Another important element of refining and petrochemical projects is technology transfer which can help develop expertise of in-country staff.

One sign of progress were ongoing discussion by Indonesia's Pertamina with international oil companies (IOCs) for joint venture development of three greenfield refinery projects. Such development would help Indonesia with domestic supplies of gasoline and reduce imports.

China's expanding refining capacity is necessary to meet demand, especially from the transportation sector. Some anticipate as much as 500 million tonnes per annum of capacity addition over the long-term. Some of the expansion would clearly be slated for export products to the region. These mega-refinery projects would pressure the economic efficiency and operations of smaller refineries.

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(Continued from p1) considered are:

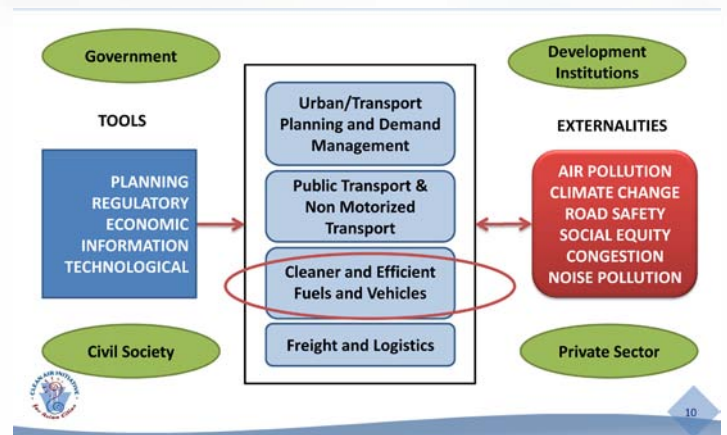
- Sulphur reduced from 150 ppm to 50 ppm max.
- Manganese reduced from 0.016 g/l to 0.012 g/l max.
- Olefins reduced from 30 vol.% to 28 vol.% max.
- Vapour pressure (RVP) reduced maximum limit from 72 (summer) and 88 (winter) to 68 (summer) and 85 (winter).
- New minimum limits for vapour pressure would also be set at 40 (summer) and 42 (winter).

Beijing's gasoline specifications (DBI 1/238-2007) are slightly different than those being proposed, specifically manganese at 0.006 g/l max, olefins at 25 vol.% max, and RVP at 65 (summer) and 88 (winter). Similar quality levels are achieved in Shanghai and Guangzhou.

The national gasoline standard specifies a grace period of three years before full implementation. It generally takes several years for China's refineries to complete the necessary upgrades to produce fuel meeting the new requirements and supply the marketplace.

As stricter vehicle emissions standards are enforced and refinery capabilities are improved, gasoline specifications meeting the Euro V-equivalent emissions levels will be needed and were included by SAC in the appendix of the proposed standards. The specific

Figure 2: Inputs to Sustainable Transportation



Source: B. Fabian, CAI-Asia Center, Downstream Asia 2010

Other challenges noted during conference included domestic product shipments by coastal tankers due to fragmented markets, which add further costs to refineries. Crude oil sourcing for private refineries is highly competitive especially against state-owned refineries. But tenders to secure crude for state-owned refineries can be a longer and slower process than those faced by private refineries that can obtain product through online and spot trades.

A significant unknown is the level of investment by China's state oil companies in the Asian refining sector. Recent success of PetroChina in outside investments could lead to further activity over the coming years. But the wider Asian fuel markets are still sensitive about outside investments regardless of the source.

gasoline vehicle emissions standards for Euro V-equivalent have not yet been drafted, however, lower sulphur content and olefins levels will likely pose challenges to maintain octane levels.

### OIL DEMAND

According to recent media reports, China's implied oil demand expanded by 13.7% in November from a year ago to reach 9.3 million barrels per day (implied oil demand is refinery crude throughput plus net imports of refined fuels). This equates to about 380,000 barrels per day (4.2%) above the previous record reached in October. As the world's second-largest oil consuming country (only behind the U.S.), China's refining industry plans to boost crude oil processing.

### ENERGY CONSUMPTION & GHG EMISSIONS

China is considering multiple methods to try to moderate energy usage and control the rate of greenhouse gases (GHG) emissions. As a part of the 12th Five-Year Plan, latest master plan for economic growth and development in the years from 2011 to 2015, government officials are looking at programs like a cap-and-trade system and a carbon tax on (Continued on p6)



## Fuels Industry Updates

### PETROVIETNAM LINING UP REFINERY PROJECTS

Growing demand for refined petroleum products in Vietnam is leading the government to seek an accelerated program to expand the first operating refinery at Dung Quat. Prior to the start-up of this facility, the nation imported virtually all of its refined petroleum products. The Dung Quat refinery provides about one-third of the country's demand for fuels. Recent media reports noted ongoing negotiations between PetroVietnam and the Russian integrated oil firm TNK-BP to jointly finance expansion plans at the Dung Quat refinery complex. Currently, the refinery capacity is 6 million ton per year (mtpy), and expansion could reach 10 mtpy by 2016 if plans are adopted. PetroVietnam recently inked an agreement with TNK-BP to acquire a stake in an offshore natural-gas project.



Construction is also about to begin at the Nghi Son oil refinery and petrochemical complex, which would be the second PetroVietnam plant. This refinery is slated for 10 mtpy if completed as planned by 2014. This project has several investment partners, including Kuwait Petroleum International, Mitsui Chemical Inc., and Idemitsu Kosan Ltd.

Discussions are also ongoing for development of PetroVietnam's third refinery and petrochemical plant that will be located at Long Son. Specific timelines and investment partnerships are still being worked out. Completion of all of these projects will bring Vietnam to near self-sufficient supply of refined products. The complex refineries being developed will also produce higher gasoline and diesel fuel qualities to meet performance and emissions requirements as the vehicle fleet expands and modernizes with economic growth in Vietnam.

### EU REACH PROGRAM SHOULD BE GLOBAL FRAMEWORK FOR REGULATION



France's largest chemical industry trade group, Union des Industries Chimiques (UIC), recently indicated that the European Union's REACH should be used as a worldwide framework on chemical regulation. Implemented and enforced by the European Chemical Agency (ECHA), REACH (Registration, Evaluation, Authorisation and Restriction of Chemicals) aims to improve human health and environmental protection by better identification and management of chemical risks, and ensure manufacturers and importers ensure safe handling and use of chemicals. Although in place since mid-2007, REACH does not have equivalent regulatory programs in the United States, China or Japan. The UIC argues that similar programs should be set into place to avoid distortion of the global chemicals market.

On November 30, 2010, the REACH law required that all chemical substances, including intermediate products, imported into or manufactured in the European Union that have annual volumes of 1,000 metric tons or greater (and some defined hazardous substances at lower volumes) must be registered with the ECHA. By May 30, 2013, REACH requires substances imported or manufactured at 100 metric tons or more to be registered, which will affect a greater number of small and medium sized companies. The registration process involves submission of chemical composition, toxicology and environmental data, and safety assessments. Various challenges have been encountered by both the industry and government in conducting the registrations. The UIC plans to submit to the ECHA proposals for making the REACH regulation more coherent with other regulations, and to improve and simplify the registration procedures.

### JAPAN TO TOUGHEN TAILPIPE EMISSIONS STANDARDS

The Automotive Environment Policy Division of the Japanese Ministry of Environment (MoE) recently indicated that the existing ambient air quality requirements will likely be maintained even after the current regulatory period expires this coming March. Over 90% of air monitoring stations across Japan shows results that meet the reduced nitrogen dioxide (NO<sub>2</sub>) and particulate matter (PM10) levels of 0.04 to 0.06 parts per million (ppm) and 0.10 milligrams per cubic metre, respectively. The current compliance period that started in 2002 under the Special Law on Gross Reduction of Nitrogen Oxides and Particulate Matter in Designated Areas, however will likely be extended for another 10 years, according to the automotive Division.

The MoE, jointly working with other ministries, is preparing to tighten tailpipe emissions requirements on NO<sub>2</sub>, PM, sulphur oxides (SO<sub>x</sub>), and carbon dioxide (CO<sub>2</sub>) for ethanol-fueled vehicles, and heavy-duty, diesel-powered vehicles. These new emissions standards under development will apply to vehicle manufacturers and importers likely by the end of 2016. The Japan Automobile Manufacturers Association indicates that the regulations will likely be closely coordinated with the European Union and the United States, once they are introduced sometime in 2011. The MoE is seeking to balance air quality requirements, including for climate change, with industry progress and advances on emissions controls.

### U.S. EPA RESTRICTS E15 BLENDS TO ONLY NEW AUTOS

The U.S. Environmental Protection Agency (EPA) has restricted the use of 15 vol. % blends of bioethanol (E15) in gasoline to model year 2007 or newer cars and light-duty trucks. In 2009, Growth Energy, an ethanol interest group, petitioned EPA to grant a waiver of fuel regulations under the Clean Air Act to

*(Continued on p6)*



# Fuels Industry Updates

(continued from p5) allow blending of the high ethanol content gasoline. The current limit under the existing waiver is set at 10 vol.% (E10). Emissions and other testing on vehicles older than the 2007 models are still underway to ensure that emissions control systems and other fuel and engine compatibility problems are not encountered with the fuel use. The EPA indicated in early December that any decision on use in other vehicle models would be delayed into next year.

To prevent misfueling by motorist, the EPA has proposed that a warning label be placed on gasoline pumps that would deliver the E15 blended gasoline. The proposed warning states that consumer should use caution to refuel only the 2007 and newer, or flex-fuel vehicles (federal law prohibits use in any other vehicles), and warns that such prohibited use could damage other vehicles. The EPA plans to finalize the warning label by early next year.

## RUSSIA CONSIDERING TAX RATE LINK TO EMISSIONS LEVELS

The Russian Ministry of Industry and Trade (MIT) recently proposed linking vehicle tax rates to the emissions class to which they belong – with higher rates imposed on higher polluting vehicles. The MIT would keep the basic tax rate on vehicles meeting the Euro-4 equivalent emissions level, currently at 2.5 to 15.0 rubles per unit of horsepower depending on the vehicle class. However, the basic tax rate for vehicles meeting the Euro-3 equivalent emissions would be raised by about 20%, and for vehicles only meeting the Euro-2 equivalent standards the rate would increase by about 60%. The MIT further proposed that for vehicles made before January 2006 the tax rate would be doubled. The proposal also calls for reducing the tax rate by 30% for vehicles that meet the Euro-5 equivalent emissions levels. The ministry believes this seg-

mented tax rate would help to encourage consumers to purchase more efficient vehicles that meet the better emissions levels. The proposal does allow the Russian regions to retain the ability to increase the tax rate, or to reduce or eliminate it for vehicles having less than 150 horsepower, depending on the emissions standards.

## CLEAN AIR INITIATIVE FOR ASIAN CITIES LAUNCHES NEW WEBSITE

The Clean Air Initiative for Asian Cities (CAI-Asia) Center has introduced a new portal to its website to expand communications and interactions on air quality management, particularly at major events such as Olympic Games and international expos. The site provides access and coordination between CAI-Asia, country networks and over 170 organizational members. The site features information on air quality at the host city before, during and after the event. The main site can help participants:



- Search for data on air quality, climate change, energy and transport
- Share viewpoints and experiences through various portals on air quality and sustainability
- Stay informed and up-to-date on event, projects and other initiatives.

The CAI-Asia promotes innovative ways to improve air quality in Asian cities and was established in 2001 by the Asian Development Bank, the World Bank, and U.S. Agency for International Development. The ACFA is a private sector member of the CAI-Asia. The portal is located at: <http://megaevents.cleanairinitiative.org>

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(Continued from p4) CO<sub>2</sub> emissions. More energy-efficient energy technology, like wind, solar and nuclear power are being advanced to help reduce the use of coal for power generation. Energy intensity and CO<sub>2</sub> emissions targets could be implemented to gain reductions. Market forces are clearly going to be used to help address the issues, and creative steps and incentives are needed to promote efficiencies as China's income levels rise with growing prosperity.

China's economic growth is expected on continue unabated and its fuel quality specifications will likewise continue to improve to meet both consumer and environmental needs.



ACFA

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### Upcoming Conferences & Events

**Refineries Asia**

18-21 January 2011, Singapore

**International Auto Technology Symposium**

19-21 January 2011, Pune, India

**12th European Fuels Conference**

8-11 March 2011, Paris

**17th Annual Fuels & Lubes Asia Conference**

9-11 March 2011, Singapore