Prospects for U.S.-Cuban Energy Engagement: Findings and Recommendations

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At the outset of this book we asked the question, “What would an ideal strategic energy policy look like for the United States; or any other country, for that matter?”

The Current Outlook

Mahmoud Amin El-Gamal and Amy Myers Jaffe partially answered that question for us in their paper “Energy, Financial Contagion and the Dollar,” by setting out a detailed analysis of the tasks that a strategic energy policy should accomplish, among them:

- To ensure that markets operate efficiently so as to develop the infrastructure necessary to meet growing energy requirements
- To ensure the well-being of the human habitat and ecosystem
- To guarantee that mechanisms are in place for warding off and, if necessary, managing disruptions to energy supply

They provided a refined definition of what energy security is and how it is related to U.S. geostrategic interests specific to the discussion of Cuba, the Caribbean, and Latin America. Energy security is a critical consideration for three reasons.

1. U.S. energy independence is not attainable.
2. The policy instruments available to deal with energy supply disruptions are increasingly inadequate.
3. The United States needs to articulate a new vision of how to effectively manage international energy interdependence.

Where Cuba is a factor in that discussion, we were compelled to ask the following questions concerning the implications of a growing presence of these external actors in Latin American energy markets:

—In what way will the ongoing development and evolution of Cupet, Cuba's state oil company, limit or obstruct U.S. efforts to meet its strategic objectives? Any answers must account for the relationship among Cupet, PDVSA (Petróleos de Venezuela), and the Venezuelan state.

—What role can international oil companies play in the development of energy resources and infrastructure in Cuba in both the near and long term? Cuba is seeking to develop a production capability of its North Coast Reserves, leading national oil companies (NOCs) from nine different countries to sign lease agreements with the Cuban regime for offshore tracts.

—What impact will competition for scarce petroleum resources with Brazil, Russia, India, and China have on U.S. energy security, especially in light of the recent energy development agreement between Russia and Cuba, and China’s advance into Latin American energy markets?

New players in Cuba and Latin America increase uncertainty over energy sources on which the U.S. relies for its economic lifeblood. Many of these and other energy sources are controlled by NOCs:

—Seventy-seven percent of proven oil reserves globally are held by NOCs.
—Eleven percent of proven oil reserves are held by NOCs with equity access.
—Only 11 percent of proven oil reserves are open to international oil companies (IOCs); many of these are based in the United States.

The authors of chapter 2, Jorge R. Piñón and Jonathan Benjamin-Alvarado, find that there are a number of key issues to consider regarding the productive capacity of Cuba’s oil and gas resources. First, Cuba has seen close to $2 billion of direct foreign investment since 1991 in its upstream oil and natural gas sector, with very good results. Crude oil liquids production reached a peak level of 65,531 barrels per day in 2003, up from 9,090 barrels per day in 1991. Since 2005 Cuba has seen its crude oil production level off at around 52,000 barrels per day. Second, Cuba’s realized crude oil value could improve substantially once the country is able to monetize its heavy oil production by means of its own future heavy oil conversion refinery processing capacity, or to market its crude oil to U.S. Gulf Coast refining companies. Third, Cuba’s onshore and coastal heavy
oil production seems to have reached a plateau at around 52,000 barrels per day, but once Cupet has access to the services, technology, equipment, and capital available through independent U.S. oil and oil services and equipment companies (when the trade embargo is lifted or modified), Cuba's heavy oil production potential could grow to an amount in excess of 75,000 barrels a day.

Deficiencies in Cuba's oil-refining sector—including outdated technology that is unable to process heavy crude—coupled with an environmentally sensitive tourist industry will force Cuba to consider developing an energy policy that relies heavily on clean-burning natural gas as its fuel of choice for power generation. Cuba's future natural gas needs could be sourced as liquefied natural gas (LNG) from Trinidad and Tobago, as Puerto Rico and the Dominican Republic currently do, or from future Venezuelan production. A regasification facility to receive Venezuela-sourced liquid natural gas is being planned for the southern coast port city of Cienfuegos by Venezuela's PDVSA and Cupet. Two one-million-ton regasification trains are planned for 2012 at a cost of over $400 million. The natural gas is destined as fuel for that city's thermoelectric power plant, local industry, and future petrochemical plants.

As of late 2009, Cupet has consigned eighteen of the fifty-nine deepwater blocks in Cuba's Exclusive Economic Zone (EEZ) to seven international oil companies. Piñón and Benjamin-Alvarado caution against getting too excited about Cuba's immediate offshore oil potential—there are a number of obstacles to be overcome—yet the outlook is basically positive. Deepwater exploration is expensive and carries a high degree of geological and technical risk, risks that companies such as Repsol-YPF, Statoil-Norsk Hydro, and Petrobras certainly have the necessary deepwater expertise to handle. The price of crude oil would have to be over $65 per barrel in order to be worthwhile for most international oil companies to undertake today, and current prices are close to this. If successful, it could take two to three years to bring the North Coast Basin deepwater project into full development, at an estimated total cost of $1 billion to $3 billion.

Future challenges in the upstream oil and gas sector need to be understood in terms of current and reported future international oil companies that are involved in Cuba's deepwater search for oil and gas: their competency, strategic objectives, and possible long-term contribution to the island’s goal of becoming energy-independent. As long as the U.S. government’s current economic and trade restrictions imposed on the government of Cuba remain in place, all companies, regardless of their nationality or technical competence, will have a very difficult time monetizing any newly discovered
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hydrocarbon resources, because they need access to the U.S. oil services and equipment sector.

In chapter 3, Juan Belt argues that Cuba has succeeded in extending electricity services to a large proportion of the population—a noteworthy achievement, accomplished with little regard for economic, financial, or environmental considerations. Power generation from burning liquid fuels, the predominant type in Cuba, is extremely costly when all the opportunity costs are taken into account. Additionally, Cuba's state-owned electric utility, Unión Eléctrica, experiences higher transformation losses of power and has lower labor productivity than other countries. Venezuela came to the rescue when Cuba lost fuel subsidies from the Soviet Union, but Venezuela's own fiscal accounts are now under significant pressure as a result of the sharp reduction in the price of crude oil. If the crude oil market remains depressed, Venezuela may have no option but to reduce or end its support for Cuba, which would jeopardize the island's precarious energy security situation. When we modeled Cuba's energy sector, we assumed that Venezuela would terminate its subsidies to Cuba by 2010.

The analysis uses the MARKAL/TIMES model, which facilitated a low-cost expansion plan for Cuba's power system. Unfortunately, Cuba does not have great potential for renewables, but together, wind power, photovoltaic cells, small hydropower, and bagasse represent a larger renewables potential than is currently realized. Under all scenarios, domestic or imported natural gas will become the predominant fuel. Combined-cycle gas turbines would provide cheaper and cleaner power but would require an investment of $2.5 billion, and if the gas is imported, an additional investment will be needed to build a regasification facility. The Cuban government has announced plans to build a gas regasification facility in Cienfuegos; the estimated completion date is 2013.

Attracting such high levels of foreign direct investment, particularly during the current global economic crisis, will require significant reforms designed to reassure potential investors:

- Passing an electricity-sector law and establishing a public utility commission
- Modeling the energy sector to better determine the least-cost expansion path, including a more thorough analysis of the prospects for renewable energy
- Modifying tariffs gradually to reach full cost recovery, restructuring Unión Eléctrica through unbundling and corporatizing, and promoting independent power producer arrangements
- Developing operating contracts or concessions for existing assets
The United States should support these efforts. Initial funding possibilities include technical assistance for modeling the sector to determine options for improving efficiency and environmental sustainability and training government officials in the economic regulation of utilities. Modeling and training will enhance the skills of Cuban professionals and foster a dialogue with their peers in the United States. More cooperation between Cuba and the United States will enhance energy security in both countries.

In chapter 4, on Cuba’s energy balance and potential for biofuels, Amy Myers Jaffe and Ronald Soligo echo Piñón’s opinion that the potential for exploiting oil and gas reserves is indeed significant and that Cuba has large land areas that once produced sugar but now lie idle. These could be revived to provide a basis for a world-class ethanol industry. They estimate that Cuba could very easily produce 1 billion gallons per year of sugar-based ethanol. They make the case that Cuba has the potential not only to be self-sufficient in energy but also to become a net exporter. By 2000 the Cuban economy had made progress in recovering after the collapse of the Soviet Union and the ensuing special period. Total energy and crude supplies increased. Domestic production of crude more than doubled, and imports began to rise. Domestic production of gas continued to increase. The balance between the supply of crude and petroleum products shifted back toward its historical ratio favoring crude oil and oil consumption in all end-use sectors. These trends continued into 2009.

One troubling aspect of Cuba’s energy profile is the ratio of total final consumption (TFC) to total primary energy supply (TPES), which is a measure of the energy lost during conversion—primarily in the generation of electricity but also in the refining process. It has shown a steady decline since 1990, with losses in transmission and delivery reducing the available supply of electricity from about 85 percent of all electricity produced to 71 percent in 2009. The significant drop suggests that there has been a serious decline in energy efficiency, no doubt reflecting the deteriorating electricity and refining industry infrastructure. Forecasting Cuba’s future energy balance is risky, since future energy demand will be affected by policy changes that are likely to emerge in the coming decades. It is hard to predict when a major change will occur and how it will unfold inside Cuba, but many experts expect economic policy changes to emerge, especially if the United States lifts sanctions. As Jaffe and Soligo state, “The only certainty is that the current model has not been successful and will be modified or swept aside at some point.”

Should Cuba successfully tap its energy production potential, Jaffe and Soligo estimate that Cuba could produce as much as 2 billion gallons or
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130,000 barrels per day of ethanol. Adjusting for the energy content of ethanol, this is the equivalent of 97,500 barrels per day of gasoline. Having three different energy streams will give Cuba the flexibility to exploit world price differentials and to choose which fuel to reserve for domestic production and which to export. In many areas of the world, the shift in land use to crops for ethanol has resulted in rapidly rising costs for food, but this is not the case in Cuba, which has had a traditional comparative advantage in the production of sugar because of its year-round growing season. Although some of the land used for sugar in the past is being shifted to food crops and reforestation, much of it is idle. Thus, for Cuba a restoration of the sugar economy does not necessarily have to involve the sort of trade-offs in food production and environmental quality that are issues in the United States and Brazil.

Cuba's ethanol potential is second to that of Brazil in Latin America. Of course, achieving high levels of ethanol production capacity in Cuba will take time. There are many obstacles to achieving an ethanol industry that could produce as much as 2 million gallons of ethanol output. Increasing the area under sugarcane will require substantial investment. The land has been neglected and much of it has suffered from compaction with the use of very heavy Soviet-built harvesting machinery. As previously mentioned, the land will have to be tilled and newly planted with sugarcane. Harvesting machinery has not been maintained and much of it will have to be replaced. In addition, many sugar mills have been closed, and those that remain have not been properly maintained. Moreover, Cuba will have to undertake significant investments in distilleries and transport, storage, and distribution infrastructure if it is to produce the levels of ethanol that we believe are achievable. Investment costs for the biorefineries alone will come to billions of dollars. Cuba has the advantage of learning from Brazilian experience. The evolution of the industry in Cuba will differ from that in Brazil in that exports are likely to play a larger role at an earlier time period in the development of the industry. This is because there is a much more robust international demand for ethanol today than was the case when Brazil initiated its efforts.

Jaffe and Soligo conclude by stating that the next decade could be one in which Cuba becomes self-sufficient in energy and most likely becomes a net exporter. Cuban energy use may grow to as much as 225,000 barrels per day by 2020 under the assumptions of 5 percent per capita growth, no improvement in transformation losses, and no substitutions of natural gas for crude in electricity generation. If, as seems likely, Cuba switches electricity
generation to natural gas, petroleum demand will be some 100,000 barrels per day less than their initial forecast.

Critical Factors in the Development of a Sustainable Cuban Energy Sector

There is certainly no guarantee that the development of Cuban oil and gas reserves will include the participation of U.S.-based oil companies, banks, or government agencies, but a careful review of the possible role for these entities is warranted: what opportunities exist for them and how they might assist the Cubans in achieving energy self-sufficiency while enhancing U.S. geostrategic and energy-security concerns. This is the place to discuss what elements are needed to make that possibility a reality.

Certain conditions are prerequisites for the design, development, and implementation of a policy of promoting energy development cooperation between the United States and Cuba that benefits both countries.

Prioritization of Strategic Goals and Objectives

The most important factor is the clear identification and prioritization of strategic goals and objectives, tasks, and probable outcomes for the development of Cuban energy resources (oil, gas, biomass, solar, wind, and so forth), and the development of energy production capabilities, with special attention paid to the long-term sustainability and impact of these development schemes.

The promotion of energy cooperation implies that there will be relatively open energy markets in Cuba for foreign direct investment that are amenable and accessible to global energy market practices. The prevailing joint-venture (empresa mixta) model of investment in Cuba's energy sector has been successful and has significant applicability, should international oil companies based in the United States be offered the opportunity to enter the Cuban market.

U.S. Involvement in the Cuban Energy Sector

The ability of U.S.-based actors to conduct business in Cuba is another critical factor. The presence of national and international oil companies from Spain, Venezuela, and Brazil, among others, does not necessarily imply that U.S. firms will be relegated to the sidelines. In fact, most if not all of these firms rely heavily on first-generation U.S. technology for their deepwater oil exploration, yet U.S. trade controls forbid the transfer of these technologies
to Cuba. Thus, it stands to reason that the relaxation of these U.S. trade regulations—permitting the transfer of these technologies, and sales of oil and gas services—are an essential precondition for the creation and development of the Cuban energy sector.

Integration of Cuban Market into the Region

To sustain the development of the energy sector it must be integrated into the market of the entire region. At present the market is segmented by NOCs and IOCs with different development schemes and priorities. Currently Cuba enjoys preferential trade arrangements for oil exports with Venezuela, but there is little if any guarantee that a possible successor regime in Venezuela will be willing to honor the present arrangement. Other factors—including oil price fluctuations and the integrity of Venezuelan oil production rates—might undermine the prevailing order and return Cuba to a situation similar to that in the early 1990s. A loss or dramatic reduction of the supply of Venezuelan oil, though not nearly as catastrophic as the loss of Russian oil in 1992, would create an economic crisis and bring about the termination of significant oil infrastructure projects currently under way (oil pipeline and storage facilities, refineries, petrochemical processing, and power generation plants).

The Cuba-Venezuela Relationship

Cuba's dependency on the Venezuelan relationship is necessary at the moment, but it is not sufficient to meet the requirements of the five "S" characteristics for a secure energy sector in the future, as delineated in chapter 1—especially energy supply, surety, and sustainability. Future optimal development of Cuba's energy sector requires the reduction or elimination of Cuba's dependency on Venezuela for its energy supply, investment capital, and the transfer of technology. The possibility of successful offshore oil and gas production would do much to eliminate this source of uncertainty and alleviate Cuba's overreliance on Venezuela.

Form of Government and the Energy Sector

The aspects of the Cuban energy future explored in the book have not indicated that the successful development of Cuba's energy sector is dependent on a specific form of government or regime type. Governments of all types have successfully exploited their nation's energy resources. It should be noted that many of these governments—for example, Nigeria, Venezuela, and Mexico—have been less successful at managing capital drawn from oil
profits because of corruption, cronyism, a lack of transparency, and overly ambitious social and economic development programs. Critical to building a sustainable energy sector is the ability of state energy policy to manage the sector's response to global fluctuations in the price of oil, minimize the impact of regional weather disasters, and enhance the integrity of the sector's management structure to respond to these and other events, such as an oil spill.

International oil companies adapt their practices to market conditions. It stands to reason that if Cuba develops its oil and gas industry via a concession-based model, then IOCs will respond appropriately. If auxiliary (downstream) service firms are required to submit to the empresa mixta (joint-venture) model of investment, they will adjust their market strategy to meet that demand.

Since 1992, there has been a significant alteration of energy development priorities in Cuba. The Cuban state has gone from a highly energy-dependent client of the former Soviet Union, enjoying preferential trade arrangements for oil imports and the transfer of advanced nuclear technology for energy development, to an energy-starved state in economic crisis. Cuba is a state that is still relatively dependent on one source, Venezuela, for its energy imports, but has significantly boosted its domestic oil production capacity, and stands at the threshold of a significant transformation if it accesses its substantial offshore reserves. In short, the lesson that can be drawn by observers from the post-cold war history of Cuba is one of incredible adaptability in the face of daunting obstacles, including an almost complete loss of energy supply, the ongoing deterioration of energy infrastructure (transmission and delivery systems), and the demise of energy generation facilities. That the Cuban energy sector has remained relatively stable and responsive to these significant changes is remarkable and bodes well for the new challenges that the country will face in the near and long term.

**Cuba, the United States, and the Five “S” Factors**

In chapter 1, I spotlighted five “S” characteristics of energy security and the related imperatives of strategic energy policy relevant to both the Cuban case as well as that of the United States. The successful development of Cuban energy resources will enhance the energy security of the United States and its broader geostrategic imperatives in the Caribbean region. Cuba can do this by potentially serving as an entrepôt for U.S. downstream activities (refining, marketing, storage, and transshipment). Cuba has already embarked on an aggressive program of investment and development of its refining capacity,
which could potentially support American energy needs by serving as a hedge against supply disruptions of refined petroleum products or facilitating the redirection of oil shipments as needed owing to any number of circumstances.

These capabilities could even meet some short-term U.S. market demands. A case in point is the loss of U.S. refining capacity due to damage from Hurricane Rita in the Houston area in 2005. The heavy concentration of U.S. oil infrastructure in the Gulf of Mexico region makes hurricanes of Rita’s intensity very problematic. Very little spare crude oil refining capacity exists in the United States. The Gulf of Mexico produces some 2 million barrels per day total, as well as having some 30 percent of the total refining capacity of the United States.6 Rita’s offshore path traveled through an area dense with pipelines and oil platforms, and skirted an onshore area with large refineries.7 The damage to U.S. refining capacity would have been devastating if Rita had directly hit the Houston region. In the future, the presence of an expanded refining capacity in Cuba might preempt a supply disruption. Alternatively, because Cuba also lies in the path of these tropical storms, having access to American markets provides the Cuban regime with another alternative to respond to and minimize the impact of such events.

A Third Way for the Energy Sector

There are three possible models for the Cuban energy sector: not only the “business as usual” and total marketization models, but also a hybrid “mixed market” scenario. The premise underlying this scenario is that the Cuban state will be the central economic actor in the energy sector. State firms will include Cupet, Unión Eléctrica, and a growing number of state enterprises. The Cubans will seek aggressively to expand their investment and development capabilities in the energy sector in a variation on the Chinese concession-driven economic development model. For example, potential investors are invited to bid on providing the Cuban energy market with the lowest price of electricity, regardless of the mode of generation.

This model can also be applied to oil and gas production, the construction of energy facilities, and associated projects. The model assumes that competition will be vigorous to tap the North Cuba Foreland Basin offshore reserves, for both downstream and upstream potential. Most domestic and international experts believe that the price of electricity may be skewed too low and that the possibility of a low profit rate and long payback terms might dissuade international finance investors from entering the market, or they
might quickly exit the market, as has occurred in the China market. Nonetheless, the Cuban state as a joint-venture partner has consistently tried to strike a balance between these concerns from investors to conflate the terms of payback so that the return on investment is more attractive for potential partners.

Cuba will continue to require state majority ownership in all of its joint-venture enterprises (empresas mixtas) but there may be the possibility of fuller marketization. Now is the time to begin considering how to design and implement an integrated policy to enhance regional energy security. Oil is traded as a fungible global commodity with little weight given to regime type or ideology. This is especially relevant in the Caribbean context—hurricanes do not recognize national borders nor corporate logos. Thus, waiting for optimal conditions is perhaps inadvisable in the face of the consequences of failing to act.

Conclusion and Recommendations

Undoubtedly, after fifty years of enmity, there is a significant lack of trust and confidence between the United States and Cuba. This is plain from the almost quaint maintenance of a sanctions regime that seeks to isolate Cuba economically and politically but hardly reflects the dramatic changes that have occurred on the island since 1991, not to mention since 2008, when Fidel Castro officially stepped aside as Cuba’s president. Now, the opportunity to advance relations in the energy arena appears to be ripe. Since 2004, representatives from American companies, trade organizations, universities, and think tanks have had the opportunity to meet with Cuban energy officials. The scope and objectives of Cuban energy development schemes have been disseminated, dissected, and discussed across a number of settings where the interested parties are now familiar with and well versed in the agendas and opportunities that exist in this arena. In public discussions, Cuban energy authorities have made it clear that their preferred energy development scenario includes working closely with the U.S. oil and gas industry and using state-of-the-art U.S. oil technologies. The assessment from U.S. energy experts on the technical acumen and capability of Cuban energy officials has been overwhelmingly positive. Should the U.S. government and the Obama administration see fit to shift its policy so as to allow broader participation of American academics and practitioners in the energy field to attend conferences and meet with Cuban energy officials, it may pave the way to establishing much-needed familiarity and confidence across these communities.
The United States and Cuba will have a unique opportunity to employ a highly educated and competent cadre of Cuban engineers and technicians to work in critical areas of the energy sector. This will deploy an underused segment of the Cuban workforce, and allow U.S. oil, construction, and engineering firms to subcontract work to an emerging class of Cuban firms specializing in these areas. The Cubans have accumulated experience and training from past energy cooperation projects and exchanges in Cuba, Mexico, Venezuela, and other countries in the region. Anecdotal evidence suggests that these contacts and exchanges have been wildly successful because of the Cubans' high level of competence and strong work ethic. The Cubans have gained invaluable knowledge and experience through the operation and construction of energy facilities in collaboration with their joint-venture partners on the island.

The United States possesses few options when it comes to balancing the various risks to U.S. energy security and satisfying energy demand, because U.S. energy independence is not attainable, the policy tools available to deal with energy supply disruptions are increasingly inadequate, and the United States needs to articulate a new vision of how best to manage international energy interdependence. In particular, even if the United States were to choose to exploit all of its domestic energy resources, it would remain dependent on oil imports to meet its existing and future demand. The critical need to improve the integrity of the U.S. energy supply requires a much broader, more flexible view on the quest for resources—a view that does not shun a source from a potential strategic partner for purely political reasons. U.S. decisionmakers must look dispassionately at potential energy partners in terms of the role they might play in meeting political, economic, and geostrategic objectives of U.S. energy security. The Obama administration has signaled that it wants to reinvigorate inter-American cooperation and integration; a movement toward energy cooperation and development with Cuba is consistent with, and may be central to, that objective.

The energy-security environment for the United States is at a critical juncture. The productive capacity of two of the United States' largest oil suppliers, Mexico and Venezuela, has declined, and the supporting energy infrastructure in both countries is in need of significant revitalization. The vagaries of the politics in the region, the variability of weather patterns, and the overall dismal state of the global economy create a setting of instability and uncertainty that requires close attention to the national security interests of the United States vis-à-vis energy. Cuba's energy infrastructure, too, is in need of significant repair and modernization (its many energy
projects notwithstanding); the price tag is estimated to be in the billions of dollars. Delaying work on many of these projects increases costs, because deterioration of the infrastructure continues and eventually pushes up the cost of renovation and replacement. It also stands to reason that the lion's share of the financial burden of upgrading Cuba's energy infrastructure will fall to the United States, directly and indirectly. Changes in U.S. policy to allow investment and assistance in Cuba's energy sector are a precondition for international entities to make significant investments, yet this change implies a large American footprint. Trade and investment in the energy sector in Cuba have been severely constrained by the conditions of the embargo placed on the Cuban regime. These constraints also affect foreign firms seeking to do business in Cuba because of the threat of penalties if any of these firms use technology containing more than 10 percent of proscribed U.S. technologies needed for oil and gas exploration and production. American private investment and U.S. government assistance will constitute a large portion of the needed investment capital to undertake this colossal effort. The longer that work is delayed, the higher the cost to all the investors, which will then potentially cut into the returns from such undertakings.

U.S. cooperation with Cuba in energy just may create an opportunity for the United States to improve its relations with Venezuela, if it can demonstrate that it can serve as a partner (or at a minimum, a supporter) of the Petrocaribe energy consortium. The United States could provide much-needed additional investment capital in the development of upstream, downstream, and logistical resources in Cuba that simultaneously addresses Petrocaribe objectives, diversifies regional refining capacity, and adds storage and transit capabilities while enhancing regional cooperation and integration modalities. This does not mean that the United States has to dismantle the nearly fifty-year-old embargo against Cuba, but the United States will have to make special provisions that create commercial and trade openings for energy development that serve its broad geostrategic and national security goals, as it has in the case of food and medicine sales to Cuba.

This discussion is intended to help distill understanding of U.S. strategic energy policy under a set of shifting political and economic environmental conditions in Cuba and its implications for U.S. foreign policy for the near and long term. Because the policies can be considered works-in-progress, an understanding of possible outcomes is important to those crafting future policy and making changes in the policymaking milieu.
Preconditions for Energy-Sector Cooperation

Four developments have been central to creating the possibility of bilateral U.S.-Cuban commercial cooperation to develop energy resources on the island.

First, Cuba's energy development policy since the economic debacle of the early 1990s has been relatively successful. In that period, it has tapped and expanded existing onshore oil reserves via joint-venture projects undertaken with Canadian firms led by Sherritt. This includes the development of cogeneration facilities in Varadero and Boca de Jaruco.

Second, Cuba landed a second highly favorable energy partner in Venezuela. Venezuela has provided Cuba with over 50 percent of its energy supply through preferential trade arrangements whereby Cuba receives refined fuels in exchange for the deployment of Cuban physicians in Venezuela.

Third, as an extension of its relationship with Venezuela, Cuba has seen a large-scale investment in its energy infrastructure (both actual and planned) valued at billions of dollars. As Cuba expands its refining capacity and replaces refined products with Venezuelan crude oil, it decreases the cost of importing refined fuels, estimated at almost $2 billion in 2008. This growing refining capacity means that Cuba oil exports (primarily refined fuels exported to Petrocaribe partners) now account for 22 percent of Cuba's export earnings, second only to nickel export earnings, at 39 percent. The chance of increasing the percentage is certainly within the realm of possibility as Cuba continues to expand its infrastructure and production capabilities, especially when the offshore reserves are brought on line.

Fourth, in the five years since the announcement of the discovery of offshore oil reserves in December 2004, Cuba has attracted nearly a dozen international and national oil companies interested in leasing offshore tracts in its exclusive economic zone (EEZ) because of the potential of oil and gas resources, which will dramatically alter Cuba's energy balance; Cuba will become a net energy exporter.

Concrete Measures to Promote U.S.-Cuba Energy-Sector Cooperation

There is a significant commercial opening for the United States in Cuba, should it choose to pursue it. Cuban energy development will proceed with or without U.S. involvement, but U.S. involvement has the potential of
speeding up the pace of development and could create an opening for a broader discussion of important geostrategic concerns for the both countries. To that end we make the following policy recommendations aimed at facilitating the promotion of strategic commercial relations between the United States and Cuba to develop energy resources.

**Recommendation 1. Initiate Confidence-Building Measures and Promote Engagement between the United States and Cuba**

Regardless of recent history, the installation of new administrations in both Cuba and the United States creates an opportunity for new modes of engagement that while initially are symbolic can over time pay significant dividends. Strategic energy and infrastructure cooperation may be a relevant consideration for this type of engagement. Prior to any formal cooperation, the United States and Cuba should engage in familiarization and confidence-building meetings and workshops between relevant parties from both countries. Initially these encounters will serve highly symbolic purposes, but over time can become vehicles for information sharing, exchange and assessment regarding mutual goals, objectives, strategies, and policies regarding energy and infrastructure cooperation and development. There are already a number of annual meetings, conferences, and workshops in Cuba that Americans could attend to gain much-needed information regarding Cuba’s energy sector. Conversely, the United States government should facilitate the attendance and participation of Cubans in American conferences, exchanges, and residencies.

**Recommendation 2. Create Opportunities to Leverage Cuban Human Capital Resources**

As a follow-up to recommendation 1, the United States should purposefully create opportunities to leverage Cuba’s considerable human capital resources. This would include creating opportunities for internships with U.S. government agencies related to energy resources development, management, and regulation; short-term employment opportunities with U.S. engineering, infrastructure development, and construction firms; and energy-related academic and scientific exchanges. This would be highly beneficial to a whole host of energy-related activities that would be created as a function of foreign direct investment, development assistance, and joint-venture enterprises between the United States and Cuba. Many individuals in Cuba’s highly trained cadres of engineers and technicians are underemployed; engaging Cuba in the areas of energy and infrastructure development may provide
opportunities to put these people to work and potentially to leverage the considerable skills and abilities of these resources for cooperative projects across the region.

Recommendation 3. Facilitate the Transfer of Critical Energy Technology

As mentioned often throughout this book, the potential of Cuba's offshore oil reserves may only be accessible when Cuba and its partners are able to employ first-generation American deepwater exploration technologies. This is especially critical as many of the firms currently conducting exploration in Cuba's offshore tracts—Repsol S.A. (Spain), Norsk Hydro (Norway), and Petrobras (Brazil)—are also operating platforms under contract to U.S. firms in the Gulf of Mexico. Simultaneously, however, these firms are prohibited from employing first-generation technology from these platforms for their operations in Cuba. The United States should take the steps necessary to ensure that U.S. firms and their subsidiaries are able to employ the technology best suited for the extraction of oil and gas from these deepwater resources. This increases the viability of the operations, avoids costly delays in the operation of these platforms, and enhances the environmental integrity of these operations.\(^1\) At present, U.S. export controls limit everyone's access to this technology. Under more favorable conditions, the United States should begin to roll back export control restrictions in this area as part of energy resource development and production-sharing scenarios.

Recommendation 4. Enhance Cuba's Project Management Capabilities

One of the most critical findings from the analysis of Cuba's effort to develop a nuclear energy capability was the absence of project management capacity during the design, implementation, and construction of the nuclear reactor site at Juragua.\(^2\) Subsequent discussions with senior Cuban government officials revealed that the development of this capacity is a high priority for Cuba as it considers challenges in terms of infrastructure and large construction projects into the future. Cubans have expressed the desire to work side by side with American partners in this critical area. Facility development is an area in which U.S. firms can and should play a vital role as models and partners for Cuba.

Recommendation 5. Promote Energy-Sector Trade and Cooperation

There are numerous areas in the energy sector in which the United States and Cuba can and should cooperate: exploration, energy production, downstream operations, transportation, and auxiliary services. In addition, the
opportunity for U.S. firms to invest directly in the development of Cuban energy resources should be created. Recent history shows that Cuba possesses the potential to be a strong regional trade partner in the area of energy and infrastructure development. It might be premature for U.S. firms to begin opening branch offices along Avenida Quinta in the Miramar district of Havana, but it is rational to consider the benefits that would be drawn from the expansion of trade and cooperation between Cuba and the United States in energy development. There will be obvious limitations on such investment opportunities because of the empresa mixta joint-venture model that the Cuban government employs, but as previously stated, international oil companies are not averse to adjusting their investment models to specific market conditions, and in the case of Cuba it would be no different. In fact, there has been no lack of interest on the part of American international oil firms in developing a Cuban market. The prevailing Cuban model of joint-venture investment and cooperation has proved to be attractive internationally, and there are numerous opportunities in this area for American firms as soon as there are significant changes in the Cuban embargo so that this type of engagement can occur.

These recommendations establish the basis for developments that speak directly to the enhancement of two broader geostrategic considerations for U.S. energy security: the diversification of regional energy resources and the establishment of a Cuban energy entrepôt. The development of partnerships in refining, storage, and engineering services will allow the regional partners to diversify their respective portfolios, in addition to dispersing resources across the region to take advantage of location, and perhaps mitigate potential market disruptions owing to weather and other natural disasters.

A further long-term prospect for Cuba may be the development of energy-related resources that are positioned strategically to serve the region in terms of oil refining and storage, oil and gas production (exploration and infrastructure), and auxiliary services. These developments would be a boon to Cuban, American, and regional economic development interests and are especially relevant in the context of growing concerns over the energy infrastructure in the region, and in particular the oil and gas industries of Mexico and Venezuela.

Oil exploration is an inherently risky enterprise; there are always trade-offs between negatives and positives relating to energy security, environmental integrity, and geostrategic considerations. The consensus arising from the studies and the analyses in this book is that the creation of mutually benefi-
cial trade and investment opportunities between the United States and Cuba is long overdue. Throughout most of the twentieth century, Cuban infrastructure and economic development were direct beneficiaries of commercial relations with the United States. This relationship was instrumental in providing Cuba with access to advanced technologies and the signs of modernity that were unparalleled in Latin America and far beyond.

Once again, the United States is presented with an opportunity that might serve as the basis of a new relationship between the United States and Cuba. It holds out the possibility of enhancing the stability and development of a region that is wrestling with questions of how and when it too might benefit from engagement with a global economic development model. The question is whether the United States chooses to be at the center, or to leave Cuba to seek some alternate path toward its goals.

Ironically, Cuban officials have invited American oil companies to participate in developing their offshore oil and natural gas reserves. American oil, oil equipment, and service companies possess the capital, technology, and operational know-how to explore, produce, and refine these resources in a safe and responsible manner. Yet they remain on the sidelines because of our almost five-decades-old unilateral political and economic embargo. The United States can end this impasse by licensing American oil companies to participate in the development of Cuba's energy resources. By seizing the initiative on Cuba policy, the United States will be strategically positioned to play an important role in the future of the island, thereby giving Cubans a better chance for a stable, prosperous, and democratic future. The creation of stable and transparent commercial relations in the energy sector will bolster state capacity in Cuba while enhancing U.S. geostrategic interests, and can help Cuba's future leaders avoid illicit business practices, minimize the influence of narcotrafficking enterprises, and stanch the outflow of illegal immigrants to the United States.

If U.S. companies are allowed to contribute to the development of Cuba's hydrocarbon reserves, as well as the development of alternative and renewable energy (solar, wind, and biofuels), it will give the United States the opportunity to engage Cuba's future leaders to carry out long-overdue economic reforms and development that will perhaps pave the way to a more open and representative society while helping to promote Cuba as a stable partner and leader in the region and beyond.

Under no circumstances is this meant to suggest that the United States should come to dominate energy development policy in Cuba. The United States certainly has a role to play, but unlike its past relationship with Cuba,
According to estimates of industry executives, the economic impact of TV's fall in price would be substantial, with a rise in consumer spending on television sets. However, some economists caution that a rise in consumer spending does not necessarily translate into increased economic activity. When share prices of TV manufacturers fell, the economic impact was felt across the entire sector.

In response to the crisis, the government took several measures to stabilize the industry. These included tax breaks for manufacturers and incentives for consumers to purchase new sets. The government also provided funding to research and development in the sector.

As a result of these measures, the industry began to recover, with a significant rise in consumer spending on television sets. However, the industry faced challenges in the long term, with the threat of increased competition from other media formats.

Notes

1. The effects of the crisis on the industry are still being felt, with many manufacturers facing financial difficulties.
2. Despite the rise in consumer spending, the long-term sustainability of the industry remains uncertain.
3. The government's measures have been praised for their effectiveness, but some critics argue that they are a temporary solution to a more fundamental problem.

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impact of the storm was significant, estimated by some as a 1 percent reduction in the GDP growth rate in the second half of 2005, from job losses, reduced production at refineries, and disruptions to the energy supply. Author interview with Jorge Piñón, New York, February 21, 2008.


9. This conclusion is based on a series of informal discussions with U.S. attendees at conferences and meetings since 2004—including events in Mexico City, Havana, New York, and Miami—where materials and presentations on the Cuban energy sector were disseminated.


11. In the period since 2000 no fewer than three hundred platforms have been damaged and taken offline because of hurricanes and other weather-related causes, yet no catastrophic events have occurred as a result of using state-of-the-art U.S. deepwater extraction technologies at these platforms. Oil-related incidents that had occurred had been mostly in the area of marine transportation of oil and other petroleum products in and near ports. In the wake of the April 2010 BP-Deepwater Horizon disaster in the northern Gulf of Mexico, it remains to be seen what type of new measures for deepwater oil exploration will be instituted and whether the United States will seek to extend these measures to regional and international oil producers.