Miguel Edgar Morales Udaeta, Murilo Tadeu Werneck Fagá, Geraldo Francisco Burani and Cidar Ramón Rocha Oliva

INDUSTRIALIZING BOLIVIAN NATURAL GAS RESERVES BY MEANS OF GTL METHOD

IEE/USP – Instituto de Eletrotécnica e Energia da Universidade de São Paulo
Av. Prof. Luciano Gualberto, 1289; CEP 05508-010; São Paulo – SP, Brasil
E-mail: udaeta@pea.usp.br

Overview

This work aims to prove the viability of Natural Gas Industrialization in Bolivia, by producing diesel from the natural gas (which is "cleaner" than the oil derivative). Bolivia has resources that could fulfill this eco-diesel's manufacturing process, The analysis shows that it is possible to process 30 million m^3 of gas per day (7.8 TCF in 20 years), obtaining local and national extraction profits, not only from the gas, but also from NGL that are found with it.

Bolivia has abundant natural resources, especially in water and hydrocarbons (Udaeta et alli, 2001); there are also bio-energy resources applied domestically, as firewood. Because of the Bolivian position in the regional context, the country has become the articulator of the main activities in energetic integration. The Gross Domestic Product (GDP) has reached in 2002 US$ 7.79 billion: an annual rising of 2.75% (in 2003 this was of 2.45%). The electric sector was responsible for a share of 2.04% in 2002, its higher level in the last years.

The hydrocarbon sector has become one of the most dynamic sectors of the Bolivian economy (Doria, 2003). In the last years, due to investments made in exploration and exploitation, the level of hydrocarbon extraction has risen 115% since 1990 and its contribution to the GDP has increased from 4.69% in 1990 to 6.5% in 2002. In the last years, the energetic subject has got special attention in Bolivia, especially referring to Natural Gas exportation, since there's an idea disseminated in the people that this resources would contribute to the reduction of poverty and the country development (Udaeta, La Fuente, 2003). As a result of that, in October of 2003 a series of protests has happened, all against exporting Gas by Chilean ports, the same reason to the fall of president Sanchez de Lozada.

Methods

The objective of this work is the technical and economical analysis in order to identify the possibility of manufacturing the Bolivian Natural Gas as GTL. Technically and economically speaking, it is important to identify the industrialization, technology investment amounts and production costs of a GTL project. Commercially speaking, the aim is to identify what future and market the current situation represents to GTL. In economics it is desired to discover the financial possibilities (amounts, interest fees, benefit periods) linked to investments in GTL. Juridically and politically speaking, the present legal place will be compared to the most appropriated to the GTL manufacturing.

Results

The Bolivian Natural Gas fields are appropriate to implement one or more GTL projects from the qualitative and quantitative point of view.

From the quantitative point of view, to produce around 100 thousands bpd of GTL byproducts, during 25 years, is necessary to process 30 million of m^3 of gas per day, which demands 10 TCF of the gas reserves. Bolivia has, among proven and probable reserves, about 50 TCF in the beginning of 2005, satisfying this requirement totally.

From the qualitative point of view, the Bolivian reserves are of non-associated Gas, what means that it doesn't have many accompanying liquid hydrocarbons, which allows minimum investments to separate the methane from other hydrocarbons. Bolivia has the greatest non-associated Gas reserves in South America: greater than, for example, the ones in the 226 TCF of total Gas reserves in Venezuela (the greatest Gas reserves of South America), but only 14 TCF are of non-associated Gas (PDVSA, 2004).

Another important aspect is that, generally, the sulfur contents of Bolivian hydrocarbons are low, which avoids investments in desulphurization plants and, on the other hand, avoids the poisoning of the catalysts, fundamental aspect in the process.

Let see in the figure 1, the summary Picture of the potential had by the projects of exportation and industrialization of the Bolivian natural gas.

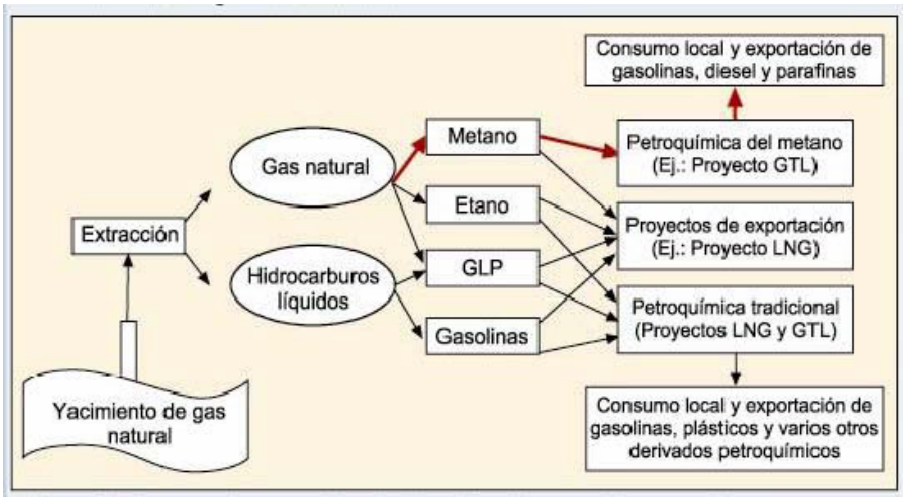

Fig. 1: Potential of the Bolivian natural gas

Conclusions

Independently of other elements as the ones tied to the local and global geopolitical interests, it is possible conclude, without doubts, that the Natural Gas Industrialization in Bolivia, with the production of a fuel environmentally friendly like the GTL-FT diesel is technically and economically feasible. It is evident, from the physical establishment that Bolivia has gas reserves, and in great quantity, to satisfy the process of this clean-diesel elaboration. The analysis shows that 30 million m^3 of Gas per day (less than 8 TCF in 20 years, nearly 15% of the present well knowed reserves) can be processed obtaining the regional and national benefits due to the extraction, not only by the Gas, but also by the liquid hydrocarbons that accompany it. In this way, of the obtained analysis and results it's concluded that:

- The country, besides exporting eco-fuels, no longer would need to concern about diesel from the outside of the country, with all the economic benefits that it implies;
- Thinking about more or less 35 million barrels per year of GTL-FT liquid fuels, would be produced with a very competitive price in comparison to the diesel from oil, more still when the high oil present prices come to knowledge;
- The jobs would be increased by the GTL project and the associated socioeconomic activities generated either;
- With the internal availability of that so named eco-diesel, the country would have more competitive for exportation, for instance across agro-industry and transport;
- GTL-FT Diesel (eco-diesel) makes possible a greater step towards the sustainable development, once it brings with itself a clean environment, especially local urban.
- The transportation and distribution of liquids are cheaper and versatile.

In the context of the macroeconomic analysis, the results allow to visualize that the investment in the GTL-FT plant construction and accessory hard activities and facilities would generate sources of jobs immediately. And with it, the Bolivian Natural Gas Industry would be consolidated. This way, the following are also evident conclusions:

- The Natural Gas fields in Bolivia are appropriate to implement one or more projects of GTL, from a quantitative and qualitative point of view;
- The GTL projects will have as objectives the Bolivian Gas Industry consolidation, through adding value to the Natural Gas production in the country;
- It's necessary to consider that for a production of 100, 000 bpd of GTL, within 25 years, is necessary to process 30 million of m3 per day, which demands 10 TCF throughout that period of time;
- The production of 100,000 bpd of clean diesel will produce a considerable amount of water and electrical energy, what brings a secondary market: electricity exportation. This means that, besides exporting Natural Gas (business already consolidated) the country would export clean environmentally friendly GTL-diesel and electricity, and so certainly Bolivia would become the center of energy distribution in its region (MERCOSUR and CAN).

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