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Biofuels Policy and Present Development Situation in Latin America

& Business Opportunities for Korean Entrepreneurs

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I. Main Energy Issues in Latin America

1. Nationalization of Fossil Fuels

• Following the upsurge of leftist governments in Latin America, support for the nationalization of fossil fuels in countries such as Venezuela, Bolivia and Ecuador gained momentum

2. Energy Crisis in South America

- Energy insufficiency appeared as a main political, economic and social issue in recent years
- Main reasons are lack of availability and instability in the supply of natural gas

- Argentina that had been providing 75% of natural gas consumed in Chile, restricted the supply, because of its own energy crisis
- Bolivia, main regional exporter of natural gas, took measures towards nationalization and price adjustments
- Gas pipeline construction project, of 8,000-12,000km length, connecting Venezuela through Brazil to Argentina
 - Confronted with technical problems to cut through Amazon area
 and secure financial resources of more than 20 billion dollars

3. Management of Itaipú and Yacyretá Power Plants

 Paraguay raised strong complaints against Brazil, co-owner of Itaipú, and Argentina, co-owner of Yacyretá, concerning the management of those Power Plants

- Management entities of the Power Plants have 10-16 billion dollars of debt and low gains, increasing Paraguay's debt burden
- Main creditors are Eletrobras of Brazil and the Argentine government

4. Conflicts on the Development of Biofuels

- With significant shares of under-nourished population, it is immoral to use food sources to produce fuels for transportation in developed countries (Cuba, Venezuela)
 - In particular, President Chavez has opposed energy integration projects in Latin America based on bioenergy
- Malnutrition problem has been caused not by food shortage but by insufficient income. Biofuels could be produced using non-food materials (Brazil)

II. Main Reasons to Develop Biofuels

in Latin America

1. Depletion of Fossil Fuels and Global Warming

- In Latin America, those two issues are not serious reasons for development of biofuels
- Latin American countries have concentrated more on development of fossil fuel resources rather than development of alternative fuels
- For them, to survive is more urgent than to protect the world against global warming
 - Latin American countries don't belong to the Annex I group of the Convention on Climate Change

2. More Specific Reasons for Latin American Region

- A. Addressing social problems through development of biofuels
 - Priorities in Latin America: wide gap between the rich and the poor, social inequality, social exclusion and enhancement of security
 - Poverty ratio in Latin America: 30-50% level
 - Policy on development of biofuels is focused on poverty reduction, development of rural areas, support for SMEs, etc.

B. Biofuel development potential

- Significant amount of idle farmland
- Favorable climate for farming
- Production and exportation of large amounts of materials for biofuels
 - Brazil, 2nd largest producer of soybean
 - Argentina, top exporter of soybean oil and sunflower oil
 - Paraguay, 6th largest producer of soybean
 - Uruguay, 6th largest producer of rice
 - Colombia, 5th largest producer of palm and exporter of palm oil
- Inexpensive hand labor available in rural areas
- Access to the huge American market through CAFTA-DR and other FTAs

C. Valuable experiences in Brazil

- Brazil is a world leader in bioethanol development and a good model for neighbor countries
- Brazil is now actively conducting bioethanol diplomacy with neighbor countries
 - Technology Cooperation and Information Exchange Agreements with Peru, Colombia, Argentina, Venezuela, Panama, etc.
- USA, OAS and IDB support Brazil's biofuel promotion activities

III. Biofuel Policy, Present Development Situation

and Production in Latin American Countries

1. Brazil

A. Bioethanol

- World leading bioethanol producer
- The most efficient production in the world
 - If the price of gasoline is over 35 dollars per barrel, Brazilian ethanol is competitive
 - Production cost of bioethanol made from corn in the USA is
 65 dollars per barrel
- Most advanced technology in production of flex-fuel engine

- Bioethanol development plan in the future
 - Expand farming area for sugarcane from 3 million ha to 5 million in 2010
 - Producing 24 billion liters and exporting 5-6 billion liters in 2010
 - Cutting all subsidies, liberalizing production, sale and prices in order to strengthen the bioethanol industry

B. Biodiesel

- Potential production of more than 1.3 billion liters yearly in 19-24 biodiesel factories
- Obligation of B2 from 2008 and B5 from 2013
- Materials produced by small farms are eligible for tax cuts and financial benefits

2. Other Countries in South America

A. Argentina

- Rich in fossil fuel resources
 - Achieved oil self-sufficiency by producing 700,000 b/d and is currently top producer of natural gas in South America
- Produces huge amount of biodiesel materials
 - 3rd largest producer and exporter of soybean
 - Top exporter of soybean oil and sunflower oil
 - 2nd largest exporter of corn and sorghum

- Enacted biofuel promotion law(26093) in 2006 and its rules of application in 2007 (Res.109/2007)
 - Mandatory E5 and B5 as of 2010
 - Focusing on supporting SMEs, promoting agribusiness and enhancing regional economies
- Grain Majors such as Cargill, Bunge, Vicentin, Dreyfus invest in biofuels in consideration of the global demand, irrespective of biofuels promotion law
 - Export tax for biodiesel(5% and 2.5% refund) is much lower than for soybean oil(24%)

B. Colombia

- Colombia has been interested in biofuels more as substitution of drug productions and for job creation in rural areas than as alternative to fossil fuels
- According to relevant law on bioethanol(693/2001), E10 is mandatory since 2005. There are plans to raise level to 25%
 - In case of biodiesel, B5 is mandatory from 2008 (939/2004)
- Incentives for the promotion of biofuel industry
 - Exemption of VAT for biodiesel producers
 - Exemption of income tax for farming biodiesel plants

- A promising biofuel producing country
 - 7th largest producer of sugarcane, with a yield of 93 ton/ha
 (Brazil 74 ton/ha)
 - Promotion of Cassava-based bioethanol production
 - 4th largest palm oil producer and 5th largest palm exporter
- Bioethanol industry will be developed further after FTA between Colombia and USA is in place
 - Bioethanol produced in Colombia is 30% more competitive than the one produced in the USA

C. Peru

- Sierra Exportadora Program is being pushed as an alternative to illegal coca cultivation
- By way of establishment of relevant regulations (Law 28054) and presidential decree (013-2005-EM)
 - Sale of environment-friendly gasoline (E7.8) started in some regions in 2006
 - Sale of environment-friendly diesel (B5) will start in some region in 2010
- FTA with the USA creates market for biofuel exports
- Three American Companies have already invested or are currently considering investing there

D. Paraguay

- For Paraguay, a land-locked country, imports of fossil fuels are expensive. Therefore it has plans to substitute 20% of fossil fuels for biofuels
- Comparatively Paraguay is well equipped with legal tools for biofuels' development:
 - Biofuels Promotion Law(2748/2005)
 - Relevant Resolutions (MIC 234/2007, MIC 235/2007)
- 4 existing bioethanol factories have the capacity to produce
 58 million liters per year
 - Another two factories produce 40,000 liters of biodiesel per day using animal fat

E. Chile

- Falls short of basic laws on biofuels
- Suggested alternative energy development plan was sent to Congress in April 2007
 - Obligation of E10 as of 2010
 - Obligation of B1 in 2010 and B5 in 2013
- Considering the systematic social structure, capable of rapid development of biofuels industry

F. Uruguay

- Even though national plan has been drafted, there is no relevant law on biofuels
- Only 0.24% of land is permanently cultivated
- TIFA with the USA(January 2007) could boost the biofuels industry

3. Central America and the Caribbean Region

A. General Observation

- Develop biofuels for energy security, environmental protection, raising income in rural sector and job creation
- 24 countries under the CBI and CBTPA can export bioethanol without paying customs duties up to a maximum quota equivalent to 7% of total US production
 - Additional quota available if large amounts of local materials are used

- CAFTA-DR has absorbed the bioethanol quota system of the CBI
 - Extra quota has been awarded to Costa Rica and El Salvador
- Span of harvest in Central America and the Caribbean is just
 120 days which is shorter than 200 days for Brazil
- 44% of the production facilities for bioethanol are located in Guatemala
- In 2005, 4 countries, Costa Rica, El Salvador, Jamaica and T&T, exported 400 million liters of bioethanol to the USA
- Almost no development of biodiesel

B. Mexico

- Set target to increase usage of renewable energy up to 8% in 2012
 - Selling E10 as of February 2006 in main cities
- Calderon administration released alternative energy development plan through farming of sugarcane and corn
 - Mexico produces 56 million tons of bioethanol per year which is not sufficient for domestic consumption
- However, production of bioethanol using corn is not plausible
 - Mexico, 4th largest corn producer (12 million tons), imports 7 million tons of corn yearly
- Production of bioethanol using sorghum seems promising because Mexico produces 6 million tons of sorghum yearly (2nd largest producer worldwide)

C. Guatemala

- Guatemala, the biggest producer of sugar in Central America and the Caribbean region and 5th largest exporter of sugar worldwide
 - 15 families manage 15 sugar refineries
 - Produces 18 million tons of sugar yearly and has the capacity to produce 490.000 liters of bioethanol
- Leading country in the field of bioenergy in Central America and the Caribbean
 - 25% bioethanol mix (Decree17/85)
 - Bioethanol and its residues account for 53% of total energy consumption
 - Renewable energy promotion law in 2003
 - Exemption of import tax, VAT, income tax,, etc.
- Possible center of biodiesel production
 - Produces large amounts of jatropha, palm and avocado
- Necessary to overcome some problems such as lobby against biofuels by petroleum sector and lack of financing for biofuel industry development

D. Honduras

- 6th largest palm growing country on the basis of size of farming area
- Plan to substitute 30% of total energy demand with biodiesel
 - Plan to invest 626 million dollars which must be sourced from international organizations or public and private financial resources
 - Plan to increase farming area to 200,000 ha and produce 757
 million liters of biodiesel
- A Chinese company released a plan to invest 30 million dollars during next 20 years in biodiesel production

IV. Regional Biofuels' Cooperation in Latin America

- 1. The first Summit on Energy in South America (April 2007, Venezuela)
 - Difference of opinion on biofuels development between Venezuela and Brazil
 - However, in the Summit Declaration,
 - Presidents recognized the potential of biofuels industry
 - They also recommended the exchange of experiences and information among member countries

2. Regional Cooperation within MERCOSUR

- In December 2007, the Council of MERCOSUR decided to establish a special working group to promote production and consumption of biofuels and to expand cooperation and technology among member states
- Cooperation in biofuels development in MERCOSUR could give a good opportunity to resolve the asymmetry problems between Brazil/Argentina on one hand and Paraguay/Uruguay on the other

3. Regional Cooperation in Central America and the Caribbean

- CARICOM has plans to organize cooperation between regional financial organizations such as CDB and IDB and member countries on biofuels
- Noticed cooperation activities among member countries of "Plan Puebla Panama"
- Mesoamerica Biofuels Group carries out technology cooperation and feasibility studies in the region under the auspice of IDB

4. Biofuel Development Promotion Policy of IDB

- Mr. Moreno, President of IDB, commented in April, 2007 that Energy, Education and Social Equality, are the three main strategic focus areas for the IDB
- IDB has committed loans of 2 billion dollars to finance projects
- IDB has also expressed a plan to establish a 300 million dollars fund to enhance incomes of small families and promote technology development in the field of biofuels

V. Obstacles for the Development of Biofuels in Latin America

1. Insufficient Infrastructure

- Latin America has big potential for biofuels development and governments of the region have a strong willingness to develop biofuel industry
 - However, insufficient infra could be a stumbling block
- It is necessary to invest more actively in pipelines, storage, terminal facilities, etc.

2. Policy Coordination

- About half of Latin American and Caribbean countries have national plans to develop biofuels industry, including targets of biofuels mix, relevant laws and incentive systems, etc.
- Obstacles for biofuel development
 - Strong lobby against biofuels from sugar industry in El Salvador and petroleum sector in Guatemala
 - Inefficient production of biofuels materials because of land possession issues
 - Outdated infra of sugar industry in Dominican Republic, Jamaica,
 T&T and others.

3. Investment Required for Development of New Technology

- Massive investment of the USA, EU and other developed countries in new technology and new biofuel plants, is now challenging Brazil's leadership
 - The second generation of bioethanol production expected to arrive in the market in 2010
 - The second generation of biodiesel production, that is, biomass-to-liquids production, is being studied actively
 - Cultivation of new biodiesel plants such as carthamus in some arid region is also being studied
- It is necessary to invest in new technology of second and third generation and new plants

VI. <u>Business Opportunities for Korean</u> <u>Entrepreneurs</u>

1. Considerations to look beyond the borders

- Global tendency to develop biofuels
- Increasing demand of biofuels (biodiesel)
 - In Korea, commercialization of biodiesel has been launched in 2006
- Poor conditions of Korea's agriculture production
- Small size of farming land in Korea

2. Investment in Production of Biofuels in Latin America

- Positive elements
 - 1 Huge non-cultivated area
 - 2 Adequate climatic conditions for cultivation of biofuel plants
 - 3 Plenty of biofuel materials
 - 4 Access to the large American market
- Negative elements
 - (1) Biofuels policies based on domestic agendas
 - 2 Difficulty for foreign companies to enjoy benefits offered by biofuel laws
 - 3 Lack of experience in Latin American markets
- Considering the above mentioned elements, it would be convenient to start production with a pilot project or to find local partners
 - To access American market, consider the countries that have
 FTA with the USA such as Guatemala and Colombia

3. Investment in Land Purchase and Cultivation of Biofuel Plants

- To be acquainted with the local market, as a first step it's better to buy land to produce biofuel materials such as soybean, corn, sunflower, etc.
 - Production of biofuels will be decided later after getting enough information on local biofuel industry
- In Latin America, in particular, Brazil and Argentina, farming will be done by local specialists
 - Farming is managed mostly by companies, not by small families
- Land purchase has the implications of investment in real estate
- Purchasing arid and inexpensive land, and consider planting Jatropha or Ricinus communis
 - To select plant, it's necessary to consult with local agriculture research institute

4. Participation in the construction of Biofuel Plants

- The Construction boom in the Middle East caused by high petroleum price, will cool down because someday petroleum will be depleted
- Construction of biofuel plants could turn into "Blue Ocean" for Korean construction companies
 - In case second generation biofuels are launched, relevant construction business will be created in the near future
- During next 14 years 200 billion dollars' investment will be realized in Latin America(IDB)
 - In Argentina, 42 biofuel projects are under construction or in the planning stage
- In USA, 78 projects to establish biofuel plants are under construction, and 8 plants are in the process of enlargement
- Korea, a formal member of IDB since 2005, could participate in bids offered by the Bank
 - Make use of the three trust funds of 140 million dollars established by the Korean government when it entered IDB

5. Obtaining CO₂ Credit According to Kyoto Protocol

• Even though Korea doesn't have an obligation to reduce greenhouse gases during the first period of gas reduction(2008-2012), it is likely to have some obligations during the second period (2013-2017)

• By way of Korea's investment in biofuel development in Latin America, it could get CO₂ credits through the flexible mechanism of the Kyoto Protocol

VII. Conclusion

- Biofuels have already created a new global industry to produce more income and more jobs
- Latin America has some negative elements for investment, nonetheless, positive conditions for foreign investment outweigh the negative points
- Accordingly, in the public sector, it will be necessary to study cooperation and interchange among governmental organizations and institutes between Korea and Latin America
- In the private sector, Korean companies could select strategic partners and countries to cooperate or participate directly in biofuel production in pilot projects

- In particular, it is strongly recommendable to get involved in construction projects of biofuel plants in Latin America
- To be a significant developed country and a global player, Korea has to strengthen its relations with Latin American countries. The biofuels' sector could be used a good window of opportunity for the enhancement of bilateral relations

Center for Cooperation between Korea and South America in the Fields of Energy and Natural Resources

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List of publications of the Center

- 1. Present situation of Natural Resources in 10 South American countries (Sep. 2006)
- 2. Present situation of Natural Resources in 23 Provinces of Argentina (Dec. 2006)
- 3. Participation in The International Conference on Mining in Argentina (Dec. 2006)
- 4. Bioenergy Policy and its Development and Production in Argentina (May. 2007)
- 5. Report on Bioenergy in Brazil (to be issued soon)
- 6. Foreign Investment Cases in Argentina (to be issued at the end of 2007)