

# IOCs finally start walking the talk on biofuels

BY ROGERIO MANSO

FORMER EXECUTIVE VICE PRESIDENT, BRENCO AND FORMER EXECUTIVE DIRECTOR, PETROBRAS



Oil companies have recently acquired positions in sugarcane ethanol in Brazil. After BP's soft-start, joint-venturing with start-up company Tropical BioEnergia, the boldest step was taken by Shell who announced a joint venture with Brazil's largest sugar-cane crusher, Cosan. That was followed by Petrobras' announcement of its US\$920 million investment in Açúcar Guarani, a sugar and ethanol producer in Brazil.

Because of earlier developments by international oil companies to adapt their logistics to handle ethanol in most parts of the world, it seems like a logical step to establish positions and construct an international supply chain that will transform today's fragmented ethanol markets into a more integrated and global marketplace. Some important supply links are still missing, and have been on the drawing board for quite some time, particularly pipeline systems which are designed to enhance transportation efficiency and reliability.

Brazil, the main exporter of ethanol, for example, is heavily dependent on truck transportation and still uses small chemical tanks to store ethanol. Exports are still predominantly made by chemical carriers and demurrage and road congestion remain important issues for ethanol exporters. New supply systems are expected to become operational by the middle of this decade and will significantly improve this situation. In the US, where ethanol moves mostly by rail, there are places like California where bottlenecks for waterborne ethanol imports are relevant.

Market access, however, remains a major hurdle. In spite of encouraging advances over recent years, stemming from the establishment of US RFS, California's Low Carbon Fuel Standard (LCFS), European mandates or even China's reduction of import taxes on ethanol, there are still significant hindrances to a global and integrated fuel market.

In the US, RFS targets are still limited by blend walls, waiting for EPA's position on increasing the blend ratio to somewhere between 12 and 15 per cent, well below Brazil's long-standing 25 per cent blend. In Europe, with the exception of a few countries, like Sweden, who are open to imports, not many additional imports are to be expected in the next few years, because the increase in local demand has already been taken up, mainly by new plants in Rotterdam and the UK.

China is probably the one country set to benefit most from ethanol opportunities because its oil companies will start looking at opportunities to bring in cleaner fuels to complement their own production which is limited by land and water factors.

As a result of uncertainties related to market growth, investment in new capacity has gone down significantly and forecasts for increases in production over the next five years fall well below potential. Financial backers of the

ethanol industry, from equity and debt side, cut credit lines dramatically during the recent crisis, and it is a situation that is not seen as improving soon.

It is interesting to note that, while many developed countries drag their feet and remain entangled in local issues which limit their ability to significantly increase their use of ethanol and other cleaner fuels, Brazil's demand for this fuel continues to grow strongly at double-digit rates, aided by a few intuitive and simple factors which have been present from the inception of the ethanol programme, more than 30 years ago. Although market mechanisms have dominated the recent increase in demand for ethanol, markets have been free to function because the underlying conditions have been present.

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A main factor supporting the ethanol market in Brazil has been government intervention to ensure coordination of changes across the value chain.

Brazil's ethanol programme was started in the seventies with incentives for sugar producers to invest in new capacity through favourable financing. As new production came on-stream, Petrobras, a government-controlled oil company was made responsible for moving ethanol throughout a country of continental dimensions using its pipelines, tankers and terminals. At the same time, ethanol supply became mandatory across the country, and the automotive industry was stimulated through lower taxes to provide the market with ethanol-dedicated engines. At service stations, designated pumps were and remain available for pure ethanol (E100) delivery.

Acting simultaneously on all links of the supply chain, Brazil has set a new paradigm in renewable energy (it is already a leader in hydropower generation). Today, ethanol is responsible for over half of the fuel supplied to light vehicles, with obvious positive consequences to air quality at city levels and also lower CO<sub>2</sub> emissions and high CO<sub>2</sub> capture.

What is surprising is that, in spite of this model being around for more than 30 years, it is still little known throughout the world. Today, all Brazil's 'gasoline' is in fact a 75/25 blend of gasoline and ethanol (E25): all of the service stations also sell pure ethanol (E100) and, for the past few years, more than four out of five new cars sold in Brazil are flex-fuel vehicles, which can run on any gasoline and ethanol blend. Those who are price-conscious and fill up with the most economical fuel



will normally not be able to work out what the blend ratio is on their car tanks, if alternating fill-ups between 'gasoline' (E25) and ethanol (E100).

To Brazilians, it comes as a surprise that most foreigners fail to understand that cars can and do run on ethanol, and that those that do understand are often bombarded by misconceptions propagated by those who see ethanol as a threat.

Take the fuel v food debate, for example. While Brazil is a country 200 times the size of the Netherlands, for example, sugar cane for ethanol production is grown in an area which in aggregate is smaller than that of the Netherlands. Brazil has the largest inventory of degraded pasture lands in the world, enough to be occupied by additional food and energy crops, without even needing to advance into protected areas of the Amazon, a place unsuitable for sugar-cane growth, for climatic reasons.

Going back to oil companies, why is the movement led by Shell relevant? First, because the financial commitments made by these oil companies confirms that sugar cane is the most efficient, cost-effective feedstock for ethanol production and that Brazil will be the major player in this field in the foreseeable future. Sugar-cane ethanol yields 8 units of energy output for every 1 unit of energy input, while corn ethanol yields less than 2:1.

Second, as major gasoline producers move into this market, they will help arbitrate investment decisions in their refining systems where gasoline directly competes with ethanol. Reducing gasoline production demands costly adjustments in refinery configuration and may ultimately lead to the closure of inefficient units, but it also brings opportunities to optimise octane levels and reduce sulphur, aromatics and particulates emissions at a lower cost.

Third, it signals a change in the oil companies' practice of waiting for breakthroughs in biofuel yields (so-called second-generation biofuels), and suggests they now realise that an efficient platform of production is needed if they are to benefit from future innovations. It may also signal a view that important evolutions are just around the corner. Pilot plants are already being established in Brazil by venture capitalists with the objective of using engineered yeasts to produce not ethanol but diesel-type fuels from sugar. And jet fuel and petrochemicals will follow.

But it would be difficult to see this movement by international oil companies unrelated to expectations of a growing international trade in ethanol. Once cost, reliability and sustainability of the project have been taken care of – obviously through continuous investment, it is the growth of foreign markets that remain the biggest uncertainty. But, that is something that the major oil companies, more than any other agents, are able to understand



*Brazil's demand for sugarcane-derived ethanol continues to grow strongly at double-digit rates*

and it is they who can act to boost trade.

Not only are they close to consumers in the main consuming countries, but they are also more able to engage foreign automotive engine producers, with whom they have a long history of cooperation, into supporting strategies consistent with the introduction of biofuels. It is very difficult, for example, to understand why all cars produced today around the world are not flex-fuel vehicles, as in Brazil, for it is certain that during the next decade, biofuel mandates will inevitably demand that cars are capable of consuming oxygenates. Suffice to say that the flex-fuel cars produced in Brazil are made by manufacturers like: Toyota, GM and Volkswagen that have production lines in Japan, US and Europe respectively. Of course, there are many other manufacturers too.

In short, the participation of international oil companies in the production of sugar-cane ethanol in Brazil is an important sign of progress towards a new and higher level of participation in biofuels in the world energy matrix. However, we must not forget that this is an industry which has developed on the fringes of the mainstream fuels markets, and often in direct competition with oil majors, a situation yet to be settled. Progress in this area will, although benefiting from these new contributors, continue to depend on the efforts of the established ethanol players as well as of those who see this as a next generation fuel – cleaner and more socially and environmentally acceptable. Apart from industry itself, governments will need to, through incisive legislation, play a leading role in stimulating continued growth and access to markets in the biofuels area. □