

Ethanol blending programme – still a distant dream ...

Ethanol can be mixed with the gasoline (petrol) to make it relatively environment-friendly fuel. Ethanol contains oxygen which helps the engine to combust the fuel completely and reduces the greenhouse gas emissions. Thus, to reduce the dependence on imported fuel and greenhouse gas emissions, Government of India (GoI) announced the ethanol blending programme (blending of ethanol with petrol) in 2002. Since then, the government has made various changes in the blending programme to ensure that the country can meet the set target of 20 per cent blending rate of ethanol by the end of 2017 in a phased manner. In October 2007, a 5 per cent blending programme was made mandatory. However, it still remains a distant dream due to deficient ethanol supply in the country.

Ethanol can be either produced synthetically from ethylene and coal or through the fermentation route using potatoes, grains, corn, wood and sugarcane crop. In India, molasses, the by-product of sugarcane derived during the process of manufacturing sugar, is used as a feedstock for producing ethanol. The sugarcane based ethanol can be produced by three different routes: a) directly from sugarcane juice b) from 'B' grade molasses c) from 'C' grade molasses.

In sugar manufacturing process, sugar is crystallised from a concentrated juice in three separate stages. At each stage, three different grades of sugar and molasses are produced. In the first stage of crystallisation, sugar derived from a concentrated juice is known as 'A' grade sugar and the non-crystalline fraction is known as 'A' grade molasses. In the second stage of crystallisation, the 'A' grade molasses is further processed to obtain 'B' grade sugar and 'B' grade molasses. Subsequently, 'B' grade molasses is fed in the third stage of crystallisation to obtain 'C' grade sugar and 'C' grade molasses which is not crystallised further.

'B' grade molasses route can be a feasible solution to augment ethanol supply but is less profitable for sugar mills and hence not adopted...

In India, primarily 'C' grade molasses is used for producing ethanol. Alternatively, to increase supply, it can be produced directly from sugarcane juice or from 'B' grade molasses. Due to higher sucrose content, ethanol produced from one tonne of 'B' grade molasses is much higher (about 350 litres) as compared to about 240 litres produced from one tonne of 'C' grade molasses. In fact, the direct route i.e. using sugarcane juice can yield almost 7-8 times the

volume of ethanol which can be produced using 'C' grade molasses. CARE Research has analysed economic viability of producing ethanol through these routes. The following table shows the comparison of profitability under sugar plus molasses route and the direct route:

Comparison of profitability under different grades of feed stocks used for ethanol production:

For sugarcane crushed -			100 tonnes
Production	'C' Molasses	'B' Molasses	Direct route
Production			
Sugar (tonnes)	10.40	8.50	0.00
Molasses (tonnes)	4.50	6.00	15.00
Ethanol Production (litres)	1,080	2,100	7,500
	(in Rs.)		
Revenue			
Sugar	3,00,248	2,45,395	0
Ethanol	29,160	56,700	2,02,500
Total Revenue	3,29,408	3,02,095	2,02,500
Cost			
Sugarcane Cost	2,50,000	2,50,000	2,50,000
Conversion cost of sugarcane into sugar	31,200	25,500	0
Conversion cost of molasses into ethanol	4,860	9,450	33,750
Total Production Cost	2,86,060	2,84,950	2,83,750
Profit/Loss	43,348	17,145	(81,250)
Source: CARE Research			

The production of ethanol through 'B' grade molasses is a feasible option which can also fulfil the demand of ethanol for 5 per cent blending rate. However, this route is less profitable for the sugar companies compared to ethanol production through 'C' grade molasses.

Currently, GoI does not allow production of ethanol directly from sugarcane juice. If this route is allowed in India and sugar manufacturers opt for this option, then the country can easily meet the target of achieving 5 per cent blending rate. However, at the current regulated ethanol prices, production of ethanol directly from sugarcane juice is a loss making proposition and is not economically viable.

The major hindrances in implementing ethanol blending programme are:

- **Inadequate availability of raw material**

Ethanol is primarily produced using sugarcane molasses, which is directly dependent on the sugarcane crushed by the sugar mills. Due to the cyclical nature

of the sugar industry, huge fluctuation has been observed in the availability of molasses thereby disrupting the supply of ethanol for blending programme.

- **Pricing mechanism**

The price at which the oil marketing companies should procure ethanol from sugar mills is decided by the government for a particular period. The price fixed by the government is neither determined on the basis of competitive market dynamics nor is it linked to the gasoline price. This, in turn has reduced the ethanol availability to a certain extent.

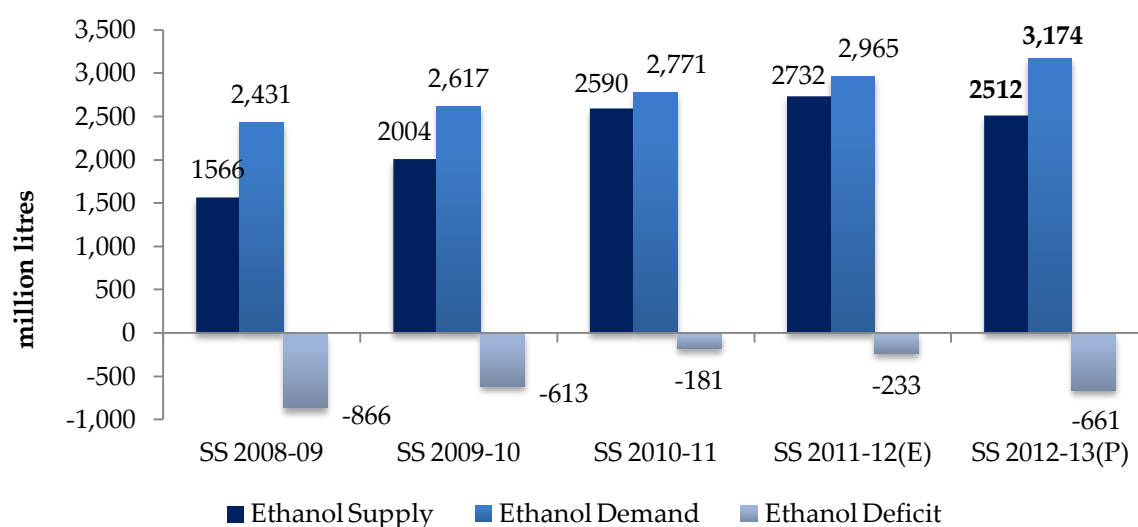
- **Competitive usage**

Ethanol is also used extensively by the chemical industry and manufacturers of potable alcohol. On account of the higher prices offered by the chemical industry and potable alcohol manufacturers, sugar mills have been diverting ethanol to these users. Currently, oil marketing companies are offering Rs.27 per litre of ethanol as against Rs. 34 per litre offered by the other competitive users.

With the current practise of using ‘C’ grade molasses, the country can achieve just 3 per cent blending rate...

In SS 2010-11, sugarcane production and sugarcane crushed by sugar mills increased substantially by 16 per cent and 29 per cent on a yoy basis, respectively. Despite of surplus sugarcane production, the country was not successful in achieving the target of 5 per cent ethanol blending. Inorder to achieve the target of 5 per cent blending rate, the country would require about 1,100 million litres of ethanol in SS 2011-12. However, CARE Research estimates that the industry will be able to meet only 80 per cent of this demand.

Ethanol demand and supply



Source: NFCSF and CARE Research

CARE Research expects that, in SS 2012-13, achieving 5 per cent blending rate is unattainable given the rising demand for petrol and lower availability of sugarcane. In SS 2012-13, the total ethanol demand (demand from potable alcohol + chemical manufacturers + oil marketing companies) is estimated at about 3,174 million litres as against the total ethanol supply of 2,512 million litres.

CARE Research estimates that, the total ethanol supply in SS 2012-13 using 'C' grade molasses route will be just sufficient to reach a level of 2.5-3 per cent blending rate.

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