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Expanding energy cooperation in the Western Hemisphere

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INTRODUCTION

Each nation in the Western Hemisphere seeks to secure its energy future. While natural energy resource endowments and energy demand patterns vary widely throughout the hemisphere, geographical proximity creates important interdependence. Normal economic forces naturally encourage mutually beneficial arrangements within the region, but it is quite certain that concerted action by governments can facilitate or retard the potential economic benefits and social welfare from cooperation. Realizing these benefits, however, requires concrete programs, not simply aspirational statements. Here I offer for discussion five program areas where regional energy cooperation offers the opportunity to benefit the hemisphere over the next decade. +

The five program areas are:

Energy infrastructure integration, which includes gas pipelines, liquefied natural gas (LNG) facilities, and electricity generation, transmission and distribution systems.

Solar and energy. The Caribbean and Central America are generally energy poor but enjoy extremely attractive levels of solar insolation and other forms of renewable energy such as geothermal.

Biofuels is a particularly attractive renewable energy option, because it is a substitute for liquid fuels, and because there is significant current production in the hemisphere, notably in Brazil and the United States.

Climate Change is the paramount global energy issue. Avoiding the adverse consequences of climate change requires an agreement to cap emission of greenhouse gases by both developed and developing countries. Although a global solution is necessary, a Western Hemisphere agreement would be a significant step forward.

Nuclear Power. Interest in nuclear power is increasing in the hemisphere because nuclear power is a carbon free source of electricity generation and does not depend on imported fossil fuel. The barrier to expansion is high cost, uncertainty about waste management, and proliferation concerns.

Energy infrastructure integration and resource nationalism The anticipated growth in energy consumption will require significant investment to replace and expand the existing energy infrastructure capital base in the following areas: (1) electricity generation, transmission, and distribution; (2) natural gas pipelines and LNG terminals for liquefaction and re-gasification; and (3) petroleum production (especially in the deep off-shore), refining, and distribution. The efficiency of this energy infrastructure depends on the way the infrastructure is designed, built, and operated. Cooperation between

+ I have profited from several sources: (1) *U.S.-Latin America Relations*, Independent Task Force Report #60, Council on Foreign Relations, Charlene Barshefsky and James Hill, co-chairs, New York (2008); (2) *Energy Cooperation in the Western Hemisphere*, CSIS Significant Issues Series, Vol. 29 #2, 608 pp., March 2007, Sidney Weintraub, editor; and (3) "Policy recommendations on energy and climate change," a paper prepared for the Partnership for the Americas Commission by Sidney Weintraub and Francisco E. Gonzalez, May 22, 2008.

firms and harmonized regulation among jurisdictions capture benefits for each nation and every consumer in the hemisphere.

North America has experienced significant integration in its energy infrastructure over the past two decades. The North American pipeline natural gas pipeline system has become highly interconnected as a result of commercial initiative supported by regulation. Progress has been made on the integration of the electricity grid, but sitting issues hamper much needed new investment. Most experts believe that a more intelligently managed and rationally designed smart network could realize significant improvements in efficiency of electricity distribution.

In contrast to progress in North America, political turmoil has slowed the development of a regional distribution system in South America. The most egregious example is Bolivia's reluctance to participate in a regional natural gas transportation system that its location and resource base makes potentially beneficial. An integrated natural gas pipeline system encompassing Venezuela, Brazil, Bolivia, Argentina, Chile, Peru, and Ecuador would have important regional economic benefits, but issues of resource nationalism, state ownership, and regulatory differences currently are precluding progress.

The North American experience should be an important example to Latin America of the benefits that accompany integration. While direct involvement by the U.S. government is unlikely to be effective in encouraging integration, revitalization of the Western Hemisphere energy ministers meetings could play a constructive role by discussing possible steps forward.

The magnitude of anticipated energy infrastructure investments in Latin America, as in other regions, is spectacular and will require and surely attract capital from many places. A significant portion of the financing can and should originate in the United States, although it is noteworthy that Europe and Asia, including China, are eager to gain access to the Latin American energy infrastructure market.

Solar and renewable energy. The equatorial belt enjoys tremendous solar insolation and this equatorial region also contains many countries that are poor and do not possess significant hydrocarbon resources. This is generally true in the Caribbean and Central America, where many countries are poor and completely dependent on oil imports. Despite much talk and a considerable number of demonstration projects, there has been little penetration of solar technology into the region beyond solar hot water heating. Neither the private sector nor government sponsored development organizations have found effective mechanisms to create new solar-based technologies that are both affordable and appropriate for application in poor rural and urban communities that lack public services.

The conventional approach to renewable energy development is for development entities, such as USAID or the UNDP to fund local projects on a case-by-case basis. The virtue of this approach is that project execution is the responsibility of a local authority that understands local conditions. However, each project is unique, project evaluation is mixed or non-existent, there is no effective learning transferred to new situations, and, in some cases there is local corruption.

An alternative approach is for the Western Hemisphere to establish a small renewable energy development agency, funded by the richer countries in the region, for the purpose of developing a suite of new affordable appropriate renewable technologies, testing and documenting these systems, and demonstrating them in cooperation with local authorities. The important difference in this proposed approach is the creation of a central organization with the capability and resources to develop new technology and with the responsibility to accumulate transferable knowledge.

Hemispheric governments, led by the United States and Canada should fund this "Renewable Energy Laboratory of the Americas" for an initial ten-year period, at a level of \$200 million per year. The laboratory should be located in Central or South American, in order to encourage better exchange of technical personnel and technology transfer.

Biofuels is a renewable energy source of special importance in the Western Hemisphere. Biomass is a unique renewable energy source, because it leads to liquid fuel that can displace imported oil. Some energy models project worldwide production of biofuels of 20 million barrels of oil equivalent per day by mid-century. There is considerable activity in biofuels in the hemisphere: The United States has adopted lavish subsidies for domestic ethanol production from corn and set ambitious targets for corn based ethanol and biodiesel.* Brazil is rapidly increasing its ethanol production from sugar cane, which is now a major source of fuel for passenger cars. The climate and land use in the Caribbean and Central America offers the potential for expansion for biofuel production to countries that lack any domestic hydrocarbon reserves.

It is technically possible to corn and sugar by cellulosic feedstock as a source of liquid fuel, but advances are needed to demonstrate economic attractiveness. Pursuing alternative technical pathways (including algae) could answer the two growing criticisms of current ethanol production: (1) use of a biomass feedstock for biofuels production that does not compete with food crops and (2) higher yields of liquid fuel from biomass with reduced input of natural gas or petroleum fuel for cultivation, conversion, and separation.

The United States currently has a 54¢ per gallon tariff on ethanol imports. This protectionist tariff restricts lower cost ethanol produced in Brazil from entering U.S. markets and artificially maintains high domestic U.S. ethanol and corn prices. The tariff should be removed. In the longer-run, because of competition for food production, corn and sugar biofuels feed stock should be replaced by cellulosic biomass. Hemispheric cooperation on cellulosic biomass technology development, both with regard to more productive biomass production and more efficient biomass conversion would be of great value to the region.

Climate change. It is generally assumed that the best, if not the only, path to global harmony in adopting measures to limit greenhouse gas emissions is a post-Kyoto agreement that bridges the significant difference between the interests of the rapidly growing, large emerging economies such as Brazil, China, India, Indonesia, and Mexico and the developed OECD economies. The difference in interest concerns balancing the responsibilities between the developed economies that have been responsible for most of the past emissions and the developing economies that are anticipated to be a progressively larger fraction of future emissions. The chairman of our commission,

* The 2007 Energy Policy Act sets ambitious targets for ethanol blending in motor gasoline and for biodiesel in diesel fuel.

Ernesto Zedillo, has expressed skepticism that progress will be made on this difficult issue on a global basis.*

It is very unlikely that Western Hemisphere countries could agree on a policy to stabilize greenhouse gas emissions, even assuming that the United States, given a new administration, was willing to adopt a stringent emission tax or cap-and-trade system. Even a more modest goal – an agreement that Western Hemisphere nations should not subsidize electricity or motor gasoline – is likely to be beyond reach, although a move to market prices would contribute greatly to reducing energy demand and hence limiting carbon dioxide emissions.

Nevertheless, there are several reasons that recommend a serious, expanded, hemispheric deliberation on climate change. First, this issue is, after all, the greatest environmental threat to the future wellbeing of the planet. Second, expansion of electricity generating capacity in every country is being slowed by the uncertainty about future emission regulations. At a minimum, the hemisphere should agree on the quality and extent of reporting of emission measurements and energy statistics. Further, environmental policies adopted in one country will effect its neighbors. For example, if the United State (or any other country) adopted policies that effectively precluded construction of coal plants, it would necessarily need to adopt policies to control electricity imports, depending upon the nature of the fuel used for generation.

Perhaps the most important reason to deepen the hemispheric dialogue on climate change is that the larger hemispheric nations, notably Brazil and Mexico, should want Washington to understand their interests and potential flexibility. Latin America faces the danger that United States participation in a global dialogue focusing on reaching a climate change understanding with China and India could effectively present countries in the hemisphere with a *fait accompli*. And there is the small but interesting possibility that engagement in the hemisphere would reveal a way forward that would be influential in making progress globally.

Nuclear Power. Concern about the risks of global warming has revived interest in commercial nuclear power around the world. Greater economic growth and, in particular, growth in electricity demand is projected for developing economies in Asia, Africa, and Latin America. Thus, experts are projecting a possible growth of nuclear power reactors in these regions (excluding developed Asia) from less than 20 reactors today to over 300 reactors by mid-century.

The following table gives the number of reactors operating in the Western Hemisphere in 2008 and an estimate (not a prediction) of the number that might be deployed at mid-century.

* See the *Yale Symposium on the Stern Review*. Ernesto Zedillo, Chapter 14, "Concluding Remarks" available at <http://www.ycsg.yale.edu/climate/forms/chapter14.pdf>

Reactors in operation in the Western Hemisphere

Country	2008	2050 (Estimate)
United States	104	286-477
Canada	18	19-32
Argentina	2	5-10
Brazil	2	17-34
Mexico	2	10-20
Other: Venezuela, Chile, Colombia	0	2-4

Source: 2008 data IAEA; http://www.iaea.org/cgi-bin/db_page.pl/pris.charts.htm; 2050 estimate: MIT *The Future of Nuclear Power*; <http://web.mit.edu/nuclearpower/>

The table clearly provides is a very optimistic estimate of the future range of nuclear deployments. In contrast, the U.S. Department of Energy's Energy Information Administration projects essentially no growth in nuclear electricity generation between 2010 and 2030 for Mexico, Central and South America.* However, whatever expanded nuclear deployment does take place in Latin America, it is most likely to take place in Brazil, Mexico, and Argentina but could also occur elsewhere, such as in Chile and Columbia.

If nuclear deployment increases significantly during the next decades, Latin American nations will want to assure effective safety regulation, and waste management practices and low cost generating cost. Cooperation between United States and Canada with their large nuclear industry, more developed regulatory structure, and government laboratories could be of benefit to all nations in the region.

Up to the present, with the exception of India, countries have not used nuclear power directly to acquire the nuclear material necessary for a weapons capability. The challenge is to continue this separation globally between nuclear power and nuclear weapons in the future. This means assuring to the extent possible that the nuclear power fuel cycle is not used as a source of weapons usable material. The greatest proliferation risk comes from two elements of the fuel cycle: enrichment of natural uranium to produce nuclear fuel and reprocessing of the spent reactor fuel that contains plutonium.

The G-8 with strong U.S. support is attempting to develop a new regime whereby nuclear supplier states, such as France, Russia, and the United States, would offer fuel cycle services to new users of nuclear power in order to delay the spread of these proliferation prone technologies around the world. If there were to be widespread increase in nuclear power deployment in the Western Hemisphere, control of the fuel cycle would need to be addressed. This almost certainly would be a difficult issue, as illustrated by the difference between the U.S. and Brazil with regard to Brazil's decision to build the new Resende enrichment plant.

* Data from the U.S. DOE EIA International Energy Outlook 2006 reference case.

Concluding remark. Western Hemisphere nations are not like transient guests in a hotel. We are part of a common ecosystem with strong economic, political, and environmental interdependence. History and recent neglect (at least by the United States) has made it easier for divisions to appear and for opportunities to be lost. Reversing this trend requires many actions: diplomacy and political engagement, trade, and attention to social concerns ranging from the environment to immigration and law enforcement. But, I believe concrete programmatic cooperation in areas such as energy has great potential as well. My purpose here is to offer five specific areas for energy cooperation as part of the new agenda for the Americas.