Date: 3/9/2012
GAIN Report Number: CI1210

Chile

Post: Santiago

Evolution of biofuels in Chile

Report Categories:
Biofuels

Approved By:
Rachel Bickford, Agricultural Attaché
Prepared By:
Nelson Ramirez, Agricultural Specialist

Report Highlights:
nnnn

Executive Summary:

The current energy conditions of Chile, characterized by high external dependency, are a key factor to look for new energy alternatives and resources. The international trend to join to biofuels tends to put to a sort of invisible pressure to get in biofuels market. Moreover, the fact that biofuels come from renewable resources give this source of energy a positive connotation that is not necessarily always correct according with the local conditions.

General Information:

Background:

The main primary energy source for Chile is crude oil, in 2008 it represented a 45% of the total primary energy; and a 97% of it was imported (CNE, 2008). The second source of primary energy
is fuel-wood, 20%. The remaining primary energy comes from coal, natural gas and hydroelectricity, (CNE, 2008). The energy coming from hydropower is directly affected the rain.

In 2006, the Chilean government defined an Energy Security Policy that gave the guidelines of short and medium term actions.

- Diversify the country's energy matrix in terms of both fuels and suppliers.
- Achieve greater energy autonomy.
- Encourage the efficient and intelligent use of energy.

Among the medium term actions, were activities to promote non-traditional renewable sources of energy; and a policy for the development of biofuels, creating a work team to study a proposal for liquid biofuels (ethanol and biodiesel).

During the first International Seminar on Biofuels done in Chile many guidelines were given to approach the subject by the Chilean government, some of them where:

-To create a Commission with all the Ministries involved in analyzing and creating the necessary conditions to incorporate this new technology in Chile. The

- The creation of a new division on the Office of Studies and Agricultural Policies (ODEPA) of the Ministry of Agriculture called Office of Studies and Agroenergy Policies to monitor the development of biofuels and to act as a link with the private sector to analyze the economical and technical possibility of this fuel in Chile.
- Have the Foundation for Agricultural Innovation (FIA) organize and finance technological missions to the U.S. (August), Germany (September-October) and Brazil to promote the conversion of corn and wheat to bioenergy.
- Organize regional seminars to share information about the experiences on biofuels in the world.

A Public-Public and Public-Private Committee, coordinated by the government are researching and evaluating the second and third generation of biofuel possibilities for Chile.

Members of the Public-Public Committee: are bodies that belong to the public sector; CONAMA, CORFO, CNE, FIA, ODEPA, Finance Ministry, Economy Ministry, SEC, ENAP.

Members of the Public-Private Committee: representing the private business sector and NGO are the Sociedad Nacional de Agricultura (SNA, Nacional Society of Agriculture), la Corporación de la Madera (CORMA, Corporation of Wood), el Colegio de Ingenieros Agrónomos (Agronomy Engineering College), la Facultad de Agronomía de la Universidad de Chile (Agronomy Faculty of University of Chile), Iansa, Biodiesel América, el Movimiento Unitario Campesino (MUCECH, Peasant Unitary Movement) y Chile Sustentable (NGO).

Representing the public sector are: CONAMA, CORFO, CNE, FIA y ODEPA

Existing Regulatory Framework:
- Decree 11/2008 of the Ministry of Economy. Defines quality specifications for biodiesel and bioethanol, authorizes the mixture of 2% and 5% of oil with gasoline.
- Circular 30/2007 of Internal Revenue Service, indicates that biofuels are not subject to an specific tax according to Law 18.502/1986.
- Law 20.399/2009 of the Ministry of Mining modifies Decree 1/1979 and adds biofueles as a liquid fuel and gives the Secretariat of Electricity and Fuels (SEC) to audit.
- Resolution 746 of SEC, technical norms for the analysis and studies for bio-ethanol and biodiesel.

Biofuels production:
Government sponsored initiatives
Even if the technology to produce first generation biofules is available, Chile like many other countries sees difficult it difficult to adopt as the land with agricultural characteristics is being use to produce food for domestic consumption and also exports, and is not an alternative to change the use to produce fuel.
On the other hand, second generation biofuels present a more attractive and feasible alternative; Chile posses a well develop forest industry so the production of liquid biofuels from cellulosic material is a possibility. Other alternative are the third generation biofuels, being developed by the use of algae, its 6,000 km. of coast makes this alternative look like a good idea.

The government of Chile has granted US$7 million to the development of two consortium on the cellulosic products.
BIOCOMSA; integrated by ENAP (National Petrol Company), university of Chile and the Wood Consortium (www.consorciobiocomsa.cl)
BIOENERCEl, with the participation of the University of Concepcion, Catholic University of Valparaiso, Fundacion Chile, CMPC Celulosa S.A. and Masisa S.A. (www.bioenercel.com); both Consortiums have the participation of universities, public and private companies.

In the area of algae, the government of Chile has grated about US$ 19 million to establish three different consortiums.

ALGAEFUEL: Integrated by Empresa Electrica del Norte, Copec, Bioscany, and the Catholic University, will work on I+D+i, infrastructure and human resources all together with a program of technology transfer.

DESERT BIOENERGY: seeks to create technology developments for the elaboration of biodiesel and other by products beginning with a mass production of high productive potential micro-algae. Is formed by the participation of University of Antofagasta, University of la Frontera, Ccitem, Electroandina and Prodalmar .

BAL BIOFUELS: integrated by Bal Chile, Enap, University of Los Lagos and Architecture Lab. Its main purpose is to work with the macro algae Macrocystis pyrifera and use advance fermentation techmology to produce biofuels that will be used in Chile.

Private sector initiatives:
There are also some private initiatives that are worth mention.
- COPEC, Chilean oil Refinery Company is building a pilot plant to produce biodiesel from raps using natural

enzymes and not chemical catalyst which makes it more efficient. They will invest US$ 20 millions to produce 2.5 millions of tons annually, that will cover the 100% of the demand of the area of Temuco, 9th region of Chile considering a mixture of 2% .
Copec is also interested in ethanol to use with gasoline, if not produced in Chile they will bring it from Brazil.

- A group of investors in Chile has acquired the rights to utilize a unique method for creating an alternative energy source.

Investors from AIQ in Chile will begin to use a method patented by Petroalgae to produce a renewable energy source in the country and plans to have a plant completed by the end of 2012.

The process involves using aquatic plants grown on water surfaces that can be dehydrated to create both oil and a rich protein source for animal consumption.
With a crop nearly 500 acres, this system is capable of producing between 100,000 and 150,000 barrels of oil annually, according to Petroalgae.

In addition, these microorganisms are able to consume between 100 and 120 tons of carbon dioxide per 2.5 acres, so the system is environmentally sustainable, according to company officials.

Conclusions:
From the beginning Chile disregarded the idea of producing biofules of the first generation, unlike the U.S. and Brazil, Chile does not have land enough to produce both for food and for fuel. Hopes were sent for the second generation bio fuels. Since the forest industry is big and modern in Chile, lots of efforts were directed to that sector, now after a few years of investigation the situation seems to have changed. The forest industry in Chile is so efficient that instead of using the waste to produce fuel, they rather use it and transform it in electricity that will be used in their advantage and reduce its cost.

The production of biofuiels out of algae seems to have worked in other countries and the technology has been imported to Chile, we just need time to see if the pass from a pilot plant to a commercial production facility.