Ethanol

Alcohol Fuel Act, Law Decree 17-85, and its Regulations of the Law of Alcohol Fuel, AG 420-85

Status: Active but inoperative by current market conditions of hydrocarbons.

Characteristics

- Price fixing (5% alcohol mixture)
  - Domestic raw materials
  - Fees producer
  - Limit of maximum production (150,000 liters)

Benefits (revoked)

- Import tax exemption
- VAT rate (0%)

Causes: Lack of incentives, less expensive additives, sugar prices, liberation of hydrocarbon prices.
Biodiesel and Biogas

• At present there is no law.

About the Quality of Biofuels

In the context of Central American Customs Union:

• Was developed the Central American Technical Regulation RTCA 75.02.43:07 "Biofuels, Biodiesel (B100) and its blends with Diesel Fuel Oil, Specifications."

  • Indicates quality specifications to be met by biodiesel.
  • Effective October 24, 2007.

• Is under final approval from the RTCA specifications Ethanol Fuel Quality.
Ethanol

The Guatemala raw materials is molasses, a byproduct of sugar cane. Molasses is processed distillery to produce ethanol. In Guatemala there are five distilleries with a capacity of 269 million liters / year.

<table>
<thead>
<tr>
<th>Nombre</th>
<th>Capacidad instalada (lt/día)</th>
<th>Factor de planta*</th>
<th>Días de operación</th>
<th>Produccion anual estimada (litros)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Palo Gordo</td>
<td>120,000</td>
<td>65%</td>
<td>155</td>
<td>18,000,000</td>
</tr>
<tr>
<td>Servicios Manufactureros</td>
<td>120,000</td>
<td>95%</td>
<td>330</td>
<td>38,000,000</td>
</tr>
<tr>
<td>DARSA</td>
<td>250,000</td>
<td>95%</td>
<td>330</td>
<td>79,000,000</td>
</tr>
<tr>
<td>Bioetanol</td>
<td>600,000</td>
<td>95%</td>
<td>155</td>
<td>89,000,000</td>
</tr>
<tr>
<td>Alcoholes MAG</td>
<td>300,000</td>
<td>95%</td>
<td>155</td>
<td>45,000,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1,390,000</strong></td>
<td></td>
<td></td>
<td><strong>269,000,000</strong></td>
</tr>
</tbody>
</table>

Currently, 90% of the alcohol produced is exported to Europe, Central America and Mexico, the rest is used in the country for industrial and food purposes.
During the 2010-2011 harvest, an estimated of 235,000 hectares were planted (Foundacion Solar Analysis).

The average productivity of sugarcane in Guatemala is 93 tons of sugar cane / hectare, this is the highest in Central America making it an important competitor for international markets. (Market Analysis HART-ENERGY)
Biodiesel

The potential feedstocks for biodiesel production are:

- Recycled oils (currently the largest source of feedstock),
- animal Fats
- Jatropha Curcas (pinion)
- African Palm

Note: The oil palm is not used to produce biodiesel, because it competes with the food security in the country and is directly affected by international prices, as their selling price as a food product is much more profitable than fuel product.
Recycled oils are the major source of feedstock for biodiesel producers today. There are several ways from obtaining recycled oil which comes from restaurants and the food industry mainly. The oil must be filtered and treated prior to processing into biodiesel.
Optimal areas for the cultivation of Jatropha Curcas

- We identified over 600 thousand hectares:
  - Vacant land / underutilized
  - Not protected areas
  - No crops replaced
  - Appropriate conditions:
    - Precipitation
    - Soil type

- At present there is Jatropha based on Biodiesel on a small scale, is starting up from such cultivation planting for research purposes to find out their levels of productivity, agronomic management, etc..
Optimal areas for the cultivation of African Palm

African Palm Production in Guatemala beginning around the year 1985. The country is self-sufficient in oil and the main export market is Mexico. It is calculated that there are 553,419 hectares in the country's potential for this crop. The palm area sown for 2010 was estimated at 90,000 hectares.
Biofuel demand scenarios in Guatemala

If it is intended to introduce the use from biofuels in the country, it should be performed as a first step for the transport sector, so that the scenarios for ethanol and biodiesel would be:

**MEZCLA DE ETANOL CON GASOLINA (E10)**

- Consumo de gasolinas: 1,270 Millones de Litros/año
- Demanda de Etanol (E10): 127 Millones de Litros/año
- Oferta de Etanol: 269 Millones de Litros/año
  
  **Superávit:** 142 Millones de Litros/año

**MEZCLA DE BIODIESEL CON DIESEL (B2)**

- Consumo de Diesel: 350 Millones de Galones/año
- Demanda de Biodiesel (b2): 7 Millones de Galones/año
- Oferta de Biodiesel: 1.46 Millones de Galones/año
  
  **Déficit:** 5.5 Millones de Galones/año
Projects

• Private Initiative:
  • Biofuels from Guatemala, working on genetic improvement of Jatropha Curcas.
  • SG Biofuels generate research and technology in the cultivation of Jatropha.
  • CENGICAÑA research and technology generated in growing sugarcane.
  • Grepalma technology researches and produces oil palm cultivation.
Universities:

- **San Carlos de Guatemala:**
  - It develops Jatropha projects, seaweed, algae, animal fats, glycerin and biogas.
- **Galileo:**
  - It develops an assessment of technical and economic prefeasibility of the potential energy of microalgae that pollute the lake Amatitlán.
Sweet Sorghum Project

- Study 5 varieties of sweet sorghum (Top 76-6, M81E, Umbrella, Mictlan, Forage)
- Analysis from agricultural aspects, potential food and ethanol production
- The estimated yield of 6,000 lts / ha / year and 6 tons of cereal (Top 76-6)
- Scenario 1: South Coast 2 crops / year
- Scenario 2: highlands and eastern 3 crops / year
- mechanical analysis
- environmental Analysis
- Currently B30 with good results
• **Institute of Agricultural Science and Technology (ICTA)**
  
  - On the Jatropha curcas have conducted the following studies:
    - Agronomic management.
    - Molecular characterization.
    - Propagation in vitro.

• **National Secretary of Science and Technology (SENACYT)**

  Supported with funding from various research projects related to both the private sector, academic and the public.
Challenges

- Creating the national policy for the use and development of biofuels.
- The necessity of incentives for biofuel having domestic use and is not exported.
- Legislation to regulate the production and commercialization of biofuels.
- Infrastructure development for blending and using biofuels (marketing).
- Suitable standard to solve environmental and social problems generated by the use of the land for bioenergy crops and food production.
Challenges

- That biofuels are part of the energy matrix of the country, due to be an eminently importing of petroleum products.
- Necessity of laboratories to certify the quality of the biofuel.
- Implementation of legal standards, which require complicated negotiations with all sectors involved and strong interests in the fuel market.
- Creating the research line oriented the country main energy crops.
Thanks for your attention!

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