



Good morning.

First, allow me to express my sincere appreciation to CBI for our continued partnership. This is the fourth time ACFA is participating in this summit that is targeted at the Asian MTBE industry.

There has been a lot of talk and activities in the past five years in particular that promoted the use of alternative fuels that potentially could substitute the use of gasoline in vehicles. In reality, gasoline is still the dominant automobile fuels in use for on-road vehicles.

In addition, as several Asian governments took steps to legislate and raise fuel quality and cut vehicle emissions to battle air pollution problems, there is a lot of attention on cleaner gasoline that contains less dirty components including sulphur, benzene, olefins and aromatics.

Science has shown that fuel ethers, namely MTBE and ETBE, are the optimal choice as a clean octane booster compared to the many options available in the market.

This is the same conclusion that China has arrived at, as one can tell from the strong growth in MTBE use in the past few years. More established markets such as South Korea, Hong Kong and Taiwan have also been using MTBE for many years to raise the overall quality of gasoline.

Today I will speak about the key role that MTBE plays in Asia and its relevance as the region continues its move towards better quality fuels, especially clean gasoline.



ASIAN CLEAN FUELS ASSOCIATION

Who is ACFA? 认识ACFA

Working closely with fuel policymakers,
regulators and stakeholders in the fuel industry,
ACFA promotes and advances the use of
cleaner automotive fuels based on principles of
**sound science, cost efficiency and
sustainability of the environment.**

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For those who are unfamiliar with ACFA, allow me to briefly introduce us.

ACFA is a not-for-profit trade organisation that promotes the use of cleaner automotive fuels. Our core principles are sound science and technology, cost efficiency and environmental sustainability.

For the past 10 years, we have been working closely with policymakers and regulators in Asia and the Middle East to develop fuel legislation and programs that support the use of cleaner fuels to improve air quality.

We believe the use of cleaner fuels is one of the compelling answers to improving air quality in a prevalent and immediate basis.

MTBE is an important clean fuels components that helps achieves this.

Clean Gasoline in Asia



- 1990s: Middle East and Asia/Pacific.
- The main driving force in Middle East was the need of MTBE for lost octane from lead phase out and as high sulphur levels are gradually reduced in gasoline.
- **In Asia/Pacific the main driving force was the real necessity of clean air through cleaner fuels legislation.**
- MTBE begun to be commonly imported in Taiwan, Thailand, Indonesia, and largely produced and consumed in Saudi Arabia, South Korea.

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Let us take a quick look at the history of clean gasoline and MTBE in Asia.

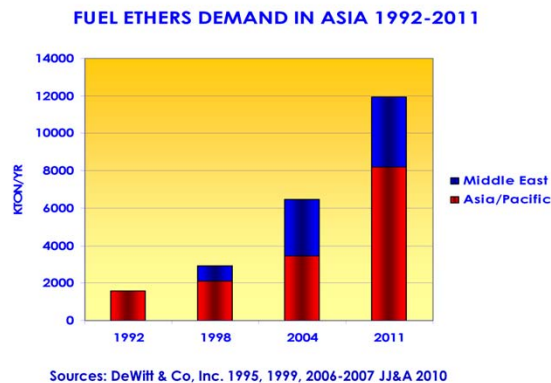
The interest for clean gasoline and MTBE in Asia started at the beginning of the 90's, with two poles of development: Middle East and Asia/Pacific.

The main driving force in Middle East was the need of MTBE for lost octane from lead phase out and as high sulphur levels are gradually reduced in gasoline.

In Asia the main driving force was the real necessity of better and cleaner air through clean fuels legislation. MTBE was first introduced in the US under the Clean Air Act, which, because of its quality as an oxygenate and octane booster, is a useful component to improve air quality.

During that period, MTBE begun to be commonly imported in Taiwan, Thailand, Indonesia, and largely produced and consumed in Saudi Arabia and South Korea.

History of MTBE in Asia



- In 1992, MTBE demand in Asia 1.6M ton, or 16.5% of world demand. (DeWitt)
- This increased to 2.9M ton in 1998 and 6.5M ton in 2004. (DeWitt)
- In 2011 the expected cumulative demand of MTBE+ETBE in Asia is set at 11.9M ton or 56.4% of world demand. (JJ&A)

According to data by DeWitt & Co., in 1992 the demand of MTBE in Asia was 1.6M ton, or 16.5% of world demand.

Since then, Asia have seen a sharp increase in MTBE demand. By 1998 the demand of MTBE has jumped to 2.9M ton and 6.5M ton in 2004.

According to Jim Jordan & Associates, in 2011 the expected cumulative demand of MTBE+ETBE in Asia is set at 11.9M ton or 56.4% of world demand.

Where is Asia now in gasoline quality

- Despite the sharp increase in demand for clean fuels (more than seven-fold in 19 years or +11.2% per annum), the gasoline quality in many Asian countries is far from being satisfactory.
- In fact, major Asian cities are still among the most polluted in the world. 13 in 15 of the world's most polluted cities are in Asia.

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Despite the sharp increase in demand for clean gasoline, the gasoline quality in many Asian countries is far from being satisfactory.

This has directly and indirectly contributed to the air pollution problems in the region. 13 of 15 of the world's most polluted cities can be found in Asia.

The implication is that there is potentially much room for growth for the MTBE industry.

Most Immediate: Cutting Vehicle Emissions



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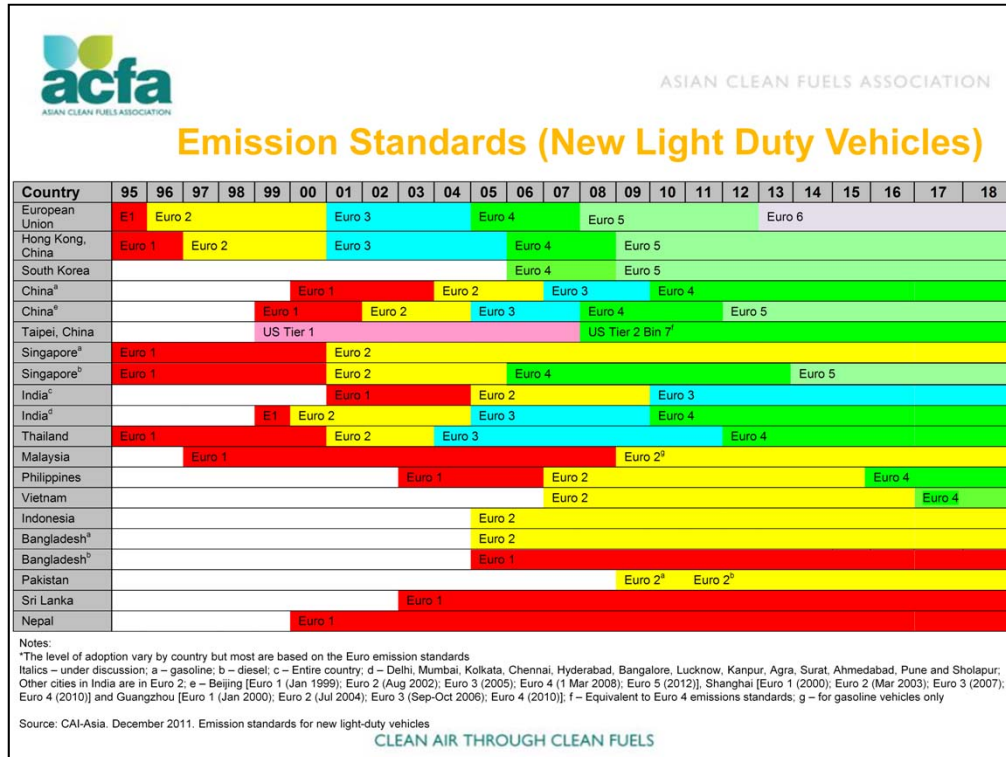
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The reality in Asia is that air pollution remains one of the biggest threats to our health and environment.

The air pollution problem has become chronic in some areas and poses a very serious health threat to residents.

The pressure is on governments to deal with this threat RIGHT NOW with actions that will make an immediate impact.

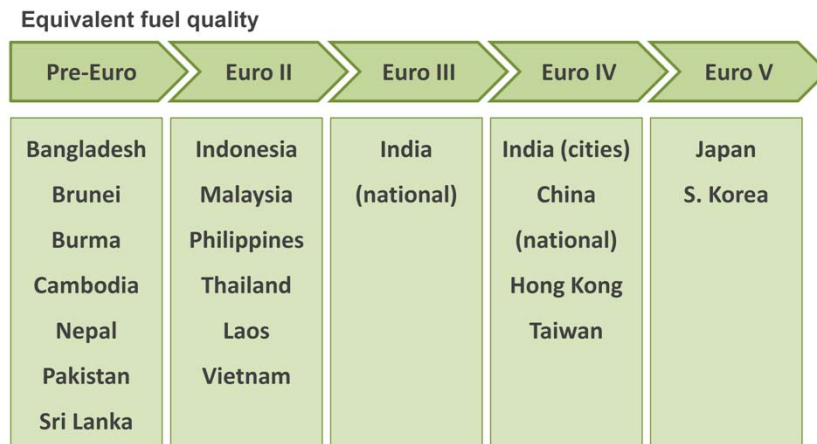
Governments know one of the best strategies to tackle air pollution issues is to cut vehicle emissions.



Vehicles are the single, biggest contributor to air pollution, which can account for up to 90% of a city's pollution. As such governments around the world are all developing or have developed stricter emission control standards.

To cut vehicle emissions, better quality fuels are needed.

Current Gasoline Specifications (Asia)



Source: IFQC, ACFA, Sep 2011

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It is widely recognised that vehicle engines and fuels need to be treated as ONE system to ensure effective emissions reductions.

Modern vehicles need cleaner fuels to meet the stricter emissions standards and to operate as designed.

Fuel quality improvements require clean-burning blending components.

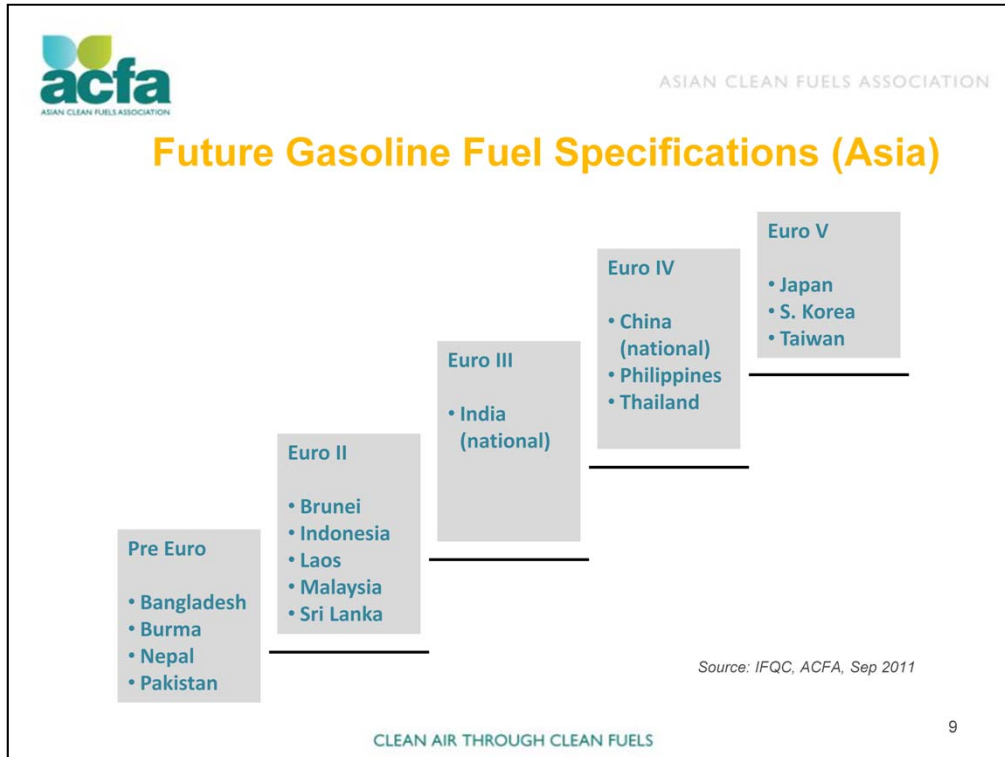
This is where MTBE can play a significant role and make an immediate difference to fuel quality. In fact the benefit can be seen overnight.

Here you see the prevailing gasoline specifications in Asia. With the exception of China, India, Hong Kong, Taiwan, Japan and South Korea, the fuel quality of most of the markets in this part of the world are equivalent to Euro 2 or lower.

Another important factor not to be forgotten is the fact that some Asian and Middle Eastern countries have not or have just started now the process of gasoline quality improvement: Iraq, Myanmar, Palestine, Yemen still have leaded gasoline.

Many countries, most of them in Middle East and South West Asia, still have more than 1,000 ppm sulphur content.

Only a few Asian markets have reached 50 ppm sulphur or less: Hong Kong, Japan, South Korea and Taiwan.



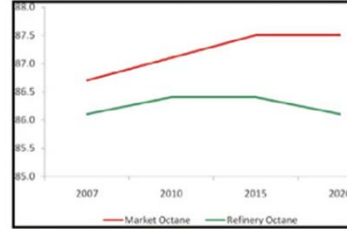
Several governments in Asia have announced plans to upgrade fuel quality standards over the next 5-10 years.

What does this mean for the MTBE industry?

Octane Trends 2007-2020

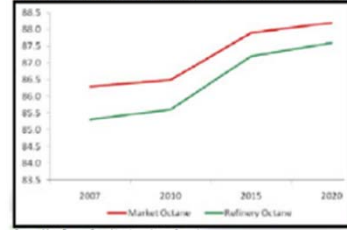
- Octane replacement due to fuel quality improvements (lead phase-out, reduction in sulphur, benzene, aromatics, olefins).
- Expanding vehicle fleet and growing gasoline demand.
- Vehicle technology advances need cleaner fuels to meet the stricter emissions standards and to operate as designed.
- Increase in minimum octane grade.
- Growing demand for higher grade gasoline.
- Market is octane-short (especially clean octane.)

Asia Pacific Market & Refinery Octane Trends (2007-2020)



Source: Hart Energy Consulting (www.hartenergy.com)

Middle Eastern Market & Refinery Octane Trends (2007-2020)



Source: Hart Energy Consulting (www.hartenergy.com)

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Fuel quality specifications limit the levels of benzene, aromatics, olefins and sulphur allowed in the gasoline produced and sold by refineries. These components provide octane, which is lost when less is allowed. Refiners then need to replace the lost octane.

MTBE is a cost effective and clean replacement for these so-called 'dirty' components.

In addition, vehicle fleet expansion, gasoline demand increases, vehicle technology advances and growing demand for higher grade and cleaner gasoline also support the need for higher octane.

Overall, Asia is short on clean octane.

Octane Boosting Options

- Ethers
 - Methyl-tert-butyl ether (MTBE)
 - Ethyl-tert-butyl ether (ETBE)
 - Alcohols
 - Ethanol
 - Methanol
 - Tert-butyl alcohol (TBA)
 - Hydrocarbons
 - Aromatics (benzene, toluene)
 - Iso-octane (2,2,4 – trimethylpentane)
 - Alkylates
 - Metallic additives
 - Lead (tetra-ethyl lead)
 - MMT (methylcyclopentadienyl manganese tricarbonyl)
- *Economics & regulations are the deciding factor on octane selection to meet specifications.*
 - *Each octane component has benefits & limitations when blended into gasoline.*

Here's a quick recap of the octane boosting options that are available to the market.

There are generally four groups: ethers, alcohols, hydrocarbons and metallic additives.

Based on our experience, the two most important factors influencing which of these will be chosen to boost octane are economics and government regulations.

In the absence of regulations, economics have dominated.

Air Quality: Gasoline Emissions Impact

	Emission Impact		
	VOC	NO _x	Toxics
Reformate	Moderate	Low/Mod	High
Alkylate	Moderate	Low	Low
Isooctane	Low	Low	Low
Benzene	Low	Low	Very High
Toluene	Moderate	Low	High
MTBE	Reduction	Low	Reduction
ETBE	Reduction	Low	Reduction
Ethanol	High	Moderate	Reduction
Methanol	High	Moderate	Reduction
t-Butanol	Low	Low	Reduction
MMT	None	Reduction	Unclear

Source: Hart Energy Consulting

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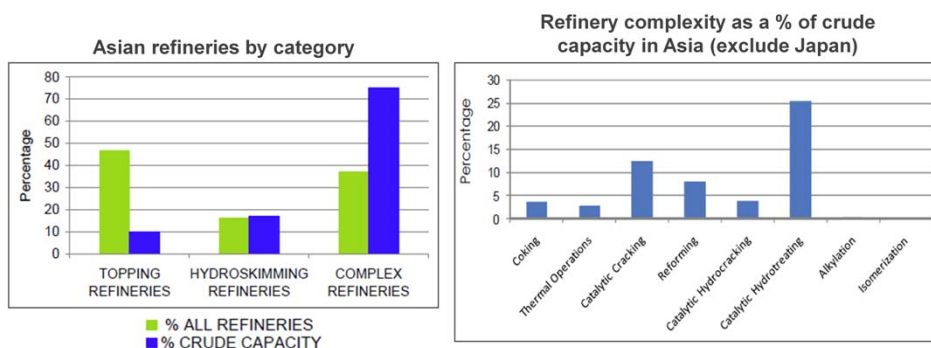
Each octane component comes with its own benefits and limitations when blending into gasoline.

This chart shows how MTBE compares to the other options in terms of the impact on vehicle emissions.

MTBE and ETBE both reduce VOC and toxic emissions and keep NO_x low.

Generally, MTBE is the logical and often the preferred clean octane booster by refiners.

Snapshot of Asian refineries



Source: J. Courtis in CAI-Asia: A Roadmap for Cleaner Fuels and Vehicles in Asia, Nov 2008

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The lack of clean octane is aggravated by the current types of refineries in Asia.

Asian refining system still has too many small refineries, too many topping and hydro-skimming model refineries and too few desulphurization units.

As such, many of the refineries in Asia are not equipped to produce gasoline that meets the higher fuel specifications set out by legislation.

In other words, there is a gap between what they are capable of producing, and the desired fuel quality as determined by the increasingly strict fuel legislation.

For this reason alone, Asia needs more fuel ethers in the blending pool. This is where a clean fuel component like MTBE comes into the picture.

Although MTBE usage in Asia has consistently grown in the last few years, the current level of fuel quality is still a long way from the quality that is required to address the air pollution problem in a meaningful way.

Asia needs MTBE

- **Asia has surpassed the 50% of the world demand for fuel ethers (MTBE + ETBE).**
 - China is the world's largest MTBE producer with approx 6.8M ton/yr of installed capacity at the end of 2010.
 - In 2009 China turned net importer of MTBE, importing approx. 400 Kton. In 2010 this increased to 740 Kton.
 - Despite the announcement of new units being in construction or projected, China is likely to remain a net importer for the medium-long term.

The next few slides provide more evidence that Asia needs MTBE.

Asia now accounts for more than 50% of the world demand for fuel ethers, that is MTBE and ETBE. Japan is the only country using ETBE in Asia for the moment hence this statistic is largely pointing to MTBE use.

China is the world's largest MTBE producing country. Since 2009 it also became a net MTBE importer.

Despite new MTBE plants and production capacity expected, we expect China to remain a net MTBE importer at least in the medium term.

Where is Asia now in fuel ethers

- **There are other three Asian markets where MTBE is largely imported: Singapore, South Korea and Taiwan.**
 - They have both domestic production and import.
 - Overall, their 2009 imports was in excess of 800 Kton.
 - On top of this demand, the three countries have an installed capacity of 1.75M ton/yr.
- **Malaysia owns the biggest MTBE merchant unit in Asia/Pacific.**
 - Installed capacity close to 350 Kton/yr.
 - Used to be exporter but became medium-sized importer in the last few years.

Singapore, South Korea, Taiwan and Malaysia are the most established MTBE markets in Asia that both produce and consume large quantities of MTBE.

Where is Asia now in fuel ethers

- **Middle East is the world's second largest MTBE production area with approx. 30% of production capacity (JJ&A 2010 data).**
 - Saudi Arabia is the world's second largest producer.
 - Middle East is a large exporter of MTBE. It covers the excess of demand of Asia and Europe.
- **In the long term the supply/demand balance of the area is not expected to change, although there is still a big potential of local consumption due to necessity of large gasoline quality improvement.**

Accounting for 30% of the world's production capacity, Middle East is the world's second largest MTBE production area and a large exporter to Asia and Europe, which continues to use MTBE to date.

In the medium term, we do not expect the demand and supply balance of these regions to change, although in the short term, there could be fluctuations due to planned and unplanned plant shut-downs and maintenance.

The key point to remember is there is still a big potential of MTBE consumption due to the need for large gasoline quality improvement, as well as a growing gasoline market.



Current Usage/Trial of Alternative Fuels

Country	CNG	LPG	Hythane	Methanol	DME	Hybrid	Electric	Hydrogen/Fuel Cell
Australia	✓	✓				✓	✓	✓
Bangladesh	✓							
Burma	✓							
China	✓	✓		✓	✓	✓	✓	✓
Hong Kong		✓				✓	✓	
India	✓	✓	✓			✓	✓	✓
Indonesia	✓	✓						
Japan	✓	✓			✓	✓	✓	✓
Malaysia	✓							
Nepal		✓					✓	
New Zealand		✓					✓	
Pakistan	✓	✓						
Philippines	✓	✓					✓	
Singapore	✓						✓	✓
South Korea	✓	✓			✓	✓	✓	✓
Taiwan		✓				✓	✓	✓
Thailand	✓	✓				✓		
Vietnam	✓	✓						
Iran	✓							
Qatar		✓						
UAE	✓					✓		

Source: Alternative Fuels Service, 2010

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Finally, this chart provides a snapshot of the different types of fuels that are in play in Asia aside from gasoline and diesel.

While gasoline remain the dominant fuel in use, we are mindful that competition is ever present. Asian governments have, for various reasons and to varying degrees, developed programs in alternative fuels with the specific intention to reduce reliance on petroleum-based fuels.

For gasoline to remain competitive and relevant, refiners have to continue to upgrade the quality of gasoline and raising the bar for alternative fuels, making it more challenging to replace or substitute its position in the market.

Concluding Remarks

- **Clean gasoline is critical in the battle for clean air.**
- **Fuel quality improvements require clean-burning blending components such as MTBE.**
- **The real challenge for conventional fuels (like gasoline) is to become cleaner to stay relevant.**
- **MTBE is a proven clean fuel component that has more than 30 years of track record.**

Let me summarise my presentation today with these four statements.

In Asia, clean gasoline is critical in the battle for clean air as it is still the most used fuel on the roads for existing and new vehicles.

Fuel quality improvements are key to cutting vehicle emissions. Clean-burning blending components like MTBE can raise the overall fuel quality and have reductionary impact on vehicle emissions.

The real challenge for conventional fuels like gasoline is to become cleaner to stay relevant.

This is where MTBE can be valuable – it is a proven clean fuel component that has more than 30 years of track record.

Thank You! 谢谢!

If you have any queries, please contact:
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I hope you enjoyed the presentation and wish you well. Thank you.