

6-1-2010

# Lithium and Bolivia: The Promise and the Problems

Bruce Bagley, Ph.D.

*Professor International Studies, University of Miami*

Olga Nazario, Ph.D.

*Senior Research Scientist, Applied Research Center, Florida International University*

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## Recommended Citation

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**June 2010**

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Applied Research Center  
Florida International University  
10555 W Flagler Street  
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# **Lithium and Bolivia: The Promise and the Problems**

**Bruce Bagley, Ph.D.**

Professor International Studies  
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**Olga Nazario, Ph.D.**

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*The views expressed in this research paper are those of the author and do not necessarily reflect the official policy or position of the US Government, Department of Defense, US Southern Command or Florida International University.*

## EXECUTIVE SUMMARY<sup>1</sup>

Lithium's potential as a key ingredient in the new generation of electric car batteries has raised international interest. It is the lightest metal on the planet and used in most electronic equipments and advance batteries. Lithium is also used in ceramics and glass production, bi-polar medication, air conditioners, lubricants, nuclear weaponry, and other products.

The world's largest lithium mining company predicted that in the near future 10 percent of all new cars - close to 5 million vehicles per year - would be powered by lithium-ion batteries. It also predicted that this rate would rise to 20 percent by 2020. Given existing, known supplies, this means that the world could run out of lithium, a non-renewable resource, in 2020.

Powerful multinational corporations plan to invest billions in future lithium production. Some industry predictions estimate that lithium car battery sales could jump ten-fold from \$100 million to \$103 billion per year over the next two decades. If such investments take place, countries that possess lithium, like Bolivia, and are willing to export it could become important suppliers in the global economy.

The largest lithium reserve bases are found in Argentina, Bolivia and Chile. Bolivia's lithium reserves are estimated at between 5.5 and 8.9 million tons and ranked among the largest in the world. They are found in the beautiful Salar de Uyuni (Uyuni Saltpan), a 3,860 square mile high-desert (Altiplano) area of salt-embedded minerals in the Bolivian Andes located in the country's southwestern Potosí Department, bordering Chile's Atacama Dessert.

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<sup>1</sup> The authors wish to thank Dr. Michael Muthig, Technology Transfer Specialist at CTC, and Dr. Alfredo Ravinet of FIU's Applied Research Center and College of Engineering, for careful reading of the manuscript and thoughtful comments.

The concentration of lithium varies widely in different parts of the Salar de Uyuni. Production may focus on small areas. Much of the lithium could remain inaccessible or would take decades to extract. Considering the real grade and distribution of lithium in the Uyuni, the deposits may not be a particularly attractive resource and the real exploitable reserve could be only approximately 300,000 tons rather than the estimated millions. In 2009, a pilot operation was initiated in the Salar de Uyuni to determine the technical and economic feasibility of mining and refining the lithium-rich brine. Results from this effort should provide significant insights into the potential value of Bolivian lithium deposits.

Bolivia will have to invest heavily over the next few years in order to produce lithium carbonate for export. It is virtually inevitable that Bolivia will have to seek partnerships with foreign companies in 2010 and beyond to obtain badly needed capital and technology. It remains to be seen if the current administration of President Evo Morales (2006-present) will be able to take advantage of growing market demands for lithium or the opportunity will be left for future Bolivian governments.

President Morales is attempting to change the past patterns of foreign exploitation by asserting national control of Bolivia's huge natural gas reserves and its massive lithium deposits. To date, his government has maintained strict state control of the country's lithium resources and limited foreign access and investment. Also, several of Bolivia's indigenous organizations, active in the Salar de Uyuni region, have demanded a "fair" share in the eventual bounty to be reaped from future lithium exploitation. As a result, mining of Bolivian lithium reserves will depend for now on the capacity of the Morales administration to negotiate and balance the benefits of all the stakeholders vs. his own political agenda.

Since 2006, foreign corporations and governments have lobbied the Bolivian government for access to the lithium riches. Among them, Japanese automakers, Brazil, Canada, French electric car maker, Bolloré, and others. In 2009, COMIBOL signed a Memorandum of Understanding with Korean Resources Corporation and with the French Bolloré Group. Also in 2009, during the visit of Iran's President Mahmoud Ahmadinejad to La Paz, an agreement reached committed Iran to assist Bolivia on conducting lithium research. Iranian experts will join Brazil's Ministry of Science and researchers from companies such as France's Eramet SA and Bolloré SA, to hold a joint study on the lithium reserves. Bolivia's current tensions with Washington have effectively left American companies on the sidelines as other foreign enterprises continue to actively negotiate lithium deals in Bolivia.

Serious potential environmental problems stemming from lithium mining in Bolivia cannot be ignored. The ecologically fragile Salar de Uyuni could become an environmental disaster, if sufficient precautions are not taken. Also, lithium development could seriously damage two key industries in the region – agriculture and tourism. The Salar de Uyuni, the brightest spot on earth as seen from space is an area of outstanding natural beauty. More than 60,000 tourists visit the area every year. The ecosystem as well as the tourist industry in the area could be seriously compromised in the search for lithium.

Finally, the chronic institutional deficiencies and lack of stability of the Bolivian state pose serious questions regarding its capacity to manage an ambitious lithium development program. Problems of inadequate administrative capacity within the Bolivian government clearly antedate the current Morales administration

## INTRODUCTION

As the world seeks energy alternatives and the efficient ways to use and store it, Bolivia has been thrown into the limelight as the country with the largest estimated lithium reserve base. Lithium is the lightest metal and coveted in the production of electric cars batteries and electronic equipment. Foreign corporations and governments alike have been lobbying the Bolivian government for access to its lithium riches. Yet, Bolivia faces daunting challenges in developing the lithium from its huge reserve base. The most significant of these challenges are as follows:

1. Need to invest heavily over the next few years to produce lithium for export.
2. Lack of technical and managerial capabilities to develop the lithium on its own.
3. A pattern of nationalization of natural resources which scares away investors with the required know how and capacity to develop the lithium.
4. The Morales government hesitation in choosing partners.
5. Geological assessment of the grade and distribution of lithium that indicate that the concentration of lithium varies widely and production would concentrate in small areas. Most of the lithium could remain inaccessible, not be economical, or would take decades to extract.
6. The risks of environmental damage to the Salar de Uyuni ecosystem and to surrounding communities could surpass benefits of lithium extraction.

Largely because of internal political tensions and nationalism, Bolivia continues in 2010 to vacillate regarding how best to tap its lithium reserves. This delay has permitted



nations with smaller reserves, like Chile and China, to step up to meet growing world demands for lithium. Yet, geologists and economists are unsure whether world lithium reserves outside of Bolivia are enough to meet exploding global demand, although some are convinced that accessible lithium resources are significantly larger than estimated by the United States Geological Survey. If true, Bolivia's current window of opportunity to exploit its lithium could eventually be eclipsed by lithium finds in other regions or by the emergence of new, alternative technological breakthroughs that do not rely on lithium at all. As Bolivian economist Juan Carlos Zuleta claims: "We have the most magnificent lithium reserves on the planet, but if we don't step into the race now, we will lose this chance. The market will find other solutions."<sup>2</sup>

This paper looks at the uses of lithium, the geological assessments that have been made of the Bolivian lithium reserves and the implications for both Bolivia and for the United States in terms of the decisions that Bolivia will make on how best to exploit its potential richness. It also offers some conclusions and recommendations in the context of US security interests. An appendix provides a brief synopsis of the Morales government.

## **THE DEMAND FOR LITHIUM**

Lithium's use as a key ingredient in the new generation of electric car batteries has raised international interest. It is the lightest metal on the planet and used in most electronic equipments and advance batteries. As of 2007, 60 percent of the world's cell phones and some 90 percent of laptops contained lithium batteries and the percentages continue to

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<sup>2</sup> Jason Mick, "Tensions Soar Among Industrialized Nations Over Bolivia's Lithium Supplies," *Daily Tech*, Feb. 6, 2009, <http://www.dailytech.com/Tensions+Soar+Among+Industrial+Nations+Over+Bolivias+Lithium+Supply/article14173.htm>.

rise each year. Lithium is also used in ceramics and glass production, bi-polar medication, air conditioners, lubricants, nuclear weaponry, and other products.<sup>3</sup>

Powerful multinational corporations plan to invest billions in future lithium production. Some industry predictions estimate that lithium car battery sales could jump ten-fold from \$100 million to \$103 billion per year over the next two decades. If such investments take place, countries that possess lithium, like Bolivia, and are willing to export it could become important suppliers in the global economy.<sup>4</sup>

Despite the enthusiasm, there are also concerns about lithium batteries on both the economic, technical, and environmental fronts. The process for transforming lithium into its commercially valuable form, lithium carbonate, remains complex and expensive. The electrical vehicle batteries currently being developed with lithium are still too large and heavy and charge too slowly. The batteries are so expensive that they push the cost of electricity-driven cars beyond the reach of most consumers, although lithium accounts for less

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<sup>3</sup> Lithium use worldwide by volume in 2007 broke down as follows: Polymer 4%; Chemical Process 3%; Battery 25%; Air-conditioning 6%; Lubricant 12%; Glass 8%; Ceramics 10%; Aluminum 4%; Continuous Casting 3%; Pharmaceutical 3%; Others 22%, in Brian W. Jaskula, "Lithium," Washington DC: US Geological Survey (USGS), 2007.

<sup>4</sup>Rory Carroll and Andres Schipani, "Multinationals eye lithium reserves beneath Bolivia's salt flats," *The Guardian*, June 17, 2009; Stephen Markley, "Will Lithium-Air Battery Be the Silver Bullet?" *The Miami Herald*, May 07, 2010. Demand for lithium has skyrocketed over the last five years as manufacturers of batteries for BlackBerrys, iPods and other electronic devices have increasingly relied on the mineral. It is, however, the automobile industry that looms as the largest potential consumer of lithium over the next decade and beyond, because lithium batteries would allow electric cars to store more energy and be driven longer distances than the heavier nickel batteries.

than five percent of the estimated cost of battery today.<sup>5</sup> Lithium batteries also have a record of catching fire. So while lithium car batteries might become a massive global market in the future, they could also fizzle.<sup>6</sup>

Environmental studies claim that mass production of lithium carbonate is not environmentally sound. The Meridian International Research, for example, has concluded that, “it could cause irreparable ecological damage to ecosystems that should be protected and that Lilon propulsion is incompatible with the notion of the “Green Car.”<sup>7</sup>

Yet, in 2007, SQM, the world’s largest lithium mining company predicted that in the near future 10 percent of all new cars - close to 5 million vehicles per year - would be powered by lithium-ion batteries. It also predicted that this rate would rise to 20 percent by 2020. Based on such predictions, the demand for battery-grade lithium carbonate would rise from 85,000 tons per year in 2007 to 160,000 tons per year in 2015. Given existing, known supplies, this means that the world would run out of lithium, a non-renewable resource, in 2020. In that context, some experts believe that depletion rates of lithium could exceed current oil depletion rates and switch dependency from one diminishing resource to another.<sup>8</sup> These forecasts, however, depend on unreliable forecasts of increasing production of electric vehicles and do

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<sup>5</sup> Interview with Jay Chmelauskas, President, Western Lithium Canada Corporation, in Jon Knox, “All Set to Power New Generation Lithium Batteries,” *Automotive Industries*, March 22, 2009.

<sup>6</sup> Simon Romero, “In Bolivia, Untapped Bounty Meets Nationalism,” *The New York Times*, February 3, 2009; Christine Negroni, “Lithium Battery Risks Draw Scrutiny,” *The New York Times*, October 27, 2009, Saqib Rhaim, “Will Lithium-Air Battery Rescue Electric Car Drivers from ‘Range Anxiety’?” *The New York Times*, May 7, 2010.

<sup>7</sup> Meridian International Research, “The Trouble with Lithium 2: Under the Microscope,” Le Legers, France, 29 May 2008, pp.1.

<sup>8</sup> William Tahil, “The Trouble with Lithium,” Meridian International Research, December 2006, pp. 1.

not take into consideration technological changes that would affect content of lithium in batteries and suspected lithium reserves in un-surveyed regions, such as Africa. At the moment, lithium seems to be abundant and inexpensive.<sup>9</sup>

The United States is the main importer of lithium materials and compounds and the leading producer of value-added lithium materials. In 2009, the US Department of Energy funded US\$2.4 billion in grants to accelerate the development of US manufacturing capacity for batteries and electric-drive components and for the deployment of electric-drive vehicles. The grants are designed to launch an advanced battery industry in the United States.<sup>10</sup>

## LITHIUM RESERVES AND PRODUCTION

Lithium reserves are contained in five raw natural mineral forms: Continental Brines, Pragmatites, Hetolites, Oil Filed Brines and Geothermal Brines, having the first one the richest contain of lithium. Experts disagree on availability of lithium reserves. The US Geological Survey, for example, indicates that lithium resources total 2.5 million tons in the United States and approximately 23 million tons in other countries, mainly Bolivia, Chile, Argentina and China.<sup>11</sup> It also predicts that that there are still huge supplies of lithium that remain untapped world-wide.<sup>12</sup>

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<sup>9</sup> Toby Procter, "How long will Lithium last?" *BLOG*, 20 April 2009, <http://www.climatechangecorp./content.asp>.

<sup>10</sup> Brian W. Jaskula, "Lithium," in *U.S. Geological Survey, Mineral Commodity Summaries*, January 2010, pp.92-93.

<sup>11</sup> *Ibid.* pp. 93.

<sup>12</sup> Jaskula, "Mineral Commodity Summaries," Washington DC: U.S. Geological Survey, January 2009; and Keith Johnson, "Peak Lithium: Will Supply Fears Drive Alternative Batteries?" *Environmental Capital*, February 3, 2009.

The largest lithium reserve bases are found in Argentina, Bolivia and Chile.<sup>13</sup> Nearly 80 percent of the known global lithium reserve base is located in the “The Lithium Triangle,” an area bordered by the three large South American salt flats: The Salar de Atacama in Chile, the Salar de Uyuni in Bolivia, and the Salar del Hombre Muerto in Argentina. In 2005-2008, the United States imported 63 percent of its lithium needs from Chile.<sup>14</sup>

The largest known lithium reserves in North America are found in the near surface lithium clay deposit located in the State of Nevada. This is the main domestic supplier for the United States. The deposits are being mined by Canada’s Western Lithium Corporation. An estimated 11 million tones of lithium carbonate equivalent are located within five mineralized near surface zones. Just one of the five zones could produce 20,000 tons a year, or approximately one-fifth of the world production.<sup>15</sup>

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<sup>13</sup> The Reserve Base is the part of the identified resource that meets specified minimum physical and chemical criteria related to current mining and production practices. It is a rather nebulous figure. Only “reserves” should be considered available at the moment, of which Bolivia is yet to be determined, in Tahil, opp cit. “The Trouble with Lithium,” pp. 4.

<sup>14</sup> Jaskula, opp. cit.

<sup>15</sup> Interview with Jay Chmelauskas, President, Western Lithium Canada Corporation, opp. cit.

## Global Lithium Production and Reserves

Country	Production 2008 Meter Tons	Reserves <sup>16</sup>
Chile	10,600	7,500,000
Australia	6,280	580,000
China	3,290	540,000
Argentina	3,170	800,000
United States	1,000	38,000
Canada	690	180,000
Portugal	700	--
Zimbabwe	500	23,000
Brazil	160	190,000
Bolivia	--	-

Source: *US Geological Survey, Mineral Commodity Summaries, January 2010*

Chile is the world's largest producer and exporter of lithium carbonate. Chilean lithium is being mined by Chemetall, a subsidiary of the New Jersey-based Rockwood Holdings Inc., and Soquimich (SQM), a Chilean state-owned company. Together they produce seventy percent of all lithium carbonate from Chile's lucrative Salar de Atacama. With an output of 40,000 metric tons of lithium carbonate per year, Chile currently supplies a third of the global market. Estimates of Chile's remaining lithium reserves range from 3 million to 7.5 million tons. Chile's lithium reserves are also among the purest in the world and Chile's easy access to sea transport helps keep its total production costs low.<sup>17</sup>

Australia, China, Argentina and the United States follow Chile as the largest producers of lithium. Serbia and Finland also produce lithium. Large deposits exist in several other

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<sup>16</sup> The US Geological Survey discontinued reserve base estimates in 2009.

<sup>17</sup> Sean Goforth, "Argentina, Bolivia and Chile: The ABCs of Lithium," *World Politics Review*, 01 Apr 2010.

countries but production is low due to the high cost of extraction. These limitations mean that the future of the world's lithium supplies remains uncertain and may be insufficient to meet potential future demand.

## **BOLIVIA'S LITHIUM**

With governments around the globe (including the United States) demanding increased fuel efficiency to reduce their dependence on imported oil, private foreign corporations are keenly pursuing access to Bolivia's lithium. Bolivia's lithium reserves are estimated at 5.5 million tons.<sup>18</sup> Some analysts believe that the reserves could be as high as 8.9 million tons, the largest in the world. The reserve base is found principally in the Salar de Uyuni (Uyuni Saltpan), a 3,860 square mile high-desert (Altiplano) area of salt-embedded minerals in the Bolivian Andes located in the country's southwestern Potosí Department, bordering Chile's Atacama Dessert.<sup>19</sup> The beautiful Salar de Uyuni is the largest salt flat in the world and the brightest object on the Earth's surface visible from space. Many experts believe that efficient exploitation of Bolivia's lithium deposits could substantially increase present world supplies.

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<sup>18</sup> Jaskula, "Lithium."

<sup>19</sup> Juan Carlos Zuleta, "El enorme potencial de litio de Bolivia," La Paz, Bolivia: *Hora* 25, No. 69, Nov. 18-Dec.2, 2009.

## Map of Bolivia



There is no definite data on Bolivia's lithium reserves. TRU Group, a lithium consulting firm, indicates that harvesting and processing lithium from the large Salar de Uyuni is a difficult and tricky task. TRU argues that further strategic deep drilling exploration is required before the real potential of Bolivia's to produce lithium carbonate for batteries is determined.<sup>20</sup>

The French Meridian Research group also believes that estimates of the concentration of lithium vary widely in different parts of the Salar. Production would concentrate in

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<sup>20</sup> TRU Group Inc., "Development of the World's Largest Lithium Brine," Uyuni Lithium Brine Salar Resource Bolivia Development, <http://trugroup.com/Uyuni-lithium.html>.



small areas. Most of the lithium could remain inaccessible or would take decades to extract.<sup>21</sup> The Meridian Research Reports that:

*The structure of the Salar de Uyuni is very different to the Salar de Atacama (Chile)...Whereas the brine containing halite layer in the Salar de Atacama is 35 meters thick, the Uyuni halite deposit is very thin...The halite is...porous all the way through, with a much higher porosity of 35% and is filled with interstitial brine. This means that the quality of lithium available per unit surface is much lower and a correspondingly greater area of the Salar will have to be exploited for an equivalent lithium production.<sup>22</sup>*

The report concludes that, considering the real grade and distribution of lithium in the Uyuni, its lithium might not be a particularly attractive resource and that the real exploitable reserve could be only approximately 300,000 tons rather than the estimated millions. Also, the available methods for mining could be highly environmentally damaging.<sup>23</sup>

The current Bolivian government of President Evo Morales (2006-present) has put forward a general plan for the development of its lithium deposits, but the specific details of how Bolivia's lithium will be mined, by whom and under what terms have not yet been clarified. In March 2008, the Morales government issued a decree investing \$5.7 million to set up a state owned "pilot extraction plant" at the edge of the Salar de Uyuni. The plant is operated by a "General Directorate of Evaporative Resources of the Salar de Uyuni,"

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<sup>21</sup> Meridian International Research, "The Trouble with Lithium 2," pp.13.

<sup>22</sup> Ibid, pp. 13.

<sup>23</sup> Ibid, pp. 14.

under the state mining company COMIBOL (*Corporación Mineral de Bolivia*). Drilling started in August 2009.<sup>24</sup>

The pilot plant is intended to determine the technical and economic feasibility of getting the lithium-rich brine out from under the Salar's crust and separating it into its distinct, marketable products. Building on the experience of this pilot plant, the Morales government intends to construct a much larger industrial-scale plant capable of producing up to 30,000 to 40,000 metric tons of lithium carbonate per year. A third phase, in which marketable lithium compounds will be produced in association or partnership with foreign investors, will then follow.<sup>25</sup>

The costs involved in making the Bolivian lithium industry operational will be very high. Current estimates suggest that it could cost at least \$200 million just to make the main plant operational. Substantial additional investments to support needed chemical industries and substantial infrastructure development in the Salar de Uyuni - still a remote and largely undeveloped region of the country - would also be required at a price of at least U.S. \$1 billion or more. In light of both the costs and the technological problems involved, Bolivia is exploring partnerships with foreign investors, a strategy that some local community groups and many Bolivian nationalists do not support.<sup>26</sup>

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<sup>24</sup> Ibid, pp. 14.

<sup>25</sup> John M. Broder, "U.S. Issues Limits on Greenhouse Gas Emissions from Cars," *The New York Times*, April 1, 2010; and Rebecca Hollender and Jim Schultz, "Bolivia and its Lithium: Can the 'Gold of the 21<sup>st</sup> Century' Help Lift a Nation out of Poverty?" Cochabamba, Bolivia: A Democracy Center Special Report, The Democracy Center, May 2010, pp. 24-25.

<sup>26</sup> Ibid, pp. 34-36; and Romero, "In Bolivia, Untapped Bounty Meets Nationalism."

## CHOOSING A PARTNER

Since 2006, foreign corporations and governments have lobbied the Bolivian government for access to the lithium riches. Bolivia has a long, often bitter history of foreign mining and mineral exports that stretches back to the exploitation of its legendary Potosí silver mines by the Spanish during the colonial era. The administration of President Morales is attempting to change the past patterns of foreign exploitation by asserting national control of Bolivia's huge natural gas reserves and its massive lithium deposits.<sup>27</sup> To date, the Morales government has maintained strict state control of the country's lithium resources and limited foreign access and investment. Also, several of Bolivia's indigenous organizations, active in the Salar de Uyuni region, have demanded a "fair" share in the eventual bounty to be reaped from future lithium exploitation.<sup>28</sup>

Among the major international investors interested in Bolivia's lithium are Brazil, Iran, the Japanese companies Mitsubishi and Sumitomo, South Korea and the French electric vehicle manufacturer, Bolloré.<sup>29</sup> In 2009, COMIBOL signed a Memorandum of Understanding with Korean

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<sup>27</sup> Hollender and Schultz, "Bolivia and its Lithium," pp. 3-4; and Barjak, Frank and Carlos Valdez, "Bolivia Pins Hopes on Lithium, Electric Vehicles," *Associated Press*, February 28, 2009.

<sup>28</sup> Romero, "In Bolivia, Untapped Bounty Meets Nationalism;" and Damian Kahya, "Bolivia holds key to electric car future," *BBC News*, 9 November 2009.

<sup>29</sup> Carroll and Schpani, "Multinationals eye lithium reserves beneath Bolivia's salt flats." Demand for lithium carbonate doubled from 2003 to 2007, and the market for lithium-ion batteries may expand to 14 times its 2009 size by 2030. In the shorter term, lithium's potential has led Credit Suisse to expect a 13% rise in sales of lithium-ion (Li-Ion) batteries and a 10% rise in sales of liquid crystal displays (LCD) within a 3-4 year horizon due to growing demand for portable electronic instruments. Credit Suisse, "Investment Ideas Bright outlook for lithium-ion batteries and liquid crystal," *Research Flash*, Zurich, 14 October 2009.

Resources Corporation.<sup>30</sup> Also in 2009, during the visit of Iran's President Mahmoud Ahmadinejad to La Paz, an agreement reached committed Iran to assist Bolivia on conducting lithium research. Iranian experts will join Brazil's Ministry of Science and researchers from companies such as France's Eramet SA and Bolloré SA, to hold a joint study on the lithium reserves.<sup>31</sup> The agreement with Iran also calls for exchange of scientific and technical information, Iranian training of Bolivian professionals on the subject and promoting faculty exchanges. The Iranian-Bolivian technical commission will also analyze potential for marketing lithium by-products in Iran and other countries.<sup>32</sup> During a previous visit to Bolivia, President Ahmadinejad also showed interest in Bolivia's uranium, although reserves are considered minimal.

Since September 2009, the French electric car consortium, Bolloré-Eramet, has been pressing the Morales government for an agreement. They have satisfied demands placed by the Morales government proposing an industrialization plan that is nature-friendly. The plan, "A French-Bolivian Project for the Well-Being of Bolivians in Harmony with *Pachamama* (Mother Earth)," includes establishing an electric manufacturing plant, a prerequisite of the Morales administration for investors interested in the Salar de Uyuni.<sup>33</sup> Yet, the Bolivian government has yet to respond to Bolloré or any other investor. "We want partners, not

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<sup>30</sup> Simon Moores, "Bolivia/Korea Strike Lithium Deal," *Industrial Minerals*, August 17, 2009; and "French/Bolivia Lithium," *Industrial Minerals*, 10 July 2009.

<sup>31</sup> "Iran to Study Bolivia's Lithium Reserves," *Press TV*, 25 November 2009.

<sup>32</sup> Anf-Agencia, "Irán también apoyará el desarrollo de la industria de litio en Bolivia," *Los Tiempos.com*, November 24, 2010.

<sup>33</sup> "Francesa Bolloré reitera interés en litio boliviano y pide acelerar proyecto," *Bolivia: Lo Mejor que Tenemos*, 29 April 2010, <http://boliviateamo.blogspot.com/2010/04/francesa-bolloré-reitera-interes-en.html>.

patrons,” is President Morales' motto for refusing to accept offers from the interested investors. As such, mining of Bolivian lithium reserves will depend for now on the capacity of the Morales administration to negotiate and balance the benefits of all the stakeholders vs. his own political agenda.

## **INSTITUTIONAL AND POLITICAL OBSTACLES FOR DEVELOPING BOLIVIAN LITHIUM**

It remains to be seen if the Morales administration will be able to take advantage of growing market demands for lithium or the opportunity will be left for future Bolivian governments. After two decades of foreign interest in Bolivia's reserves, the country's natural resource policies, regional posture and poor infrastructure have led foreign investment in lithium mining to increasingly favor Chile and Argentina in recent years.<sup>34</sup> Bolivia will have to overcome daunting obstacles before it will be able to export significant amounts of lithium to international markets. Key developmental challenges are outlined below.

### **LACKING A ROAD MAP**

Bolivia does not have yet the technical capacity to achieve the goals laid out by the Morales administration regarding exploitation of the country's lithium reserves. President Morales alleges that Bolivia itself will produce electric cars. There is no clear indication when the electric car will be fully developed--since the industrial capacity for this type of complex industrial process is inexistent in the country-- how big that market will be, and when it will peak. Bolivia could aim at more traditional lithium markets, such as glass and ceramics, but demand in these markets is not likely to be as

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<sup>34</sup> Goforth, “Argentina, Bolivia and Chile: The ABCs of Lithium;” and Matthew Smith and Matthew Craze, “Lithium for 4.8 Billion Electric Cars Lets Bolivia Upset Market,” *Bloomberg*, December 7, 2009.

profitable. A middle course would be for Bolivia to supply already proven types of lithium batteries for products such as watches, cell phones, iPods, laptops and other electronic devices. No matter which option is finally selected, Bolivia will have to come up with a clear plan or road map to maximize the development potential of its lithium reserves. It does not yet have one.<sup>35</sup>

## **INSTITUTIONAL WEAKNESSES**

The chronic institutional deficiencies and lack of stability of the Bolivian state pose serious questions regarding its capacity to manage an ambitious lithium development program. Problems of inadequate administrative capacity within the Bolivian government clearly antedate the current Morales administration. To undertake lithium development successfully, the Bolivian state will need trained and qualified experts in the technical and scientific aspects of lithium mining, environmental controls, in business and financial management, as well as in international legal contracts, social and environmental impact assessments. At present, those capacities required for effective, professional development of its lithium resources are not in place.<sup>36</sup>

## **ENVIRONMENTAL IMPACTS**

Serious potential environmental problems stemming from lithium mining in Bolivia cannot be ignored. Bolivia's ecologically fragile Salar de Uyuni could become an environmental disaster, if sufficient precautions are not taken. The adequacy of Bolivia's environmental strategy for lithium development in Southwest Potosí is questioned by many Bolivian and international environmental organizations. Lithium mining could cause a major water crisis in the Uyuni region, which already suffers from serious

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<sup>35</sup> Hollender and Schultz, "Bolivia and its Lithium," pp.29-34.

<sup>36</sup> Hollender and Schultz, "Bolivia and its Lithium," p. 48.

water shortages that negatively impact the farming, llama herders, the tourism industry, and drinking water supplies. While Bolivian officials claim that the national lithium project's water requirements will be minimal, their estimates are based on only limited and incomplete information.<sup>37</sup>

Contamination of the air, water and soil is also a potential concern. Large quantities of toxic chemicals must be used to process the predicted 30,000 to 40,000 tons of lithium per year that the project expects to mine. The escape of such chemicals via spills or air emissions could threaten the communities in the area and the ecosystem as a whole. Reports from Chile's Salar de Atacama describe a landscape marred by toxic piles of discarded salt and extensive canals filled with chemically contaminated water.

Bolivian officials have often minimized such risks in the past while the institutional systems in place to protect the environment are inadequate at best. Public institutions, such as Bolivia's Ministry of the Environment and Water, that are responsible for enforcing compliance with national environmental regulations and standards, do not have the professional expertise, technical capabilities or legal authority to intervene effectively.<sup>38</sup>

## **THREATS TO BOLIVIA'S RURAL COMMUNITIES AND TOURISM**

Some groups and communities in the region openly endorse lithium development as an opportunity for increased income and development. But there are also groups with serious objections that oppose such development. Quinoa producers and tourism operators have repeatedly expressed concerns

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<sup>37</sup> Hollender and Schultz, "Bolivia and its Lithium," pp. 39-41; and Phil Plait, "Want a Planet? You Might Want to Avoid Lithium," *Discover Magazine*, November 11, 2009.

<sup>38</sup> Hollender and Schultz, "Bolivia and its Lithium," pp. 42-43.

about the benefits that the Bolivian government has promised from lithium on the grounds that the supposed benefits would not meet local needs. Moreover, lithium development could seriously damage two key industries in the region – agriculture and tourism. Bolivia’s laws guaranteeing community participation are as weak as its environmental protections.<sup>39</sup>

The Salar de Uyuni, often classified as a natural wonder of the world, is an area of outstanding natural beauty. Flamingos breed in the lagoon created over the Salar during the summer rains. More than 60,000 tourists visit the area every year. The ecosystem as well as the tourist industry in the area could be seriously compromised in the search for lithium.<sup>40</sup>

## **BOLIVIA -U.S RELATIONS**

US relations with Bolivia under the administration of President Morales have been tense and antagonistic. President Morales has consistently opposed free-trade policies advocated by the United States and adamantly refused to negotiate with the U.S.-sponsored regional Andean free trade agreement, as did Ecuador and Venezuela.

The US has been concerned about rising Bolivian coca cultivation. Bolivia is the world's third largest producer of coca leaf, the raw material used to manufacture cocaine. Crop-eradication programs in the 1990s and early 2000s, funded by the US, incensed many of Bolivia's poorest farmers – mainly Morales supporters - for whom coca is often their only source of income. A former coca farmer himself, Morales tolerant policies towards coca cultivation for traditional and medicinal uses has progressively

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<sup>39</sup> Ibid, pp. 45-46.

<sup>40</sup> Meridian International Research, “The Trouble with Lithium 2,” p. 16.



worsened U.S.-Bolivian bilateral relations since 2006.<sup>41</sup> The close alliance between the Morales administration and Venezuela's President Hugo Chavez has also made the Bolivian government antagonistic to US policies in the region.

In 2008, Washington suspended most U.S. drug control funding for Bolivia and recalled Ambassador Philip Goldberg for "consultations". President Morales also took actions against the U.S. He expelled the U.S. Agency for International Development (USAID) alternative development workers from the Chapare coca growing region.<sup>42</sup> He formally expelled Ambassador Goldberg, after accusing him of meddling in Bolivia's internal affairs. Soon after, the US government temporarily suspended Peace Corps operations in Bolivia. Washington followed by declaring that Bolivia had "failed" to uphold its international counterdrug obligations, although President George W. Bush did grant Bolivia a "national security waiver" so that U.S. assistance would not automatically be cut off. President Bush also suspended Bolivia's U.S. trade preferences under the Andean Trade Promotion and Drug Eradication Act (ATPDEA), again citing Bolivia's failure to adhere to anti-narcotics commitments. In November 2008, Morales ordered the U.S Drug Enforcement Agency (DEA) out of Bolivia.<sup>43</sup>

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<sup>41</sup> Andres Schipani, "Coca casts shadow on Bolivian election," *BBC News*, November 22, 2009, 13:49:08 GMT, <http://news.bbc.co.uk/1/hi/americas/8364909.stm>.

<sup>42</sup> Peter DeShazo, "Testimony before the House Committee on Foreign Affairs, Subcommittee on the Western Hemisphere Hearing on U.S.-Bolivia Relations: Looking Ahead," Washington DC, March 3, 2009, p. 2; Viola Gienger and Bill Faries, "U.S. Ousts Bolivian Envoy in Tit-for-Tat With Morales," (Update1) *Bloomberg*, September 11, 2008.

<sup>43</sup> DeShazo, "Testimony before the House Committee on Foreign Affairs," p.3; and, "Déjà vu all Over Again: 'Decertification' Memo of Justification Inaccurate and Misleading," *Andean Information Network*, October 15, 2009.

The Obama administration maintained Bolivia's suspension from APTDEA in 2009 and again in 2010. In early June 2010, however, U.S. Assistant Secretary of State for Western Hemisphere Affairs, Arturo Valenzuela, traveled to La Paz to re-start talks on a bilateral framework agreement that could lead to the re-establishment of full diplomatic relations between the two countries within the year.<sup>44</sup>

## **BOLIVIA'S LITHIUM GAMBLE**

The strains in U.S.-Bolivian bilateral relations have not dampened efforts by non-U.S. foreign corporations to court the Bolivian government. U.S. companies, however, do seem to have been disadvantaged by the recurrent tensions in bilateral relations. But even non-U.S.-based foreign companies seeking to tap Bolivia's lithium reserves have had to navigate carefully around Morales' resource nationalism. Indeed, President Morales has clashed repeatedly with American, European and even South American investors. In 2006 Morales shocked Brazil by nationalizing Petrobras' (Brazil's state-owned petroleum company) natural gas projects in Bolivia and then demanding a sharp rise in the prices paid by the Brazilians for Bolivia's natural gas. He carried out further nationalizations just before the 2009 vote on the Constitution by sending Bolivian soldiers to occupy the operations of the British oil giant BP.<sup>45</sup>

Bolivia will have to invest heavily over the next few years in order to produce lithium carbonate for export. With world economic growth slowed as a result of the 2008-09 global recession, it remains unclear how Bolivia will be able to

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<sup>44</sup> "U.S.-Bolivia Relations: Valenzuela Goes to Bolivia," In *Just the Facts*, June 2, 2010.

<sup>45</sup> "Lula y Morales firman acuerdos para construir una carretera sobre el litio y la formación profesional," *El Economista*, 22 August 2009; and Jonathan Levin, "Mitsubishi, Sumitomo Propose Lithium Joint Venture in Bolivia," *Bloomberg*, May 15, 2009.

make such investments on its own.<sup>46</sup> Given domestic realities and international circumstances, it is virtually inevitable that Bolivia will have to seek partnerships with foreign companies in 2010 and beyond to obtain badly needed capital and technology. Bolivia's current tensions with Washington have effectively left American companies on the sidelines as other foreign enterprises continue to actively negotiate lithium deals in Bolivia.<sup>47</sup>

Yet, largely because of internal political tensions and nationalism, Bolivia continued in 2010 to vacillate regarding how best to tap its lithium. This hesitation has permitted nations with smaller reserves to step up to meet growing world demand for lithium. Chile leads the pack. China has also emerged as a top lithium producer, tapping reserves found in a Tibetan salt flat. But geologists and economists are unsure whether world lithium reserves outside of Bolivia are enough to meet exploding global demand, although some are convinced that accessible lithium resources are significantly larger than estimated by the United States Geological Survey. If true, Bolivia's current window of opportunity to exploit its lithium riches in the national interest under advantageous international conditions would appear to be only a limited one that could eventually be eclipsed by lithium finds in other world regions or by the emergence of new, alternative technological breakthroughs that do not rely on lithium at all.

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<sup>46</sup> Susan Kaufman Purcell, "Why Greece is Important to Latin America," *AméricaEconomía*, June 2010.

<sup>47</sup> Romero, "In Bolivia, Untapped Bounty Meets Nationalism;" on business conditions in Bolivia, see The World Bank, *Doing Business in Bolivia*, Washington DC: The World Bank, 2010.  
<http://espanol.doingbusiness.org/ExploreTopics/DealingLicenses/>.

## CONCLUSIONS

Bolivian lithium does not appear critical in satisfying US demand. Nor is it clear if Bolivia's real reserves could produce as much lithium as the reserve base indicates or of desirable quality. Moreover, lithium-carbonate batteries might not provide the environmentally sound and sustainable alternative the US seeks to reduce its demand on fossil oil. Yet, considering the unpredictability of the technological developments, having access to potential resources is generally a sound policy.

The perspectives for the Morales administration capacity to develop its lithium potential, under current conditions, are not encouraging. Bolivia lacks the technical and managerial capacity to do so on its own. Also, most experts believe that Bolivia's lithium potential does not match that of its oil and gas reserves. The Morales administration's reluctance to accept the offers being presented by foreign investors may result in Bolivia losing an opportunity to profit from the growing demand for lithium. Also, investors with the needed know-how may be reluctant to investing under an environment charged by recent nationalizations and lack of assurance of negotiating in a leveled field and under sustainable conditions. Yet, countries like Iran may be approaching Bolivia hoping to have access to its resources both for industrial or nuclear purposes and thus, the lithium may become increasingly politicized.

The progressive worsening of US-Bolivian relationship in recent years, characterized by mutual suspicion and distrust, presents formidable obstacles to any rapid improvements. Yet, the Obama administration has indicated a willingness to strengthen relations with Bolivia. Considering that natural resources often last longer than governments, despite current antagonistic relationship, US would be well-served to have a

long term policy strategy in dealing with Bolivia and its resources.

Finally, the United States and the international community should raise awareness of the environmental risks involved in tapping lithium and other resources in the unique Salar de Uyuni.

## **APPENDIX**

### **Bolivia under the Morales Government**

A nation of statistical extremes, landlocked Bolivia is the highest and most isolated South American country. Approximately 60 percent of its 9.9 million (2009) inhabitants are indigenous, the largest proportion of any country in the hemisphere. Although rich in mineral and energy resources, Bolivia ranks among South America's poorest countries. Wealthy urban elites, mostly of Spanish ancestry, traditionally dominated economic, social and political life of the country while the great majority of Bolivians, mostly low-income subsistence indigenous peasant farmers, miners, small traders and artisans, had little or no voice in national affairs.<sup>48</sup>

Victorious in the presidential campaign of 2005, Evo Morales is the first full-blooded, Indian president ever elected in Bolivia. Morales belongs to an Aymara impoverished family. He rose to prominence in Bolivian politics in the 1990s as a champion of the marginalized rural and urban poor, first as the leader of Bolivia's militant coca farmers' (cocaleros) association and, subsequently, of the leftist Movimiento al Socialismo (MAS) party. The movements he led were increasingly imbued with nationalism and heightened ethnic awareness.

In May 2006, President Morales put Bolivia's energy industry under state control. Foreign energy firms were given six months to sell at least 51 percent of their holdings to the state and negotiate new contracts or leave the country.

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<sup>48</sup> BBC, "Country Profile: Bolivia," BBC News, December 19, 2009, 14:39:39 GMT,

[http://news.bbc.co.uk/go/pr/fr/-/2/hi/americas/country\\_profiles/1210487.stm](http://news.bbc.co.uk/go/pr/fr/-/2/hi/americas/country_profiles/1210487.stm).

Library of Congress, *A Country Study, Bolivia*, Washington DC, American University, 1991.

Although vehemently opposed by Bolivian business elites and foreign oil executives as a radical move, Morales nationalization was in practice more a renegotiation of terms with the foreign energy companies than an outright expropriation. As world energy prices rose in 2006 and beyond, the country's finances improved dramatically. At the same time, President Morales allied his government closely with the leftist, populist and anti-American Venezuelan President, Hugo Chavez, and adopted an increasingly critical, public stance toward the United States.<sup>49</sup>

In June 2006, Morales' MAS party won a decisive majority in special elections for a new constituent assembly that was tasked with rewriting the nation's constitution. The resulting draft constitution promised more rights to Bolivia's indigenous majority and more autonomy to the departments. It also contained provisions authorizing an incumbent president to stand for re-election for a second five-year term. Violent demonstrations by opponents, mainly from the wealthy elites, ensued and four of the country's richest regions defiantly declared autonomy in protest. The new charter was finally approved by more than 60 percent of Bolivian voters in a referendum held in January 2009. The passage of the new Constitution shifted political power toward the highland provinces, where poor, indigenous voters predominate, and away from the lowlands, where most of Bolivia's food is grown and where its petroleum and natural gas reserves are located.<sup>50</sup>

Talks between Morales's congressional backers and the fragmented opposition ultimately produced a compromise that modified earlier versions of the proposed new charter. One of the most polemical articles in the final draft reversed a plan to allow Morales to run for re-election indefinitely,

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<sup>49</sup> "Country Profile," BBC; and Painter, "Bolivian president to deepen social revolution."

<sup>50</sup> Ibid.

limiting him (and future Bolivian presidents) instead to a single five-year term without the possibility of re-election. Other, often vaguely worded items among the new Constitution's 411 articles broadened definitions of property to include communal ownership; allowed Indians to mete out corporal punishment under their own legal systems; extended limited autonomy to regional prefects (governors); and reaffirmed state control over Bolivia's ample natural gas reserves and other resources.<sup>51</sup>

Opposition leaders, especially in the eastern lowlands, campaigned vigorously against approval of the proposed new charter. The Constitution was finally adopted in a referendum on January 25, 2009, with close to 60% of the country in favor. The four departments in Bolivia's rebellious eastern lowlands rejected the charter by wide margins. Despite the intensity of his opposition in the eastern lowlands, President Morales scored a comfortable win over his conservative opponents when he stood for re-election in December 2009, improving on his 2005 majority and becoming the first incumbent Bolivian president since 1964 to win a second term. His party also won control of both chambers of congress, though in the lower house it fell just short of the two-thirds majority needed for constitutional changes.<sup>52</sup>

On April 4, 2010, Bolivians went to the polls to elect 500 officials in local and provincial elections, including the governors of nine departments. The election was seen as a crucial test of the spreading strength and influence of President Morales and his MAS party. They won handily. On

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<sup>51</sup> BBC, "Bolivian Indians in historic step," BBC News, August, 3, 2009, 08:47:01 GMT.

<http://news.bbc.co.uk/go/pr/fr/-/2/hi/americas/8180790.stm> .

<sup>52</sup> Miguel Centellas, "Bolivia's Regional Elections: A Setback for Evo Morales," in *Americas Quarterly*, April 8, 2010, <http://www.americasquarterly.org>.



May 1, 2010, the Morales government took control of four privately owned companies that generate electricity. The companies accounted for more than half of Bolivia's electricity market.<sup>53</sup>

The key to Morales's success has been his appeal to the 65 percent of Bolivians who identify as indigenous and who see him as "one of their own". Under Morales, they have benefited from increased levels social spending, boosted by high international prices for hydrocarbons and more taxes on foreign oil and gas companies. Cash payments have been made to poor families to encourage school attendance. Extra pension payments have been provided to the elderly and pre-natal and post-natal care has been extended to mothers without access to health care. Some estimates suggest that the payments reached a quarter of Bolivia's almost 10 million people in 2010.<sup>54</sup>

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<sup>53</sup> Centellas, "Bolivia's Regional Elections;" and Diego Ore and Eduardo Garcia, "Bolivia Nationalizes Four Power Companies," *The Washington Post*, May 2, 2010; A14.

<sup>54</sup> *Ibid.*

## WORKS CITED

Anf-Agencia. "Irán también apoyará el desarrollo de la industria de litio en Bolivia," *LosTiempos.com*, Nov. 24, 2010.

Andean Information Network. "Déjà vu all Over Again: "Decertification" Memo of Justification Inaccurate and Misleading," October 15, 2009.

Barjak, Frank and Carlos Valdez. "Bolivia Pins Hopes on Lithium, Electric Vehicles," *Associated Press*, February 28, 2009.

BBC. "Bolivian Indians in historic step," *BBC News*, August 3, 2009.  
<http://news.bbc.co.uk/go/pr/fr//2/hi/americas/8180790.stm>.

\_\_\_\_\_. "Country Profile: Bolivia," *BBC N*, December 19, 2009.  
[http://news.bbc.co.uk/go/pr/fr//2/hi/americas/country\\_profiles/1210487.stm](http://news.bbc.co.uk/go/pr/fr//2/hi/americas/country_profiles/1210487.stm).

Broder, John M. "U.S. Issues Limits on Greenhouse Gas Emissions from Cars," *The New York Times*, April 1, 2010.

Carroll, Rory and Andres Schipani. "Multinationals eye lithium reserves beneath Bolivia's salt flats," *The Guardian*, June 17, 2009.

Centellas, Miguel. "Bolivia's Regional Elections: A Setback for Evo Morales," in *Americas Quarterly*, April 8, 2010. <http://www.americasquarterly.org>.

- Credit Suisse. “Investment Ideas Bright outlook for lithium-ion batteries and liquid crystal.” *Research Flash*, Zurich, 14 October 2009.
- DeShazo, Peter. “Testimony before the House Committee on Foreign Affairs, Subcommittee on the Western Hemisphere Hearing on U.S.-Bolivia Relations: Looking Ahead.” Washington DC, March 3, 2009.
- El Economista. “Lula y Morales firman acuerdos para construir una carretera sobre el litio y la formación profesional,” *El Economista*, 22 August 2009.
- “Francesca Bolloré reitera interés en litio boliviano y pide acelerar proyecto,” *Bolivia: Lo Mejor que Tenemos*, 29 April 2010, <http://boliviateamo.blogspot.com/2010/04/francesa-bollore-reitera-interes-en.html>.
- Gienger, Viola and Bill Faries. “U.S. Ousts Bolivian Envoy in Tit-for-Tat With Morales,” (Update1), *Bloomberg*, September 11, 2008.
- Goforth, Sean. “Argentina, Bolivia and Chile: The ABCs of Lithium,” *World Politics Review*, 01 Apr 2010.
- Hollender, Rebecca and Jim Schultz. “Bolivia and its Lithium: Can the ‘Gold of the 21<sup>st</sup> Century’ Help Lift a Nation out of Poverty?” (Cochabamba, Bolivia: A Democracy Center Special Report), The Democracy Center, May, 2010.
- “Iran to Study Bolivia’s Lithium Reserves,” *Press TV*, 25 November 2009.
- Jaskula, Brian W. “Lithium,” Washington DC: U.S. Geological Survey (USGS), 2007.

- \_\_\_\_\_. “Mineral Commodities Summaries.” Washington DC: U.S. Geological Survey, January 2009.
- \_\_\_\_\_. “Lithium,” in *U.S. Geological Survey, Mineral Commodity Summaries* (January 2010), pp.92-93.
- Johnson, Keith. “Peak Lithium: Will Supply Fears Drive Alternative Batteries?” *Environmental Capital*, February 3, 2009.
- Just the Facts, “U.S.-Bolivia Relations: Valenzuela Goes to Bolivia,” In *Just the Facts*, June 2, 2010.
- Kahya, Damian. “Bolivia holds key to electric car future,” *BBC News*, 9 November 2009.
- Kaufman-Purcell, Susan. “Why Greece is Important to Latin America,” *AméricaEconomía*, June 2010.
- Knox, Jon. “All Set to Power New Generation Lithium Batteries,” *Automotive Industries*, March 22, 2009, [www.allbusiness.com/automotive/automotive-industry-environmente/12290847-1.html](http://www.allbusiness.com/automotive/automotive-industry-environmente/12290847-1.html).
- Levin, Jonathan. “Mitsubishi, Sumitomo Propose Lithium Joint Venture in Bolivia,” *Bloomberg*, May 15, 2009.
- Library of Congress. *A Country Study, Bolivia*. Washington DC, American University, 1991.
- Markley, Stephen. “Will Lithium-Air Battery Be the Silver Bullet?” *The Miami Herald*, May 07, 2010.
- Meridian International Research. “The Trouble with Lithium 2: Under the Microscope.” Le Legers, France, 29 May 2008.

- Mick, Jason. "Tensions Soar Among Industrialized Nations Over Bolivia's Lithium Supplies," *Daily Tech*, Feb. 6, 2009.  
<http://www.dailytech.com/Tensions+Soar+Among+Industrial+Nations+Over+Bolivias+Lithium+Supply/article14173.htm>.
- Moore, Simon. "Bolivia/Korea Strike Lithium Deal," *Industrial Minerals*, August 17, 2009
- \_\_\_\_\_. "French/Bolivia Lithium," *Industrial Minerals*, 10 July 2009.
- Negroni, Christina. "Lithium Battery Risks Draw Scrutiny," *The New York Times*, October 27, 2009.
- Ore, Diego and Eduardo Garcia. "Bolivia Nationalizes Four Power Companies," *The Washington Post*, May 2, 2010.
- Painter, James. "Bolivian president to deepen social revolution," *BBC News*, December 7, 2009  
<http://news.bbc.co.uk/go/pr/fr/2/hi/americas/8400639.stm>.
- Plait, Phil. "Want a Planet? You Might Want to Avoid Lithium," *Discover Magazine*, November 11, 2009.
- Procter, Toby. "How long will Lithium last?" *BLOG*, 20 April 2009,  
<http://www.climatechangecorp./content.asp>.
- Rhaim, Saqib. "Will Lithium-Air Battery Rescue Electric Car Drivers from 'Range Anxiety'?" *The New York Times*, May 7, 2010.

- Romero, Simon. "In Bolivia, Untapped Bounty Meets Nationalism," *The New York Times*, February 3, 2009.
- Schipani, Andres. "Coca casts shadow on Bolivian election," *BBC News*, November 22, 2009, <http://news.bbc.co.uk/go/pr/fr//2/hi/americas/8364909.stm>.
- Smith, Matthew and Matthew Craze. "Lithium for 4.8 Billion Electric Cars Lets Bolivia Upset Market," *Bloomberg*, December 7, 2009.
- Tahil, William. "The Trouble with Lithium," *Meridian International Research*, December 2006.
- US Geological Survey. *Mineral Commodity Summaries*, January 2010.
- World Bank. *Doing Business in Bolivia*, Washington DC: The World Bank, 2010. <http://espanol.doingbusiness.org/ExploreTopics/DealingLicenses/>.
- Zuleta, Juan Carlos. "El enorme potencial de litio de Bolivia," *Hora 25*, No. 69, La Paz, Bolivia: 18 November-2 December 2009.

## **ABOUT THE AUTHORS**

**Bruce Bagley** holds a Ph.D. in Political Science from the University of California, Los Angeles. His research interests are in U.S.-Latin American relations, with an emphasis on drug trafficking and security issues. From 1991 to 1995 he served as associate dean of the Graduate School of International Studies at the University of Miami. Prior to his appointment at UM, he was assistant professor of Comparative Politics and Latin American Studies at the School of Advanced International Studies (SAIS) of the Johns Hopkins University.

**Olga Nazario** holds a Ph.D. in International Studies from the University of Miami, Coral Gables, FL. For the past ten years, she has been implementing USAID democracy and governance projects in Latin America and Africa. Prior to that, she was a Senior Foreign Policy Analyst with the US Information Agency. She is a Senior Research Scientists at Florida International University's Applied Research Center.

## WHEMSAC PUBLICATIONS

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