

The Current Status and Future Prospects for Oil Exploration in Cuba: A Special Report for the Cuban Research Institute, Florida International University.

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In the period since the announcement that it had discovered offshore oil reserves off of the northwest coast of Cuba, the Castro regime, its energy development plans and its growing list of international partners have garnered increased interest from American policy analysts, corporate oil interests and a widening number of U.S. government officials regarding the scope and direction of the Cuban oil boom, and how this might alter the standing embargo against the Castro regime.² Specifically, the questions have centered on the size and potential of the oil reserves and the possibility of American involvement in both the private and public domain. This special report is an attempt to clarify the current conditions of Cuban oil and gas development schemes and their impact on longer term U.S. interests as they pertain to energy security, the diversification of strategic energy resources especially those related to oil refining, and the role that cooperation in this arena may be beneficial after the eventual normalization of relations between these two countries.

At first glance, listed below are the important factors to consider in assessing these prospects:

1. Since 1990, Cuba has increased its domestic oil production to a level where it now accounts for 95 percent of the fuel used to produce electricity for the island.
2. Cuba is enjoying its Venezuelan bonanza – a “virtually” guaranteed supply of oil imports amounting to 85,000 barrels of oil daily, mostly in the form of refined petroleum products; gasoline, diesel, and jet fuel.
3. The discovery of a sizable oil field off the northwest coast of Cuba estimated to be approximately half of the oilfields of the Alaska National Wildlife Reserve (ANWR).
4. The growing interest and investment of oil exploration companies from Canada, China, Spain, Brazil, India and Norway potentially resulting in hundreds of millions of dollars in investment and significant transfers of cutting-edge technology to Cuba.
5. The attempt by the Cuban government to increase efficiency in the consumption of electricity and to promote an island-wide comprehensive program of energy conservation.
6. To improve the integrity of Cuba’s national electrical grid (*la sistema de electricidad nacional – SEN*) by shutting down inefficient plants, improving the national grid for transmission and delivery, and installing remote micro-electrical generation facilities to offset the impact of disruptions of service due to hurricanes and other catastrophes.

Given that there are no formal diplomatic or economic relations between the governments of the United States and Cuba, the level of interest has grown significantly in the 3 years due primarily to three reasons in the following interest areas: energy

security interests; broader regional strategic; and purely economic interests. First, the energy security interests in the potential of Cuban oil – although it really would not minimize the immediacy of an American energy crisis – is seen as possible if only partial remedy to energy supply concerns. Second, as Cuba, in part because of the increasing number of oil partnerships furthers its diplomatic and economic ties to with countries like Venezuela, China, Brazil and members of the European Union it may prove to provide Cuba for a sufficient buffer against U.S. opposition as it solidifies its economic and diplomatic role in the region. This is important inasmuch as there is a *de facto* trend in the Americas that clearly disavows and attempts to minimize the influence of the United States in the region, and with the growing demands on the world economy by China, it stands to reason that Cuba may assume an increasing stature that almost potentially lessens the presence of American influence in Cuban and hence regional affairs. Finally, and as demonstrated by the presence of American oil interests in the February 2006 U.S.-Cuban Energy Summit in Mexico City, there may be interest in cooperating in joint venture projects, and by extension assisting in the long-term development in Cuba's oil industry.

To accomplish this task the report seeks to lay out some national security policy considerations applying strategic thought to what I will term "Post-Oil" Cuba – a Cuba that has a small but vibrant and growing oil and gas production capacity with extensive relations with a number of partners, and an increasingly positive outlook toward addressing energy and economic development questions that have plagued the Castro regime since the Cuban Revolution.³

The primary consideration is to determine the present state of Cuban energy and what possibilities exist that would be available to American foreign policy decision makers and business interests as the relations with Cuba evolve over the coming years.⁴ This is important because any realistic appraisal of how Cuba is to take advantage of its oil bonanza involves the United States. Previous research in this area has clearly laid out the scope and objectives of Cuban energy development schemes in the period since the demise of Cuba's favorable trade arrangements with the former Soviet Union. Recently, and as a result of the oil discovery and Cuba's energy arrangement with the government of Hugo Chavez in Venezuela there is renewed interest in Havana's energy policies. Most of that analysis has been focused on concrete possibilities where there can be cooperation in the energy field between these two neighbors. Specifically, the work has looked at areas for the convergence of energy interests as they apply to the near- and long-term energy development scenarios facing both countries. Myers Jaffe and Soligo have addressed this possibility by looking at the potential to increase diversification and dispersion of energy resources. This is an important consideration when one takes into consideration that well over one-third of all oil refining capacity resides on or near the Houston shipping channel. The potential negative impact on America's refining capacity following Hurricane Rita⁵ made a significant impression on oil industry analysts for the necessity of diversifying the location of these vital national resources. The potential of viewing Cuba as a "staging area" for American oil storage and refining is plausible because of the proximity of the island. This also becomes more attractive because of the growing climatic concerns over the uncertain security of oil resources in the Gulf region as clearly demonstrated by Hurricanes Katrina and Rita in 2005. While it is true that Venezuela has initiated an investment of \$1 billion dollars to bring the Cienfuegos

refinery online, there are still many other possibilities open and available to American companies, as well as a growing number of foreign firms.⁶ Additionally, Venezuela remains the fourth largest importer of oil to the United States and one can surmise that the existing trade arrangements between the U.S. and Venezuela will remain intact, the evolution of the Bolivarian revolution under Chavez and a growing Chinese presence in the region notwithstanding. Additionally, pursuing such a path would allow United States policymakers to take advantage of what Cuba has to offer in the following areas: domestic technical capabilities; continuing human capital development; strategic positioning in the Caribbean, and an improved diplomatic stature. Cuba, by any measure, possesses a largely untapped technical capacity owing to advanced training and education in the core mathematic and scientific areas. This was clearly demonstrated by its attempt to develop a nuclear energy capability in the 1980s and 1990s whereby thousands of Cubans pursued highly technical career paths leaving Cuba with among the highest ratios of scientists and engineers to the general population in all of the Americas. Moreover, the foundation of Cuba's vaunted public education system remains intact and increased investment under various scenarios suggests that Cuba will continue to produce a well-educated workforce that will be critical to its future economic vitality. This raises an important consideration that being the role that Cuba will play in the region in the 21st century. It suffices to say that Cuba remains the strategically important state by virtue of its geographical location alone, in efforts against drug and human trafficking and related national and regional security matters. The extent to which a stable Cuban government has cooperated with the U.S. in drug interdiction efforts in the past suggests that the results from improved diplomatic relations between neighbors would have the effect of improving national security concerns related to terrorist activity, illicit weapons transfers and the like. Ultimately, a successful normalization of relations between the U.S. and Cuba in these areas may well enhance and stabilize regional relations that could possibly lessen (or at a minimum, balancing) fears of a Chinese incursion in hemispheric affairs. To lessen those fears it may be useful to review the present structure of joint-venture projects in the energy sector in Cuba to ascertain the feasibility and possible success of such an undertaking become available to American firms. Moreover, it is interesting to note that U.S. firms in the agriculture sector have successfully negotiated and consummated sales to Cuba totaling more than \$1 billion dollars over the past four years under conditions that are less than optimal circumstances but have well-served the commercial interests of all parties involved.

Cuba's Joint Venture Success – Energas, Sherritt and the Environment

In 1997, Cuba launched the ambitious Energas joint venture project with the Canadian energy and mining firm Sherritt Ltd. to convert flared gas from its Matanzas-Varadero oil fields into fuel through a combined cycle process.⁷ The project would allow Cuba to make use of the gas for low yield generation facilities in Boca de Jaruco and Varadero on 15MW and 30MW respectively. The project was financed by an initial public offering (IPO) in Canada by Sherritt and construction was completed in 2004. The process entailed the removal of the sulfur from the heavy crude from the region, and utilizing the recovered gas to fuel turbines. Environmentally, this process is much cleaner and allowed the Cubans to capture emissions and particulates that were previously being discharged into the environment. This is especially critical as the Matanzas-Varadero oil fields are contiguous to Cuba's major tourist destination, the beaches of Varadero,

located some 90 miles east of La Habana. Ironically, there are no tell-tale signs of the existence of the oil production in this region to the tourist crowds owing to two factors. First, most of the offshore fields are accessed by slant and horizontal drilling techniques behind and out of sight of the Varadero peninsula, and the thermo-electric generation stations are relatively distant from the tourist zone.

The Energas facilities are small-scale showcase of the Cuban energy sector exemplifying the application of ecologically-friendly processes for the production of electricity to the national grid in a partnership with a foreign firm that has been successful in creatively utilizing the existing oil reserves in a manner that promotes efficiency and was by all indications, provided a sound return on investment for the joint venture.

But why has Sherritt succeeded when the perception on the part of many American observers has been that Cubans are difficult and mercurial partners? Sherritt Oil is a medium sized firm with medium sized aspirations that simultaneously seeks to produce a reasonable return on investment for its ventures in Cuba while operating a commercial enterprise that is working within a country in dire need of reliable energy sources that operates under the strictures of a command economy.⁸ This perhaps explains why Sherritt has been successful where others failed. The terms of “doing business” in Cuba are often too severe for conventional profit-seeking firms, but in this case, Sherritt appears to have altered its basis for success to coordinate its objectives with those available under the prevailing Cuban joint venture model. The Spanish oil firm, Repsol spent \$53 million in oil and gas exploration in 2004 and came up with nothing and yet has contracted to continue exploration of 8 offshore tracks on the northwest coast of Cuba.⁹

It is also interesting that all, of the firms operating in Cuba at the present time are operating with dated technology and must be able to service all of its own exploration operations. This owes in part to the fact that American oil engineering represents the leading edge of oil exploration technology and explicit in all of its foreign sales are export control stipulations that none of that technology can be sold or transferred to a short but well known list of countries: Iraq; North Korea; until recently Libya; and of course, Cuba. This proscription adds up to 30 percent to the operating costs that what is still for Sherritt, and other joint venture partners, a profit making venture. Sherritt must also account for being largely responsible for providing all engineering support services as Cuba provides few of these services owing to the denial of technology on the part of the U.S.

On this point, the U.S. embargo has been successful in relegating Cuba’s energy development schemes to a less than world class status. Moreover, it appears to have had a residual effect – as not to appear to be suffering from a technology gap, Cuba pursues upstream investment, such as the purchase of three drilling rigs from the Chinese for symbolic as well as practical reasons.¹⁰ Legitimately, given the existing resources on the island and interest from oil and gas exploration firms from Europe, Latin America and Canada, and especially because of Cuba’s cozy relationship with oil-rich Venezuela it is perhaps a questionable investment. American oil industry experts suggest that for a small country like Cuba, it could derive a greater benefit from investment in oil infrastructure such as pipelines, terminals, batteries, etc. These are the types of services essential to oil production and serve as revenue generating sources long after the reverie of an oil find. In

an inherently risk driven industry it makes better sense for a small relatively resource constrained state to pursue this course of energy investment.

Another example of the Cuban effort to address “*la problemática energetica*” is the creation of remote diesel fueled generation sub-stations in Pinar del Rio province.¹¹ In the past 16 years, Cuba has suffered direct hits from hurricanes in the Caribbean. While there has been almost no loss of human lives from these natural disasters, the impact on the national electrical grid of the country has been devastating. This owes to the fact that the electrical grid extends the length of the island, traversing it east to west. Almost all of the hurricanes pass over the island in a south-north direction essentially slicing the island in half, destroying everything in its path, and in this case, the towers that support the high-tension electrical wires of the national grid.

After the storms’ passing these towers often resemble the set of monster movie where the path of the beast has rendered a swath of flattened and twisted metal in its wake. This was most critically evident in 2004 in the path of Hurricane Charley. The path of Charley cut across the island over Pinar del Rio province on August 12th (Fidel Castro’s birthday) with winds in excess of 145 mph, cutting the national electrical grid in half and leaving the entire province of nearly a quarter of a million inhabitants without electricity for the next fourteen days. The Cuban electrical utility, *Union Electrica* and the Cuban Ministry of Basic Industry subsequently designed and implemented a project that would address the nature of energy supply disruptions to the grid from natural disasters and allow for additional electricity to be generated during peak demand periods. Most importantly, this would enable the officials of *Union Electrica* to deal with an increase in the number of, and the strength of hurricanes and tropical storms in the region.

The Reality of a Cuban Oil Bonanza

In December 2004, the Cuban regime of Fidel Castro announced that they had discovered a significant oil reserve off the northwest coast of the island. More importantly, the potential of the oil finds could dramatically decrease the island’s dependence on imported oil and could serve as boon to the Cuban economy. There has been much conjecture of the size and scope of oil reserves in the 59 offshore tracts in Cuban exclusive economic zone (EEZ). The working estimates are that there are a potential of 120 thousand barrels of oil per day, perhaps more, but the sea floor is over a mile deep and the oil reserves perhaps an additional 3,000 feet beneath the sea floor. This lies within the capacity of the existing oil drilling technology, but as previously explained, the task of extracting the oil will have to be undertaken using second or third generation technology because of U.S. export control regulations against trading with Cuba. The challenge for Cuban oil development policy makers is to simultaneously pursue frontier exploration in the Gulf of Mexico, while continuing to produce from the existing mature oil reserves with higher levels of efficiency and environmental integrity. Add to this challenge and additional question of securing the appropriate technology for the task.

The shaded blocks in Figure 1 indicate the 16 blocks under contract with various oil companies. Six blocks are under contract to Repsol-YSP from Spain,¹² 4 blocks with Sherritt from Canada, 6 blocks are presently under negotiation, and the remaining 43 are presently open. According to Cuban energy officials, the objectives for 2006 are to increase the drilling of wells by over 50 percent, to carry out a seismic campaign to

collect more data for the available tracts, to increase the domestic production of oil and gas (presently 85,000 barrels/day), and to put more drilling rigs into operation. But how does this compare to other significant oil finds? The 2005 report by the United States Geological Survey (USGS) estimated that the oil reserves off the northwest coast of Cuba contained a mean (a middle range estimate) of 4.6 billion barrels of oil (bbo) and a mean of 9.8 trillion feet of associated dissolved gas and 1.2 trillion cubic feet of non-associated gas.¹³ By comparison, the 1998 USGS study of the vaunted Alaska National Wildlife Reserve (ANWR) contains resource volumes of 5.7 to 16 billion billion barrels of crude oil, with a mean estimate of 10.4 billion bbo. Clearly, this places the Cuban oil find at almost half the size of the reserves at ANWR (4.6bbo as compared to 10.4bbo) leaving little doubt that it is a discovery of significant size.

Conclusion

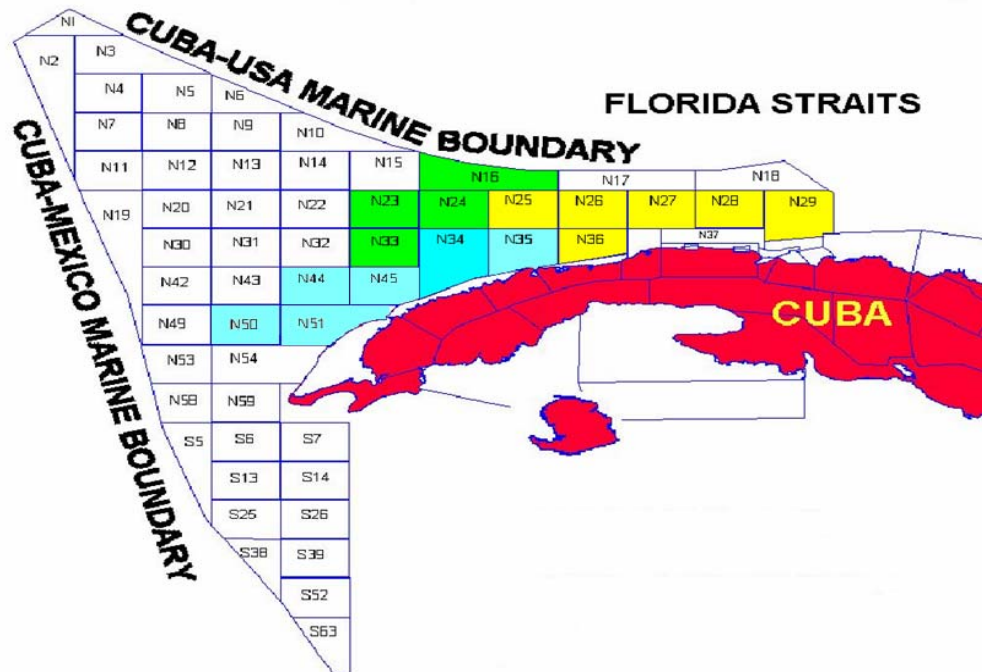
Why is it important to clarify the current status of Cuban energy in the face of a continuing opposition by the United States to anything resembling what can be construed as “good news” for the Castro regime? Obviously, because up until this point it hasn’t cost the United States much if anything. The current policy continues to clearly place at the forefront the sanctity and utility of a comprehensive economic and political embargo in the hopes that it helps to foment a change in regime and a peaceful transition to a democratic system of governance and a complimentary market economy. As energy security concerns continue to percolate up to an increasingly important status in the realm of national security objectives we may begin to see the erosion of the hard position against the Cuban regime regardless of its leadership.

The overview of the Cuban energy developments clearly and unambiguously reveals that the Castro regime has every intention of continuing to promote, design and implement energy development policies that will benefit Cuba for generations to come. Cuba is sparing no effort by instituting bottom-up and top-down policy initiatives to meet this challenge. It has significantly increased its international cooperation in the energy sector and continues to enhance its efforts to ensure energy security in these most uncertain of times. But it stands to reason that no matter how successful these efforts are, they will come up short. Two factors may alter this present situation. First, Cuba may indeed realize a bonanza from the offshore tracts that will allow it to possibly address its many energy challenges, from increasing oil production and refining capacity, to improving the nation’s energy infrastructure, ensuring a stable energy future. Second, and no less significant, is the possibility of normalization of trade relations with the United States. This is important not only because it will allow direct foreign investment, technology transfer and information sharing between these neighboring states but it possibly enhances the energy security of both states, and hence, the region, realized through a division of labor and dispersion of resources that serve as a hedge against natural disaster and market disruptions. Moreover, all states could derive benefit from the public information campaigns to promote energy efficiency and conservation presently being promoted in Cuba in the face of diminishing energy stocks and uncertain global markets. Ultimately, and only after normalization, the task still falls to the Cuban government, but the cost will necessarily be spread through a number of sources that are predominately American because of strategic interests, proximity and affinity. It suffices to say that the requisite investment and assistance will have a distinct American tinge to it, inasmuch as American corporations, U.S. government agencies, and international

financial institutions, of which the U.S. is a major contributor, will play important roles in the funding of the effort to revitalize the Cuban energy sector. Cuban officials are not averse and perhaps would prefer that the U.S. be its major partner in this effort owing to the fact that most if not all of the cutting-edge technology in energy, oil and gas comes from the United States. It is remarkable that the Cuban energy sector is as vibrant as it presently is, absent the type of infrastructural investment that is available to most developing states, in large part because of the American economic embargo.

Finally, the cost is significant and it stands to reason that the longer one waits to address the challenge at hand the higher the cost of modernizing the energy sector. For this reason alone, the American role in assisting Cuba in this effort will be significant and every day that the task is put off, it increases the long-term cost of the effort. This should serve as an obvious point of entry into cooperation with the Cuban government and perhaps can serve as a catalyst for promoting confidence, trust and cooperation in this critical issue area across the region.

Figure 1: Cuba’s Exclusive Economic Zone for Oil Exploration



Source: CUPET, 2006.

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² See, Jay Newton-Small, "Oil Firms and Cuban-Americans Fall Out Over Off-Shore Drilling." *The New York Sun*, June 22, 2006. Via internet: www.nysun.com.

³ The scenario makes no judgment regarding the ideological or political composition of the Cuban government in the "Post-Oil" setting nor in any post-Castro regime but under the prevailing economic and political practices in Cuba there has been significant opening of the economy for joint venture projects in critical areas such as tourism, mining and energy development.

⁴ Benjamin-Alvarado, Myers Jaffe and Soligo, Piñon and others have clearly laid out the possibilities presently available to American policy makers. See Jonathan Benjamin-Alvarado, "The Problems and Prospects of a Sustainable Energy Future in Cuba"; Amy Myers Jaffe and Ron Soligo, "Energy in Cuba" in *Cuba in Transition: Volume 15. (2006) Papers and Proceedings of the Fifteenth Annual Meeting of the Association for the Study of the Cuban Economy (ASCE)*; Jorge R. Piñon Cervera, "Cuba's Energy Challenge: Fueling the Engine of Future Economic Growth" forthcoming in *Cuba in Transition: Volume 15. (2006) Papers and Proceedings of the Fifteenth Annual Meeting of the Association for the Study of the Cuban Economy (ASCE)*.

⁵ Oil industry insiders were greatly relieved that the Houston area avoided the devastation from Hurricane Rita from a direct hit and perhaps causing an economic crisis. Such an event might critically injure America's capacity to meet market demands raising the costs of oil and gas for transportation and energy insofar as over 35 percent of American oil refining capacity is located along the Houston ship channel.

⁶ "Venezuela and Cuba agree oil link," *BBC News*, April 11, 2006. Via internet: <http://www.bbc.co.uk>.

⁷ For a detailed illustration of the Energas joint venture project see, Jonathan Benjamin-Alvarado, *Power to the People: Energy and the Cuban Nuclear Program* (New York: Routledge, 2000) 97-98.

⁸ Interview with Barry Hatt, Senior Vice President, Sherritt Oil Ltd., Havana, Cuba, July 20, 2005.

⁹ One could argue that like many oil exploration firms, Repsol subjected itself to "gambler's ruin" by placing all of its chips on a single bet -making the enormous oil find in Cuba. From all estimates, there is oil in Cuba but not readily present and of the scope necessary for firms like Respol, Petrobras, Total SA or ExxonMobil for that matter to justify in the already risky business of oil and gas exploration. For an excellent review of the joint venture project, see Eloise Linger, "Joint Ventures: New Developments in Cuban Mining and Oil Exploration," paper presented at the National Summit on Cuba, June 10, 2005, Mobile, Alabama.

¹⁰ Cuba Petroleo (CUPET) signed a \$40 million dollar contract for drilling rigs with China's SINOPEC Group – a state-run oil firm to conduct drilling operations in Santa Cruz de Norte, some 33 miles east of Havana. See *EFE, Prensa Latina*, 1/31/05 and *Reuters*, 6/4/05).

¹¹ Interviews with Cuban Vice Minister of Basic Industry Raul Perez de Prado, and Vicente de la O, Director General of Union Electrica, February 4, and March 3-4, 2006.

¹² Spanish oil-prospecting company Repsol YPF resumed subsurface sounding in Cuban waters, following a failed attempt last year. With a new joint-venture deal that entitles it to 40% of all revenues and puts it at the helm of the drilling rig, the company is planning to pick up where it left off. Other shareholders in the joint-venture will be Chinese state-owned CNOOC, with a 30% stake, and Norwegian Norsk Hydro, with the remaining 30%. (*Notimex*, 3/6/05)

¹³ U.S. Geological Survey (USGS), "Assessment of Undiscovered Oil and Gas Reserves of the North Cuba Basin, Cuba, 2004." USGS Fact Sheet 2005-3009, (February 2005), 2pgs.