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OPPORTUNITIES TO MARKET U.S. TECHNOLOGIES THROUGHOUT THE WESTERN HEMISPHERE

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**Opportunities to Market U.S.
Technologies Throughout the Western Hemisphere**

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ACRONYMS

DOE	U.S. Department of Energy
-EM	Environmental Management (DOE)
-OST	Office of Science and Technology (DOE)
-HQ-IPO	Headquarters International Program Officer (DOE)
OLADE	Energy Organization of Latin America
LAC	Latin America and Caribbean
CNEA	National Atomic Energy Commission, Argentina
FIU	Florida International University
HCET	Hemispheric Center for Environmental Technology
NGOs	Non-Governmental Organizations
JCCRM	Joint Coordinating Committee for Radioactive and Mixed Waste Management
VS	Virtual Secretariat
TDA	Trade Development Agency
SAIC	Science Applications International Corporation
MERCOSUR	Southern Cone Common Market (Mercado Común del Cono Sur)

EXECUTIVE SUMMARY

In the *Declaration of Principles* and the *Plan of Action* of the Summit of the Americas, Western Hemisphere leaders made a commitment to guarantee the sustainable development and conservation of the environment for present and future generations. They expressed that sustainable economic development requires cooperation throughout the hemisphere. In this regard, Florida International University's Hemispheric Center for Environmental Technology (FIU-HCET) will take action and aid in the identification of projects/technologies that are intended to promote access to competitive clean energy.

FIU-HCET will support DOE-EM's mission of providing a full range of science and technology resources and capabilities by forming partnerships with LAC nations and providing the best technologies available in the marketplace. This will be accomplished by continuing to improve market access for FIU-HCET's industrial partners and to commercialize environmental technology.

Because of its size, sophistication, and geographic proximity, the U.S. environmental industry has the potential to become a major player in the environmental markets in Latin America and the Caribbean. Building on the alliances previously established by Florida International University with organizations in Latin America and the Caribbean, FIU-HCET will work with U.S. governmental agencies and industry to develop, adapt, and market/transfer their technologies throughout the Western Hemisphere. FIU-HCET will aid government leaders of the Americas in the promotion of the use of efficient and non-polluting technologies.

1.0 INTRODUCTION

Florida International University's Hemispheric Center for Environmental Technology (FIU-HCET) fills the needed roles as both a "successful partner" and an "independent organization." Established in August 1995 by the U.S. Department of Energy's Office of Science and Technology (DOE-OST) and FIU, this research and development partnership was created to develop, demonstrate, and transfer U.S. innovative environmental technologies and to establish alliances that would support the implementation and commercialization of these technologies in Latin American and Caribbean nations (LACN).

The United States Department of Energy (DOE) and the Republic of Argentina's National Atomic Energy Commission (Comisión Nacional de Energía Atómica, CNEA) have signed a science and technology agreement to exchange information and technologies used in the management of radioactive and mixed waste. For the agreement to accomplish the objectives envisioned by DOE and CNEA, an independent organization is needed to coordinate the work performed under this agreement.

The DOE's Office of Science and Technology recently designated FIU-HCET as this independent organization, based on its continuous high performance in research and development. As DOE-OST primary technology transfer agent for Latin America and the Caribbean, FIU-HCET will administer joint projects and facilitate the demonstration, commercialization, and implementation of U.S. environmental technologies, while also expediting technological and educational exchanges.

FIU-HCET is continuing to monitor and track opportunities for the transfer and commercialization of U.S. technologies throughout Latin America and the Caribbean. For this, FIU-HCET examines the environmental technology market and explores new opportunities where partnerships might be developed.

2.0 PROJECT DESCRIPTION

This project involves an open-ended, continuous process of information gathering with respect to Latin American and Caribbean environmental issues. This entails the development of contacts with individuals and institutions conducting research and work on issues of sustainability and environmental technology in the Americas. As part of this phase, a database containing information on firms, nongovernmental organizations (NGOs), governmental institutions, and other participants in Latin America's environmental sector was developed and is continually being updated. In addition, FIU-HCET's efforts were geared toward determining environmental technological needs in different parts of the region and identifying the most significant and lucrative markets.

The project requires that FIU-HCET continually cement those contacts already established, continue updating the database to be made available to external users, and identify U.S. companies with the necessary expertise to participate in the Latin American and Caribbean markets. To aid in this endeavor, comprehensive, country-specific studies of the market for environmental goods and services are drafted and published by FIU-HCET.

FIU-HCET, with sponsorship from OST, will make new, innovative, and more cost-effective technologies available for transfer throughout the Western Hemisphere. Environmental/energy technology development projects encompass the range of problems experienced by LACN. This includes mixed waste characterization and treatment, soils and groundwater remediation. In addition, future activities will include the issues of energy, climate change, and fossil fuels.

3.0 RELATED PROJECT EXPERIENCE

FIU-HCET will provide DOE-EM a single, independent point of contact for the management, coordination, and facilitation of all activities occurring under the DOE-CNEA Joint Coordinating Committee for Radioactive and Mixed Waste Management (JCCRM) cooperative arrangement. This function will be closely coordinated with DOE's EM-50 International Coordinator, assisted by the appropriate focus area managers, and guided by the *Procedures for the Management of DOE/CNEA Projects*, *Procedures for Proposal Development*, and *Procedures for Resolving Action Items from a Joint Coordinating Committee for Radioactive and Mixed Waste Management Record of Meeting (ROM)*. These procedures have been completed and officially accepted, and FIU-HCET's International Coordinator will proceed to administer and report on action items pertaining to the JCCRM workshop held on September 15, 1998, between DOE and Argentina's CNEA under the *Science and Technology Implementing Arrangement for Cooperation on Radioactive and Mixed Waste Management*.

Recently, FIU-HCET participated in the First Energy Business Forum in Caracas, Venezuela, which coincided with the Third Hemispheric Meeting of Energy Ministries. This provided an excellent opportunity for FIU-HCET to continue to learn about energy integration projects within the region and to develop relations with government representatives. At the request of DOE, FIU-HCET is becoming more involved in facilitating the exchange of information between private business and governments in the area of energy integration opportunities. To facilitate the process of completing the initiatives from the Hemispheric Energy Agenda, an outcome of the Meeting of Energy Ministries, FIU-HCET has been designated as the home of the Internet tool known as the "virtual secretariat" (see Appendix A).

This tool will be used to oversee the region's hemispheric energy cooperative undertakings under Action Items 12 and 21 of the 1994 Miami Summit of the Americas (see Appendix B). The virtual secretariat is an Internet tool built to benefit the Western Hemisphere's private and public sectors by facilitating the exchange and dissemination of information currently being undertaken on behalf of the Summit of the Americas process.

FIU-HCET will effectively disseminate and relay information in regard to the initiatives that have been undertaken, and those that will be, in the implementation process of the Hemispheric Energy Steering Committee. Through the development of the virtual secretariat, the region's energy representatives will be provided with a focal point for analysis, trade, and investment in energy-related initiatives.

FIU-HCET, under the direction of the International Program coordinator, and SINAPSIS, the Foundation for the Development of an Integrated Economic Area, have established the Environmental Consulting Program for MERCOSUR. This program will provide new resources to U.S. companies and the MERCOSUR region wishing to expand their international business opportunities. It will also provide a conduit for the exchange of technical and economic information that will further the principles of hemispheric integration. The goal of the program, established by these two institutions, is the formation of a communication link between academia, government, and industry levels to foster the knowledge on environmental technologies, promote sustained economic development, and create the basis for new business ties between U.S. and MERCOSUR companies.

4.0 SELECTED FY98 ACTIVITIES

FIU-HCET has participated in a number of international events. These events have aided in promoting FIU-HCET's capabilities to the international arena. To follow is a list of key events in which FIU-HCET collaborated and/or participated:

- The Third Hemispheric Meeting of Energy Ministers in Caracas, Venezuela. This meeting took place January 15-16, 1998. The meeting served as a review of past projects and as an opportunity to plan future projects that continue the agenda of the Energy Initiative from the Summit of Americas. A declaration outlining the Energy Agenda initiative was developed to inform delegations of the upcoming Summit of Americas in Santiago, Chile.
- The Energy Business Forum of the Americas in Caracas, Venezuela. This meeting took place January 14-15, 1998. Participation allowed FIU-HCET personnel to keep informed of energy integration projects throughout Latin America and the Caribbean, looking for opportunities to market U.S. environmental technologies (see Appendix C, for the *Summary of Key Conclusions* from this event).
- TDA's Chilean Environmental Officials Orientation Visit, (Washington, D.C., April 8). While in Washington, D.C., FIU-HCET personnel met with officials from DOC-Office of Environmental Technologies Exports, DOE-Office of International Policy, SAIC, and the National Association of State Development Agencies to discuss future collaborations.

The center has formed partnerships through the association with a number of organizations.

- FIU-HCET signed a Memorandum of Understanding and established the Environmental Consulting Training Program with SINAPSIS, a private advisory board to the MERCOSUR market. These two documents will serve as a platform for collaboration on environmental projects within the MERCOSUR region (see Appendix D & Appendix E).

- FIU-HCET co-sponsored a business briefing on opportunities in MERCOSUR May 21 with SINAPSIS and the Consulate of Argentina attended by approximately 60 companies.
- FIU-HCET co-sponsored a diplomatic reception with the U.S. Export Assistance Center. This event welcomed senior commercial officers of the U.S. Commercial Service from Latin America. The event was attended by approximately 75 companies.
- FIU-HCET participated in the "Miami Roundtable on the Western Hemisphere" working lunch. This event examined the Florida District Export Council's new initiatives that can be supported by cooperation with others in South Florida. The Assistant Secretary of the Department of Commerce attended this meeting.
- FIU-HCET hosted personnel from the DOE Office of Policy Analysis, Trade, and Investment to determine FIU-HCET's participation in the design and implementation of the Website for the Western Hemisphere Energy Secretariat, the working body behind the Summit of the America's Energy Initiative.

In addition, FIU-HCET has worked on a number of initiatives to aid in the identification of future collaborative work in Latin America. Examples include the following:

- FIU-HCET completed work on Chile, Mexico, and Spain Environmental Market Assessments. The documents are used to identify potential collaborative work with U.S. companies or foreign governments. The studies are also available for distribution.
- FIU-HCET personnel developed a database of engineering and environmental firms working in Latin America. This database contains information on contact points, services provided, and countries in which they are currently working.

Contact ID	21	Contact ID	23
Company Name	Wolf Environmental Lining Serv	Company Name	Millennium Science & Engineerl
First Name	Renate	First Name	Dale A.
Last Name	Voelcker	Last Name	Rice
Address	Wolf Environmental Lining Services	Address	Millennium Science & Engineering Inc.
City	Sutter Creek	City	McLean
State/Province	California	State/Province	Virginia
Postal Code	95685-	Postal Code	22101-
Country	USA	Country	USA
Phone	209-223-4214	Phone	703-734-1080
Fax	209-223-6204	Fax	703-734-1093
Email Name	wolfels@thegrid.net	Email Name	mse@erols.com
Projects	Lining of Wastewater lagoons, and lining of a hydro-electric dam.	Projects	Groundwater remediation, drilling and installation of monitoring wells, groundwater treatment system, inspection, advising, wastewater treatment process design, chemical oxidation, and remedial investigation.
Services	Handling hazardous waste, lining of wastewater lagoons, and lining of hydro-electric dams, and they are a licensed California Specialty Contractor.	Services	Wastewater engineering (conceptual design, treatability studies, preliminary design, start-up and operations assistance), site assessments and environmental audits. Phase II environmental assessments, groundwater investigations, and US Trade and Development Agency definitional missions and desk studies.
Countries	Honduras, and Costa Rica.	Countries	Mexico, Brazil, Argentina, Venezuela, Colombia, and Ecuador.

Figure 1. Samples from the engineering and environmental firms' database.

- OLADE, Venezuela, and DOE representatives collaborated to establish the Internet tool referred to as the Virtual Secretariat (VS) at FIU-FIU-HCET. The VS will coordinate all activities associated with the Steering Committee, provide technical assistance for the Working Groups, disseminate information, be a liaison with private sector and non-government organizations, and identify potential funding sources for Working Group activities. FIU-HCET is scheduled to showcase the VS at the next Energy Steering Committee meeting to be held in Peru, January 29-30, 1999 (see <http://131.94.161.161:8001>).

These activities undertaken by FIU-HCET reinforce the U.S. commitment to invest in people and technology to strengthen the economy and at the same time protect the environment. In trying to reach sustainable development, the countries of the Western Hemisphere are seeking access to appropriate technology. FIU-HCET will choose projects that insure Latin American and Caribbean nations have access to a clean and efficient system of energy supply through the introduction of innovative environmental technologies that seek to reduce global warming, aid in the cleanup of contaminated sites, and re-affirm U.S. policy on fostering a secure and reliable energy system. FIU-HCET recognizes the importance played by market-based mechanisms and will promote opportunities for technology transfer through cooperative interactions and through improved access to information as seen with the initiatives undertaken above.

FIU-HCET will work through the activities it undertakes to become a major partner in world-class science and technology. For FY99 activities will continue to affirm its commitment to leadership in policy support and technology development for the Western Hemisphere. FIU-HCET will continue to identify and participate in seminars, workshops, and trade missions that allow FIU-HCET to meet top government and business officials. These relations will allow the pursuit of technology research partnerships with industry, academia, and government agencies and proactively accelerate the transition of technologies to end users.

In January the Virtual Secretariat will be showcased at the next Hemispheric Energy Steering Committee meeting to be held in Peru. Both government and private sector will be participating in this event. The goal for FY99 is to have a commercialized aspect to this Internet tool.

In FY99 FIU-HCET will continue to support the activities of the Environmental Management (EM) office at the Department of Energy (DOE) which included support work for the National Atomic Energy Commission of the Argentine Republic (CNEA).

5.0 CONCLUSIONS

Florida International University's Hemispheric Center for Environmental Technology (FIU-HCET) manages an aggressive international program for applied research, development, demonstration, testing, and evaluation. This program that seeks to identify opportunities to market U.S. technologies throughout the Western Hemisphere has been successful. It has made a number of cooperative agreements that seek to identify technologies to aid in the cleanup of DOE nuclear component manufacturing sites and at the same time to work faster, safer, and cheaper than current available technologies.

It is also important to ensure that private sector companies, including small businesses, are able to bring their technologies into the market so that the most innovative, cost-effective solutions are being showcased. This will be accomplished by partnering with private sector companies to assist in developing their technologies through full-scale demonstrations at FIU-HCET sites. FIU-HCET also participates in deployment initiation as needed. In this process the Center would work closely with faculty, staff, contractors, program persons, technical managers, and other related personnel to ensure that end user requirements are met.

This partnering process will result in effective management of the projects, by which projects will be terminated or redirected as the technology matures and moves toward commercial application. Significant benefits will be reaped not only on the private sector but also to the cleanup efforts of DOE as cost savings are accrued through widespread use of technologies and services provided to both government and private sector companies. EM will benefit by being supplied a number of technologies from the private sector companies. The EM strategy that entails competitive procurements based on end-state performance specifications, technology deployment, privatization, and outsourcing will continue to meet EM needs.

The goal is to provide technological solutions that reduce costs associated with cleanup activities, reduce health and safety risks, and enable intractable problems to be solved. To achieve these goals, FIU-HCET will ensure that private industry, other federal agencies, universities, and DOE National Laboratories are major participants in developing and deploying new and emerging technologies. This is accomplished by seeking partnerships with private sector or government agencies during the technology development and demonstration phases. These partnerships will facilitate implementation of these emerging technologies to solve the Western Hemisphere's environmental problems.

In FY99 FIU-HCET will continue to be involved in activities that reinforce the U.S. commitment to invest in people and technology to strengthen the economy while at the same time protecting the environment. Reaching sustainable development for the countries of the Western Hemisphere is an important initiative for the U.S. government, specifically, the U.S. Department of Energy, and FIU-HCET will aid in this endeavor. Recognizing the importance of appropriate technologies being exported to Latin America, FIU-HCET will continue to promote opportunities for technology transfer through cooperative interactions and improved access to information.

APPENDIX A

ESTABLISHMENT OF AN INTERNET TOOL FOR THE VIRTUAL SECRETARIAT AND THE HEMISPHERIC ENERGY STEERING COMMITTEE AT FLORIDA INTERNATIONAL UNIVERSITY HEMISPHERIC CENTER FOR ENVIRONMENTAL TECHNOLOGY

Establishment of an Internet Tool for the Virtual Secretariat and the Hemispheric Energy Steering Committee at Florida International University Hemispheric Center for Environmental Technology

This past January, in Venezuela, the region's energy ministers decided to establish a temporary "virtual" secretariat to oversee the region's hemispheric energy cooperative undertakings. The newly established provisional entity agreed to develop a tool that would facilitate the efforts of the participating energy representatives. The device would serve to support the coordinating mandate of the "virtual" secretariat and the interactive efforts of the Steering Committee.

Consequently, Florida International University (FIU), located in Miami, Florida, has been designated as the sight to host the Internet tool at its Hemispheric Center for Environmental Technology (HCET). FIU-HCET has unique capabilities and characteristics that make it an ideal location for the establishment of an Internet tool to be the communication support system for the "virtual" secretariat and the Steering Committee.

Within the University an information center was established to serve the research and academic communities of the College of Engineering. As its core mission, the information center is responsible for developing and implementing the College's Information Systems strategy.

This includes the evolution of the underlying computational technologies as well as the communications infrastructure that serve the Center's diverse set of constituencies. Additionally, the Center provides services in software development and computer training.

FIU-HCET offers both the necessary facilities/infrastructure and technical expertise for maintaining the communication support and technical operations of this Internet tool. This will create a more knowledgeable and efficient Secretariat, keeping cost minimal and saving time. FIU-HCET, in collaboration with the Steering Committee and Working Groups of the Western Hemisphere Energy Symposium can maintain a successful and efficient Secretariat that will implement the initiatives of the Energy Agenda.

FUNCTIONS OF THE INTERNET TOOL

GENERAL COORDINATION OF ACTIVITIES

- Serve as a source of information on meetings of the Ministers and the Steering Committee.
- Provide Internet technical support to the various working groups.

TECHNICAL ASSISTANCE FOR WORKING GROUPS AND STEERING COMMITTEE

- Post information that monitors key energy and environmental issues, technological developments and financial trends that may influence the integration process in order to inform the Working Groups and Steering Committee.
- Maintain and post information on the Working Group activities.

INFORMATION DISSEMINATION

- Facilitate information exchange by aiding in the collection of data, distribution of energy and/or related material produced by the members of the Hemispheric Energy Steering Committee and/or affiliated delegates.
- Document the progress made in the implementation of the various initiatives and, where necessary,
- Expand and maintain the Home Page by continually collecting information on all Summit related activities.

LIAISON WITH PRIVATE SECTOR AND NONGOVERNMENT ORGANIZATIONS

- Maintain Internet and e-mail linkages with the regions energy ministries and other energy related organizations.
- Provide linkages to other regional energy organizations conducting similar initiatives including APEC, EU, and the IEA.

In addition the Internet tool will have the following resources available to Steering Committee members:

- Interactive Web Messaging: allows authorized users to share messages over the World Wide Web
- Collaborative Document Production: allows authorized users to collaboratively create and edit documents over the World Wide Web
- FileShare Briefcase: allows authorized users to share files over the World Wide Web
- Real-time Web Chat: allows authorized users to participate in real-time chat sessions over the World Wide Web.

FIU-HCET will preview this Internet tool at the next Steering Committee meeting taking place January 29-30, 1999, in Peru. If there is interest in posting information in the Internet tool (i.e., documents, papers, working group material) bring it with you; an FIU-HCET representative will collect it. FIU-HCET will propose in Peru an interim Steering Committee meeting to be held in Miami mid-August. This meeting will allow the opportunity to train all interested and participating members on the usage of this Internet tool.

FIU-HCET is in the process of identifying the energy ministry websites of countries in the Western Hemisphere. To date the following sites have been identified: Argentina, Bolivia, Brazil, Canada, Chile, Colombia, Costa Rica, El Salvador, Grenada, Guatemala, Honduras, Mexico, Nicaragua, Peru, Trinidad and Tobago and Uruguay. Countries not mentioned should contact FIU-HCET with required data. This data will be used to form linkages to the Internet tool and web page. The contact person is Ms. Ana M. Ferreira, International Coordinator, FIU-HCET, 305-348-1818(t); 305-348-1852(f); e-mail: ferreira@eng.fiu.edu.

APPENDIX B

SUMMIT OF THE AMERICAS PLAN OF ACTION (ITEMS 12 AND 21)

SUMMIT OF THE AMERICAS PLAN OF ACTION (Items 12 and 21)

12. ENERGY COOPERATION*

The nations of the Hemisphere have begun a new era of economic growth. This new era is based on greater economic cooperation, freer trade, and open markets. Sustainable economic development requires hemispheric cooperation in the field of energy.

Governments will:

- Convene a follow-up hemispheric official's meeting in the first semester of 1995 to encourage cooperation to study ways to develop the energy industry within the Hemisphere, consistent with the least cost national energy strategies and the activities described in the "Partnership for Sustainable Energy Use" in the following areas:
 - * Consideration of ways to use the energy sector to promote sustainable economic growth.
 - * Cooperation to study ways to optimize and facilitate the financing mechanisms of international financial institutions to support the development of projects in the energy sector, especially including those pertaining to the enhancement of efficiency in the use of energy and to non-conventional renewable energy.
 - * Promotion of the use of efficient and non-polluting energy technologies, both conventional and renewable, leading to a higher degree of knowledge and technical expertise in this area.
 - * Consideration of the enhancement of ongoing efforts to establish electric and other energy facilities in accordance with domestic regulatory frameworks and, where appropriate, under sub-regional agreements.
- This initiative is integrally linked with the Partnership for Sustainable Energy Use item.

21. PARTNERSHIP FOR SUSTAINABLE ENERGY USE *

Consistent with Agenda 21 and the Framework Convention on Climate Change, sustainable energy development and use promote economic development and address environmental concerns. Governments and the private sector should promote increased access to reliable, clean, and least cost energy services through activities and projects that meet economic, social, and environmental requirements within the context of national sustainable development goals and national legal frameworks.

Governments will:

- Pursue, in accordance with national legislation, least cost national energy strategies that consider all options, including energy efficiency, non-conventional renewable energy (i.e., solar, wind, geothermal, small hydro, and biomass), and conventional energy resources.
- Emphasize market-oriented pricing, which discourages wasteful energy use.
- Identify for priority financing and development at least one economically viable project in each of the following areas: non-conventional renewable energy, energy efficiency, and clean conventional energy.
- Promote, in cooperation with the private sector and rural and isolated communities, rural electrification programs which take into account where appropriate the utilization of renewable energy sources, in accordance with the domestic regulatory framework.
- Seek to ratify and begin implementation of the provisions of the Framework Convention on Climate Change, which entered into force on March 21, 1994.
- Encourage the World Bank and IDB to increase promptly and substantially, as a portion of energy lending, financing of projects in energy efficiency and renewable energy and financing to improve the environmental sustainability of conventional energy sources, in accordance with economic rationality.
- Call on the multilateral financial institutions and other public and private financial institutions to finance regional and national programs in support of this action plan, such as training and exchange programs as well as technology cooperation, in accordance with the needs and conditions of receiving countries.
- Assist with coordination and technical cooperation between countries, using existing regional organizations, including project identification and implementation, training programs, and personnel and information exchanges to increase capacity.
- Promote the identification and implementation of private sector projects that reduce greenhouse gas emissions.
- Convene a Sustainable Energy Symposium in the first half of 1995 to discuss follow-up activities relative to this initiative. In the spirit of cooperation countries will share their experiences and discuss progress on implementing this action plan.

* This initiative is integrally linked with the Energy Cooperation item.

APPENDIX C

FIRST ENERGY BUSINESS FORUM OF THE AMERICAS ENERGY INITIATIVE OF THE AMERICAS

Summary of Key Conclusions

FIRST ENERGY BUSINESS FORUM OF THE AMERICAS

ENERGY INITIATIVE OF THE AMERICAS

Summary of Key Conclusions

BACKGROUND

The first Energy Business Forum of the Americas brought together some 250 representatives of the energy sector in Caracas over Wednesday and Thursday, January 14 and 15. A number of excellent presentations were made on the prospects for energy integration projects in the Americas. Attendees had the opportunity to comment on the presentations and to submit their views and ideas on the barriers that might inhibit proper development of these projects, and the actions that Western Hemisphere governments might take to lower these barriers. This paper summarizes the key conclusions of the Forum.

The powerful drivers that favor regional energy integration have been set out in the Ceding paper. Principally, they recognize that the historic links between the Atlantic countries and the Middle East will inevitably diminish as Middle East oil supplies increasingly focus on growing Asian markets. As these historical long-distance linkages widen, it will be necessary to further strengthen regional linkages within the Western Hemisphere. Further, the Forum focused on the tremendous growth opportunities inherent in cross-border natural gas pipeline and electricity transmission projects. These projects can create substantial wealth by monetizing otherwise unutilized resources for the producing country and by providing environmentally friendly fuel to consuming countries. The two drivers of the political desire to strengthen regional ties and to optimize the potential value of existing resources provide a powerful incentive for regional energy integration.

A final longer term driver for integration is the belief by several participants that alternative energy sources to fossil fuels are desirable in the medium term and will be necessary in the longer term, such that they should be nurtured in the shorter term. These alternative energy sources should not be subsidized, but their contribution to energy security and impact on greenhouse gases and their role in rural electrification should be recognized where applicable.

From the plenary sessions and the industry segment sessions a number of issues were raised for the consideration of the Ministers.

GENERAL

The issues of general applicability to all energy forms echo the recommendations contained in the previous document, in stressing the following objectives:

- Strengthen the judicial system across the region and maintain its political independence
- Clear, understandable, and stable laws and regulations

- Maintenance of open markets
- Promotion of foreign investments
- Open and transparent processes for contract awards, with neutral and equal treatment of all qualified potential participants, both domestic and foreign
- Independent regulatory bodies with clearly defined roles
- Stable and fair fiscal terms that facilitate the free flow of goods, services, and investments
- Continued progress in privatization
- Convertible currencies
- Labor legislation that allows market forces to operate, productivity to be rewarded, and skilled workers to be mobile
- Strengthen local service and manufacturing companies
- Pragmatic, harmonized, and goal-based environmental measures.

Forum participants recommended specific initiatives for consideration by the Ministers, including the establishment of a Western Hemisphere Free Trade Zone for energy and petrochemical products and equipment used in the production of these products, and reconvening the Hemispheric Conference on the Energy Regulation Process started in Mexico City in July 1996.

More specific recommendations were developed for the different energy sectors.

OIL

The Forum noted the continued progress toward open markets and privatization in many national markets and recommends that this progress should be sustained. Further, the Forum noted the progress made by ARPEL on behalf of OLADE in recommending harmonized minimum product quality specifications across Latin America. These recommendations should be implemented.

It was also noted that there was a need for considerable investment in regional refining capability to meet rising demand, heavier fuel stocks, and improved product quality. The Latin American industry is currently characterized by a preponderance of smaller, unsophisticated refineries. The Forum recommends that market forces should be allowed to determine which refineries should be expanded and which should be closed.

The Forum also considered the lessons learned from oil developments requiring cross-border pipelines and those in disputed territories. In both cases, the private sector can assist governments to find win-win solutions. However, governments must be prepared to enter negotiations in good faith and with the intent of finding a mutually agreeable resolution. Mechanisms for accelerating resolution of disputes that are not covered by existing treaties would be very beneficial.

The Forum supports the opening of exploration and production opportunities to private companies that are occurring throughout the region. The Forum recommends continued cooperation among the hemisphere's nations to create fiscal and natural resource regimes that will induce capital and technology to aid in the development of their hydrocarbon resources.

A network of treaties designed to avoid double taxation and to clarify the taxing authorities of different levels of government is also recommended. By contrast, attempts to create fully uniform domestic oil legislation would probably be unproductive.

NATURAL GAS

There are tremendous opportunities available in Latin America, some presently underway, to take advantage of increasing demand and available supply of natural gas. Construction of natural gas infrastructure, as with other energy construction, must comply with environmental regulations. The type and content of these regulations can vary substantially by country. Additionally, some financing sources, i.e., IFC, World Bank, impose their own environmental standards on projects. We recommend that environmental standards be harmonized in the region. This action would ensure consistency of construction, maintenance, and equipment costs in cross-border projects. Furthermore, this action would eliminate potential conflicts with NGOs (nongovernmental organizations) that could portray regulatory differences as discrimination.

A broad and flexible regulatory framework needs to be developed in order to promote investments. Conversely, a very restrictive framework may allow neither companies nor countries to capture the possible benefits of vertical integration. We recommend that governments should be open to proposed changes in project definitions, within a stable regulation framework, in such a way as to permit the emergence of alternative ideas and solutions.

Following the Kyoto meetings, it is clear that natural gas will take an increasingly important role as an energy source. The Forum notes that Southern Cone cross-border projects are proceeding rapidly. However, there are significant reserves of natural gas in the Andean Pact countries, Trinidad, and Mexico that are being developed more slowly. Potential markets exist for this gas in small and large countries to the North. We recommend that the Ministers charter a work group to analyze potential natural gas transportation infrastructure to mobilize these resources for the benefit of producers and consumers. Specifically, two projects have been identified. The first connects reserves in Trinidad and Eastern Venezuela through the Caribbean islands to Florida and has been studied in the pre-Kyoto context by the World Bank. The second connects Eastern Venezuela and Colombia to Central America, Mexico, and ultimately Texas. The work group should also address the potential roles of LNG, gas to liquids and other technologies in mobilizing these resources.

ELECTRICITY

The hemisphere has some demonstrated successes in recent years. These include the following:

In Central America, there have been interconnections between countries since 1976; and the SIEPAC transmission infrastructure project is to come online by 2002.

- 1) In the Southern Cone, the dynamic relations between the MERCOSUR countries and between Argentina and Chile have led to a series of interconnections driven by commercial and industrial demand.
- 2) The Venezuelan-Colombian three-line interconnection experience.
- 3) Established patterns of interconnection between Canada, the United States, and Mexico.
- 4) Mexico and Guatemala will complete their interconnection by 1999.

The basis of success in each of the above is driven by taking advantage of political agreements, clear economic advantage, and a reduction of the operational risk of the system as a whole.

Learning from past experience immediately suggests that political stability and democratic depth facilitate economic liberalization and market consolidation processes. For example, MERCOSUR and NAFTA contribute to the integration of the hemispheric electric sector, since both provide socioeconomic benefits, generate lower risk and improved access.

To achieve that, the following actions are strongly recommended:

- Recognize the different situations in the Southern Cone and the Andean Region
- Study the success factors in MERCOSUR and establish the basis for their adapted replication in the Andean Region and Central America.
- Develop a country-by-country regulatory framework with appropriate symmetries that will encourage joint projects.
- Develop highly professional independent regulatory entities that can operate on the basis of commercial needs and a supply and demand economy.
- Introduce the opportunity for the development of national wholesale elects marketers and allow for their economic integration at a regional level.

The Forum encourages the Ministers to work with the private sector to demonstrate the viability of integrated electricity markets via electric grids that are throughout the hemisphere. In the spirit of the Miami Summit of the Americas, this achievement would foster trade and development, promote the preservation of the environment, and improve the health and welfare of the entire hemisphere.

As another specific and immediate action we recommend the creation of the Andean Energy Wholesale Market.

Develop the needed actions toward an open market for trading and transmitting wholesale electricity between the countries of the Andean Region (Bolivia, Colombia, Ecuador, Peru and Venezuela) that are based on the evolution and development of each of the

national markets. This will start with the countries currently interconnected or are about to be so (Colombia, Ecuador, and Venezuela).

This requires the adaptation and flexibility of the regulatory framework in each country (existing or in the process of being defined) to facilitate the free market of energy.

For starters we recommend the creation of a working group that will promote the initiative between Colombia and Venezuela for an Energy Wholesale market. This working group will engage in a series of studies that will lead to a specific action plan resulting in an Andean Energy Wholesale Market by the year 2003.

As an integral part of strengthening a democratic integration that respects national needs and policies, the Ministers will be well advised to consider the importance of reassessing cross-subsidy policies. These should be reduced to an absolute minimum and should be dealt with in a transparent and explicit manner. The type of such cross-subsidies should be prioritized and explicitly incorporated to both the national and the electric sector budgetary process.

An additional action recommendation for the region as a whole is to establish a regulatory and legal framework that promotes the participation of private capital on a national and regional level in the electric business.

COAL AND ORIMULSION

Modern technologies have made possible an efficient and clean utilization of alternate energy sources such as coal and orimulsion in the world energy markets. Availability of plentiful local resources (i.e., coal in Colombia, bitumen in Venezuela) provide significant opportunities for growth in the supply of these fuels through properly channeled investment in these industries.

However, resistance from established suppliers of conventional fuels, often using specious environmental arguments, is resulting in political opposition to market expansion of coal and orimulsion.

An important issue to consider in this Forum is the need to provide adequate political, legal, and fiscal hemispheric frameworks to permit rational investment in these industries and ensure fair competition with the established suppliers of conventional fuels.

RENEWABLE ENERGY SOURCES

Modern renewable energy technologies, including solar, wind, and geothermal power, have seen dramatic decreases in costs coupled with increased efficiency and reliability over the past few years, allowing them now more than ever to provide economically viable alternatives to conventional power production.

As a result, renewable energy technologies are being increasingly chosen to help meet the surging growth in electric power demand-both on and off-grid-in Latin America and the Caribbean (LAC).

In the case of the electrification of rural and remote communities, renewables often provide the only sustainable solution for meeting a community's growing power needs. Today, 76 million people, 18% of the region's population, are still without electric service.

While renewables have seen significant growth over the past 10 years, they continue to face considerable barriers for development, especially when competing with conventional fossil technologies.

There are three key areas that can be addressed by us through the Forum:

- 1) *Raise the awareness of the benefits of renewables among energy decision-makers and investors.*

Key benefits of renewables include the following:

- Diversity of generation technologies
- Utilize local natural resources
- Cost-effective
- Environmentally sound
- Provide significant employment opportunities
- Modularity
- Demonstrated commercial technologies
- Well adapted for remote or small loads
- Create new investment opportunities.

- 2) *Motivate the creation of new financing sources for sustainable energy projects.*

The participants in the Forum urge the hemisphere's Energy Ministers to put additional pressure on the multilateral banks and international organizations to play a more active role in developing these financing mechanisms, and in focusing the attention of lenders on the particularities and benefits of investments in renewable energy projects.

- 3) *Support policy and regulatory frameworks which improve market conditions for renewable energy project development.*

There are clearly many options available to address the policy needs of both off-grid and grid-connected renewables. In designing their energy markets, governments should realize that long-term strategic energy plans can and should be created to encompass an energy mix that includes the integration of renewable energy sources.

CLIMATE CHANGE

Policies on climate change and greenhouse gas emissions will have major consequences for private and public energy sectors and were explicitly considered by the Forum. The decisions made in Kyoto, as well as those deferred to COP4 (emissions trading, the role of developing countries, and how to measure sinks and sources), have a serious potential impact on economic development throughout the region.

In November 1998, Argentina will host the Third Conference of the Parties of the Framework Convention on Climate Change. The Forum urges the Hemisphere's Energy Ministers to work with members of the Forum as they develop strategies to safeguard the global environment, to be sure that the policies adopted do not inadvertently result in unintended consequences.

APPENDIX D

MEMORANDUM OF UNDERSTANDING BETWEEN SINAPSIS AND FLORIDA INTERNATIONAL UNIVERSITY

**MEMORANDUM OF UNDERSTANDING
BETWEEN
SINAPSIS
AND
FLORIDA INTERNATIONAL UNIVERSITY**

Florida International University (FIU), for and on behalf of the Board of Regents for the benefit of the Florida International University-Hemispheric Center for Environmental Technology (FIU-HCET), and Sinapsis enter into this Memorandum of Understanding (MOU) in good faith, with the goal of expanding opportunities for joint work.

Sinapsis, the Foundation for the Development of Integrated Economic Areas, is a private nonpolitical institution based in Buenos Aires, Argentina. Its main objective is to promote and develop research and debate and to contribute and support the different processes of integration between countries, focusing on Mercosur, NAFTA and the European Union. FIU-HCET's mission is to provide a bridge between academia, government, and industry for the diffusion of environmental technologies that promote economic and sustainable development, serving as an incubator of new business. FIU-HCET and Sinapsis, having their own individual areas of expertise, are in the fortunate position to assist each other in performing their respective missions, and to collaborate in the pursuit of improving economic and environmental conditions throughout the Americas.

This cooperative relationship will provide new resources to industries in Florida and the Mercosur region wishing to expand their international business opportunities. It will also provide a conduit for the exchange of technical and economic information that will further the principles of hemispheric integration. As FIU is a designated Historically Black College and University/Minority Institution, such experiences also support joint interests in the advancement of minority participation in international trade and the environmental sciences. Sinapsis' strong understanding of the region's vision for future economic growth combined with FIU-HCET's specific knowledge in the international environmental industry provides synergy for mutual success from this working relationship.

The goal of this MOU will be achieved through the development of specific commitments and agreements to support work, proposals, or marketing ventures. These specific agreements will be individually developed, agreed upon, and executed. Both parties agree that they will cooperatively work to foster mutual benefits from results arising from these joint efforts. Each party will have all rights to information and processes resulting from or associated with these activities to the extent not otherwise restricted or excluded in the specific agreement or the terms of any contract with project sponsors.

SINAPSIS

FLORIDA INTERNATIONAL
UNIVERSITYFLORIDA INTERNATIONAL
UNIVERSITY - HEMISPHERIC
CENTER FOR ENVIRONMENTAL
TECHNOLOGYBy: By: By: Print Name: Dr. Horacio BercúnPrint Name: Dr. Thomas BreslinPrint Name: Dr. M.A. EbadianTitle: Vice President
Executive CommitteeTitle: Acting Vice President
Research & Graduate StudiesTitle: Director
HCETDate: May 20, 1998Date: May 20, 1998Date: May 20, 1998

APPENDIX E

ENVIRONMENTAL CONSULTING AND TRAINING PROGRAM FOR MERCOSUR

Established by

Sinapsis, Argentina

and

Hemispheric Center for Environmental Technology, USA

October 30, 1998

Environmental Consulting and Training Program for MERCOSUR

INTRODUCTION

On May 20, 1998, Florida International University's Hemispheric Center for Environmental Technology (FIU-HCET) and Sinapsis signed a Memorandum of Understanding to collaborate to improve the economic and environmental conditions throughout the Americas and to strengthen the hemispheric technology integration process.

Sinapsis, a Foundation for the Development of the Integrated Economic Areas, is a nonpolitical institution based in Buenos Aires, Argentina. Its main objective is to promote and develop research and debate to contribute to and support the different processes of integration between countries, focusing on MERCOSUR, the North American Free Trade Act, the Free Trade Area of the Americas, and the European Union. FIU-HCET's objective is to provide a communication link between academia, government, and industry for the diffusion of environmental technologies to promote economic and sustainable development and create the basis for new business ties.

PURPOSE

FIU-HCET and Sinapsis, having their own individual areas of expertise, are in an excellent position to provide mutual assistance to perform their assigned duties and collaborate in the pursuit of improved economic and environmental conditions throughout the Americas. Given the advisory role Sinapsis plays to industry within MERCOSUR, it is able to provide and/or collect specific knowledge on the industry's environmental needs and to relay the information to FIU-HCET for evaluation. Furthermore, the collaboration between FIU-HCET and Sinapsis provides both institutions a new avenue to assist governments of the MERCOSUR countries in identifying, prioritizing, and approaching their environmental needs. This collaboration will serve as an international example to promote the integration process within the Western Hemisphere, as stated during the 2nd Summit of the Americas held in Chile in 1998.

FIU-HCET and Sinapsis will cooperate to establish an Environmental Consulting and Training Program for MERCOSUR that will address environmental issues faced by universities, industries, governments, and the general population. The details for this program are explained in the following sections.

PROGRAM DESCRIPTION

The program will be developed over a two-year period (1999-2000) and its overall activities will focus on the following target issues:

- Municipal and industrial sewerage
- Creation of environmental regulatory framework and norms
- Potable and rural water supply systems, use of reclaimed water and general water quality standards and issues

- Solid and hazardous waste disposal infrastructure
- Reduction of industrial wastes through the use of new and innovative technologies
- Environmental issues concerning worker health and safety
- Waste handling and treatment in general and of hazardous, toxic, and pathogenic substances in particular
- Environmental risk analysis and impact assessment
- Promotion, standardization, and classification of quality objectives
- Development of industrial competitiveness through improvement and standardization of quality control programs
- Air quality standards and pollution abatement programs
- Industrial environmental issues placing particular emphasis on small to medium-sized companies

The program intends to establish a collaborating and consulting network based upon an executive body and three components: University Consortium Network, Industrial Consortium Network, and Environmental Consulting Program for MERCOSUR.

Executive Committee

The executive committee will consist of one member appointed by Sinapsis and another one appointed by FIU-HCET. The responsibilities of the executive committee will be to:

- coordinate development of the entire program
- coordinate collaboration and interaction among partners and program components
- administer the program
- market and promote activities that may benefit entire program and its components
- write and publish program's reports

University Consortium Network

This component will work to improve the quality of environmental engineering education of the academic member institutions and enhance the environmental curriculum taught throughout the region. It will assist by designing new curriculum materials, arranging conferences and student and professor exchange programs, supporting the industrial consulting program, and offering opportunities for hemispheric integration on environmental issues. This network will serve as a source of knowledge for providing consulting services to both private and government institutions.

Industrial Consulting Program

This component will provide consulting services to private industry on environmental issues and will work closely with the University Consortium Network to provide industry comprehensive training on pollution prevention, ISO 9000 and 14000 standards, hazardous waste handling, and waste minimization processes design.

The Industrial Consulting Program will work in other areas as well as meet overall program objectives. It will also serve as a technology transfer hub to identify and make available newly developed environmental technologies to be used and applied by private industry. National government agencies, provincial and city offices as well as non-government entities will be able to contact this program to seek technical services on national and international environmental issues.

Environmental Consulting Program for MERCOSUR

This component will provide consulting services on environmental issues to the governments and institutions of the MERCOSUR countries. This component will assist with developing environmental standards and programs (i.e., waste management and tracking requirements, and environmental regulatory programs) that will facilitate the integration process among nations. Also, the program will provide consulting services on issues affecting the national environmental programs of each MERCOSUR country.

PROGRAM ACTIVITY PLANS

Executive Committee

The executive committee will perform the following activities:

- publishing a newsletter (bimonthly during year 01 and monthly during year 02)
- creating and maintaining the program's website which will be linked to FIU-HCET's and Sinapsis' websites
- organizing events such as meetings, seminars, conferences

University Consortium Network

FIU-HCET and Sinapsis will establish a university consortium from universities of the MERCOSUR countries to offer consulting services to each other, and to the other program components. This consortium will focus on improving the environmental education by specifically addressing the subject of environmental technologies that may provide technical and economic advantages over existing ones or that may represent innovative environmental developments. FIU-HCET will be the link between universities and industry. All the information collected from and supplied by the private industry will play a key role for the development of a suitable curriculum that will meet the needs of the various employment sectors.

Proposed Activity Plan

- Identify key universities within MERCOSUR countries that may serve as leaders to address a selected number of environmental topics (i.e., soil, air, water, solid waste and environmental engineering)
- Establish and administer an electronic communication network to facilitate interaction among universities
- Develop and manage the following:
 - * topics and issues to be evaluated/investigated
 - * information exchange in the areas specified within this document.
 - * workgroups to address pre-determined assignments for future investigation or evaluation. Investigation topics will be determined by FIU-HCET and Sinapsis; however, participating universities may also be summoned for consultation.
 - * publishing workgroups' papers
- Establish student/professor exchange programs to promote transfer of knowledge about environmental issues.

Other feasible activities

- Improve environmental education/curriculum at the university level
- Collaborate in the development, demonstration, and implementation of environmental technologies to benefit private industry
- Develop and implement national, regional, state, and municipal environmental awareness campaigns to educate the general population and encourage the adoption of environmentally safe practices (i.e., recycling, conservation)

Industrial Consulting Program

FIU-HCET will collaborate with Sinapsis to create and develop an environmental technology program for industry within MERCOSUR. Its activities may include:

- design and develop training programs for industry to meet MERCOSUR environmental regulations
- act as technology transfer agent for companies seeking innovative technologies
- provide environmental consulting services

The industrial consulting program is expected to become a network of technical experts capable of providing knowledge and training as well as performing Environmental Impact Assessments (EIA), technology demonstrations, process engineering, etc. These experts will work closely with the University Consortium Network, relaying upon the various universities to provide their expertise on possible solutions to be adopted.

Proposed Activity Plan

- Develop new management programs for hazardous waste handling operations or participate in existing industry programs for the handling of hazardous wastes
- Provide consulting services in the areas of:
 - * Municipal and industrial sewage
 - * Creation of environmental regulatory framework and norms
 - * Potable and rural water supply systems, use of reclaimed water and general water quality standards and issues
 - * Solid and hazardous waste disposal infrastructure
 - * Reduction of industrial wastes through the use of new and innovative technologies
 - * Environmental issues concerning worker health and safety
 - * Waste handling and treatment in general and of hazardous, toxic, and pathogenic substances in particular
 - * Environmental risk analysis and impact assessment
 - * Promotion, standardization, classification, and certification of quality objectives
 - * Development of industrial competitiveness through improvement and standardization of quality control programs
 - * Air quality standards and pollution abatement programs
 - * Industrial environmental issues placing particular emphasis on small to medium sized companies
- Develop and implement pollution prevention training programs to be used in Latin America
- Develop and implement ISO 9000 and 14000 training programs
- Support development of specific environmental programs for small to medium-sized companies to assist during in the transition to more environmentally acceptable methods, practices and policies
- Provide environmental technology databases and networking capabilities to assist in selecting the best technological solutions to specific problems, including:
 - * Water quality
 - * Air quality
 - * Soil and land reconditioning
 - * Recycling and reuse
 - * Disposal and treatment of biomedical and pathogenic waste
 - * Oil spill detection and response

- * Environmental management, including waste minimization and air pollution abatement.
- * Mining site decontamination and EIA

Other feasible activities

- Conduct a survey among top private and public companies and entities, businessmen, leaders, and the general population, at least in Argentina and Brazil, to identify major needs, concerns, problems, activities, and performance regarding environmental related issues and how they may affect MERCOSUR integration
- Develop training courses key environmental issues (i.e., how to approach solving environmental problems)

Environmental Consulting Program for MERCOSUR

FIU-HCET and Sinapsis collaboration will aim at becoming the primary environmental consulting board for MERCOSUR governments and institutions. It will provide consulting services on regulatory and operation development to appropriate bodies within MERCOSUR countries, including developing environmental regulations, operation standards, and effective management systems.

Proposed Activity Plan

- Develop toxic and hazardous waste control programs or participate in already existing industry and facility control programs
- Develop a waste placarding and labeling program, including design, standardization, and adequate training programs for the industry and the public
- Design and implement environmental management plans to meet local and project specific constraints and requirements
- Provide support to the development and maintenance of environmental compliance programs and audits
- Assist in the development of national recycling programs
- Provide independent consulting services to evaluate proposed environmental technologies to be used or adopted, including testing and evaluations to confirm the fulfillment of expected goals

PROGRAM BENEFITS

The collaboration between FIU-HCET and Sinapsis to establish this program will result in a mutually beneficial relationship. Maintaining and improving the environmental standards while bringing about hemispheric economic integration is an important component for a sustainable development process. Therefore, this program is aimed at addressing these issues in such a way as to benefit the parties involved.

As a result of this partnership, Sinapsis will have a greater presence in various sectors such as universities, industry and government which will strengthen its standing within MERCOSUR countries. The establishment of this program will give Sinapsis the opportunity to fully participate in the international trade arena on important issues like environmental regulations. Also, by working with FIU-HCET, Sinapsis will have the opportunity to provide additional resources to its members and communities. These resources will increase international trade and encourage economic integration. Thus, Sinapsis will become a leader in the advancement of the technological capabilities of MERCOSUR countries.

FIU-HCET will also benefit from this partnership. By joining Sinapsis, FIU-HCET can expand its international activities since it will be involved in activities within three different sectors of the countries. The MERCOSUR countries represent an excellent opportunity for FIU-HCET to become known in the region and get involved in technology transfer activities with those nations. It will also provide access to the knowledge and resources of other institutions in the international environmental arena. Moreover, this program will provide opportunities and create ties to MERCOSUR countries' universities and industry that could lead to future endeavors. Finally, this program's goals and objectives address those outlined by Florida International University. Expanding university programs and ensuring the success of its centers are central to the continued growth of FIU.