Brazil: Just Not That Into Second-Generation Biofuels

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While the US and the EU - two of the largest biofuel-consuming-and-producing markets of the world- are moving towards the introduction of second generation or advanced biofuels, Brazil, the second largest producer, does not foresee production or legislation to promote cellulosic or advanced biofuels in the next ten years.

Global biofuel production has grown sevenfold since 2000, and today biofuels provide 3% of road fuel transport by energy basis. According to the International Energy Agency (IEA), in 2010 the biofuel contributing percentage was particularly higher in Brazil, US and the EU, with 20.1%, 4.4% and 4.2% respectively. The IEA, the US Energy Information Administration and even the major oil companies like Exxon and BP, predict a higher biofuel share in the future. BP expects biofuel consumption in Brazil to be around 38% by volume and in the US, 24% of road transport by volume in 2030. Following US and EU biofuel legislation, cellulosic ethanol and other advanced biofuels are expected to play an increasing role in global biofuel production and consumption.

However, Brazil is not as eager to join the race for the development and commercialization of second- generation and advanced biofuels as the other main producing countries/regions, despite having the largest share of flex fuel cars in the world, the highest ethanol blend percentage mandate and consumer awareness of ethanol´s positive impacts.

The long history of ethanol use and the two ´revolutions´

Brazil has a long history of ethanol implementation that started since the first blending mandate in 1931. In the South American country, ethanol is derived from sugarcane in two ways: as hydrous ethanol, used as a complete fuel substitute (E100) and anhydrous ethanol (in proportions up to 25% mixed with gasoline E25). In Brazil there have been two major revolutions that have substantially increased the use of sugarcane ethanol in the country which created a large first generation ethanol market.

The first revolution was the government Proalcool programme in the 1970´s. During this programme ethanol as a fuel substitute was first introduced along ethanol-run cars (made only in Brazil).This programme increased the ethanol blending mandate from 4.5% in 1977 to 15% in 1979, it also pushed ethanol-powered cars reach 90% of total cars sold in Brazil in 1983. Although the Programme was abandoned due to ethanol shortage and lower oil prices, it provided the country with wide ethanol infrastructure adaptations for distributing, transporting and selling this type of biofuel at pump stations.

The other great change in the Brazilian ethanol market took place when the flex-fuel cars became available in 2003. This type of vehicle has a new engine that can take any combination between hydrated alcohol and gasoline. In 2003, only 2.6% of new manufactured cars were flex fuel type; but by 2010, nearly 80% of all cars produced in Brazil were of the flex fuel-compatible. In contrast to the US market, where not more than 5% of cars are Flex Fuel, Brazil has the largest market flex-fuel fleet (over 11 million) representing nearly 50% of all cars in use in Brazil a trend that is expected to increase to 83% by 2021. The large share of flex-fuel cars prompted a substantial increase in both anhydrous (blending component) and hydrous (substitute fuel) ethanol demand.

The ethanol market share within the light vehicle fleet fuel market has also reached a large proportion, attaining more than 50% in 2009 (a historic record for an alternative fuel). However, the aftermath of the 2008 crisis generated a downturn in the production and consumption of both type of ethanol fuels. The mismatch between the country´s domestic supply and demand resulted in ethanol imports from the US in 2011. Since 2012, domestic production has recovered, but the government does not expect a swift recovery to levels before the crisis. Brazil had in 2012 an ethanol market of 23.5 billion litres, down from 28 billion litres in 2010.

The sugarcane feedstock advantage

Brazil´s sugarcane ethanol has been characterized as the most efficient source of first generation biofuel available, providing more than 60% reduction of greenhouse gas (GHG) emissions compared with gasoline. Current US biofuel legislation FS(2) consider sugarcane ethanol as an “advanced fuel” due to the fact that it reduces more than 50% of GHG emissions and therefore provides an opportunity to export to the US market. Moreover, the removal of the US ethanol import brought an extra incentive to spur ethanol production in the South American country.

Stuck on first-generation, missing drivers and lacking second-generation policy

Despite the recent US market incentives, the largest flex-fuel share in the world and the highest anhydrous blend, Brazil has not generated stimulus to follow the US and EU´s examples for advancing legislation for the development of cellulosic ethanol and other advanced fuels. The missing drivers for such endeavour are related to characteristics of the Brazilian sugarcane ethanol, which already provide high reduction of GHG emissions and to the lack of interest of pursuing the biotechnological route by the Brazilian government.

Brazil, which has had difficulties supplying their local market since 2011, has done very little to promote the development of cellulosic or other advanced biofuels. There is currently a lack of legislation in place that sets targets for the production and incorporation of the cellulosic or advanced biofuels in

the Brazilian transport mix for the next decade. Brazil´s Ministry of Energy, in its ten year plan for 2012-2021 does not foresee second generation production in Brazil in 2021. It expects all 61 billion litres of ethanol production in 2021 to come from conventional sources.

There have been few projects seeking to develop new advanced technologies using sugarcane feedstock both from government funded institutions and other private companies. However, not surprisingly, numerous projects are being developed by international companies such as Novozymes, Butamax, Dupont, Petrobras, Abengoa which are among a selected group that are in the process of receiving up to 70% of credit of their total costs from the 880 million USD PAISS program, a program financed by the National Brazilian Development Bank (BNDES) and FINEP (National Innovation Funding Agency) for developing sugarcane-based advanced biofuels.

Graal Bio, in partnership with an Italian firm Beta Renewables, claims to have the first cellulosic plant of its type in South America; they are expected to be fully operational in 2014 and produce 82 million litres of ethanol per year. They plan to export their production to the United States.

Conclusion

First, the development of first generation ethanol implementation has not provided stimulus to spur cellulosic or advanced biofuel legislation and development. Second, if cellulosic or other advanced biofuels are to be developed to large scale and play an important role in the future fuel transport mix, Brazil should be taking more steps into the promotion of such fuels, helping to diversify the feedstock sources as it currently does with sugarcane in first generation.

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The views and opinions expressed in this article are those of the author only. Available online at: http://theenergycollective.com/nelsonmojarro/282571/brazil-just-not-second-generation-biofuels

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