For a Sustainable International Fuel Ethanol Market

by Dr. Sergio C. Trindade
SE^{2}T International Ltd., USA

Today, there is no international fuel ethanol market, although, over the past ten years there have been occasional transactions, limited to Brazilian imports from various sources, particularly from the USA. It would however be possible to establish a sustainable international market for fuel ethanol by 2005, but this would take considerable political will, skillful negotiations, systematic effort and focus to build a consensus among the key stakeholders.

Introduction

Ethanol can be obtained from biomass feedstock (bio-ethanol), originating from agriculture (sugarcane, corn, cassava, rice, etc.), forestry as well as rural and urban residues. Ethanol can also be obtained from fossil feedstock such as natural gas, petrochemical naphtha and coal. Ethanol markets include:

- fuel markets (neat fuel, blends with hydrocarbons or converted to ETBE)
- industrial markets (solvents and chemical feedstock)
- beverages markets (based on agricultural bio-ethanol)

Until 1975, the year of the launch of the Proalcool programme in Brazil, the ethanol market was predominantly beverages and industrial. From then onwards, the fuel ethanol market developed fast and today accounts for some 60 percent of the world consumption (Figure 1). The latter has fluctuated at the level of 30-35 million m^3/yr, with an economic value ranging from US$ 9 to 12 billion. The main world producers in 2001, in million m^3/yr were Brazil (11.4), the USA (7.3), China (3.1), European Union (2.2), India (1.8), Russian Federation (1.2), Saudi Arabia (0.39), South Africa Customs Union (0.39) and Thailand (0.12) (Figure 2).

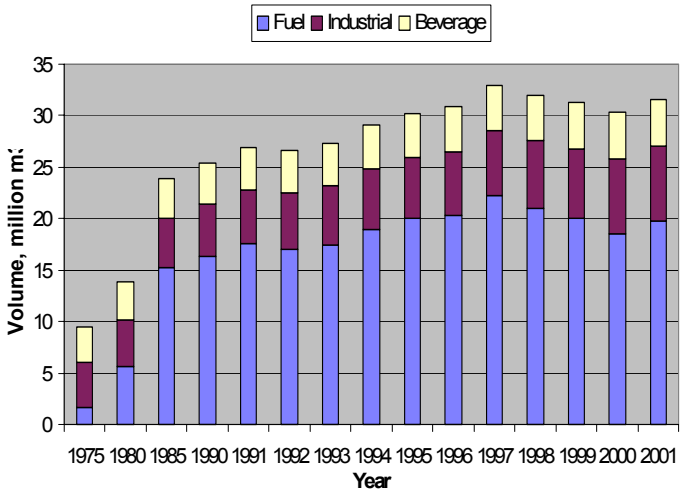

Figure 1: World ethanol markets

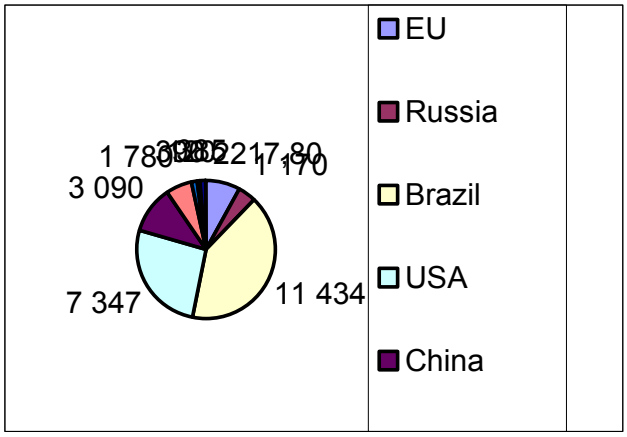

Figure 2: Major ethanol producers in 2001 (in thousand m^3)

International ethanol trade

During 1992-2001, the total international trade of ethanol in the fuel, industrial and beverage markets varied in the range of 2.4 to 4.2 million m^3/yr. Trade was dominated by fuel ethanol transactions, particularly the Brazilian imports. Trade has represented between 7-15 percent of world ethanol output of all types. In 2000, the largest exporting regions were Europe (29.1 percent), the Americas (28.8 percent) and Asia (21.4 percent), for a total trade of 3.36 million m^3. In 1996, for a total trade of 4.16 million m^3, the shares were as follows: the Americas (39.6 percent), Europe (25.7 percent) and Asia (13.9 percent). Back in 1992, the trade distribution replicated that of 2000, with Europe (30.8 percent) leading, followed by the Americas (25.4 percent) and Asia (25.2) for a total trade of 2.43 million m^3. Figure 3 displays the world exports by continents.

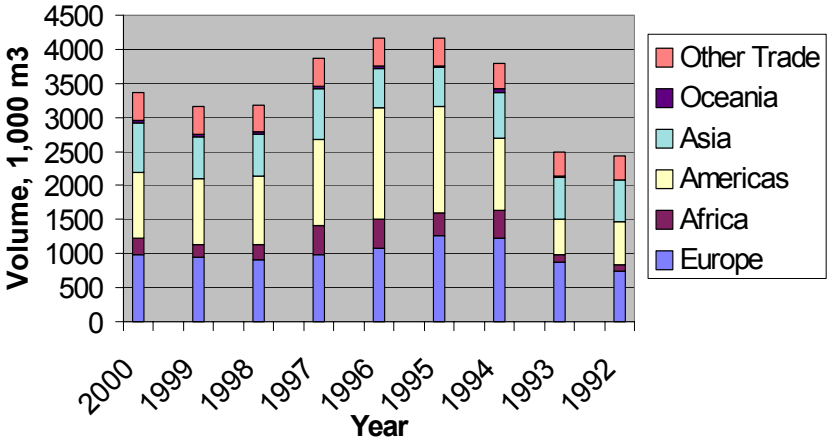

Figure 3: World ethanol exports

Considering specifically the international trade of fuel ethanol, the only importers during 1980-2001 were Brazil and the USA. But, the latter shut off the door to fuel ethanol imports in the middle of the '80s, except for the CBI (Caribbean Basin Initiative) regime. The fuel ethanol exporters during the same period of time were Brazil, the USA, Saudi Arabia, South Africa, the CBI (re-exporters mainly) and the EU (via the CBI).

Opportunities and Strategies

In the long run, to promote a sustainable international ethanol fuel market, it will be crucial to emphasize the common interests of the key stakeholders. These are ethanol producers, consumers and other ethanol economy stakeholders, such as farmers, oil refiners, automakers, governments, banks and NGOs in the relevant countries, namely, Australia, Brazil, Canada, China, Colombia, France, Germany, Mexico, Spain, Sweden, Thailand and the USA. It is necessary to find a consensus space, where all the conflicting interests of the stakeholders can be resolved and subsumed, thus promoting a gradual freeing up of the international ethanol fuels market. The prevailing subsidies in the national fuel bio-ethanol markets, in the USA, Europe and other countries, cause a great distortion in the market and prevent the free flow of fuel ethanol. As a matter of fact, presently, there is no international market for fuel ethanol. There have been, of course, over the past decade, occasional transactions, mainly between Brazil and the USA, in times of domestic supply shortages in Brazil. As the almost sole participants of the international ethanol fuel transactions, and the prominent world producers, Brazil and the USA bear special responsibility for initiatives to free the international market. All other countries, which import ethanol, use it in the industrial and beverage markets.

Possible evolution of the international fuel ethanol market

In the years to 2005, the USA ethanol fuel market may grow rapidly. This would be the result of the banning of MTBE as the provider of oxygen in reformulated gasoline (RFG), first in California and then in the East Coast and eventually all over the country. Although the MTBE phase out date in California has been moved to 31 December 2003, BP, Shell, Exxon/Mobil have joined Phillips/Tosco in substituting fuel ethanol for MTBE in RFG formulation, beginning with the winter gasoline season of 2002. These refiners represent about 60% of the gasoline market of California. This market penetration alone is of the order of 1.8 million m^3/yr of fuel ethanol. If the remaining main refiners, Chevron/Texaco, Valero and Tesoro convert to fuel ethanol, the market could reach 3 million m^3/yr. The US East Coast market is estimated at the same level of 3 million m^3/yr of fuel ethanol, if its MTBE replacement potential is fully realized, but would build up gradually from 2004.

Ongoing developments in the US Congress might have a significant impact on the size and geography of the USA fuel ethanol market. The US Energy bill, presently under negotiation by a House/Senate conference, would remove oxygen requirement from RFG formulation, but would mandate a Renewable Fuels Standard (RFS), which if enacted into law, may increase the USA fuel ethanol market to some 18 million m^3/yr.

During the same timeframe a number of countries in Latin America, Asia, Europe and Oceania might expand their ethanol producing capabilities to respond to their emerging domestic ethanol fuel markets. Figure 4 sketches a possible evolution of the world ethanol market driven by the expansion of fuel ethanol, in line with the trends mentioned above.

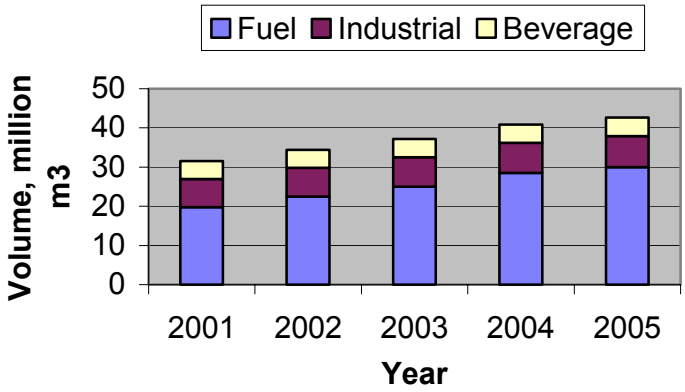

Figure 4: World ethanol markets, 2001 - 2005

The following five years (2006-2010) will be affected by deliberations within the European Union. In November 2001, the Commission of the European Communities presented a Communication and two Directives with respect to the promotion and fiscal incentives to bio-fuels in the EU.

The Communication refers to ‘alternative fuels for road transportation and to a set of measures to promote the use of biofuels’ (COM (2001) 547 final) and the proposals for Directives refer to ‘the promotion of the use of biofuels in transportation’ (2001/0265 (COD)) and to ‘amending Directive no. 92/81/CEE with regard to the possibility of applying a reduced rate of excise duty on certain mineral oils containing biofuels and on biofuels’ (2001/0266 (CNS)).

The European Union's new measures to promote the use of 'green' transport fuels will soon become law, when formally signed in May 2003 by the President of the European Parliament. This new legislation, which was given the green light by the Council of Ministers on 8 April 2003, lays down targets for the progressive introduction of biofuels derived from agricultural, forestry and organic waste products between now and 2010. Member States now have until 31st December 2004 to transpose the Directive into national law.

The adoption of this Directive is a further a step in the European Union's quest for alternatives to petrol and diesel and will enable progress towards a more sustainable transport system for the future. For the first time, each Member State will have to set targets for the market share of biofuels. These targets will have to be based on challenging benchmarks set by the Directive: 2% market share by December 2005; 5.75% market share by December 2010. Any country setting lower targets will have to justify them using objective criteria.

This new EU biofuels directives will contribute to the emergence of domestic ethanol markets in various countries. It may lead to the production of surpluses or deficits, which would reinforce the incipient international ethanol fuel market, which in the immediately preceding years was confined to occasional imports by Brazil from the USA. Evidently, the protectionist regimes, which might have been established in the emerging fuel ethanol countries, would have to be relaxed, at least partially, for the international market to establish itself and grow.

From 2010 onwards, the future of the ethanol fuel market is influenced by the following long-term driving forces:

LONG-TERM DRIVING FORCES

- CLIMATE CHANGE AND KYOTO PROTOCOL COMMITMENTS
- SUSTAINABILITY OF DOMESTIC FUEL ETHANOL MARKETS
- FREEING OF FUEL ETHANOL TRADE
- EU MARKET EVOLUTION
- CONTINUITY OF RENEWABLE FUEL MANDATES IN USA AND EU
- RENEWABLE FUEL ALTERNATIVES
- TECHNOLOGICAL PROGRESS AND MARKET EVOLUTION (e.g. FUEL CELLS, FFVs CELLULOSIC FEEDSTOCKS)

Motivation, obstacles and solutions for the international fuel ethanol market

A sustainable international fuel ethanol market is desirable, in the short term, for countries with existing large-scale bio-ethanol programs, such as Brazil and the USA. It would provide a means to balance domestic supply and demand and limit the risks resulting from failures of harvests that supply the feedstock for the production of ethanol. It would also control the temptation of short-term attractive prices in the ethanol co-product markets, as cane sugar in the Brazilian case and high-fructose syrup in the American case.

Nevertheless, there are obstacles, as well as opportunities, for the creation of a sustainable international fuel ethanol market. One key obstacle is the motivation of domestic fuel ethanol programs, whose objective is to support national agriculture and to find non-food markets for agricultural output, which originate the subsidies and other protective measures by national governments. Thus, a free fuel ethanol market can be construed as a threat to national ethanol production by foreign producers, either more efficient or more subsidized than the domestic producers.

Another difficulty is the difference in the scale of production and consumption of the two largest markets currently, Brazil and the USA, and the other national producing and consuming markets. This imbalance makes it difficult, for instance, to provide fuel ethanol to Brazil, when occasional supply shortages occur in that market. In the Brazilian case, future occasional deficits could be balanced by varying the ethanol content in gasoline blends, as has happened in the past. However, this tactic alone would not resolve neat ethanol shortages. The international market could certainly play a role balancing short-term deficits in certain national markets with surpluses in other domestic markets.

A possible solution, which would reconcile national agricultural interests in expanding national fuel ethanol markets, as seems to be the USA case, would be the establishment of contingent markets. For instance, the US West Coast, and perhaps the US East Coast, could have access to fuel ethanol imports, with dispensation, temporary or permanent, from the onerous tariff wall. Meanwhile, the US Midwest, the largest US producing area would remain closed and protected from imports. As previously mentioned, should the RFS pass the US Congress, the US Midwest market is likely to become an even larger fuel ethanol market in that country.

Another initiative, which would promote a sustainable international fuel ethanol market, would be to stimulate the emerging producing countries to create growing national markets that, from time to time, would produce surpluses or suffer deficits. The international market so created, with a larger number of players than just Brazil and the USA, would be much more sustainable than the present situation, where there are occasional transactions, but no market.

Future Trends

Looking into the future, one would expect a growth in the demand for fuel ethanol during 2001-2010 in a few countries. The **USA** market will be stimulated by the banning of MTBE; the establishment of the RFS; policies to sustain non-food markets for farmers; to some extent lessen dependence on imported oil; and even climate change, if California law no. 1493 is replicated throughout the country. In **Brazil**, ethanol is a standard component of gasoline, and there is a sizable neat ethanol fleet. The market there is likely to grow as a result of the growth of the automotive gasoline fleet and perhaps the neat ethanol market revival, and even the prospect of flexible fuel fleets. The market in the **EU** may grow as a consequence of the Directives on bio-fuels, stimulated by concerns over the local and global environment; support to non-food markets for agriculture; the wine ethanol regime; climate change mitigation, and, to some extent, security of supply. **Thailand** has the rudiments of a national fuel ethanol program, to respond to the need to support agriculture, through non-food markets; to attenuate balance of payments issues; to improve local urban air quality and to lessen dependence on imported oil. **Mexico**, a country that belongs to the NAFTA free trade area with Canada and the USA, and is a net oil exporter, may feel encouraged to develop fuel ethanol production to supply California needs; to support local non-food agriculture and to improve local urban air quality. **Colombia**, **Australia**, **India** and **China** may expand their incipient fuel ethanol markets motivated by agricultural and environmental concerns.

Obviously, the process of implementing a sustainable international fuel ethanol market implies the removal of the present tariff and non-tariff barriers to imports. In the immediate future (2002-2005), the only potential importers of fuel ethanol are Brazil and the USA. The potential exporters will possibly be Brazil, the USA and the other participants in the occasional transactions of the recent past, namely Saudi Arabia, South Africa, the CBI countries and the EU wine ethanol via the CBI.

Global Ethanol Coalitions

Brazil and the USA are the natural leaders of initiatives to implement a sustainable international fuel ethanol market. One way of exercising this natural leadership would be to get the private and public sectors of both countries organized to rapidly achieve this objective. It is possible to visualize such a process, guided by a stakeholder consensus-based strategy and supported by "Global Ethanol Coalitions (GEC)". These would gather both government and the private sector of Brazil, the USA, and the emerging ethanol producers (Canada, China, Colombia, EU, India, Mexico, Russian Federation, Saudi Arabia, South Africa and Thailand). These GECs would facilitate platforms of dialogue, negotiation and partnership to explore common interests and mutual benefits. A key task of these platforms would be to stimulate large-scale fuel ethanol production in emerging markets, to satisfy growing domestic demand in a variety of countries, thus building up a common interest in sustainable international markets, which accommodate surpluses and deficits of domestic outputs.

Political initiatives in Brazil, the USA, the EU and the other countries would surely be needed to promote a sustainable international market for fuel ethanol. Perhaps, in the beginning, import markets could be limited to satisfy the immediate concerns of local agricultural interests, but gradually engaging them in the benefits accrued by an expanded market. Bilateral and multilateral negotiations will be required among all interested countries to free markets for fuel ethanol, in the context of the present World Trade Organisation (WTO) round, the Free Trade Area of the Americas (FTAA) process and the Kyoto Protocol.