

USE OF BIO-FUELS IN BRAZIL

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ABSTRACT

Although the use of bio-fuels in Brazil can be traced back to the 1920s, the real stimulus for the bio-fuels industry development occurred during the 1970s due to the oil crisis. Oil prices increased rapidly, creating much concern over the security of national energy supplies and balance of payments. Brazil therefore created in 1975 its National Alcohol Program named "PROÁLCOOL" which aimed the partial substitution of gasoline and also the revitalization of the sugar cane industry. Production of bio-ethanol from sugar cane became the heart of the program and both ethanol-gasoline blends and neat ethanol became available to the public nationwide. Since then the production of bio-ethanol has increased considerably reaching in the 2003-2004 crop season 14.7 billion liters. Presently all automotive gasoline in Brazil contains 25% anhydrous bio-ethanol while hydrous ethanol is consumed by a fleet of approximately 2.4 million cars that operate exclusively on this fuel. Bio-ethanol represents already almost 25% of total automotive fuel demand and the recent introduction of flex-fuel vehicles into the marketplace represents an opportunity to further expand its use in Brazil.

The consolidation of bio-ethanol as an important source of energy is linked to the creation of about one million direct jobs and an extensive agribusiness supply chain that has been contributing to rural and industrial development. Also bio-ethanol has helped to improve air quality in urban areas due to its much lower pollution characteristics and it has been regarded as an important alternative to greenhouse effect mitigation. Actually under Brazilian typical production and demand conditions bio-ethanol avoids the emission of 2.6 tons of CO₂ equivalent /m³ for the anhydrous grade while for the hydrous grade the value is 1.7 tons of CO₂ equivalent /m³. Furthermore the energy balance of the bio-ethanol cycle is highly favorable resulting in a net output of 8.3 units of energy for each unit of energy input.

Based on the successful experience of bio-ethanol Brazil is just starting a biodiesel program that aims basically to reduce imports of diesel oil, stimulate social development of poor rural areas, mainly in the Northeastern part of the country, and reduce emissions from diesel-powered vehicles. Starting in 2005 production and use of biodiesel will be encouraged by a comprehensive policy that is being finalized by the Federal government. Initial demand of Biodiesel is expected to reach 800 million liters/year and this volume is likely to be used primarily for diesel blends containing 2% biodiesel. It is worth of note that conversely to what happens elsewhere where vegetable oil is processed with methanol to produce methyl ester in Brazil the preferred route for biodiesel production will use bio-ethanol to produce ethyl ester. The environmental advantage is obvious considering that methanol is mainly produced from fossil feedstocks.