Statement of Current Research

My current research projects are focused substantially on analytical work, with emphasis on energy policy analysis, organization of energy industry regulatory framework, appropriation of energy by society. In addition I am also working on technological development, but to a lesser extent.

Ongoing and recently concluded projects include:

- An assessment of the potential of Bolivia and Paraguay to implement sustainable electric mobility in substitution of petroleum fueled internal combustion engines based mobility, taking advantage of local natural resources, especially electric power generation and lithium to build electric batteries, thus allowing for the local development of production chain dedicated to Battery Electric Vehicles manufacturing to supply local markets and for export.

- Assessment of the Brazilian Biodiesel production experience in an environment of competing use of resources to produce food or fuel, under the hegemonic role of petroleum as fuel source.

- An assessment of wind power prospects in the Brazilian hydrothermal system evaluating the resource potential in face of recent technological advance and of scale and learning curves, as well as of potential complementarity with the current dominant hydropower.

- A critical assessment of the Electric Power Regulatory and Organizational framework in Brazil in view of the subsisting crisis, with degradation of reliability and well above inflation increase in tariffs to consumers.

- Exploratory Assessment of the Economic Gains of a Pre-Salt Oil Field in Brazil. During the recent past years Brazil has made public several oil discoveries located in deep waters, after the salt layer. Discoveries are steadily enhancing national reserves and have brought the country into a new role in the global oil industry. Currently two regulatory regimes are in place: concession for non-pre-salt areas and production sharing, for pre-salt. However service contracts should also be considered. This research aims at investigating the economic gains that could be expected from a Brazilian oil field in the pre-salt region. Analyses are carried out based on the Libra field, the largest oil discovery in Brazil until the present, with approximately 10 billion barrels. Results for different scenarios of oil prices, companies’ arrangements and regulatory regimes will be calculated and compared. The preliminary findings suggest that under the current rules the economic gains for the Brazilian Government are higher when the oil production is carried out under a concession regime with the public company Petrobras operating with exclusivity instead of the production sharing scheme as it was adopted in the country recently. Results further indicate that the adoption of alternative regimes as a service contract scheme could bring higher earnings for the government not to mention the oil property an production rhythm control which are essential to coordinate with other oil
exporting countries to optimize prices to maximize rent extraction under the prevailing OPEC+Russia oligopolistic compound.

- Evaluation of the regional energy integration projects, especially the case of ITAIPU developed jointly between Paraguay and Brazil, with the prospects of transforming it into the core of a full-fledged Regional Latin American Energy Company that could incorporate other by-national projects such as those of Argentina and Uruguay and Paraguay.

- On a more technological oriented activity I have also developed research on energy efficiency, with works on a comparative assessment of Brazilian electric motors performance with minimum efficiency standards and on power quality and energy efficiency assessment and the need for labelling and minimum performance standard of uninterruptible power systems (UPS) in Brazil, which are based on laboratory measurements and provide public policy recommendations to improve efficiency of the Energy System in Brazil. Additional work on energy efficiency was the prospective assessment NICARAGUA’S 2013 residential lighting program, currently being expanded into an Integrated Resource Plan for the Nicaraguan Power Sector.

ILDO LUÍS SAUER

RESEARCH STATEMENT

OUTLINE OF POSSIBLE RESEARCH AT DUKE

Conventional Oil Context and the Potential Role of Shale Oil, New Oil Provinces and Biofuels in Latin America and the Relations with USA.

Energy appropriation played an essential role in assuring the mode of production of all social formations in Humanity’s History, as well as in two main revolutions. Agricultural revolution “domesticated” photosynthesis via plants and animals, whence nomad hunters and gatherers became sedentary farmers. Industrial revolution relied on tapping stocks: first coal for steam of industry, trains and ships, then oil to fuel internal combustion engines that enhanced flexible mobility and electric power systems to support a new urban-industrial structure. As economic conditions allowed for renewable sources, provide by the fluxes, mainly from the Sun, took a share of supply. Energy appropriation enhanced productivity of socially organized labor, thus allowing
for intensified production and circulation of goods and people as well as intensified generation of economic surplus.

Under the capitalist production system, that was born concomitantly with the Industrial Revolution generation of surplus value to allow for intensified capital accumulation became a major goal. Surplus value may accrue either in the form of normal profits or rents, surplus profits (well above average normal profits), which are obtained from monopolizing the access to resources, assets and technologies under conditions of imperfect competition, such as is possible in the oil sector. Control and access to oil resources became a major economic, geopolitical and security issue during the XX century. In Latin America as early as 1922 Argentine General Mosconi lead an initiative to foster creation of national companies to produce and refine oil as requisite for development with industrialization and urbanization and lead the way out of rural society. After decolonization process in Africa and Asia local governments also entered the process to capture a share of the oil surplus. To this end OPEC was founded in 1960, when oil reserves control was as follows: 85% by International Oil Companies (IOCs); 14% by the USSR; and only 1% National Oil Companies (NOCs). Such low level of control over resources may be one of the reasons why the 1973 and 1979 oil shocks failed to sustain prices and generate stable surplus to those countries.

In 2010, the situation of reserves control was substantially reversed: only 6% were with IOCs; 6% with the Russians and 88% with NOCs. This new condition, along with internal cohesion of OPEC members together with Russia may well have played relevant role no the oil price escalation started in 2005 and sustained until 2014. In 2013 OPEC plus Russia controlled more than half of petroleum (oil and gas) production, and very importantly, the vast majority of oil exports, required to complement demand of countries whose production is consumed domestically, thus with smaller potential to influence pricing. Under the prices that prevailed until 2014, the approximately 30 billion of barrels produced per year entailed a surplus between 2.5 to 3.0 billion dollars per year. Off course now, with prices back to about 50 dollars per barrel, such surplus is bellow half that figure. One can only speculate how much of the reasons for the price decline are related to the dissent among OPEC and Russia, and how much of it may results from the shale oil and gas production in USA, from the biofuels increased production, from the opening of new oil frontiers such as the Brazilian pre-salt, the prospective opening of Mexican side of the Gulf and even to improved energy efficiency. It is quite clear that the initiative launched by the USA Government on March 2011 (Blueprint for a Secure Energy Future), as well as the failed proposal, by the Chinese Government, to create a sort of Counter-OPEC, an Organization of Oil Importer Countries, spurred a kind of a strategic war on oil price and access, having the OECD+China compound on one side and OPEC+Russia on the other.

Venezuela is a founding member of OPEC whereas Ecuador is the only other member from Latin America. Brazil is planning to become a large oil exporter over the next decade by developing the newly discovered pre-salt province. Mexico and Venezuela have undergone reduction in production and in exports. Several countries have successfully launched biofuels programs, the most longstanding being the Brazilian sugarcane bioethanol production since the 1930s. More recently USA
became the largest world ethanol producer, based on corn. With less success biodiesel programs have been undertaken in Brazil, Argentina, Colombia and others, but with difficulties to become viable. Venezuela has exercised the PetroCaribe initiative by providing oil products under special arrangements to countries of the Caribbean (Cuba, Nicaragua, Honduras, El Salvador).

The 2011 USA Blueprint for a Secure Energy Future proposes: a global shale oil and gas initiative to foster nonconventional petroleum production all over the world, including Latin American countries (like Argentina, Brazil, Mexico and Paraguay); technical cooperation between Brazil and USA to accelerate the development of Brazilian pre-salt resources; cooperation between Brazil and USA for the worldwide diffusion of biofuel production; opening of Mexican side of the Gulf for oil production. These proposals, amidst falling oil prices, apparent dissent inside OPEC, unrest in the Middle-East, Northern Africa and Venezuela, bring about a new context for the relations between the USA and Latin America and the Caribbean Region, as far as energy security and supply are concerned. An outstanding issue is the regulatory framework, considering concessions, production sharing and service contracts regimes being considered in the Region to coordinate and organize exploration and production.

Some of the above mentioned issues and context that may be deserve detailed focus for research at Duke, depending on local interest and prospective cooperation, may include: surveying and assessing the current status of selected Latin American countries, (like Brazil, Argentina, Mexico, Venezuela, Colombia); evaluate the prospects and impacts of shale gas and oil initiatives; evaluate the biofuels programs and potential contribution; evaluate local oil current and potential production; evaluate potential economic surplus production, Government take and public policies distribution, according to prevailing and proposed regulatory frameworks; prospective impact on energy security of selected initiatives.