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## Pakistan

## Bio-Fuels

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## 2007

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### Report Highlights:

Pakistan's sugar industry operates twenty-one distillery units, with an annual production capacity of 400,000 tons ethanol. Most distilleries produce hydrous ethanol. Last year, Pakistan produced and exported 36,500 tons of fuel grade ethanol, mostly to United States. During the current year, fuel grade ethanol production is expected to decline due to lower global prices. Pakistan exported 165,406 tons of ethanol during 2006 and is projected to export 234,000 tons during the current year.

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Includes PSD Changes: No  
Includes Trade Matrix: No  
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**Background:** Pakistan is the world's seventh largest sugarcane producer. The crop is grown mainly to produce refined sugar. The sugar industry is the second largest industry in Pakistan after textiles, contributes 2 percent to GDP and 13 percent to the manufacturing sector. There are 76 sugar mills in the country, with a crushing capacity of 300,000 tons of cane per day. Cane molasses is the main by-product. In order to maximize returns, the sugar industry processes molasses to produce anhydrous and hydrous ethanol. There are twenty-one distillery units in Pakistan with a capacity to process 2 million tons of molasses to produce 400,000 tons of ethanol.

**Fuel Grade ethanol (99.7% anhydrous alcohol):** Petrol consumption in Pakistan during FY 2005-06 totaled 1.6 million tons. Last year, the government approved a pilot project to initiate the sale of petroleum mixed with 10 per cent locally-produced ethanol on an experimental basis from three petrol stations in Karachi, Lahore, and Islamabad through the state run Pakistan State Oil (PSO). Oil marketing companies (OMCs) and refineries looked at the initiative with skepticism because it did not provide any saving or cost reduction and required additional investment in sugar plants and post-refining mixing. This is the first time that the concept of ethanol blending with motor gasoline has been considered in Pakistan. The ratio of blended fuel is 10 per cent ethanol and 90 percent gasoline.

It will take another year to determine fuel specifications, establish quality control standards, and introduce relevant legislation because de-neutering of alcohol specifications also needs to be determined. The existing distilleries produce ethanol with 95 per cent octane, which needs to be enhanced to 99.7 per cent for blending with gasoline. Of the twenty-one distilleries, only six have the capacity to produce ethanol fit for 10 percent blending while the remaining units would require an investment of around Rs 1.5 million per distillery to upgrade them. The list of sugar mills engaged in manufacture of fuel grade ethanol is:

- 1) Noon sugar Mills, Bhalwal, Sargodha
- 2) Habib Sugar Mills Nawabshaw
- 3) Dewan Sugar Mills Badin.
- 4) Abdullah Sugar Mills, Toba Tek Singh
- 5) Shakarganj Sugar Mills, Jhang

During 2006, these sugar mills manufactured 36,500 tones of fuel grade ethanol, which was mostly exported to United States while a limited quantity was utilized in local market. During the current year, production of fuel grade ethanol is expected to decline due to lower global prices. The oil industry needs to establish requisite infrastructure for successful marketing of ethanol and gasoline-ethanol blends. Most of the infrastructure requirements are due to the fact that ethanol is not a part of the existing petroleum system. Neither the oil nor the automobile industry in Pakistan has sufficient knowledge and experience to use ethanol blends in gasoline. They will require a learning phase before the country can venture into nationwide mandatory blend.

Pakistan's four provinces have been directed by the federal government to allow for the sale of blended fuel. Oil Marketing companies are being encouraged to market ethanol as blended fuel because it is cost effective and environment friendly. The Ministry of Food, Agriculture and Livestock (MinFAL) has also been directed to explore other sources of raw material for ethanol production like maize, wheat, rice, potatoes, and sorghum.

**Hydrous Ethanol Production and infrastructure:** Presently 21 distilleries are operating in the country with a total production capacity of more than 400,000 tons. Most of the distilleries are producing hydrous ethanol, which is 96 percent pure with 4 percent water. In

order to convert hydrous ethanol into fuel ethanol or power ethanol dehydration upto 99.95 percent purity is required by using suitable technologies. Molecular sieve technology is being introduced by the distilleries.

The production ratio of molasses to ethanol is 5:1, meaning that for producing the existing capacity of ethanol (410,400 tons), the industry would require 2.052 million tons of molasses. However, after the expected addition of four units, ethanol production will rise to 632,400 tons, requiring 3.162 million tons molasses. The projected production of 234,000 tons during current year (January to December 2007) would require around 1.25 to 1.3 million tons molasses. The industry is expected to produce around 234,000 tons in 2007 as compared to 165,405 tons produced in 2006, valued at \$100.6 million at an average rate of \$570 to \$590 per ton.

Currently, distilleries are operating at 60 percent capacity. Despite the fact that sugar industry's profitability has improved after entering into ethanol production, the viability of producing more ethanol depends on world oil prices as it is being used as an alternative fuel to supplement regular POL products. The export of molasses is declining and more than 90 percent production is now being used to produce ethanol.

**Ethanol Export:** There has been a consistent increase in ethanol exports for the last eight years indicating that distilleries are converting larger volume of molasses into value added ethanol.

Year	Ethanol Export (tons)
2000	20,841
2001	32,800
2002	34,888
2003	61,710
2004	99,711
2005	122,104
2006	165,406
2007	234,000 (projected)

**Current Marketing trends:** During the last three months, Pakistan entered into export contracts for around 108,000 tons of ethanol, whereas last year entire export volume was at 165,406 tons. Exporters are receiving export contract prices in the range of \$540 to

\$550 per ton of ethanol. Against this, molasses is being quoted at around \$61 per ton in the world market. It is expected that higher volumes of ethanol will be produced considering the rising world oil prices.

**Transportation and Storage:** Being an inflammable commodity, ethanol needs extra care in transportation and storage stages. There are specially built liners with a loading capacity of 3500 to 4000 tons for carrying ethanol. Similarly extra care has to be taken during storage and tanks have to be segregated by walls as a safety measure in case of fire. Moreover, storage areas need to be fully equipped with fire-fighting equipment to counter fire hazard.